



**Research & Innovation Projects relevant to  
the Circular Economy Strategy  
CALLS 2016 - 2018**

**HORIZON 2020**

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## PREFACE

The European Commission has launched an EU action plan for the Circular Economy<sup>1</sup> which aims to support the transition towards an economy in which valuable materials, products and resources are maintained as long as possible while reducing the generation of waste.

Knowledge, innovation and investments are an essential part of the systemic changes needed for the transition to a more circular economy. In that sense, the Horizon 2020 work programme 2016-2017 included a targeted initiative "Industry 2020 in the circular economy" supporting the objectives of the circular economy and contributing to fostering the industrial competitiveness of the EU.

The work programme 2018-2020 has deployed an ambitious Focus Area - 'Connecting economic and environmental gains- the Circular Economy' aimed to further support and enable the transition towards a circular economy. The contribution of this focus area will be in renewing Europe's industrial capacities and boosting growth, in a world of resource constraints. This will mobilise substantial resources to develop new technologies and new business models, and facilitate their uptake by industry and SMEs by linking different sectors and public bodies; while developing integrated value chains and better communication engaging society and consumers.

Many other fields of activity within the Horizon 2020 work programme 2016-2017 and 2018-2020, such as bioeconomy, resource and energy efficiency or SMEs dedicated programmes, are also contributing to the circular economy package.

The objective of the present report is to provide a snapshot of the numerous projects resulting from the calls 2016, 2017 and 2018 that are contributing to the circular economy strategy. Without aiming to be exhaustive or exclusive, the listed projects represent a good sample of actions financed so far by the Horizon 2020 programme in the different stages of a circular economy (production, consumption and waste). The spectrum of priorities contemplated by the selected projects are very diverse and address more sustainable production in all kind of industrial processes, new bio-based and biodegradable products, substitution or recovery of raw materials, conversion of CO<sub>2</sub>, packaging, plastics, etc.

The 257 selected projects are resulting from the calls for proposals<sup>2</sup> of 2016, 2017 and 2018 in the Horizon 2020 priorities 'Industrial leadership' and 'Societal Challenges'. The present overview do not cover the projects funded by the 'Excellence' part of Horizon 2020. Altogether, the presented 257 projects are mobilising resources totalling around EUR 1,450 million, of which more than EUR 1,237 million as EU funding. The projects could last up to 5 years duration.

This presentation is organised per call identifier, year and topic number. Therefore, the projects are grouped in accordance to the objectives of the action and then sorted per acronym in alphabetic order. At the end of the document, there is a group of 40 relevant projects to the circular strategy that are receiving EUR 218 million from the Joint Undertakings Bio-Based Industries (BBI), Clean Sky (CS2) and Fuel Cells and Hydrogen (FCH), as resulted from the calls launched in 2016, 2017 and 2018. The Circular Bioeconomy Thematic Investment Platform, a risk-sharing financial instrument, supported with EUR 100 million from Horizon 2020, is briefly presented at the very end of this document

To **search specific information** on a project or topic, either you use a thematic search following the mentioned structure or a free text search across the entire document using the 'Find' command <Ctrl+F> and introducing free text keywords (e.g. pesticides, rare earth, automotive, ...).

This presentation is a living piece of information subject to changes and updates<sup>3</sup>. We strongly recommend to use only the electronic version of this document (more portable, editable and searchable) and only print it if when really needed and justified.

### **More about the EU Circular Economy Strategy:**

[http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)

### **More about research and innovation in the area:**

<https://ec.europa.eu/programmes/horizon2020/en/h2020-sections>

### **Funding opportunities are published in the Participant Portal:**

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/index.html>

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<sup>1</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614>

<sup>2</sup> <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/reference-documents>

<sup>3</sup> The data provided is based on information available at the end of January 2019. At that time, a number of grant agreements were on preparation, and therefore subject to modifications.

**SOME FACTS AND FIGURES**

WP year	Projects (*)	EU grant (EUR)	Project Costs (EUR)
2016	78	366.408.104	423.599.362
2017	78	399.423.792	475.238.173
2018	101	471.391.049	551.451.978
<b>Grand Total</b>	<b>257</b>	<b>1.237.222.945</b>	<b>1.450.289.513</b>

(\*) In addition the Joint Undertakings Bio-Based Industries (BBI), Clean Sky (CS2) and Fuel Cells and Hydrogen (FCH), which also receive funding from Horizon 2020, are supporting with EUR 218 million some 40 relevant projects to the Circular Economy Strategy, as resulted from the calls launched in 2016, 2017 and 2018.

Type of Action	Projects (*)	EU grant (EUR)	Project Costs (EUR)
CSA	24	33.218.090	33.278.296
ERA-NET-Cofund	1	4.708.842	14.269.217
IA	85	626.759.080	769.972.283
PCP	1	5.000.000	6.190.075
RIA	92	482.606.093	504.422.960
SME-2	54	84.930.840	122.156.681
<b>Total</b>	<b>257</b>	<b>1.237.222.945</b>	<b>1.450.289.513</b>

**CSA:** Coordination and support action

**ERA-NET – Cofund:** Actions supporting public-public partnerships

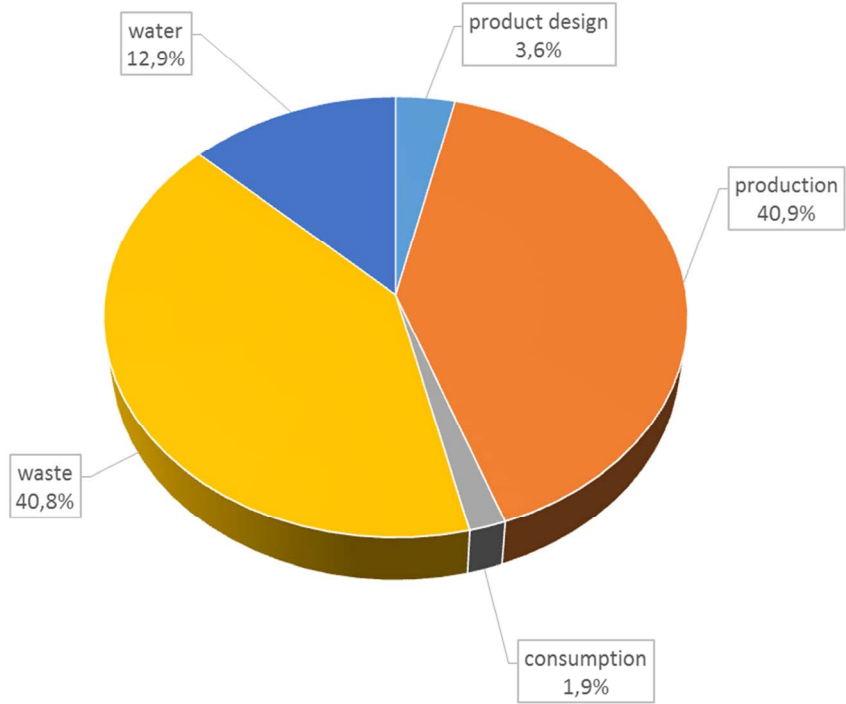
**IA:** Innovation Action

**PCP:** Pre-commercial procurement

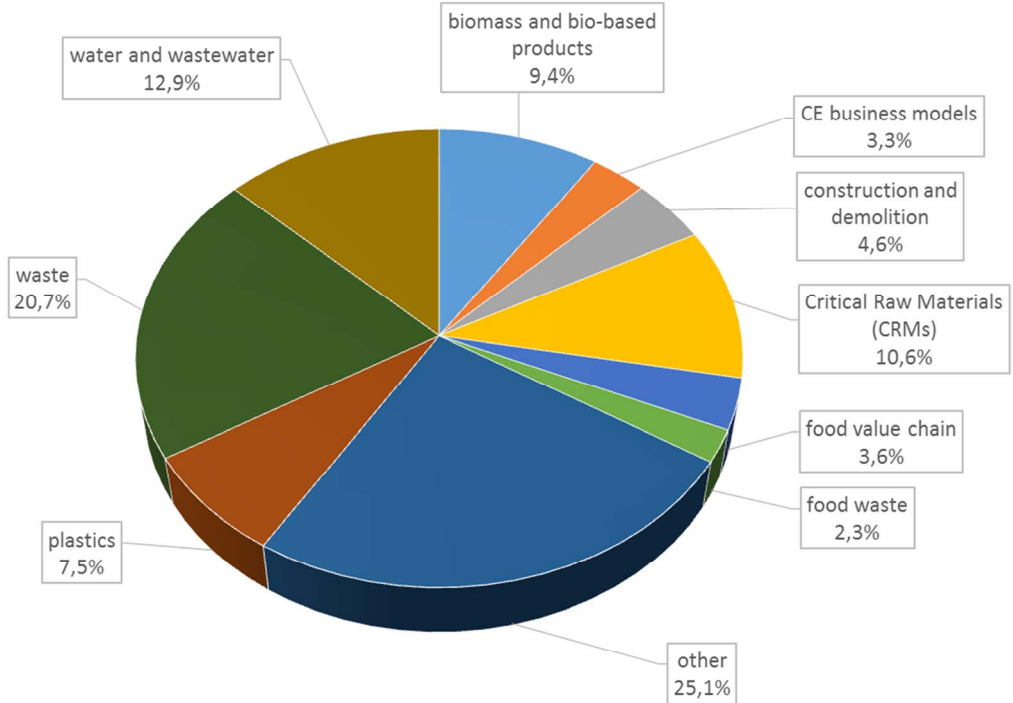
**RIA:** Research and innovation action

**SME-2:** SME instrument – phase 2

EU grant share per CE stage



EU grant share per CE priority



CE relevant projects - Horizon 2020 calls 2016-2018

WP Year	Topic code	Nr of projects	EU grant (EUR)
2016	BB-01-2016	1	4.983.872
	BB-06-2016	1	996.056
	BG-01-2016	2	19.734.341
	BIOTEC-02-2016	3	19.144.906
	CIRC-01-2016-2017	8	68.541.423
	CIRC-02-2016-2017	2	12.111.236
	CIRC-03-2016	1	1.742.748
	CIRC-04-2016	1	3.013.475
	CIRC-05-2016	1	2.996.689
	EEB-04-2016	4	18.095.529
	FTIPilot-01-2016	4	6.835.130
	ICT-26-2016	1	3.797.050
	ICT-29-2016	1	3.891.264
	INNOSUP-02-2016	2	160.727
	LCE-19-2016-2017	2	23.723.444
	NMBP-03-2016	4	18.543.259
	NMBP-36-2016	1	1.470.126
	RUR-04-2016	2	9.996.872
	SC5-11-2016	1	2.289.000
	SC5-12-2016	1	1.999.379
	SC5-13-2016-2017	6	40.750.282
	SC5-15-2016-2017	1	2.999.500
	SC5-24-2016	1	285.689
	SC5-25-2016	1	501.280
	SFS-19-2016-2017	1	4.708.842
	SMEInst-03-2016-2017	1	1.469.289
	SMEInst-07-2016-2017	2	2.932.360
	SMEInst-09-2016-2017	2	3.145.321
	SMEInst-10-2016-2017	1	1.470.315
	SMEInst-11-2016-2017	4	6.735.235
	SPIRE-01-2016	3	17.301.501
	SPIRE-02-2016	4	23.196.425
	SPIRE-03-2016	3	16.959.409
	SPIRE-04-2016	3	18.895.320
SPIRE-05-2016	1	495.748	
SPIRE-06-2016	1	495.065	
<b>TOTAL 2016</b>		<b>78</b>	<b>366.408.104</b>

CE relevant projects - Horizon 2020 calls 2016-2018

WP Year	Topic code	Nr of projects	EU grant (EUR)
2017	BG-07-2017	2	11.652.901
	BIOTEC-05-2017	3	20.798.984
	BIOTEC-06-2017	1	4.362.048
	CIRC-01-2016-2017	7	46.451.069
	CIRC-02-2016-2017	3	29.185.210
	EEB-07-2017	1	5.993.466
	EUB-02-2017	1	1.478.090
	ICT-11-2017	1	1.824.683
	INNOSUP-01-2016-2017	1	4.999.394
	LCE-06-2017	1	3.998.026
	LCE-08-2016-2017	1	5.896.988
	LCE-20-2016-2017	2	20.002.253
	NMBP-05-2017	1	6.590.358
	NMBP-22-2017	3	11.698.688
	SC5-14-2016-2017	4	48.394.215
	SC5-15-2016-2017	2	3.229.630
	SC5-26-2017	1	5.000.000
	SFS-30-2017	2	13.849.846
	SFS-32-2017	2	11.881.975
	SFS-35-2017	3	16.207.237
	SFS-47-2017	1	4.884.494
	SFS-48-2017	1	6.999.999
	SMEInst-01-2016-2017	1	2.477.362
	SMEInst-02-2016-2017	2	2.470.959
	SMEInst-07-2016-2017	3	3.528.370
	SMEInst-08-2016-2017	1	1.146.846
	SMEInst-09-2016-2017	1	2.130.363
	SMEInst-10-2016-2017	1	974.541
	SMEInst-11-2016-2017	9	15.123.012
	SPIRE-07-2017	3	19.911.824
	SPIRE-08-2017	3	21.618.363
	SPIRE-09-2017	4	24.346.039
	SPIRE-10-2017	3	17.768.100
	SPIRE-11-2017	1	499.369
SPIRE-12-2017	1	999.614	
SPIRE-13-2017	1	1.049.481	
<b>TOTAL 2017</b>		<b>78</b>	<b>399.423.792</b>

CE relevant projects - Horizon 2020 calls 2016-2018

WP Year	Topic code	Nr of projects	EU grant (EUR)
2018	EIC-FTI-2018-2020	2	4.171.035
	FETOPEN-01-2018-2019-2020	1	2.831.994
	IBA-SC5-PRESIDENCY-2018	1	109.250
	CE-SC3-NZE-2-2018	4	15.941.933
	LC-SC3-RES-13-2018	1	15.599.843
	LC-SC3-RES-21-2018	5	25.083.717
	LC-SC3-RES-28-2018-2019-2020	1	2.998.044
	LC-SC3-EE-1-2018-2019-2020	1	3.999.519
	CE-BIOTEC-04-2018	2	9.959.225
	DT-FOF-02-2018	1	6.986.574
	DT-FOF-03-2018	1	7.997.969
	CE-SPIRE-02-2018	4	31.711.390
	CE-SPIRE-03-2018	3	28.446.359
	CE-SPIRE-10-2018	5	35.112.887
	CE-NMBP-24-2018	3	19.689.231
	CE-NMBP-26-2018	4	23.636.128
	RUR-15-2018-2019-2020	2	3.999.854
	CE-RUR-08-2018-2019-2020	1	5.999.969
	CE-SC5-05-2018	1	1.998.860
	CE-SC5-08-2018-2019-2020	2	4.898.671
	SC5-12-2018	7	21.226.821
	CE-SC5-01-2018	7	32.219.693
	CE-SC5-02-2018	1	4.997.778
	CE-SC5-03-2018	4	39.600.740
	CE-SC5-06-2018	3	18.968.335
	CE-SC5-07-2018-2019-2020	2	18.272.383
	SC5-09-2018-2019	1	5.888.235
	SC5-11-2018	2	9.998.148
	CE-SFS-25-2018	3	27.719.596
	EIC-SMEInst-2018-2020	26	41.326.869
	<b>TOTAL 2018</b>		<b>101</b>



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727740	STAR-ProBio	BB-01-2016	RIA	Sustainability Transition Assessment and Research of Bio-based Products	22
727892	GENIALG	BG-01-2016	IA	GENetic diversity exploitation for Innovative macro-ALGal biorefinery	23
727874	SABANA	BG-01-2016	IA	Sustainable Algae Biorefinery for Agriculture aNd Aquaculture	24
774586	CLAIM	BG-07-2017	IA	Cleaning Litter by developing and Applying Innovative Methods in european seas	25
774499	GoJelly	BG-07-2017	IA	GoJelly - A gelatinous solution to plastic pollution	26
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730378	R2PI	CIRC-04-2016	RIA	TRANSITION FROM LINEAR 2 CIRCULAR: POLICY AND INNOVATION	28
730349	RES URBIS	CIRC-05-2016	RIA	REsources from URban Blo-waSte	29
730423	CIRC-PACK	CIRC-01-2016-2017	IA	Towards circular economy in the plastic packaging value chain	31
730456	ECOBULK	CIRC-01-2016-2017	IA	Circular Process for Eco-Designed Bulky Products and Internal Car Parts	32
730323	FiberEUse	CIRC-01-2016-2017	IA	Large scale demonstration of new circular economy value-chains based on the reuse of end-of-life fiber reinforced composites.	33
730305	PAPERCHAIN	CIRC-01-2016-2017	IA	New market niches for the Pulp and Paper Industry waste based on circular economy approaches	34
730292	PlastiCircle	CIRC-01-2016-2017	IA	Improvement of the plastic packaging waste chain from a circular economy approach	35
730308	PolyCE	CIRC-01-2016-2017	IA	Post-Consumer High-tech Recycled Polymers for a Circular Economy – PolyCE	36
730400	SYSTEMIC	CIRC-01-2016-2017	IA	Systemic large scale eco-innovation to advance circular economy and mineral recovery from organic waste in Europe	37
730390	ZERO BRINE	CIRC-01-2016-2017	IA	Re-designing the value and supply chain of water and minerals: a circular economy approach for the recovery of resources from saline impaired effluent (brine) generated by process industries	38
730285	RUN4LIFE	CIRC-02-2016-2017	IA	RECOVERY AND UTILIZATION OF NUTRIENTS 4 LOW IMPACT FERTILIZER	39
730398	Water2REturn	CIRC-02-2016-2017	IA	REcovery and REcycling of nutrients TURNing wasteWATER into added-value products for a circular economy in agriculture	40
776851	CarE-Service	CIRC-01-2016-2017	IA	Circular Economy Business Models for innovative hybrid and electric mobility through advanced reuse and remanufacturing technologies and services	41
776751	CINDERELA	CIRC-01-2016-2017	IA	New Circular Economy Business Model for More Sustainable Urban Construction	42
776503	CIRC4Life	CIRC-01-2016-2017	IA	A circular economy approach for lifecycles of products and services	43
776680	CIRCUSOL	CIRC-01-2016-2017	IA	Circular business models for the solar power industry	44
776714	C-SERVEES	CIRC-01-2016-2017	IA	Activating Circular Services in the Electric and Electronic Sector	45
776708	HOUSEFUL	CIRC-01-2016-2017	IA	Innovative circular solutions and services for new business opportunities in the EU housing sector	46
776577	ReCiPSS	CIRC-01-2016-2017	IA	Resource-efficient Circular Product-Service Systems	47
776643	HYDROUSA	CIRC-02-2016-2017	IA	Demonstration of water loops with innovative regenerative business models for the Mediterranean region	48
776541	NextGen	CIRC-02-2016-2017	IA	Towards a next generation of water systems and services for the circular economy.	49

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776816	Project O	CIRC-02-2016-2017	IA	Project O: demonstration of planning and technology tools for a circular, integrated and symbiotic use of water	50
723825	GREEN INSTRUCT	EEB-04-2016	RIA	Green Integrated Structural Elements for Retrofitting and New Construction of Buildings	51
723916	InnoWEE	EEB-04-2016	RIA	Innovative pre-fabricated components including different waste construction materials reducing building energy and minimising environmental impacts	52
723583	RE4	EEB-04-2016	RIA	REuse and REcycling of CDW materials and structures in energy efficient pREfabricated elements for building REfurbishment and construction	53
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820352	Smartmushroom	EIC-FTI-2018-2020	IA	Smart MAnagement of spent mushRoom subStrate to lead the MUSHROOM sector towards a circular economy	58
777112	SWAMP	EUB-02-2017	RIA	Smart Water Management Platform	59
829047	triboREMEDY	FETOPEN-01-2018-2019-2020	RIA	The triboreactor as breakthrough remediation strategy for safeguarding human and environmental health	60
737802	BioDie2020	FTIPilot-01-2016	IA	Demonstration of new, challenging and high FFA waste oil and fat feedstock in biodiesel process with improved costs, conversion and high fuel quality	61
737741	BIOMULCH	FTIPilot-01-2016	IA	Integrated solution for innovative biodegradation control of agricultural plastic mulches	62
760642	NIRSort	FTIPilot-01-2016	IA	Development and Market Replication of novel NIR-transparent polymer colourants to replace carbon black, and allow the sorting of black and coloured polymers from mixed waste streams	63
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731465	AQUARIUS	ICT-29-2016	RIA	BROADBAND TUNABLE QCL BASED SENSOR FOR ONLINE AND INLINE DETECTION OF CONTAMINANTS IN WATER	67
780121	PTwist	ICT-11-2017	IA	PTwist: An open platform for plastics lifecycle awareness, monetization, and sustainable innovation	68
777773	C-VoUCHER	INNOSUP-01-2016-2017	IA	Circularize ValUe CHains across European Regional Innovation Strategies	69
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745810	Torero	LCE-19-2016-2017	IA	TORrefying wood with Ethanol as a Renewable Output: large-scale demonstration	72
745749	TO-SYN-FUEL	LCE-19-2016-2017	IA	The Demonstration of Waste Biomass to Synthetic Fuels and Green Hydrogen	73
764675	Heat-To-Fuel	LCE-08-2016-2017	RIA	Biorefinery combining HTL and FT to convert wet and solid organic, industrial wastes into 2nd generation biofuels with highest efficiency	74
789562	BIO4A	LCE-20-2016-2017	IA	Advanced sustainable BIOfuels for Aviation	75

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764089	ABC-SALT	LCE-06-2017	RIA	Advanced Biomass Catalytic Conversion to Middle Distillates in Molten Salts	77
838014	C2FUEL	CE-SC3-NZE-2-2018	RIA	Carbon Captured Fuel and Energy Carriers for an Intensified Steel Off-Gases based Electricity Generation in a Smarter Industrial Ecosystem	78
838061	CO2Fokus	CE-SC3-NZE-2-2018	RIA	CO2 utilisation focused on market relevant dimethyl ether production, via 3D printed reactor- and solid oxide cell based technologies	79
837733	COZMOS	CE-SC3-NZE-2-2018	RIA	Efficient CO2 conversion over multisite Zeolite-Metal nanocatalysts to fuels and OlefinS	80
838077	eCOCO2	CE-SC3-NZE-2-2018	RIA	Direct electrocatalytic conversion of CO2 into chemical energy carriers in a co-ionic membrane reactor	81
818169	GECO	LC-SC3-RES-13-2018	IA	Geothermal Emission Gas Control	82
818310	BioRen	LC-SC3-RES-21-2018	RIA	Development of competitive, next generation biofuels from municipal solid waste	83
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818011	Pulp and Fuel	LC-SC3-RES-21-2018	RIA	Pulp and Paper Industry Wastes to Fuel	86
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720770	DAFIA	BIOTEC-02-2016	RIA	Biomacromolecules from municipal solid bio-waste fractions and fish waste for high added value applications.	99
720918	FALCON	BIOTEC-02-2016	RIA	Fuel and chemicals from lignin through enzymatic and chemical conversion	100
720777	VOLATILE	BIOTEC-02-2016	RIA	Biowaste derived volatile fatty acid platform for biopolymers, bioactive compounds and chemical building blocks	101
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760431	BioRECO2VER	BIOTEC-05-2017	RIA	Biological routes for CO2 conversion into chemical building blocks	103

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820561	PreMa	CE-SPIRE-03-2018	IA	Energy efficient, primary production of manganese ferroalloys through the application of novel energy systems in the drying and pre-heating of furnace feed materials.	117
820770	iCAREPLAST	CE-SPIRE-10-2018	IA	Integrated Catalytic Recycling of Plastic Residues Into Added-Value Chemicals	118
820787	ISOPREP	CE-SPIRE-10-2018	IA	Ionic Solvent-based Recycling of Polypropylene Products	119
820687	MMAtwo	CE-SPIRE-10-2018	IA	Second generation Methyl MethAcrylate (MMAtwo)	121
820695	MultiCycle	CE-SPIRE-10-2018	IA	Advanced and sustainable recycling processes and value chains for plastic-based multi-materials	122
820665	POLYNSPIRE	CE-SPIRE-10-2018	IA	Demonstration of Innovative Technologies towards a more Efficient and Sustainable Plastic Recycling	123
814671	BIZEOLCAT	CE-NMBP-24-2018	RIA	Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation	124
814557	C123	CE-NMBP-24-2018	RIA	Methane oxidative conversion and hydroformylation to propylene	125
814548	ZEOCAT-3D	CE-NMBP-24-2018	RIA	Development of a bifunctional hierarchically structured zeolite based nano-catalyst using 3D-technology for direct conversion of methane into aromatic hydrocarbons via methane dehydroaromatization	126
814505	DECOAT	CE-NMBP-26-2018	RIA	Recycling of coated and painted textile and plastic materials	127
814543	PUReSmart	CE-NMBP-26-2018	RIA	PolyUrethane Recycling towards a Smart Circular Economy	128
814588	Repair3D	CE-NMBP-26-2018	RIA	Recycling and Repurposing of Plastic Waste for Advanced 3D Printing Applications	129
814400	TERMINUS	CE-NMBP-26-2018	RIA	in-built Triggered Enzymes to Recycle Multi-layers: an INnovation for USes in plastic-packaging	130
727984	FAirWAY	RUR-04-2016	RIA	Farm systems that produce good Water quality for drinking water supplies	131



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727450	WATERPROTECT	RUR-04-2016	RIA	Innovative tools enabling drinking WATER PROTECTiOn in rural and urban environments	132
818470	NUTRIMAN	RUR-15-2018-2019-2020	CSA	Nutrient Management and Nutrient Recovery Thematic Network	133
818088	SuWaNu Europe	RUR-15-2018-2019-2020	CSA	Network for effective knowledge transfer on safe and economic wastewater reuse in agriculture in Europe	134
818309	LEX4BIO	CE-RUR-08-2018-2019-2020	RIA	Optimizing Bio-based Fertilisers in Agriculture – Knowledgebase for New Policies	135
724060	4PRIMA	SC5-12-2016	CSA	Partnership for Research and Innovation in the Mediterranean Area	136
724052	T2gE	SC5-24-2016	CSA	Transition to the Green Economy	137
730264	IC4WATER	SC5-11-2016	CSA	Tackling Water Challenges in the International Context	138
730471	CHROMIC	SC5-13-2016-2017	RIA	effiCient mineral processing and Hydrometallurgical RecOvery of by-product Metals from low-grade metal containing seCOnDary raw materials	139
730411	IMPACT	SC5-13-2016-2017	RIA	Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits	140
730480	ITERAMS	SC5-13-2016-2017	RIA	Integrated mineral technologies for more sustainable raw material supply	141
730224	PLATIRUS	SC5-13-2016-2017	RIA	PLATInum group metals Recovery Using Secondary raw materials	142
730105	SCALE	SC5-13-2016-2017	RIA	Production of Scandium compounds and Scandium Aluminum alloys from European metallurgical by- products	143
730294	SLIM	SC5-13-2016-2017	RIA	Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies	144
730227	SCREEN	SC5-15-2016-2017	CSA	Solutions for CRITICAL Raw materials - a European Expert Network	145
730316	CIRCULAR IMPACTS	SC5-25-2016	CSA	Measuring the IMPACTS of the transition to the CIRCULAR economy	146
776745	COLLECTORS	SC5-15-2016-2017	CSA	waste COLLECTiOn systems assessed and good pRacticeS identified	147
776517	ORAMA	SC5-15-2016-2017	CSA	Optimising quality of information in RAw MAterials data collection across Europe	148
776838	POSIDON	SC5-26-2017	PCP	POLLuted Site DecontaminatiON - PCP	149
776473	CROCODILE	SC5-14-2016-2017	IA	first of a kind commercial Compact system for the efficient Recovery Of COball Designed with novel Integrated LEading technologies	150
776846	NEMO	SC5-14-2016-2017	IA	Near-zero-waste recycling of low-grade sulphidic mining waste for critical-metal, mineral and construction raw-material production in a circular economy	151
776469	RemovAL	SC5-14-2016-2017	IA	Removing the waste streams from the primary Aluminium production and other metal sectors in Europe	152
776559	SecREETs	SC5-14-2016-2017	IA	Secure European Critical Rare Earth Elements	153
820707	CICERONE	CE-SC5-05-2018	CSA	ClrCular Economy platfoRm for eurOpeaN priorities strategic agEnda	154
820859	CEWASTE	CE-SC5-08-2018-2019-2020	CSA	Voluntary certification scheme for waste treatment	155
820892	WoodCircus	CE-SC5-08-2018-2019-2020	CSA	Underpinning the vital role of the forest-based sector in the Circular Bio-Economy	156
820906	INDIA-H2O	SC5-12-2018	RIA	blo-mimetic and phyto-techNologies Designed for low-cost purfICAtion and recycling of water	157
820881	LOTUS	SC5-12-2018	RIA	LOW-cost innovative Technology for water quality monitoring and water resources management for Urban and rural water Systems in India	158
820718	PANI WATER	SC5-12-2018	RIA	Photo-irradiation and Adsorption based Novel Innovations for Water-treatment	159

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821410	PAVITR	SC5-12-2018	RIA	Potential and Validation of Sustainable Natural & Advance Technologies for Water & Wastewater Treatment, Monitoring and Safe Water Reuse in India	160
821051	PAVITRA GANGA	SC5-12-2018	RIA	Unlocking wastewater treatment, water re-use and resource recovery opportunities for urban and peri-urban areas in India	161
821427	Saraswati 2.0	SC5-12-2018	RIA	Identifying best available technologies for decentralized wastewater treatment and resource recovery for India	162
821423	SPRING	SC5-12-2018	RIA	STRATEGIC PLANNING FOR WATER RESOURCES AND IMPLEMENTATION OF NOVEL BIOTECHNICAL TREATMENT SOLUTIONS AND GOOD PRACTICES	163
821366	CIRCULAR FLOORING	CE-SC5-01-2018	RIA	New products from waste PVC flooring and safe end-of-life treatment of plasticisers	164
820477	CREAToR	CE-SC5-01-2018	RIA	Collection of raw materials, Removal of flAme reTardants and Reuse of secondary raw materials	165
820895	NONTOX	CE-SC5-01-2018	RIA	Removing hazardous substances to increase recycling rates of WEEE, ELV and CDW plastics	166
821087	PLAST2bCLEANED	CE-SC5-01-2018	RIA	PLASTics to be CLEANED by sorting and separation of plastics and subsequent recycling of polymers, bromine flame retardants and antimony trioxide	167
821431	PureNano	CE-SC5-01-2018	RIA	A purification/regeneration process of spent plating baths based on functionalized magnetic nanoparticles.	168
820869	REACT	CE-SC5-01-2018	RIA	REcycling of waste ACrylic Textiles	169
821136	REMADYL	CE-SC5-01-2018	RIA	Removal of Legacy Substances from polyvinylchloride (PVC) via a continuous and sustainable extrusion process	170
820331	PROMPT	CE-SC5-02-2018	RIA	PRemature Obsolescence Multi-Stakeholder Product Testing Program	171
821201	CIRCuiT	CE-SC5-03-2018	IA	Circular Construction In Regenerative Cities (CIRCuiT)	172
821033	CityLoops	CE-SC5-03-2018	IA	Closing the loop for urban material flows	173
821479	Pop-Machina	CE-SC5-03-2018	IA	Collaborative production for the circular economy; a community approach	174
820937	REFLOW	CE-SC5-03-2018	IA	constRuctive mEtabolic processes For material FLOws in urban and peri-urban environments across Europe	175
821096	BIORECOVER	CE-SC5-06-2018	RIA	Development of an innovative sustainable strategy for selective biorecover of critical raw materials from Primary and Secondary sources	176
815748	ION4RAW	CE-SC5-06-2018	RIA	Ionometallurgy of primary sources for an enhanced raw materials recovery	178
821159	TARANTULA	CE-SC5-06-2018	RIA	Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams	179
821114	SUSMAGPRO	CE-SC5-07-2018-2019-2020	IA	Sustainable Recovery, Reprocessing and Reuse of Rare-Earth Magnets in a Circular Economy (SUSMAGPRO)	180
821000	WOOL2LOOP	CE-SC5-07-2018-2019-2020	IA	Mineral wool waste back to loop with advanced sorting, pre-treatment, and alkali activation	181
820911	AlSiCal	SC5-09-2018-2019	RIA	Towards sustainable mineral and metal industry: ZERO Bauxite Residue and ZERO CO2 from co-production of Alumina, Silica and precipitated Calcium carbonate by the Aranda-Mastin technology	182
820954	DWC	SC5-11-2018	IA	DIGITAL-WATER.city - Leading urban water management to its digital future	183
820751	SCOREwater	SC5-11-2018	IA	Smart City Observatories implement REsilient Water Management	184
727473	SUSFOOD2	SFS-19-2016-2017	ERA-NET-Cofund	ERA-Net Cofund on Sustainable Food production and consumption (SUSFOOD2)	185
773375	GLOPACK	SFS-35-2017	IA	Granting society with LOW environmental impact innovative PACKaging	187
774265	MYPACK	SFS-35-2017	IA	Best markets for the exploitation of innovative sustainable food packaging solutions	188

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773872	YPACK	SFS-35-2017	IA	HIGH PERFORMANCE POLYHYDROXYALKANOATES BASED PACKAGING TO MINIMISE FOOD WASTE	189
774233	SiEUGreen	SFS-48-2017	IA	Sino-European innovative green and smart cities	190
773649	Circular Agronomics	SFS-30-2017	RIA	CIRCULAR AGRONOMICS - Efficient Carbon, Nitrogen and Phosphorus cycling in the European Agri-food System and related up- and down-stream processes to mitigate emissions	191
773682	Nutri2Cycle	SFS-30-2017	RIA	Transition towards a more carbon and nutrient efficient agriculture in Europe	192
773330	GAIN	SFS-32-2017	RIA	Green Aquaculture Intensification in Europe	193
774109	IMPAQT	SFS-32-2017	RIA	Intelligent management system for integrated multi-trophic aquaculture	194
773903	SHui	SFS-47-2017	RIA	Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems	195
817788	SCALIBUR	CE-SFS-25-2018	IA	SCALABLE TECHNOLOGIES FOR BIO-URBAN WASTE RECOVERY	196
818312	VALUEWASTE	CE-SFS-25-2018	IA	Unlocking new VALUE from urban bioWASTE	197
818308	WTUP!	CE-SFS-25-2018	IA	Value chains for disruptive transformation of urban biowaste into biobased products in the city context	198
822464	ALS2	EIC-SMEInst-2018-2020	SME-2	AcidLess Separation 2.0	199
830202	AQUOLIVE	EIC-SMEInst-2018-2020	SME-2	Improving Aquaculture production with bioactives from olive oil processing by-products.	200
811532	BlockPLA	EIC-SMEInst-2018-2020	SME-2	Innovative nanostructured PLA polymer to expand suitable uses of biodegradable packaging	201
849052	Branbox	EIC-SMEInst-2018-2020	SME-2	Biodegradable and waterproof take-away containers made of wheat bran	202
848596	CHBTECH	EIC-SMEInst-2018-2020	SME-2	Sulphur-free production method for non-food biopolymers (dissolving pulp, hemicellulose and lignin)	203
848757	Circlenergy	EIC-SMEInst-2018-2020	SME-2	Production of renewable methanol from captured emissions and renewable energy sources, for its utilisation for clean fuel production and green consumer goods	204
822720	EcoMDF	EIC-SMEInst-2018-2020	SME-2	Bringing EcoMDF to the market	205
830508	FlexPack2Circle	EIC-SMEInst-2018-2020	SME-2	Transfer of Multimaterial Flexible Packaging to Circular Economy	206
829535	freeCr6plat	EIC-SMEInst-2018-2020	SME-2	Chrome plating without toxic Cr(VI). An ecofriendly electroplating for automotive plastic parts.	207
822732	FRESHDETECT	EIC-SMEInst-2018-2020	SME-2	FRESHDETECT – food safety – fast and reliable	208
812001	FRESHTRAY	EIC-SMEInst-2018-2020	SME-2	New multi-active cardboard packaging solution to extend the shelf-life of fresh fruits and vegetables by 40%.	209
829282	Grass Paper	EIC-SMEInst-2018-2020	SME-2	Grass Fibre as raw material for innovative Grass Paper products: the new economic and ecological resource for the European paper industry	210
849704	H2S Analyzer	EIC-SMEInst-2018-2020	SME-2	Market launch of an autonomous and online based hydrogen sulfide (H2S) Analyzer for the implementation of IIoT - digitalization of the sewer system	211
823124	HTCycle	EIC-SMEInst-2018-2020	SME-2	Sewage sludge reuse with Phosphate recovery and heavy metal absorption with an innovative HTC technology.	213
822134	iMEC	EIC-SMEInst-2018-2020	SME-2	Real-time assessment of toxic sulphide in wastewater – market maturation of an Industrial Micro Electrochemical Cell	214
812242	Is it fresh	EIC-SMEInst-2018-2020	SME-2	Is it fresh. Keeping it fresh digitally	215
823392	MOGU floor	EIC-SMEInst-2018-2020	SME-2	Natural-Grown Flooring for Circular Buildings	216
849533	REBICOM	EIC-SMEInst-2018-2020	SME-2	New innovative REcyclable and Bio-COMpostable film for flexible packaging	217

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811514	REGMAX	EIC-SMEInst-2018-2020	SME-2	An innovative and sustainable process for reducing the environmental impact of stainless steel production, enabling impressive recovery rates and cost savings.	218
829943	SensaSticker	EIC-SMEInst-2018-2020	SME-2	Improving the global cold chain with cutting-edge temperature monitoring solution	219
812411	SMILE	EIC-SMEInst-2018-2020	SME-2	A smile in return	220
848361	StemSense	EIC-SMEInst-2018-2020	SME-2	A precise irrigation monitoring system to provide an accurate measurement of water status in crops	221
829681	SULACHANGE	EIC-SMEInst-2018-2020	SME-2	Microplastic-free Sulapac-material challenges plastic	222
830150	TAPP X	EIC-SMEInst-2018-2020	SME-2	The world's first Sensor-Based Water Filter to Purify and Analyse Tap Water	223
811908	ULTRAWAT	EIC-SMEInst-2018-2020	SME-2	Ultrapure Water Technology - nanoparticle free water for the advanced nanoelectronics industry enabling further miniaturization of electronic devices	224
848537	WATERSIGN	EIC-SMEInst-2018-2020	SME-2	WATERSIGN: Smart Water Monitoring & Leakage Detection	225
779024	Madaster	SMEInst-01-2016-2017	SME-2	Towards a circular economy: Eliminate waste through an open platform that facilitates material passports	226
805997	CGM	SMEInst-02-2016-2017	SME-2	A next generation nano media tailored to capture and recycle hazardous micropollutants in contaminated industrial wastewater.	227
783696	Cronogard	SMEInst-02-2016-2017	SME-2	HIGH PERFORMING ADVANCED MATERIAL PLATFORM FOR ACTIVE AND INTELLIGENT FOOD PACKAGING: CRONOGARD™	228
733718	INDALG	SMEInst-03-2016-2017	SME-2	Development of an innovative algae based tertiary wastewater treatment and value recovery system	229
793325	Green-DROP	SMEInst-07-2016-2017	SME-2	Precise subarea specific irrigation and fertilization system	230
766747	HYDROBLOOD	SMEInst-07-2016-2017	SME-2	Innovative processing plant for optimal production of Decolourised Hydrolysed Protein (DHP). A secure, cost-effective and eco-friendly blood by-product solution.	231
739479	INFARM	SMEInst-07-2016-2017	SME-2	The vertical farming revolution, urban Farming as a Service.	232
726665	MILQAS	SMEInst-07-2016-2017	SME-2	Milk quality antibiotics sensor	233
805055	VegeaTextile	SMEInst-07-2016-2017	SME-2	Innovative biomaterials production from wine industry waste	234
767839	ULTRAFISH	SMEInst-08-2016-2017	SME-2	ECO-INNOVATIVE PROCESSING TECHNOLOGY FOR BETTER QUALITY AND SHELF LIFE OF FISH PRODUCTS	235
783727	BIOGASTIGER	SMEInst-09-2016-2017	SME-2	BIOGASTIGER® system – turning global organic waste streams into smart and clean energy	236
738874	PigHeat	SMEInst-09-2016-2017	SME-2	Utilizing Pig By-products as Heat Source to Save Recycling and Energy Cost.	237
731695	SHEPHERD	SMEInst-09-2016-2017	SME-2	Energy-Efficient Activated Sludge Monitoring for Wastewater Treatment Plants	238
724613	SmartWASTE	SMEInst-10-2016-2017	SME-2	Smart logistics for WASTE and recycling operations in European cities	239
778897	TRANSAFELOAD	SMEInst-10-2016-2017	SME-2	The European Leader Equipment for Packaging Testing	240
767333	ALGAMATER	SMEInst-11-2016-2017	SME-2	Using microalgae bioreactor technology to deliver the world's most cost-effective, energy-efficient and adaptable system for the treatment of toxic industrial and landfill wastewater	241
726618	ARENA	SMEInst-11-2016-2017	SME-2	The first on-site mobile solution for complete synthetic grass recycling and materials reuse	242
766614	CLEANTECHBLOCK2	SMEInst-11-2016-2017	SME-2	Market maturation of CleanTechBlock technology	243
766649	ECOSHEET-PRO	SMEInst-11-2016-2017	SME-2	An Eco-Innovative Alternative to Plywood	244



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777770	HOMEBIOGAS	SMEInst-11-2016-2017	SME-2	Turning food industry's organic wastw into value	245
778065	MUBIC	SMEInst-11-2016-2017	SME-2	Mushroom and biogas production in a circular economy	246
756165	nanoHPcs	SMEInst-11-2016-2017	SME-2	Sustainable nanoHVOF and nanoaxialPlasma coating solutions against wear problems of extrusion machines allowing an eco-efficient use of materials and the increase of recycling in the plastics industry	247
777780	NUOVOpb	SMEInst-11-2016-2017	SME-2	A unique Lead Acid Battery (LAB) recycling technology to reduce CO2 emissions by 89%, reduce waste by 81%, and transform the battery recycling industry	248
804453	PFS	SMEInst-11-2016-2017	SME-2	A cost- energy-efficient treatment technology to remove pharmaceutical pollutants from water	249
724586	PHOSave	SMEInst-11-2016-2017	SME-2	Innovative solution for phosphate recovery from exhausted extinguishing powders	250
778742	Propelair	SMEInst-11-2016-2017	SME-2	The refinement, miniaturisation and demonstration of an ultra low flush toilet capable of saving 2.8 billion litres of clean, potable water being unnecessarily wasted in Europe every day.	251
783638	reNEW	SMEInst-11-2016-2017	SME-2	Sustainable cleaning agent and organic fertilizer recovery from sewage sludge	252
756841	RUBSEE	SMEInst-11-2016-2017	SME-2	Extending artificial intelligence revolution in the waste field beyond sorting	253
723702	INSPIREWater	SPIRE-01-2016	IA	Innovative Solutions in the Process Industry for next generation Resource Efficient Water management	254
723729	ReWaCEM	SPIRE-01-2016	IA	Ressource recovery from industrial waste water by cutting edge membrane technologies	255
723577	SPOTVIEW	SPIRE-01-2016	IA	Sustainable Processes and Optimized Technologies for Industrially Efficient Water Usage	256
723661	COCOP	SPIRE-02-2016	RIA	Coordinating Optimisation of Complex Industrial Processes.	257
723575	CoPro	SPIRE-02-2016	RIA	Improved energy and resource efficiency by better coordination of production in the process industries	258
723523	FUDIPO	SPIRE-02-2016	RIA	Future Directions of Production Planning and Optimized Energy- and Process Industries	260
723650	MONSOON	SPIRE-02-2016	RIA	MOdel based coNtrol framework for Site-wide OptmizatiON of data-intensive processes	261
723070	Bio4Products	SPIRE-03-2016	IA	4x4, demonstrating a flexible value chain to utilize biomass functionalities in the processing industry	262
723268	KARMA2020	SPIRE-03-2016	IA	Industrial Feather Waste Valorisation for Sustainable KeRatin based MAterials.	263
723670	REHAP	SPIRE-03-2016	IA	Systemic approach to Reduce Energy demand and CO2 emissions of processes that transform agroforestry waste into High Added value Products.	264
723641	DREAM	SPIRE-04-2016	RIA	Design for Resource and Energy efficiency in cerAMic kilns	265
723706	IMPROOF	SPIRE-04-2016	RIA	INTEGRATED MODEL GUIDED PROCESS OPTIMIZATION OF STEAM CRACKING FURNACES	267
723803	VULKANO	SPIRE-04-2016	RIA	Novel integrated refurbishment solution as a key path towards creating eco-efficient and competitive furnaces	268
723678	CarbonNext	SPIRE-05-2016	CSA	The Next Generation of Carbon for the Process Industry	269
723748	INSPIRE	SPIRE-06-2016	CSA	Towards growth for business by flexible processing in customer-driven value chains	270
767533	ENSUREAL	SPIRE-07-2017	IA	Integrated cross-sectorial approach for environmentally sustainable and resource-efficient alumina production	271
768652	Morse	SPIRE-07-2017	IA	Model-based optimisation for efficient use of resources and energy	272
768612	SUPREME	SPIRE-07-2017	IA	Sustainable and flexible powder metallurgy processes optimization by a holistic reduction of raw material resources and energy consumption.	273

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768919	Carbon4PUR	SPIRE-08-2017	RIA	Turning industrial waste gases (mixed CO/CO <sub>2</sub> streams) into intermediates for polyurethane plastics for rigid foams/building insulation and coatings	274
768543	ICO <sub>2</sub> CHEM	SPIRE-08-2017	RIA	From industrial CO <sub>2</sub> streams to added value Fischer-Tropsch chemicals	275
768583	RECODE	SPIRE-08-2017	RIA	Recycling carbon dioxide in the cement industry to produce added-value additives: a step towards a CO <sub>2</sub> circular economy	276
768573	DEMETO	SPIRE-09-2017	IA	Modular, scalable and high-performance DE-polymerization by Microwave Technology	277
768692	ECCO	SPIRE-09-2017	IA	Energy Efficient Coil Coating Process	278
768604	NOVUM	SPIRE-09-2017	IA	Pilot line based on novel manufacturing technologies for cellulose-based electrical insulation components	279
768905	PORTABLECRAC	SPIRE-09-2017	IA	PORTABLE SOLUTION FOR THE ELECTROCHEMICAL REGENERATION OF ACTIVATED CARBON	280
768789	CO <sub>2</sub> EXIDE	SPIRE-10-2017	RIA	CO <sub>2</sub> -based Electrosynthesis of ethylene oxide	281
767798	OCEAN	SPIRE-10-2017	RIA	Oxalic acid from CO <sub>2</sub> using Electrochemistry At demonstration scale	282
768788	SIDERWIN	SPIRE-10-2017	RIA	Development of new methodologies for industrial CO <sub>2</sub> -free steel production by electrowinning	283
767412	SPRING	SPIRE-11-2017	CSA	Setting the framework for the enhanced impact of SPIRE projects	284
768755	HARMONI	SPIRE-12-2017	CSA	Harmonised assessment of regulatory bottlenecks and standardisation needs for the process industry	286
768748	SCALER	SPIRE-13-2017	CSA	Scaling European Resources with Industrial Symbiosis	287

**List of CE relevant 2016-2018 projects funded by the JUs Bio-Based Industries (BBI), Clean Sky (CS2) and Fuel Cells and Hydrogen (FCH)**

745789	EUCALIVA	BBI-2016-D03	BBI-IA-DEMO	EUCalyptus Lignin Valorisation for Advanced Materials and Carbon Fibres	288
745766	BIOMOTIVE	BBI-2016-D05	BBI-IA-DEMO	Advanced BIObased polyurethanes and fibres for the autoMOTIVE industry with increased environmental sustainability	289
745746	EMBRACED	BBI-2016-D06	BBI-IA-DEMO	Establishing a Multi-purpose Biorefinery for the Recycling of the organic content of AHP waste in a Circular Economy Domain	290
744330	OPTISOCEM	BBI-2016-D07	BBI-IA-DEMO	OPTimized conversion of residual wheat straw to bio-ISObutene for bio based CHEMicals	291
745591	SYLFEED	BBI-2016-D08	BBI-IA-DEMO	From forest to feed: enable the wood industry to bridge the protein gap	292
744310	AgriChemWhey	BBI-2016-F01	BBI-IA-FLAG	An integrated biorefinery for the conversion of dairy side streams to high value bio-based chemicals	293
745737	AFTERLIFE	BBI-2016-R01	BBI-RIA	Advanced Filtration TEchnologies for the Recovery and Later conversion of relevant Fractions from wastEwater	294
745586	BioBarr	BBI-2016-R05	BBI-RIA	New bio-based food packaging materials with enhanced barrier properties – BioBarrier	295
745762	BIOSMART	BBI-2016-R05	BBI-RIA	Bio-based smart packaging for enhanced preservation of food quality.	296
745791	REFUCOAT	BBI-2016-R05	BBI-RIA	Full recyclable food package with enhanced gas barrier properties and new functionalities by the use of high performance coatings	297
745578	BARBARA	BBI-2016-R07	BBI-RIA	Biopolymers with advanced functionalities for building and automotive parts processed through additive manufacturing	298
744311	ECOXY	BBI-2016-R07	BBI-RIA	Bio-based recyclable, reshapable and repairable (3R) fibre-reinforced EpOXY composites for automotive and construction sectors.	299
745839	POLYBIOSKIN	BBI-2016-R07	BBI-RIA	High performance functional bio-based polymers for skin-contact products in biomedical, cosmetic and sanitary industry	300
745828	PERCAL	BBI-2016-R08	BBI-RIA	Chemical building blocks from versatile MSW biorefinery	301

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792021	SUSFERT	BBI.2017.D4	BBI-IA-DEMO	Sustainable multifunctional fertilizer – combining bio-coatings, probiotics and struvite for phosphorus and iron supply	302
792195	EFFECTIVE	BBI.2017.D5	BBI-IA-DEMO	Advanced Eco-designed Fibres and Films for large consumer products from biobased polyamides and polyesters in a circular ECoNomy perspecTIVE	303
792049	ReInvent	BBI.2017.D5	BBI-IA-DEMO	Novel Products for Construction and Automotive Industries Based on Bio Materials and Natural Fibres	304
792004	UNRAVEL	BBI.2017.R2	BBI-RIA	UNique Refinery Approach to Valorise European Lignocellulosics	305
790956	AQUABIOPROFIT	BBI.2017.R4	BBI-RIA	AQUAculture and Agriculture BIOMass side stream PROteins and bioactives for Feed, FITness and health promoting nutritional supplements	306
792054	EXCornsEED	BBI.2017.R4	BBI-RIA	Separation, fractionation and isolation of biologically active natural substances from corn oil and other side streams	307
790507	iFermenter	BBI.2017.R4	BBI-RIA	iFERMENTER - CONVERSION OF FORESTRY SUGAR RESIDUAL STREAMS TO ANTIMICROBIAL PROTEINS BY INTELLIGENT FERMENTATION	308
792050	Pro-Enrich	BBI.2017.R4	BBI-RIA	Development of novel functional proteins and bioactive ingredients from rapeseed, olive, tomato and citrus fruit side streams for applications in food, cosmetics, pet food and adhesives	309
790157	Prolific	BBI.2017.R4	BBI-RIA	Integrated cascades of PROcesses for the extraction and valorisation of proteins and bioactive molecules from Legumes, Fungi and Coffee agro-industrial side streams	310
792063	SusBind	BBI.2017.R5	BBI-RIA	Development and pilot production of SUStainable bio BINDER systems for wood based panels	311
792261	NEWPACK	BBI.2017.R6	BBI-RIA	Development of new Competitive and Sustainable Bio-Based Plastics	312
837998	DEEP PURPLE	BBI.2018.SO1.D2	BBI-IA-DEMO	CONVERSION OF DILUTED MIXED URBAN BIO-WASTES INTO SUSTAINABLE MATERIALS AND PRODUCTS IN FLEXIBLE PURPLE PHOTOBIOREFINERIES	313
837771	VAMOS	BBI.2018.SO2.D3	BBI-IA-DEMO	Value added materials from organic waste sugars	314
837866	VEHICLE	BBI.2018.SO2.D3	BBI-IA-DEMO	Valorise Extensive quantities of Hemlcellulosic and Cellulosic sugars from Lignocellulosic biomass into high-value End products	315
837527	GRETE	BBI.2018.SO2.R6	BBI-RIA	Green chemicals and technologies for the wood-to-textile value chain	316
837583	B-FERST	BBI.2018.SO3.D4	BBI-IA-DEMO	Bio-based FERtilising products as the best practice for agricultural management SusTainability	317
838120	INGREEN	BBI.2018.SO3.D5	BBI-IA-DEMO	Production of functional innovative ingredients from paper and agro-food side-streams through sustainable and efficient tailor-made biotechnological processes for food, feed, pharma and cosmetics	318
838104	PLENITUDE	BBI.2018.SO3.F2	BBI-IA-FLAG	First-of-its-kind, large-scale, lowest-cost, zero-waste biorefinery for the production of proteins for food and feed application from low cost sustainable feedstocks.	319
837761	BIOntop	BBI.2018.SO3.R10	BBI-RIA	Novel packaging films and textiles with tailored end of life and performance based on bio-based copolymers and coatings	320
838056	CelluWiz	BBI.2018.SO3.R10	BBI-RIA	Process developments for a recyclable and compostable all-cellulose multilayer material for packaging	321
837715	MANDALA	BBI.2018.SO3.R10	BBI-RIA	The transition of MultiLayer/multipolymer packagiNg into more sustainable multilayer/single polymer products for the fooD and phArma sectors through the deveLopment of innovative functional Adhesives	322
836884	USABLE PACKAGING	BBI.2018.SO3.R10	BBI-RIA	Unlocking the potential of Sustainable BiodegradabLe Packaging	323
837863	ECOAT	BBI.2018.SO3.R9	BBI-RIA	ECO sustainable multifunctional biobased COATings with enhanced performance and end of life options	324

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832012	DIGESTAIR	JTI-CS2-2018-CfP08-AIR-03-04	CS2-RIA	A novel anaerobic DIGESTer solution in AIR transport for on-board safe and efficient waste management	325
826234	WASTE2WATTS	FCH-02-7-2018	FCH2-RIA	Unlocking unused bio-WASTE resources with loW cost cleAning and Thermal inTegration with Solid oxide fuel cells	326
826161	WASTE2GRIDS	FCH-02-8-2018	FCH2-RIA	Converting WASTE to offer flexible GRID balancing Services with highly-integrated, efficient solid-oxide plants	327
Circular Bioeconomy Thematic Investment Platform (risk-sharing financial instrument)					328

<b>BioReg</b>		<b>727958</b>
Title: <b>Absorbing the Potential of Wood Waste in EU Regions and Industrial Bio-based Ecosystems</b>		
Call Id: <b>H2020-BB-2016-1</b>	Topic: <b>BB-06-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>996.056,25</b>	EU requested grant (€): <b>996.056,25</b>	

**Free keywords:** *bio-based industries, bio-based products, wood waste, wood waste ecosystems, bioenergy*

### **Abstract:**

BioReg project proposes to create a platform of stakeholders who are able to influence and develop their regions towards bio-based industries and products.

Demonstrator case studies have been selected among European regions – Gothenburg, (SE); Karlsruhe, Baden-Wurttemberg (Ge), Lombardy, Emilia-Romagna (IT), North West England (UK) and Vorarlberg and Styria, Austria. Those have set up renewable wood waste-based systems at different stages of the waste wood value chain including different wood waste source, pre-sorting, sorting, collection, recycling and wood waste treatment (to materials, biochemicals or biofuels) as well as the different gradings and regional wood waste composition in each country.

3 recipient regions were selected for this project in regards to their unused waste wood potential: Normandy (France), Lublin (Poland), Andalusia (Spain).

The BioReg platform will function on two levels. On the EU level: best practices in terms of strategies and technologies as well as implementing mechanisms will be shared with the beneficiary recipient regions on the project and disseminated to many other potential regions in the EU (EUBIA). The platform will encourage the collaboration of members and stakeholders on the European level. On the regional level: the best practices will be replicated in the three beneficiary regions. The proposal offers collaboration with regional existing clusters, constructive dialogue with regional authorities and policy makers, industrial and RTD establishments in the recipient regions. It will mobilize the recipient regions to develop the existing potential for industrial innovative projects and build bio-based ecosystems. Industries, regions and investors will be brought together to establish an efficient dialogue so that demand and supply can be aligned and large impact projects can be realized.

The project proposes mechanisms to engage the stakeholders in collaboration also after the EU funding on BioReg is over.

<b>STAR-ProBio</b>		<b>727740</b>
Title: <b>Sustainability Transition Assessment and Research of Bio-based Products</b>		
Call Id: <b>H2020-BB-2016-2</b>	Topic: <b>BB-01-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>5.306.371,50</b>	EU requested grant (€): <b>4.983.871,50</b>	

**Free keywords:** *Fit-for-purpose sustainability scheme; circular economy; end-of-life, indirect land use change*

### **Abstract:**

STAR-ProBio constitutes a multidisciplinary and multi-actor collaborative project that will meet environmental, social and economic challenges, paving the way for a much-needed sustainability transition towards a bio-based economy.

The overall objective of the project is to promote a more efficient and harmonized policy regulation framework, needed to promote the market-pull of bio-based products. This will be achieved by developing a fit-for-purpose sustainability scheme, including standards, labels and certifications for bio-based products. To this aim, an integral part of STAR-ProBio will be the adoption of life-cycle methodologies to assess the roll-out of bio-based products. Environmental assessment will be performed, through LCA, in a circular economy framework (with a focus on end-of-life analysis) looking at issues which emerge upstream and downstream the value chain. This will be complemented by a techno-economic assessment and by a social impact assessment conducted through stakeholder analysis, SLCA, surveys and field experiments. Indirect land use change issues (ILUC) will also be addressed from an environmental, economic and social perspective. Moreover, the analysis of selected case studies on (1) construction materials, (2) bio-based polymers, and (3) fine chemicals, will ensure that the approach is not too broad and theoretic, allowing the benchmarking against non bio-based products.

Hence, STAR-ProBio will integrate scientific and engineering approaches with social sciences and humanities-based approaches in order to formulate guidelines for a common framework promoting the development of regulations and standards to support the adoption of business innovation models in the bio-based products sector.



<b>GENIALG</b>		<b>727892</b>
Title: <b>GENetic diversity exploitation for Innovative macro-ALGal biorefinery</b>		
Call Id: <b>H2020-BG-2016-1</b>	Topic: <b>BG-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>12.224.237,50</b>	EU requested grant (€): <b>10.885.817,25</b>	

**Free keywords:** *High-yielding seaweeds, large-scale aquaculture, IMTA, biorefinery, marine enzymes, market validation, sustainability, social acceptance*

### **Abstract:**

The GENIALG project aims to boost the Blue Biotechnology Economy (BBE) by increasing the production and sustainable exploitation of two high-yielding species of the EU seaweed biomass: the brown alga *Saccharina latissima* and the green algae *Ulva* spp. GENIALG will demonstrate the economic feasibility and environmental sustainability of cultivating and refining seaweed biomass in multiple use demanded products of marine renewable origin. The consortium integrates available knowledge in algal biotechnology and ready to use reliable eco-friendly tools and methods for selecting and producing high yielding strains in economically feasible quantities and qualities. By cracking the biomass and supplying a wide diversity of chemical compounds for existing as well as new applications and markets, GENIALG will anticipate the economic, social and environmental impacts of such developments in term of economic benefit and job opportunities liable to increase the socio-economic value of the blue biotechnology sector. In a larger frame, conservation and biosafety issues will be addressed as well as more social aspects such as acceptability and competition for space and water regarding other maritime activities. To achieve these objectives GENIALG will foster a trans-sectorial and complementary consortium of scientists and private companies. • GENIALG will involve a diversity of private companies already positioned in the seaweed sector individually for different applications (texturants, feed, agriculture, bioplastics, pharmaceuticals, personal care products...) in order to strengthen interactions for developing a bio-refinery concept and accelerate efficient and sustainable exploitation of seaweed biomass to bring new high-value products on the market.

<b>SABANA</b>		<b>727874</b>
Title: <b>Sustainable Algae Biorefinery for Agriculture aNd Aquaculture</b>		
Call Id: <b>H2020-BG-2016-1</b>	Topic: <b>BG-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>10.646.705,00</b>	EU requested grant (€): <b>8.848.523,75</b>	

**Free keywords:** *Biorefinery, Microalgae, Marine water, Large Scale, Biopesticides, Biostimulants, Aquafeed, Wastewaters*

### **Abstract:**

SABANA aims at developing a large-scale integrated microalgae-based biorefinery for the production of biostimulants, biopesticides and feed additives, in addition to biofertilizers and aquafeed, using only marine water and nutrients from wastewaters (sewage, centrate and pig manure). The objective is to achieve a zero-waste process at a demonstration scales up to 5 ha sustainable both environmentally and economically. A Demonstration Centre of this biorefinery will be operated to demonstrate the technology, assess the operating characteristics of the system, evaluate environment impacts and collaborate with potential customers for use.

The key advantages of SABANA project are: the sustainability of the process, using marine water and recovering nutrients from wastewaters while minimizing the energy consumption, and the socioeconomic benefits, due to the relevance of the target bioproducts for two major pillars in food production as agriculture and aquaculture. Bioproducts capable of increasing the yield of crops and fish production are highly demanded, whereas recovery of nutrients is a priority issue in the EU. Instead of considering wastewater as an inevitably useless and problematic residue of our society, SABANA acknowledges its potential as an opportunity for economically relevant sectors.

SABANA project includes (i) the utilization of microalgae-bacteria consortia and in co-culture with other algae to control grazing species, (ii) the implementation of efficient thin-layer cascade and raceway, (iii) the scale-up of reactors to ensure stable operation, (iv) to use marine water to increase the sustainability of the process; (v) to recover nutrients from wastewaters, (vi) to develop harvesting processes taking into account the remaining water, (vii) to establish processes for mild/energy efficient extraction of bioproducts, (viii) to process residual biomass to produce biofertilizers and aquafeed in zero-waste schemes, (ix) using robust and sustainable technology



<b>CLAIM</b>		<b>774586</b>
Title: <b>Cleaning Litter by developing and Applying Innovative Methods in european seas</b>		
Call Id: <b>H2020-BG-2017-1</b>	Topic: <b>BG-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>6.185.612,75</b>	EU requested grant (€): <b>5.654.786,01</b>	

**Free keywords:** *Integrated approach, Visible and invisible coastal pollution, Innovative green technologies, Forecasting tools, Microlitter, Macrolitter*

### **Abstract:**

CLAIM focuses on the development of innovative cleaning technologies and approaches, targeting the prevention and in situ management of visible and invisible marine litter in the Mediterranean and Baltic Sea.

Two innovative technological methods will be developed, a photocatalytic nanocoating device for cleaning microplastics in wastewater treatment plants and a small-scale thermal treatment device for energy recovery from collected litter on board ships and ports. An innovative floating boom for collecting visible litter and a method to measure microlitter on board ships (Ferrybox) will be developed. The proposed cleaning technologies and approaches prevent litter from entering the sea at two main source points, i.e. wastewater treatment plants and river mouths. Effectiveness of developed devices and methods will be demonstrated under real conditions.

Additionally, CLAIM will develop innovative modeling tools to assess the marine visible and invisible plastic pollution at basin and regional scales (Saronikos Gulf, Gulf of Lyon, Ligurian Sea and Belt Sea).

An ecosystems approach will be followed to evaluate the potential benefit from proposed litter cleaning methods to ecosystem services. New business models will be developed to enhance the economic feasibility for upscaling the innovative cleaning technologies, taking into account the existing legal and policy frameworks in the CLAIM countries, as well as acceptance of the new technologies by their end-users and relevant stakeholders.

The data and information produced will be made available to policymakers, stakeholders and end-users in a user-friendly format, both meaningful and tailored to each stakeholder group. CLAIM aims at the same time to raise public awareness with respect to having healthy oceans and seas, clean of litter and pollutants, and hence the importance of reducing marine (macro, micro and nano) pollution in European seas and beyond towards restoring marine ecosystems based on a circular economy.

<b>GoJelly</b>		<b>774499</b>
Title: <b>GoJelly - A gelatinous solution to plastic pollution</b>		
Call Id: <b>H2020-BG-2017-1</b>	Topic: <b>BG-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>6.222.816,50</b>	EU requested grant (€): <b>5.998.114,75</b>	

**Free keywords:** *Microplastics, Jellyfish, forecasting, waste water treatment, organic farming, cosmetics, nutraceuticals, food science, aquafeed, socioecological systems, trade-offs, blue jobs, circular economy*

### **Abstract:**

The objective of the GoJelly project is to develop, test and promote a gelatinous solution to microplastic pollution by developing a TRL 5-6 prototype microplastics filter (GoJelly) for commercial and public use, where the main raw material is jellyfish mucus. In doing so, the consortium addresses two environmental issues with one approach by removing the commercially and ecologically destructive sea and coastal pollution of both jellyfish and microplastics. This innovative approach will ultimately lead to less plastic in the ocean, municipal demand (and thereby competitive prices) for jellyfish raw material to fill the "mucus-need" by filter developers, and in turn more jobs for commercial fishers in off-seasons. The by-products of the GoJelly biomass have other uses as well, ensuring that GoJelly also delivers a green innovation, resulting in novel, valuable resource for the food and feed industry as well as agro-biological fertilizer for organic farming. The GoJelly prototype products will be tested and demonstrated in three different European seas (Norwegian, Baltic and Mediterranean), by a range of stakeholders, including commercial fishers and industry partners. Tying it together, the project will also ensure the possibilities for broader European promotion and utilization of GoJelly at the local, regional and global level by delivering a socio-ecological methodological toolbox for forming and implementing policies. GoJelly will broadly communicate its results in several formats such as traditional social media, open lab ship cruise, and in the form of an experimental online game depicting different management scenarios under different jellyfish- and microplastics combinations. An interdisciplinary and international consortium consisting of technology developers, business analysts, fishing companies, research institutes, and both natural and social scientists will realize GoJelly, and will ensure the uptake of GoJelly products by industry and policy makers.

<b>SCREEN</b>		<b>730313</b>
Title: <b>Synergic Circular Economy across European Regions</b>		
Call Id: <b>H2020-CIRC-2016OneStage</b>	Topic: <b>CIRC-03-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>1.742.747,50</b>	EU requested grant (€): <b>1.742.747,50</b>	

**Free keywords:** *synergic use of H2020 and Structural Funds for Circular Economy Initiatives dealing with Smart Specialisation strategies*

### **Abstract:**

SCREEN aims at the definition of a replicable systemic approach towards a transition to Circular Economy in EU regions within the context of the Smart Specialization Strategy, through the identification and implementation of operational synergies between R&I investments from H2020 and the European Structural and Investment Funds, thus contributing to novel future eco-innovative and horizontal business models across different value chains.

The concept of the action is to develop a EU reference framework for establish operational synergies between Horizon 2020 and the European Structural and Investment Funds related to Circular Economy by:

- a) Sustaining the regional actors' participation at H2020. The mechanism of the "vouchers", already adopted in the past, will be reinforced an harmonized, in order to ensure common rules in EU regions and therefore encouraging to composition of international Consortia applying for circular economy projects related to the regional Smart Specialisation.
- b) Encouraging the entrepreneurial initiatives based on H2020 project's results. The participating Regions will agree about a specific rule in their Structural Funds giving an advantage for those initiatives targeted to the exploitation of the H2020 project results with a circular economy approach.
- c) Investigating the possibility of maximizing the H2020 investment through a "recovery"(fully or partial) of well ranked unfinanced proposals dealing with circular economy. Even if there is a clear presence of several bureaucratic and operational barriers, a possible solution could have an impressive multiplier effect on the H2020 results.

The approach of the action is to leverage on growing industry sectors in EU regions to act as a driver also for the less performing ones, through a circular economy approach, and to support the emergence of new actors in the regional economies leading to new or redesigned value chains.

<b>R2PI</b>		<b>730378</b>
Title: <b>TRANSITION FROM LINEAR 2 CIRCULAR: POLICY AND INNOVATION</b>		
Call Id: <b>H2020-CIRC-2016OneStage</b>	Topic: <b>CIRC-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>3.013.475,00</b>	EU requested grant (€): <b>3.013.475,00</b>	

**Free keywords:** *Circular economy; Sustainability; Business models; CEBM; Transition*

### **Abstract:**

R2 $\pi$  examines the shift from the broad concept of a Circular Economy (CE) to one of a Circular Economy Business Models (CEBM), by tackling both market failure (business, consumers) and policy failure (conflicts, assumptions, unintended consequence). Its innovation lies in having a strong business-focus, examining stimuli beyond environmental goals (including ICT and eco-innovation), and in examining the role of policy innovation (including the use of policy nudges and of "Policy Packages"). R2 $\pi$  unfolds in diverse contexts with a strong emphasis on involvement and exchange. The research design employs mixed-methods, with a strong emphasis on case studies but also including desktop research, feasibility assessments (including surveys where applicable), policy formulation & stakeholder involvement. The ultimate goal of the project is to see the widespread implementation of the CE based on successful Business Models to ensure sustained economic development, to minimize environmental impact and to maximize social welfare.

The goal of the R2 $\pi$  project is therefore to develop sustainable business models that would facilitate the circular economy and to propose "Policy Package" that will support these business models. The R2Pi Consortium consists of 14 partners from 9 Member states and associated countries. The wide range of expertise, knowledge, tools and connections existing among the consortium members will be leveraged to develop innovative practical tools and procedural guidelines that may be widely and systematically applied across many different business sectors in diverse regions and countries, across the spectrum from large established EU countries to newer and smaller member states.. Through these innovative business models and "Policy Packages", the European economy will move into a more sustainable, resource efficient and resilient economic track.

R2 $\pi$  will position Europe as a world leader in advancing the circular economy model.

<b>RES URBIS</b>		<b>730349</b>
Title: <b>REsources from URban Bio-waSte</b>		
Call Id: <b>H2020-CIRC-2016OneStage</b>	Topic: <b>CIRC-05-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>3.377.915,00</b>	EU requested grant (€): <b>2.996.688,75</b>	

**Free keywords:** *urban bio-waste, biodegradable fraction, municipal solid waste, sewage sludge, wastewater, biorefinery, bio-based products, bioplastics, polyhydroxyalkanoate, PHA, biosolvent, biocomposite*

### **Abstract:**

RES URBIS aims at making it possible to convert several types of urban bio-waste into valuable bio-based products, in an integrated single biowaste biorefinery and by using one main technology chain. This goal will be pursued through:

- collection and analysis of data on urban bio-waste production and present management systems in four territorial clusters that have been selected in different countries and have different characteristics.
- well-targeted experimental activity to solve a number of open technical issues (both process- and product-related), by using the appropriate combination of innovative and catalogue-proven technologies.
- market analysis within several economic scenarios and business models for full exploitation of bio-based products (including a path forward to fill regulatory gaps).

Urban bio-waste include the organic fraction of municipal solid waste (from households, restaurants, caterers and retail premises), excess sludge from urban wastewater treatment, garden and parks waste, selected waste from food-processing (if better recycling options in the food chain are not available), other selected waste streams, i.e. baby nappies.

Bio-based products include polyhydroxyalkanoate (PHA) and related PHA-based bioplastics as well as ancillary productions: biosolvents (to be used in PHA extraction) and fibers (to be used for PHA biocomposites).

Territorial and economic analyses will be done either considering the ex-novo implementation of the biowaste biorefinery or its integration into existing wastewater treatment or anaerobic digestion plants, with reference to clusters and for different production size. The economic analysis will be based on a portfolio of PHA-based bioplastics, which will be produced at pilot scale and tested for applications:

- Biodegradable commodity film

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- Packaging interlayer film
- Speciality durables (such as electronics)
- Premium slow C-release material for ground water remediation

<b>CIRC-PACK</b>		<b>730423</b>
Title: <b>Towards circular economy in the plastic packaging value chain</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>9.252.466,25</b>	EU requested grant (€): <b>7.308.180,13</b>	

**Free keywords:** *Plastic, Packaging, Design, biobased, biodegradable, recycling, new business models, organizational innovation, plastics landfill reduction*

### **Abstract:**

CIRC-PACK project aims at more sustainable, efficient, competitive, less fossil fuel dependence, integrated and interconnected plastic packaging value chain. To this end, three case studies will work in developing, testing and validating better system-wide economic and environmental outcomes by i) decoupling the chain from fossil feedstocks, (ii) reducing the negative environmental impact of plastic packaging; and (iii) creating an effective after-use plastics economy. All in all, the work will be supported by non-technological analysis and advanced methodological analysis (including circular economy and industrial symbiosis principles) which will trigger a broadly deployment of the tested solutions. CIRC-PACK project will provide breakthrough biodegradable plastics using alternative biobased raw materials, which will have an instrumental role to play in the subsequence steps of the plastic value chain. In addition, eco-design packaging for improving and end-of-like multilayer and multicomponent packaging will be technologically advanced and adapted also to the new materials produced. Thus these developments will also contribute with a great impact in the packaging footprint, and increasing the biobased content and using compostable materials. Lastly, a multi-sectorial cascaded approach along plastic packaging value chain will be applied with critical impacts in other value chains beyond the targeted plastic packaging value chain. The overall outcome of the project will facilitate the transition from the current linear plastic packaging value chain to circular economy principles.

<b>ECOBULK</b>		<b>730456</b>
Title: <b>Circular Process for Eco-Designed Bulky Products and Internal Car Parts</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>12.153.947,38</b>	EU requested grant (€): <b>9.665.562,88</b>	

**Free keywords:** *Circular economy, design, furniture, automotive, building, recycling, remanufacturing, user engagement, modular*

### **Abstract:**

ECOBULK through a large scale demonstration effort will contribute to “closing the loop” of composite products in the automotive, furniture and building sectors by promoting greater re-use, upgrade, refurbishment and recycle of products, parts, and materials. It will bring opportunities for both the environment and the economy by offering business opportunities along the entire new defined supply and value chains. ECOBULK approach will be based on identifying and promoting commonalities in processes, technologies, products and services ensuring replicability and transferability to other industrial sectors. The ambitious application of the circular economy model in the three selected sectors is justified by the high numbers of synergies, in terms of the design (design for modularity, design for disassembly/dismantling), materials (fibre and particle reinforced plastic composites), manufacturing technology (moulding, extrusion, hot pressing, thermobonding) and business models (leasing, renting, PSS, fix-it shops, etc.). The methodology will embrace and focus on large scale demonstration activities in 7 countries and more than 15 demonstrators to address the key components of the circular economy solutions; rethinking product design to shift towards a Design Circular Framework, validation of material and product manufacturing technologies to ensure technical and economic feasibility, new reverse logistics for the recovery of products and parts from consumers or users and into the supply chain, implementation of Innovative business models exploring C2C, B2C and B2B opportunities, and dissemination to raise awareness and knowledge sharing activities on circular economy solutions. Finally, an end-user and Stakeholder platform linking end users with relevant actors from the early design stages will foster second life, reuse and recycle of product and parts as well as material recovery for reintroduction into a circular production chain.



<b>FiberEUse</b>		<b>730323</b>
Title: <b>Large scale demonstration of new circular economy value-chains based on the reuse of end-of-life fiber reinforced composites.</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>11.943.963,75</b>	EU requested grant (€): <b>9.793.548,75</b>	

**Free keywords:** *Composite Re-use, Remanufacturing and Recycling. New Business Model. Systemic Solution.*

### **Abstract:**

Glass and carbon fiber reinforced polymer composites (GFRP and CFRP) are increasingly used as structural materials in many manufacturing sectors like transport, constructions and energy due to their better lightweight and corrosion resistance compared to metals. Composite recycling is a challenging task. Although mechanical grinding and pyrolysis reached a quite high TRL, landfilling of EoL composites is still widespread since no significant added value in the re-use and remanufacturing of composites is demonstrated.

The FiberEUse project aims at integrating in a holistic approach different innovation actions aimed at enhancing the profitability of composite recycling and reuse in value-added products.

The project is based on the realization of three macro use-cases, further detailed in eight demonstrators:

Use-case 1: Mechanical recycling of short GFRP and re-use in added-value customized applications, including furniture, sport and creative products. Emerging manufacturing technologies like UV-assisted 3D-printing and metallization by Physical Vapor Deposition will be used.

Use-case 2: Thermal recycling of long fibers (glass and carbon) and re-use in high-tech, high-resistance applications. The input product will be EoL wind turbine and aerospace components. The re-use of composites in automotive (aesthetical and structural components) and building will be demonstrated by applying controlled pyrolysis and custom remanufacturing.

Use-case 3: Inspection, repair and remanufacturing for EoL CFRP products in high-tech applications. Adaptive design and manufacturing criteria will be implemented to allow for a complete circular economy demonstration in the automotive sector.

Through new cloud-based ICT solutions for value-chain integration, scouting of new markets, analysis of legislation barriers, life cycle assessment for different reverse logistic options, FiberEUse will support industry in the transition to a circular economy model for composites.

<b>PAPERCHAIN</b>		<b>730305</b>
<b>Title: New market niches for the Pulp and Paper Industry waste based on circular economy approaches</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>9.217.196,20</b>	EU requested grant (€): <b>7.826.080,89</b>	

**Free keywords:** *Industrial symbiosis, Pulp and Paper Industry, Construction Sector, Mining Industry, Chemical Industry, Secondary Raw Materials*

### **Abstract:**

Europe is the second world producer of pulp and paper, manufacturing 130 million tonnes in 2014 and representing 23% of world production. The EU pulp and paper manufacturing and converting industries generate an annual turnover of €180 billion, representing 1,26% of the European GDP. In particular, the Pulp and Paper industry (PPI) has a turnover of €75 billion, comprises 920 plants and provides 180,000 jobs in Europe directly, and 1.5 million in the value chain. This sector is resource intensive and produces 11 million tonnes of waste yearly . It has been found that 25-40% of municipal solid waste generated each year worldwide is paper-related. Furthermore, Europe is nowadays facing the challenge of resource scarcity and more efficient use. If managed in a sustainable manner, PPI waste can become a valuable raw material for other resource intensive industries such as the construction (i.e 5,4 billion tonnes of raw material consumption) or the chemical industry (1 billion tonnes). Mining industry waste generation is estimated at up to 20.000 million tons of solid waste yearly, and relevant part of this waste needs to be kept in environmental safety conditions, which in turn implies additional use of resources (e.g borrow materials). New widespread markets are needed to extend the valorisation operations, reduce the landfilling rates and increase the competitiveness of the PPIs creating new added value markets for their inorganic waste.

The overall objective of PAPERCHAIN is to deploy five novel circular economy models centred in the valorisation of the waste streams generated by the PPI as secondary raw material for a number of resource intensive sectors: construction sector, mining sector and chemical industry. PAPERCHAIN aims to unlock the potential of a resource efficient model based on industrial symbiosis which will demonstrate the potential of the major non-hazardous waste streams generated by the PPI as valuable secondary raw material.

<b>PlastiCircle</b>		<b>730292</b>
Title: <b>Improvement of the plastic packaging waste chain from a circular economy approach</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>8.674.540,89</b>	EU requested grant (€): <b>7.774.016,75</b>	

**Free keywords:** *plastic waste, circular economy, urban areas, collection, transport, sorting, valorization*

### **Abstract:**

The European plastic market is not currently aligned with the circular economy. More than 25.8 million tonnes of plastic waste are produced per year in the EU28 being recycled only 29.7%. This represents a clear loose in the plastic market loop (losses of €10.56bn). Moreover, this goes against the EU legislation on waste (high environmental impact; 23.8 Mt of CO<sub>2</sub>).

Low recycling rates of plastic are mainly due to the situation of packaging waste (i.e. main plastic waste fraction), since it is mainly domestic residue and consequently the quality of the material collected depends on the system of segregation available and the environmental awareness of citizens.

PlastiCircle aims to develop and implement a holistic process to increase recycling rates of packaging waste in Europe. This will allow to reprocess again plastic waste in the same value chain (i.e. Circular economy; closure of plastic loop). This process is based on four axes: collection (to increase quantity of packaging collected), transport (to reduce costs of recovered plastic), sorting (to increase quality of recovered plastic), and valorization in value-added products (i.e. foam boards, automotive parts like engine covers/bumpers/dashboards, bituminous roofing membranes, garbage bags, asphalt sheets/roofing felts and urban furniture like fences/benches/protection walls).

The target is to increase collection from 81.7% to 87% and valorization in a 9.8%. The implementation of PlastiCircle approach in Europe have the potential to increase collected plastic in 861,250t (reaching 14.14 Mt) and valorization in 1.59Mt. The valorization of this new material, represents a market value of €2.86bn-€7.95bn. Taking into account current figures of the plastic sector (turnover €350bn, 62,000 companies, 1.45M employees), this could imply creation of 500-1400 new companies and the generation of 11,900-33,000 new jobs in the medium to long term if PlastiCircle approach is extended in a EU level.

<b>PolyCE</b>		<b>730308</b>
Title: <b>Post-Consumer High-tech Recycled Polymers for a Circular Economy – PolyCE</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>9.452.964,59</b>	EU requested grant (€): <b>8.321.995,72</b>	

**Free keywords:** *WEEE, post-consumer recycled plastics, technical requirements, grade systems for recycled plastics, standardisation, supply and value chain, dematerialisation, new business models*

### **Abstract:**

Various activities address the WEEE value chain in order to reduce waste generation and enhance the sustainable resource management through use of recycled materials instead of their virgin counterparts. While the system for metals recycling is already well established, the rising volumes of waste plastics point to stalemates in the current plastics economy, which hamper its shift to a more circular model. Although there are individual efforts to improve the collection and recycling of WEEE plastics, the plastics value chain is still too fragmented and WEEE recycled plastics seem unattractive material for the end-user. To shift towards circular economy a systematic transformation is required, involving all actors in the value chain and encompassing the entire lifecycle of plastic materials.

While substantially reducing the WEEE plastics generation and enhancing the use of recycled plastics in new applications, PolyCE will demonstrate the feasibility of circular plastics supply and value chain. In particular, PolyCE will elaborate harmonized set of technical requirements addressing the entire value chain and develop grade system for recycled plastics according to their material properties and final application suitability. Accordingly, PolyCE will strengthen the market for recycled plastics through an online platform integrating the different plastic grades. In parallel, the technical and economic feasibility as well as environmental benefits of using recycled plastics will be validated in several electronics demonstrators. In addition, PolyCE will provide Guidelines for designing new electronics products with recycled plastics. The project's impact will be scaled up by involving target cities and their green public procurement initiatives; by EU-wide information and awareness raising campaigns. PolyCE will establish a feedback loop from the research activities, provide policy input regarding technical feasibilities and policy conflicts from technical perspective

<b>SYSTEMIC</b>		<b>730400</b>
Title: <b>Systemic large scale eco-innovation to advance circular economy and mineral recovery from organic waste in Europe</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>9.723.586,25</b>	EU requested grant (€): <b>7.859.828,75</b>	

**Free keywords:** *Waste valorisation, nutrient recovery, demonstration plant, biobased industries, biochemicals, biogas, secondary raw materials*

### **Abstract:**

SYSTEMIC will reach a break-through to re-enter recovered nutrients from organic waste into the production cycle. Consequently, this will offer solutions for pressing environmental issues and to reduce the import of P as finite irreplaceable resource in mines.

The SYSTEMIC project aims to shift the European Biomass treatment practice to the next level. Departing from existing business cases and a new ground-breaking large scale demonstration plant, the future of anaerobic digestion (AD) value chains will be investigated and demonstrated. The result will help existing and future AD-operators to maximise their performance: produce and sell more quality products, generate more energy and be independent on subsidies. By the market driven leadership, the SYSTEMIC-project will finally turn biomass waste into valuable products while reducing water pollution, greenhouse gas emission and creating quality jobs in rural areas.

The planned demonstration plant will allow innovative combinations of modules to elaborate possible optimizations for increasing the production quantity and quality of new mineral products, and the integration of these products into a circular economy. Reflecting the experiences from the demonstration plant with a set of 4 mirror cases in different members states allow systemic innovation including end-user driven (a) specific technical development and (b) the cost efficient investigation of real world circular economy business cases and (c) operational, regulatory, institutional and contextual barriers to overcome.

Using partial funding from the EC, the SYSTEMIC industry-driven consortium will validate for the first time the technical and economic viability of a fully integrated, multistep approach in an operational environment. The successful practical demonstration will put the European sector in a leading position to offer efficient mineral recovery technologies.

<b>ZERO BRINE</b>		<b>730390</b>
Title: <b>Re-designing the value and supply chain of water and minerals: a circular economy approach for the recovery of resources from saline impaired effluent (brine) generated by process industries</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>11.081.972,78</b>	EU requested grant (€): <b>9.992.209,11</b>	

**Free keywords:** *Brine effluent, Water recovery, Minerals recovery, Salt, Magnesium recovery, Waste Heat, Industrial Symbiosis, Circular Economy, Closing-the-loop*

### **Abstract:**

This project aims to facilitate the implementation of the Circular Economy package and the SPIRE Roadmap in various process industries by developing the necessary concepts, technological solutions and business models to re-design the value and supply chains of minerals (including magnesium) and water, while dealing with present organic compounds in a way that allows their subsequent recovery.

This is achieved by demonstrating new configurations to recover these resources from saline impaired effluents (brines) generated by process industry, while eliminating wastewater discharge and minimising environmental impact of industrial operations through brines (ZERO BRINE). The project will bring together and integrate several existing and innovative technologies aiming to recover end-products of high quality and sufficient purity with good market value. It will be carried out by large Process Industries, SMEs with disruptive technologies and a Brine Consortium of technology suppliers across EU, while world-class research centres ensure strong scientific capacity and inter-disciplinary coordination to account for social, economic and environmental considerations, including LCA.

A large scale demonstration will be developed in the Energy Port and Petrochemical cluster of Rotterdam Port, involving local large industries. Two demo plants will be able to treat part of the brine effluents generated by one process industry (EVIDES), while the waste heat will be sourced by neighbouring factories. The quality of the recovered end-products will be aimed to meet local market specifications. The involvement of representatives covering the whole supply chain will provide an excellent opportunity to showcase Circular Economy in Rotterdam Port, at large scale. Finally, three large-scale pilot plants will be developed in other process industries, providing the potential for immediate replication and uptake of the project results after its successful completion.

<b>RUN4LIFE</b>		<b>730285</b>
Title: <b>RECOVERY AND UTILIZATION OF NUTRIENTS 4 LOW IMPACT FERTILIZER</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-02-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.720.900,61</b>	EU requested grant (€): <b>6.239.340,65</b>	

**Free keywords:** *Nutrient recovery, Water reuse, social acceptance, Source separation*

### **Abstract:**

Domestic wastewater (WW) is an important carrier of nutrients usually wasted away by current decentralised WW treatments (WWT). Run4Life proposes an alternative strategy for improving nutrient recovery rates and material qualities, based on a decentralised treatment of segregated black water (BW), kitchen waste and grey water combining existing WWT with innovative ultra-low water flushing vacuum toilets for concentrating BW, hyper-thermophilic anaerobic digestion as one-step process for fertilisers production and bio-electrochemical systems for nitrogen recovery. It is foreseen up to 100% nutrient (NPK) recovery (2 and >15 times current P and N recovery rates) and >90% water reuse.

Obtained products will be >90% reused thanks to prospective end-users in the consortium and a new Business model based on a cooperative financial scheme. Run4Life impacts will be evaluated on safety and security (Risk Assessment), from an environmental point of view (Life Cycle Assessment and Environmental Technical Verification), on the economy (Benefit Cost Analysis) and considering Social Risk Perception. Active measures will be developed with the support of a Stakeholders and Exploitation Panel for achieving institutional, legal and social acceptance. Different parts of Run4Life will be large scale demonstrated at 4 demo-sites in Belgium, Spain, Netherlands and Sweden, adapting the concept to different scenarios (market, society, legislation). Performance tests will be carried out with obtained products (compared to commercial fertilisers) with close collaboration with fertiliser companies. Process will be optimised by on-line monitoring key performance indicators (nutrient concentration, pathogens, micropollutants). The information obtained in the 4 demo-sites will be used for process simulation to conceive a unified Run4Life model which will be applied in a fifth demo-site in Czech Republic, allowing new business opportunities and providing data for critical raw material policies.

<b>Water2REturn</b>		<b>730398</b>
Title: <b>REcovery and REcycling of nutrients TURNing wasteWATER into added-value products for a circular economy in agriculture</b>		
Call Id: <b>H2020-CIRC-2016TwoStage</b>	Topic: <b>CIRC-02-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>7/1/2017</b>	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.129.322,50</b>	EU requested grant (€): <b>5.871.895,76</b>	

**Free keywords:** *water reuse, high added value products, bioestimulants, algae production, circular economy*

### **Abstract:**

Water2REturn proposes a full-scale demonstration process for integrated nutrients recovery from wastewater from the slaughterhouse industry using biochemical and physical technologies and a positive balance in energy footprint. The project will not only produce a nitrates and phosphate concentrate available for use as organic fertiliser in agriculture, but its novelty rests on the use of an innovative fermentative process designed for sludge valorisation which results in a hydrolysed sludge (with a multiplied Biomethane Potential) and biostimulants products, with low development costs and high added value in plant nutrition and agriculture.

This process is complemented by proven technologies such as biological aeration systems, membrane technologies, anaerobic processes for bio-methane production and algal technologies, all combined in a zero-waste-emission and an integrated monitoring control tool that will improve the quality of data on nutrient flows. The project will close the loop by demonstrating the benefits associated with nutrients recycling through the implementation of different business models for each final product. This will be done with a systemic and replicable approach that considers economic, governance and social acceptance aspects through the whole chain of water and targets essentially two market demands: 1) Demand for more efficient and sustainable production methods in the meat industry; and 2) Demand for new recycled products as a nutrient source for agriculture.

As a summary, Water2REturn project adopts a Circular Economy approach where nutrients present in wastewaters from the meat industry can be recycled and injected back into the agricultural system as new raw materials. The project foster synergies between the food and sustainable agriculture industries and propose innovative business models for the resulting products that will open new market opportunities for the European industries and SMEs in two key economic sectors.



<b>CarE-Service</b>		<b>776851</b>
<b>Title: Circular Economy Business Models for innovative hybrid and electric mobility through advanced reuse and remanufacturing technologies and services</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.722.365,75</b>	EU requested grant (€): <b>6.229.505,01</b>	

**Free keywords:****Abstract:**

Electric and Hybrid Electric Vehicles (E&HEVs) will be an opportunity to drastically innovate mobility products and services in the direction of sustainability and of higher accessibility for customers. If coupled with innovative services offered by car manufacturers in a network of well coordinated partners supporting extensive and efficient End-Of-Life operations, the advent of E&HEVs could revolution the current mobility consumption uses of people and preserve the environment much more than the only substitution of traditional cars with E&HEVs could do. In particular, non-ownership based models of E&HEVs with additional added-value services (leasing or renting contracts with periodic upgrade through remanufacturing, pay per use, etc.), would give OEMs the possibility to establish long-term customers relationships on one hand, and of setting-up innovative supply chains that performs systematic remanufacturing and reuse of E&HEVs parts in order to maximize the residual value of components and materials on the other. Remanufacturing, reuse and recycling would become the strategies upon which car manufacturers would base future competitiveness, leveraging on the benefits of costs saving and, at the same time, guaranteeing environmental benefits and superior performances to customers.

However, there are substantial barriers to implement these new business models. The main one is developing adequate capabilities to remanufacture and reuse E&HEVs' components and materials in order to provide customers with added value. This is significantly difficult especially from the technological point of view, since E&HEVs determine a fundamental transformation in vehicles design, featuring a substantial evolution in the critical components and materials.

The CarE-Service project will demonstrate new enabling technologies and service to systematically perform innovative reuse and remanufacturing as key-processes to provide value to customers and, at the same time, to minimize environmental impacts.

<b>CINDERELA</b>		<b>776751</b>
Title: <b>New Circular Economy Business Model for More Sustainable Urban Construction</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.635.365,25</b>	EU requested grant (€): <b>6.729.219,00</b>	

**Free keywords:** *circular economy business model, CinderOSS, secondary raw material based construction products, industrial symbiosis, urban construction*

### **Abstract:**

The EU-28 total waste generation in 2014 was 2598M tones, the highest since 2004, 33.5% of which was from the construction sector, being also one of the larger consumers of inorganic raw materials. Construction activities are mainly localized in urban areas where by 2050 about 86% of the developed world is expected to live. CINDERELLA project aims to develop a new Circular Economy Business Model (CEBM) for use of secondary raw materials (SRM) in urban areas, connecting different industries, the construction sector and municipal services, decision makers and the general public with the support of CinderOSS, a “One-Stop-Shop” service, articulated in (i) an on-line ICT platform for tracking and modelling the urban waste-to-product flows, on-line marketing and sharing knowledge and information along the value chain (ii) production and marketing of (SRM) based construction products and (iii) building with SRM based construction products supported by building information modelling (BIM). Different streams of waste will be exploited in the project, i.e. construction and demolition waste, industrial wastes, heavy fraction from municipal solid waste and sewage sludge, mostly of them currently landfilled and/or incinerated. Their suitability for use for building materials will be demonstrated through large scale demonstration activities in Slovenia, Croatia and Spain while the ICT platform will be demonstrated in Slovenia, Croatia, Spain, Poland, Italy and The Netherlands. The project will contribute to 20% reduction of environmental impacts along the value and supply chain, reducing virgin material exploitation and converting wastes to products. Sustainability of CEBM will be proven with the environmental, economic and social assessment through whole life (LCA, LCC and S-LCA). The pre-feasibility analysis of the proposed CEBM indicates an increase of recycling by 30% of CDW, 13% of industrial waste, 100% of heavy fraction and 25% of sewage sludge with a net profit of 18%.

<b>CIRC4Life</b>		<b>776503</b>
Title: <b>A circular economy approach for lifecycles of products and services</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.228.773,75</b>	EU requested grant (€): <b>6.294.033,39</b>	

**Free keywords:****Abstract:**

This project aims to develop and implement a circular economy approach for sustainable products and services through their value and supply chains. Three new circular economy business models will be developed including (i) co-creation of products and services, (ii) sustainable consumption, and (iii) collaborative recycling and reuse.

The Co-creation of Products/Services model will bring end-users closer to the design and manufacturing phases by identifying consumer preferences via Big-data online mining product reviews and evaluating product specifications and prototypes via Living Lab to customise the end-user requirements. Benefited from the co-creation features, sets of sustainable production methods will be implemented and new products/services will be created.

The Sustainable Consumption model will develop a method to calculate the eco-points of products based on the outcome of FP7 myEcoCost project, assess product environment footprints (PEF), provide a traceability solution to monitor product's sustainability along the value chain, and support end-users and stakeholders to actively implement the circular economy via awareness raising and knowledge sharing activities.

The Collaborative Recycling/Reuse model will develop a system for stakeholders to interact with each other to facilitate the use/reuse of end-of-life products and reduce waste, and implement the eco-credits awarding scheme to encourage people to recycle/reuse.

This project will be demonstrated at a large scale in electrical and electronic products and farming/agri-foods sectors, provide an effective means to communicate with wide communities to disseminate the project outcome, and involve a large number of stakeholders along value and supply chains throughout the project lifetime, including end-users, producers, researchers and civil society.

An ICT platform will be developed to support the development, implementation, demonstration, communication and dissemination.

<b>CIRCUSOL</b>		<b>776680</b>
Title: <b>Circular business models for the solar power industry</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>8.255.590,00</b>	EU requested grant (€): <b>7.014.892,76</b>	

**Free keywords:** *Circular economy, business model, large-scale demonstrator, product-service systems, resource efficiency, solar power, photovoltaic, battery, innovation methodology, second-life products, co-creation*

### **Abstract:**

Solar power generates nearly 4% (and still growing) of Europe's electricity demand. In 2021, the 200 GW of capacity installed in Europe will result in saving of 219 million CO2 tons/year. By 2030, 8 million tons of PV panels are expected.

Resource efficiency is a critical success factor for the solar power sustainable growth. Performance-based, third-party ownership Product-Service System (PSS) has been widely seen as a key circular economic model to stimulate resource efficiency and reduce waste generation. CIRCUSOL aims to establish solar power as a spearhead sector to demonstrate a path driven by PSS business models towards a circular economy in Europe.

Through a co-creative approach with end-users and the entire value chain, CIRCUSOL will develop two main blocks of a circular PSS model: circular product management with re-use/refurbish/remanufacture ("second-life") paths in addition to recycling, and value-added new product-services for residential, commercial and utility end-users. Five large-scale, real-life demonstrators will be set up in these 3 market segments, in 3 European countries (FR, BE and CH) to validate market acceptance, business viability and resource efficiency benefits.

CIRCUSOL will deliver tangible innovation for the solar power industry with market-validated PSS business models, 2nd-life PV/battery labelling/certification protocols and cost/application analysis, and an info-sharing ICT platform. The results will be exploited in FR, BE and CH and prepared for replication in Europe (Letters of Support of stakeholders attached). CIRCUSOL will also deliver verified circular business innovation methodologies for broader use by other industries, sustainability professionals and academia; plus evidence-based knowledge in circular economy implementation for policy makers. All together, CIRCUSOL will contribute to a more resource efficient Europe, while reducing GHG emissions and creating new business opportunities and jobs.

<b>C-SERVEES</b>		<b>776714</b>
Title: <b>Activating Circular Services in the Electric and Electronic Sector</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>8.034.707,31</b>	EU requested grant (€): <b>6.349.067,37</b>	

**Free keywords:** *Customization; Electric and electronic sector; Ecodesign; Electrical and electronic Equipment (EEE); Waste of electrical and electronic equipment (WEEE); Ecoleasing; Eco-innovatives; NGOs; Large Demos*

### **Abstract:**

C-SERVEES aims to boost a resource-efficient circular economy in the electrical and electronic (E&E) sector through the development, testing, validation and transfer of new circular economic business models (CEBMs) based on systemic eco-innovative services that include: (1) eco-leasing of EEE, (2) product customization, (3) improved WEEE management, and (4) ICT services to support the other eco-services. ICT tools (relying on QR codes) will be developed as the driver of the proposed eco-innovative services to take full advantage of the potential and synergies of two major revolutions of our time: the circular economy and the Industry 4.0. The project will thus contribute to transform the E&E sector into circular and 4.0, raising new opportunities for end-users (such as their involvement in design or the access to a product as a service) and for social and solidarity economy (conducted by NGOs, like EMAUS, which employ people at risk of social exclusion to repair and prepare WEEE for re-use). The techno-economic, environmental and social viability of the new CEBMs will be validated through demonstrations dealing with four target products belonging to different EEE categories: large household appliances, IT equipment, telecommunications equipment, and consumer equipment. These EEE categories together account for 77% of WEEE collected in the EU.

The project will result in an estimated economic benefit of 57.03 M€ over the period 2022-2026, which taking into account the project budget (8.03 M€) yields a ROI ~ 7.1. Specifically, the project will generate in the mid-term an economic benefit of 28.4 M€/year, with about 355 green employees (including direct and indirect jobs) and a total reduction of 2,620 tonnes CO<sub>2</sub> eq/year.

C-SERVEES (10 Member States and Turkey, including industry, end-users and researchers, ensures that strategic, design and implementation decisions) will be in line with business realities and set the foundation for realistic market-ready solutions.

<b>HOUSEFUL</b>		<b>776708</b>
Title: <b>Innovative circular solutions and services for new business opportunities in the EU housing sector</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>54 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>8.535.247,50</b>	EU requested grant (€): <b>6.997.228,50</b>	

**Free keywords:** *Social innovation, systemic service, housing sector, construction, water re-use, bio-waste treatment, biogas production, wastewater, co-creation, circular economy business opportunities*

### **Abstract:**

The housing sector is a major contributor to current global problems of resource depletion and climate change, representing one of the most important consuming sectors at EU level: 50% of all extracted materials, 40% of final energy consumption, 33% of water consumption and 33% of all produced waste. The lock-in to the linear business models of today is causing many environmental problems and is one of the major barriers in transition towards a circular economy. HOUSEFUL project proposes an innovative paradigm shift towards a circular economy for the housing sector by demonstrating the feasibility of an integrated systemic service composed of 11 circular solutions. HOUSEFUL will introduce solutions to become more resource efficient throughout the lifecycle of a building, taking into account an integrated circular approach where energy, materials, waste and water aspects are considered. This approach fosters new forms of co-creation, increasing the collaboration among stakeholders of the housing value chain to develop new circular solutions and services. HOUSEFUL concept will be large scale demonstrated at 4 demo-sites in Austria and Spain, adapting the concept to different scenarios, including in social housing buildings. HOUSEFUL solutions will be evaluated from an environmental (Life Cycle Assessment), economic (Life Cycle Cost) and social (Social Assessment) point of view. The results obtained will be used to define an integrated HOUSEFUL service which will be driven and promoted through a SaaS (Software as a Service). The SaaS will integrate a Circularity Tool to quantify the circularity level of buildings and will include different circular solutions to be offered as services, encouraging the housing value chain to redesign traditional business models towards circular ones. 10 EU Follower buildings will be engaged with the support of a Collaborative Community of Housing Experts to replicate HOUSEFUL results and maximise the impact of the project.

<b>ReCiPSS</b>		<b>776577</b>
Title: <b>Resource-efficient Circular Product-Service Systems</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>8.833.302,10</b>	EU requested grant (€): <b>6.837.122,50</b>	

**Free keywords:** *white goods, washing machines, automotive parts, product-service systems*

### **Abstract:**

The overall goal of ReCiPSS is to explore success factors for circular manufacturing systems in two cases where OEMs have different levels control over their value chains: one case with full control, and one case with partial control. The project will achieve this goal through two industry-driven large-scale demonstrators of circular manufacturing systems in two key industries

The white goods demonstrator relates to a tightly connected value chain and will demonstrate the successful implementation of circular manufacturing systems where the OEM (Gorenje) is in full control of the entire product throughout all stages (i.e. design, manufacturing, forward supply chain, customer use phase, reverse supply chain, recovery activities and re-distribution). The demonstrator will develop and implement a pay-per-wash offering for 300 washing machines, using co-creation methods. Each washing machine will be refurbished twice and serve over 3 life cycles of 5 years. The generalization of this new business model should lead to additional revenues of €150M per year.

The automotive spare parts demonstrator relates to a more complex value chain where the OEM (Bosch) does not have full control of the product throughout all stages. In order to demonstrate how third-party automotive remanufacturers can be effectively integrated in circular supply chains while keeping their independence from the OEM, the demonstrator will streamline the reverse logistics flow for 80,000 cores, enabling aftermarket stakeholders to close the loop by using a single service provider for reverse logistics. Cores will be identified and evaluated only once and then directly shipped to the final destination (remanufacturer), allowing cost savings of €5 per core i.e. potential savings of €175M per year if generalized throughout the industry. Co-creation workshops with stakeholders will ensure that the way the used cores are identified and transported is optimally aligned with the needs of all parties involved.

<b>HYDROUSA</b>		<b>776643</b>
<b>Title: Demonstration of water loops with innovative regenerative business models for the Mediterranean region</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-02-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>7/1/2018</b>	Duration: <b>54 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>12.015.448,75</b>	EU requested grant (€): <b>9.958.706,88</b>	

**Free keywords:** *Closing water loops*

### **Abstract:**

HYDROUSA will provide innovative, regenerative and circular solutions for (1) nature-based water management of Mediterranean coastal areas, closing water loops; (2) nutrient management, boosting the agricultural and energy profile; and (3) local economies, based on circular value chains. The services provided lead to a win-win-win situation for the economy, environment and community within the water-energy-food-employment nexus.

HYDROUSA water loops will include water from non-conventional sources including wastewater, rainwater, seawater, groundwater and vapour water, all resulting in recovered and marketable products. HYDROUSA will demonstrate at large scale the feasibility and sustainability of innovative, low-cost water treatment technologies to recover freshwater, nutrients and energy from wastewater, salt and freshwater from seawater, and freshwater from atmospheric water vapour. Water conservation solutions including aquifer storage and sustainable agricultural practices including fertigation will be applied. The solutions will be demonstrated on 3 major touristic islands in Greece. Detailed technical and financial deployment plans will be established for replication in additional 25 locations worldwide. Through the on-site water loops of HYDROUSA, complex supply chains for resource recovery are not required, as producers are directly involved as consumers of derived products. HYDROUSA will combine traditional skilled workmanship with modern ICT integration in beautiful and smart automation systems. HYDROUSA will revolutionise water value chains in Mediterranean areas and beyond, from water abstraction to sewage treatment and reuse. The proposed HYDROUSA solutions show massive potential to change the way humans interact with water, food and energy.



<b>NextGen</b>		<b>776541</b>
Title: <b>Towards a next generation of water systems and services for the circular economy.</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-02-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>7/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>11.389.106,04</b>	EU requested grant (€): <b>9.965.230,51</b>	

**Free keywords:** *Circular water systems; Water reuse; energy recovery; materials recycling; large scale demonstration; business models; Energy recovery; Knowledge co-creation; Marketplace; Evidence Base*

### **Abstract:**

The NextGen initiative will evaluate and champion innovative and transformational circular economy solutions and systems that challenge embedded thinking and practices around resource use in the water sector. We will produce new understandings to underpin the exploitation of techniques and technologies that enhance our ability to recover, refine, reuse, repurpose, capture value from, and extend the use-life of, an ever-increasing range of resources and products, thereby projecting the European water and allied sectors as global circular economy pioneers. NextGen will demonstrate innovative technological, business and governance solutions for water in the circular economy in ten high-profile, large-scale, demonstration cases across Europe, and we will develop the necessary approaches, tools and partnerships, to transfer and upscale.

The circular economy transition to be driven by NextGen encompasses a wide range of water-embedded resources: water itself (reuse at multiple scales supported by nature-based storage, optimal management strategies, advanced treatment technologies, engineered ecosystems and compact/mobile/scalable systems); energy (combined water-energy management, treatment plants as energy factories, water-enabled heat transfer, storage and recovery for allied industries and commercial sectors) and materials (nutrient mining and reuse, manufacturing new products from waste streams, regenerating and repurposing membranes to reduce water reuse costs, and producing activated carbon from sludge to minimise costs of micro-pollutant removal).

The project mobilises a strong partnership of water companies, industry, specialised SMEs, applied research institutes, technology platforms, city and regional authorities and builds on an impressive portfolio of past research and innovation projects, leveraging multiple European and global networks guaranteeing real impact.

<b>Project O</b>		<b>776816</b>
Title: <b>Project Ô: demonstration of planning and technology tools for a circular, integrated and symbiotic use of water</b>		
Call Id: <b>H2020-CIRC-2017TwoStage</b>	Topic: <b>CIRC-02-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>10.692.937,68</b>	EU requested grant (€): <b>9.261.272,38</b>	

**Free keywords:** *Water Footprint; Advanced Oxidation Processes; Nanoadsorption; Modularisation; Demosntration activities; Industrial Symbiosis; Textile finishing; Food processing; Agriculture; Aquaculture*

### **Abstract:**

Project Ô intends to demonstrate approaches and technologies to drive an integrated and symbiotic use of water within a specific area, putting together the needs of different users and waste water producers, involving regulators, service providers, civil society, industry and agriculture. The project seeks to apply the pillars of integrated water management (IWM) as a model for “water planning” (akin to spatial planning) and to demonstrate low cost, modular technologies that can be easily retrofitted into any water management infrastructure at district/plant level, hence enabling even small communities and SMEs to implement virtuous practices. Technologies and planning instruments complement each other as the first make possible the second and the latter can provide as example or even prescribe the former (and similar technologies allowing virtuous water use practices). Indeed the technologies support the regulators in implementing policy instruments, as foreseen by IWM, for convincing stakeholders (like developers and industry) to implement water efficiency strategies and could include instruments for e.g. rewarding virtuous behaviours (for example: advantageous water tariffs), planning regulations that award planning consent more swiftly or even prescribe the use of water from alternative sources (including recycling). Project Ô has in summary the overall objective of providing stakeholders (everybody using or regulating the use of water in an area) with a toolkit that enables them to plan the use of and utilise the resource water whatever its history and provenance, obtaining significant energy savings in terms of avoided treatment of water and waste water and release of pressure (quantity abstracted and pollution released) over green water sources. This overall objective will be demonstrated in up to four sites each in different Countries of Europe and in Israel, involving industries, aquaculture and agriculture as well as local authorities of different sizes.

<b>GREEN INSTRUCT</b>		<b>723825</b>
Title: <b>Green Integrated Structural Elements for Retrofitting and New Construction of Buildings</b>		
Call Id: <b>H2020-EEB-2016</b>	Topic: <b>EEB-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>4.996.626,25</b>	EU requested grant (€): <b>4.996.626,25</b>	

**Free keywords:** *BIM, CFD, Construction & demolition waste, Energy efficient buildings, Extrusion, Geopolymer, Green wall, Magnesium oxychloride cement, Phase-change material, Polyurethane, Prefabricate, Rheology*

### **Abstract:**

The Green INSTRUCT project will develop a prefabricated modular structural building block that is superior to conventional precast reinforced concrete panels by virtue of its reduced weight, improved acoustic and thermal performance and multiple functionalities. The Green INSTRUCT block consists of over 70% of CDW in weight.

The Green INSTRUCT project will: (i) achieve sustainability and cost savings through CDW sourced materials and C2C, (ii) develop efficient, robust, eco-friendly and replicable processes, (iii) to enable novel cost efficient products and new supply chains, (iv) develop a building block that renders refurbished or new buildings safe and energy efficient and (v) safeguard a comfortable, healthy and productive environment. They can be achieved by defining the structural, thermal and acoustic performance of our final product to be competitive to similar products in the market. The types and sources of CDW are carefully identified, selected and processed while the supply chain from the sources, processing, fabrication units to assembly site of the whole modular panel will be optimized. The project is guided by a holistic view through building information modelling and optimal overall performance. This includes considering the life cycle analysis, weight, structural performance, thermal and acoustic insulation, connectivity among modular panels and other structural/non-structural components as well as the compatibility of different internal parts of the each modular panel. In order to homogenize the production process, all individual elements are fabricated by extrusion which is a proven cost effective, reliable, scalable and high yield manufacturing technique. The concept, viability and performance of developed modular panels will be verified and demonstrated in two field trials in test cells.

<b>InnoWEE</b>		<b>723916</b>
<b>Title: Innovative pre-fabricated components including different waste construction materials reducing building energy and minimising environmental impacts</b>		
Call Id: <b>H2020-EEB-2016</b>	Topic: <b>EEB-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>3.361.000,00</b>	EU requested grant (€): <b>3.361.000,00</b>	

**Free keywords:** *Construction and Demolition Waste, prefabricated panels, geopolymers, insulating panel, radiating panel*

### **Abstract:**

The basic idea is to embed the waste from building demolition (fragmented bricks, fragmented plaster or concrete, fragmented glasses, machined wood from windows frame or from wood beams after demolition etc.) in a geopolymer matrix to produce prefabricated panels for different use.

The main objective of InnoWEE is in fact the development of an optimized reuse of Construction and Demolition Waste (CDW) materials producing high add value prefabricated insulating and radiating panels to be used in energy efficient buildings.

The proposal is based on:

- 1) Recovery, selection and disassembling of CDW that will be characterized and eventually treated to yield suitable raw materials to be used for production of prefabricated components.
- 2) Development of new high performance prefabricated insulating geopolymeric panels for building walls envelopes and radiating panels for indoor wall and ceilings with low environmental impact, low embodied energy, low CO2 emissions, high thermal performance. Panels will be fabricated recycling cement, bricks, mortars, glass and wood reaching at least 30% of CDW.
- 3) To install the panels in demo sites characterized by different climate to evaluate their performance in terms of reducing energy use and minimizing environmental impacts.
- 4) To use an integrated design process and a holistic approach for the whole life cycle of the materials and components and produce a material that is cost effective, competitive, robust, reliable and low maintenance.
- 5) To create practical and sustainable building solutions that are easy to integrate into building designs, easy to install, take in consideration the needs of the stakeholders that strongly influence the market, and have been tested to meet all the current standards.

<b>RE4</b>		<b>723583</b>
<b>Title: REuse and REcycling of CDW materials and structures in energy efficient pREfabricated elements for building REfurbishment and construction</b>		
Call Id: <b>H2020-EEB-2016</b>	Topic: <b>EEB-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.117.523,75</b>	EU requested grant (€): <b>4.808.148,75</b>	

**Free keywords:** *Construction and demolition*

### **Abstract:**

The overall goal of the RE4-Project is to promote new technological solutions for the design and development of structural and non-structural pre-fabricated elements with high degree of recycled materials and reused structures from partial or total demolition of buildings. The developed technology will aim at energy efficient new construction and refurbishment, thus minimizing environmental impacts. The RE4-Project targets the demonstration of suitable design concepts and building elements produced from CDW in an industrial environment, considering perspective issues for the market uptake of the developed solutions. The technical activities will be supported by LCA and LCC analyses, certification and standardization procedures, demonstration activities, professional training, dissemination, commercialisation and exploitation strategy definition, business modelling and business plans.

The overarching purpose is to develop a RE4-prefabricated energy-efficient building concept that can be easily assembled and disassembled for future reuse, containing up to 65% in weight of recycled materials from CDW (ranging from 50% for the medium replacement of the mineral fraction, up to 65% for insulating panels and concrete products with medium mineral replacement coupled with the geopolymer binder). The reusable structures will range from 15-20% for existing buildings to 80-90% for the RE4-prefabricated building concept.

<b>VEEP</b>		<b>723582</b>
<b>Title: Cost-Effective Recycling of CDW in High Added Value Energy Efficient Prefabricated Concrete Components for Massive Retrofitting of our Built Environment</b>		
Call Id: <b>H2020-EEB-2016</b>	Topic: <b>EEB-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>4.929.753,75</b>	EU requested grant (€): <b>4.929.753,75</b>	

**Free keywords:** *Circular economy, Construction and Demolition waste recycling, Insulated wall panels*

### **Abstract:**

Around 461 million ton/year of C&DW are generated in EU28. Recent studies on the characterization of C&DW samples at European level revealed a predominant fraction of concrete (52% average). Over the last years, novel technology has been developed aiming to guarantee high quality recycled concrete aggregates for use in new concrete, thereby closing the concrete loop. The most advanced concrete recycling technologies currently produce coarse (>4mm) recycled concrete aggregates by removing cement paste from the surface of the aggregates. However, the fine (0-4 mm) fraction, ca. 40% of the concrete waste, still faces technical barriers to be incorporated into new concrete and consequently, is often down-cycled. At the other extreme, there are minor (e.g. glass) and emerging (e.g. mineral wool) C&DW materials, currently accounting for 0.7% of the total, but revealing growing rates as consequence of European regulations. Those emerging C&DW streams have not yet found technological and business solutions, being mostly landfilled. On the other hand, concrete is the most widely used material in building, with a growing trend towards prefabrication. The European precast concrete sector faces diverse needs for resource efficiency improvement (reduction in natural resource consumption and metabolization of waste materials, reduction in carbon footprint and embodied energy, design for reuse, increase in process efficiency and waste minimization, lighter solutions, enhanced thermal performance through novel cost-effective insulating materials). Aiming at facing these challenges, VEEP main objective is to eco-design, develop and demonstrate new cost-effective technological solutions that will lead to novel closed-loop circular approaches for C&DW recycling into novel multilayer precast concrete elements (for both new buildings and refurbishment) incorporating new concretes as well as superinsulation material produced by using at least 75% (by weight) of C&DW recycled materials.

<b>PLUG-N-HARVEST</b>		<b>768735</b>
Title: <b>PLUG-N-play passive and active multi-modal energy HARVESTing systems, circular economy by design, with high replicability for Self-sufficient Districts Near-Zero Buildings</b>		
Call Id: <b>H2020-EEB-2017</b>	Topic: <b>EEB-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>51 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.896.147,50</b>	EU requested grant (€): <b>5.993.466,25</b>	

**Free keywords:** *Adaptive dynamic building envelopes, building control, energy management/harvesting in building and district level*

### **Abstract:**

Conventional Retrofitting (CR) can result in high energy use reductions at the expense of high installation costs and, usually, without being able to directly perform harvesting from Renewable Energy Sources (RES). Building Automation (BA) systems, as compared to CR, can result in medium energy use reductions and in low or medium harvesting from RES at the expense of medium installation costs and medium operational costs. Recently, the concept of Adaptable/Dynamic Building Envelopes (ADBE) - such as Multifunctional Façade Modules - has been proposed towards overcoming many of the shortcomings of CR and BA. ADBE systems can result in high energy use reductions and high harvesting from RES at the expense of medium-to-high installation costs and medium operational costs. The main strategic goal of the PLUG-N-HARVEST proposal is to design, develop, demonstrate and exploit a new modular, plug-n-play concept/product for ADBE - deployable to both residential and non-residential buildings - which is able to provide high (maximum possible) energy use reductions and high (maximum possible) energy harvesting from RES both at the single-building and the district scale while requiring medium-to-low installation costs and almost-zero operational costs. Moreover, by appropriately exploiting its attributes, the PLUG-N-HARVEST system will be designed and implemented considering circular economy principles, which will allow implementing new business models based on leasing and renting modes and, by this, leaving the door open to massive implementations. Four different multi-building Pilots – in Germany, Spain, Greece and the U.K. - will be used for demonstrating the use of the integrated PLUG-N-HARVEST system in full-scale, on a 24/7 basis and for a long period. The Pilots involve buildings with all different kinds of energetic, thermal and occupants' interactions, home occupants of highly diverse behaviour and background and include both residential and non-residential buildings.

<b>DRALOD</b>		<b>820554</b>
<b>Title: Renewables-based drying technology for cost-effective valorisation of waste from the food processing industry</b>		
Call Id: <b>H2020-EIC-FTI-2018-2020</b>	Topic: <b>EIC-FTI-2018-2020</b>	Type of Action: <b>IA</b>
Project start date: <b>8/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.468.152,50</b>	EU requested grant (€): <b>1.906.892,00</b>	

**Free keywords:** *high growth business, environment,*

### **Abstract:**

The EU27 annually generates 90 million tonnes of food waste, with a 39% generated in the manufacturing processes. The food processing industry critically needs sustainable solutions for waste valorisation and re-use.

Our Proposition: DRALOD, a disruptive replicable drying process 100% environmentally-friendly and extremely cost-effective:

- Environmentally: DRALOD uses renewables only, to allow valorisation of plant-origin waste into highly valuable functional ingredients as demanded by the nutraceutical and pharmaceutical industry.
- Cost-effectiveness: DRALOD drying plant has a pay-back period shorter than 6 years for an average plant with 35,000 tonnes/year capacity.

Our Assets:

- Consortium's technological background: The Coordinator (PERNIA) is experienced in solar drying plants with licensing rights on a leading solar heating technology. OKOTHERM is specialist in the development and manufacturing of innovative biomass heating systems since 1995, while RTDPs DFBZ and RISE bring world-class knowledge for implementation of energy recovery and smart control units for DRALOD combined solar-biomass drying system.
- Industry-driven vision: PERNIA's turnover is over €2.2million in 2017, with a net profit increase growth of 32% with respect to 2016, operating in solar drying for BSG valorisation, evidencing a high potential.

Target market: The generated volume of high-water content waste from plant-origin food processing, leads to an SAM estimated at €1,395 million in 2024.

Business model: Commissioning of DRALOD drying plants under a franchise business model, designed to overcome the up-front investment barriers by lowering our customers' required initial investment in 30%.



## CE relevant projects - Horizon 2020 calls 2016-2018

Commercialisation strategy: The Brewery sector is our beachhead market. We currently work for the largest Spanish Brewery group. Our follow-on markets will include wineries, fruit juice and the olive oil sectors.

Financial projections: 44 million € and 80 new direct jobs by 2024.

<b>Smartmushroom</b>		<b>820352</b>
Title: <b>Smart MAnagement of spent mushRoom subsTrate to lead the MUSHROOM sector towards a circular economy</b>		
Call Id: <b>H2020-EIC-FTI-2018-2020</b>	Topic: <b>EIC-FTI-2018-2020</b>	Type of Action: <b>IA</b>
Project start date: <b>8/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.002.793,75</b>	EU requested grant (€): <b>2.264.143,13</b>	

**Free keywords:** *Mushroom, Spent Mushroom Substrate, organic fertilizers, anaerobic digestion, biogas, drying, circular economy, agricultural waste, organic farming*

### **Abstract:**

Waste from animal breeding and agriculture, specifically horse and chicken manure and wheat straw, are the raw materials of the growing substrate of mushroom. To grow 1 tonne of mushroom, 3 to 4 tonnes of substrate are needed. However, when mushroom production is completed the substrate cannot be used for another growing cycle due to the depletion of nutrients needed for mushroom growing and it is called Spent Mushroom Substrate (SMS) and becomes a waste that should be managed according to regulations. In Europe, c.a. 3.65 million tons of SMS are generated each year. SMS is a high-moisture content bulk material rich in organic matter and nutrients and it could be reused in agriculture by adding it to the soils as amendment or mulch or weathered to be reused as casing soil. However, nitrates directive set a disposal limit that makes that large quantities of SMS cannot be simply spread in soils next to growers' facilities, as there is a high risk of leachates and water pollution. Due to its low bulk density and high water content, transportation costs are high and therefore storage is becoming a sound problem. SmartMUSHROOM aims to increase mushroom growers' waste management efficiency by using a new technology which allow them to obtain enough biogas from fresh SMS to dry a mixture of digestate and additional fresh SMS and pelletize it targeting to obtain a marketable high-quality organic fertilizer rich in organic matter and in nutrients, easy to handle, store and transport to any farming region in Europe. A perfect example of biobased circular economy. The aim of the project is to build a pilot plant to demonstrate the technology and find the best commercial formulation for the pellets to enter organic farming market. After the end of project we aim to build at least 18 treatment plants that will place in market 153,000 tonnes of SMS-pellets, generating a total Turnover of 54M€ in the period 2021-2025 and up to 105 related new jobs.

<b>SWAMP</b>		<b>777112</b>
Title: <b>Smart Water Management Platform</b>		
Call Id: <b>H2020-EUB-2017</b>	Topic: <b>EUB-02-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>CNECT/E/04</b>
Total costs (€): <b>1.478.090,00</b>	EU requested grant (€): <b>1.478.090,00</b>	

**Free keywords:** *Internet of Things, Water Management, Autonomous devices*

### **Abstract:**

The SWAMP project develops IoT based methods and approaches for smart water management in precision irrigation domain, and pilots them in Italy, Spain, and Brazil (2).

Water is vital for ensuring food security to the world's population, and agriculture is the biggest consumer amounting for 70% of freshwater. The water wastages are caused mainly by leakages in distribution and irrigation systems, and in the field application methods. The most common technique, surface irrigation wastes a high percentage of the water by wetting areas where no plants benefit from it. Localized irrigation can use water more efficiently and effectively, avoiding both under-irrigation and over-irrigation. However, in an attempt to avoid under-irrigation, farmers feed more water than is needed resulting not only to productivity losses, but also water is wasted. Therefore, technology should be developed and deployed for sensing the level of water needed by the plantation and for flowing the water to places where and when needed. The SWAMP project addresses these issues by use of the Internet of Things (IoT), data analytics, autonomous devices and other related technologies.

The challenges addressed by SWAMP project are following: 1) Reducing effort in software development for IoT-based smart applications. 2) Automating advanced platforms and integrating different technologies and components. 3) The integration of heterogeneous and advanced sensors, particularly flying sensors (drones) providing precision in the water supply for irrigation. 4) The use of a Software Platform together with technologies such as IoT, Big Data, Cloud/Fog and drones for the deployment of pilot applications for smart water management. 5) Proposing, testing and validating new business models for using IoT in smart water management settings. 6) Technological components must be flexible and adaptable enough in order to adapt to different contexts and to be replicable to different locations and contexts.

<b>triboREMEDY</b>		<b>829047</b>
<b>Title: The triboreactor as breakthrough remediation strategy for safeguarding human and environmental health</b>		
Call Id: <b>H2020-FETOPEN-2018-2019-2020-01</b>	Topic: <b>FETOPEN-01-2018-2019-2020</b>	Type of Action: <b>RIA</b>
Project start date: <b>3/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>REA/A/05</b>
Total costs (€): <b>2.831.993,75</b>	EU requested grant (€): <b>2.831.993,75</b>	

**Free keywords:****Abstract:**

Environmental remediation for safeguarding human health is difficult. Effective processes enabling scalable operability are lacking. triboREMEDY aims at solving this impasse by providing the foundational steps towards the novel technology called “tribolysis” for safe, controlled, and efficient degradation of hazardous chemicals and effective inactivation of the pathogens. The scientific and technological breakthrough of triboREMEDY is based on the generation of nascent surfaces, high pressures, and shearing forces that will supply the required activation energy for dissociation of polychlorinated biphenyls (PCBs) and cell disintegration of pathogens. The centrepiece of triboREMEDY is the fully-controlled “triboreactor” in which mechanically (tribologically) induced chemical reactions take place as viable alternative to A) highly costly incineration or storage of hazardous waste, notably PCBs, and B) chemical, thermal inactivation or ultra-violet irradiation of pathogens in drinking water. The main project aim is to set scalable design rules for the “triboreactor” (proof of concept) based on the identification of PCB degradation products and pathogen inactivation pathways together with their relationships to operational parameters. In addition to this, the long-term vision beyond halogen elimination of PCBs and disinfection of drinking water avoiding chlorine treatments, will cover other toxic organic chemicals, application in chemical synthesis, catalysis free of critical raw materials, coating processes, requiring sensors for the monitoring of trace components, opening a wide new scientific and technological field. triboREMEDY will be driven by a multidisciplinary team of excellent researchers in mechanical engineering, chemistry, physics, biology, and medicine enabling the required unique breakthrough and interdisciplinary approach.

<b>BioDie2020</b>		<b>737802</b>
<b>Title: Demonstration of new, challenging and high FFA waste oil and fat feedstock in biodiesel process with improved costs, conversion and high fuel quality</b>		
Call Id: <b>H2020-FTIPilot-2016-1</b>	Topic: <b>FTIPilot-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.825.586,25</b>	EU requested grant (€): <b>2.119.087,01</b>	

**Free keywords:** *biodiesel, demonstration, waste, feedstock, oils and fats, FOG, high FFA, conversion, energy efficiency, fuel quality, closed loop business model, commercialisation, biofuel, circular economy,*

### **Abstract:**

BioDie2020 will recover unconventional, degraded waste oils & fats, notably from Water Company infrastructures, and demonstrate the conversion of these wastes as a sustainable feedstock for biodiesel production. This break-through & beneficial pathway will maximise the use of waste oils & fats on a large scale for the 1st time on the biodiesel market, leading to lower transport carbon emissions. BioDie2020 FTI combines 5 top EU players in an agile & direct value-chain, working on this industry-wide milestone which will improve costs & conversion, achieving high fuel quality. Project coordinator Argent (UK, INDUS), a forward-thinking biofuel leader, will thus demonstrate biodiesel production in a closed-loop business model. 2 key process improvements will go from TRL6 to 7 at Argent's biodiesel plant (site at Stanlow, UK): i) biofuel technology provider BDI (Austria, SME) will deliver Sulphur reduction in the biodiesel process; ii) microwave technology provider LJMU (UK, Uni) will integrate their bespoke microwave unit to improve pre-treatment of challenging feedstocks. Stagecoach (UK, INDUS), a leading EU captive bus fleet service provider, will perform field trials of final biodiesel. Quantis (France, SME), an ambitious EU SME will perform LCA & LCC analysis of the overall process, ensuring sustainability objectives are achieved. BioDie2020 partners own IP on each technical brick, giving pathways to market & business opportunities. Argent will save ~€5 million/year on feedstock costs, improving ROIC from 12% to 18% by 2019. Demo of BDI's new process will confer a competitive edge on the retrofit market, giving them a ~25% sales increase by 2020. BioDie2020 will deliver 17 direct jobs and ~100 indirect jobs created or sustained in the EU by 2020. Argent's ultimate aim is to invest in biofuel deployment via this reproducible waste-to-biodiesel plant (embedded in a closed-loop business model) with market replication by 2020 via commissioning or acquisition & retrofit.

<b>BIOMULCH</b>		<b>737741</b>
Title: <b>Integrated solution for innovative biodegradation control of agricultural plastic mulches</b>		
Call Id: <b>H2020-FTIPilot-2016-1</b>	Topic: <b>FTIPilot-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.976.993,75</b>	EU requested grant (€): <b>1.613.667,50</b>	

**Free keywords:** *biodegradation, bioplastic, mulch-films, agriculture, plasticulture, resource-efficiency, soil-protection.*

### **Abstract:**

Nowadays, mulching is an essential technique used in agriculture to satisfy the worldwide growing demand for agricultural products. It consists of covering the soil surface in order to modify climate conditions and favouring the crops. Conventional mulch is made of polyethylene plastic with important limitations: the plastic has to be removed after the harvest (time consuming, expensive & 10-20% remaining at soil) and it is difficult to be recycled due to its high contamination by ground, stones or waste, being the most part (45.2%) placed in landfills. Therefore, plastic mulches cause serious problems of environmental and economic concerns. Other developed mulch alternatives are not sufficient: oxodegradable (based on polyethylene, are a risk of accumulation in environment) and biodegradable (do not guarantee total degradation under uncontrolled conditions and they are three times more expensive).

There is a market demand to find alternatives. Our innovative product, BIOMULCH, will be a biobased mulch with controlled biodegradation (independent from temperature, humidity and soil conditions) and being cost competitive (€1,100/ha respect to €3,000/ha of polyethylene, €2,078/ha of oxodegradable and €2,150/ha of biodegradable), covering the current agriculture market needs. BIOMULCH will be commercialised as a kit and will guarantee the farmers the complete mulch film biodegradation when is exactly required by them. The mulch film will be fully degraded in a 30-40 days period with our innovative mulching technique.

As a result, it is expected an important growth for consortium companies, obtaining a total turnover above €354M in 2018-2022. Also it is expected an important benefit for UE, above 759M euros by 2022, derived from savings for farmers and waste savings. BIOMULCH counts already with letters of support of prestigious companies which are very interested in its business model.

<b>NIRSort</b>		<b>760642</b>
Title: <b>Development and Market Replication of novel NIR-transparent polymer colourants to replace carbon black, and allow the sorting of black and coloured polymers from mixed waste streams</b>		
Call Id: <b>H2020-FTIPilot-2016-1</b>	Topic: <b>FTIPilot-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.474.375,00</b>	EU requested grant (€): <b>1.005.762,50</b>	

**Free keywords:** *near infra-red sorting black coloured plastic recycling pigment carbon black*

### **Abstract:**

Currently, around 25 million tonnes of plastic waste is created each year across Europe, primarily from three sources – consumer packaging, WEEE disposal and vehicle dismantling. The requirements for sorting and segregation of polymer types within waste streams are intensifying - more stringent targets for recycling are forcing recyclers to segregate more difficult materials that they could formerly lose as scrap; increased volumes and high labour costs force the industry to reduce manual segregation and increase shredding; this requires more automation of sorting facilities; producer regulations increase the responsibility for the supply side to ensure identifiability of the materials they provide, through to the point of recycling. Automated sorting operations are all based on Near Infra-Red spectroscopy, which can rapidly recognize the NIR signature of different polymers, and activate sorting equipment to segregate the polymer types. NIR is the only technique that is fast enough, powerful enough and robust enough to be usable on a recycling line. BUT the NIR technique fails to “see” black materials and some colours, because the carbon black pigment used also absorbs the NIR beam and prevents the reflection of the polymer’s characteristic spectrum back to the sensor. This project, based on our successful previous work, will develop a range of “NIR transparent” alternatives to carbon black, to enable the NIR sorting operations to segregate black and coloured plastic where they have been unable to before, to a purity that will be usable in high value recycled engineering polymers. We will base our market entry strategy on a “spiral economy” approach, where the packaging industry uses virgin detectable polymer to make their packaging, and this, with its product life of under one year, is recycled into high quality engineering plastics for the manufacturers of automotive and consumer durables to use without waiting for returns from their own end-of-life materials.



<b>SILENT RUBBER PAVE</b>		<b>760564</b>
<b>Title: Accelerate the commercialization of RARX technology process in the global markets of ECOLOGICALLY FRIENDLY SILENT RUBBER PAVEMENTS</b>		
Call Id: <b>H2020-FTIPilot-2016-1</b>	Topic: <b>FTIPilot-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>4/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.995.161,25</b>	EU requested grant (€): <b>2.096.612,88</b>	

**Free keywords:** *Rubber pavements, crumb rubber, reuse of the end-of-life tires*

### **Abstract:**

Paving industry sector faces nowadays different challenges as the need for less maintenance, more silent and more environmental friendly pavements. The use of crumb rubber (CR) derived from end-of-life tires (ELTs) in bituminous mixtures replies to all these needs however its wide implementation has not been extended due mainly of the following barriers that prevent its wide implementation are:

- i. A crumb rubber alone cannot be placed directly into the mixes (dry method) because it will swell and absorb the bitumen causing raveling in the roads
- ii. The wet method works well but requires that every contractor buys expensive equipment
- iii. If crumb rubber is used in terminal blends it is essentially a waste of product because over time it becomes all digested

The solution proposed in this initiative to overcome these barriers is the use of use of reacted and activated rubber that it can be used directly into the plugmill of a contractor's plant. The SILENT RUBBER PAVEMENTS project main goal is to market uptake and achieve a wider deployment of the RARX technology, based in a patent of CONSULALPV, that has the best of both methods:

- Easy to apply and use as in the "dry method"
- Performance and cost effectiveness beyond that of the "wet method"

To enter in the global market, two large companies (Valoriza SM- Composan) have made an agreement with a specialized SME (Consulpav, a first industrial applicant) who has developed and patented the RARX technology to exploit at European level. SACYR, a multinational pavement construction company present in more than 20 countries, will be the responsible for the pilot construction in different climate and evaluation. Our distributor in Italy, FHL group will assist the consortia in internationalizing our commercialization strategy.

<b>CE2019</b>		<b>831730</b>
<b>Title: The sustainable transition to a low carbon, climate-resilient circular economy: Creating the knowledge base</b>		
Call Id: <b>H2020-IBA-SC5-PRESIDENCY-2018</b>	Topic: <b>IBA-SC5-PRESIDENCY-2018</b>	Type of Action: <b>CSA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>12 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>109.250,00</b>	EU requested grant (€): <b>109.250,00</b>	

**Free keywords:** *Circular economy, sustainability, climate-resilience, knowledge base*

### **Abstract:**

The aim of the project is to organize a conference “The sustainable transition to a low carbon, climate-resilient circular economy: Creating the knowledge base, CE2019” in cooperation with the Finnish government. The CE2019 conference will be part of The Sustainable Days 30.9.-1.10.2019, Presidency Event Finland that will be organized partly jointly and partly in parallel with two conferences that are: Sustainable and smart manufacture (MF) and Sustainable innovation (SI). The event is planned as a flagship event during the Presidency of the Finland of the Council of the European Union on 30 September to 1 October 2019.

The opening sessions on the first day of the two-day The Sustainable Days 30.9.-1.10.2019 will be organised jointly by the three separate conferences, while the second day programs are conference-specific, taking place in parallel and in the same venue. The second day will end to a joint adjourn, that summarises and concludes the main findings and messages of the opening session and the three conferences, as well as draft key messages and recommendations for future actions on sustainable transitioning towards low carbon, climate-resilient circular economy in the European Union. Organising the three conferences jointly and in parallel is expected to bring several benefits, in particular as regards the visibility, spreading the information and invitations, management of the events, as well as the impact, networking, and sharing of knowledge and resulting in common learning.

The CE 2019 conference will be addressing the state-of-the art of science in circular economy. The aim is the identification of policy options and priorities via review and assessment of developments, and sharing of information and comparison of points of views; and efficient networking of various stakeholders and support to their activities, e.g. natural scientists, social scientists, businesses, investors, local authorities, environmental organisations, museums and schools.

<b>IMAGINE</b>		<b>731761</b>
Title: <b>Robots Understanding Their Actions by Imagining Their Effects</b>		
Call Id: <b>H2020-ICT-2016-1</b>	Topic: <b>ICT-26-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>CNECT/A/01</b>
Total costs (€): <b>3.797.050,00</b>	EU requested grant (€): <b>3.797.050,00</b>	

**Free keywords:****Abstract:**

Today's robots are good at executing programmed motions, but they do not understand their actions in the sense that they could automatically generalize them to novel situations or recover from failures. IMAGINE seeks to enable robots to understand the structure of their environment and how it is affected by its actions. "Understanding" here means the ability of the robot (a) to determine the applicability of an action along with parameters to achieve the desired effect, and (b) to discern to what extent an action succeeded, and to infer possible causes of failure and generate recovery actions.

The core functional element is a generative model based on an association engine and a physics simulator. "Understanding" is given by the robot's ability to predict the effects of its actions, before and during their execution. This allows the robot to choose actions and parameters based on their simulated performance, and to monitor their progress by comparing observed to simulated behavior.

This scientific objective is pursued in the context of recycling of electromechanical appliances. Current recycling practices do not automate disassembly, which exposes humans to hazardous materials, encourages illegal disposal, and creates significant threats to environment and health, often in third countries. IMAGINE will develop a TRL-5 prototype that can autonomously disassemble prototypical classes of devices, generate and execute disassembly actions for unseen instances of similar devices, and recover from certain failures. For robotic disassembly, IMAGINE will develop a multi-functional gripper capable of multiple types of manipulation without tool changes.

IMAGINE raises the ability level of robotic systems in core areas of the work programme, including adaptability, manipulation, perception, decisional autonomy, and cognitive ability. Since only one-third of EU e-waste is currently recovered, IMAGINE addresses an area of high economical and ecological impact.

<b>AQUARIUS</b>		<b>731465</b>
Title: <b>BROADBAND TUNABLE QCL BASED SENSOR FOR ONLINE AND INLINE DETECTION OF CONTAMINANTS IN WATER</b>		
Call Id: <b>H2020-ICT-2016-1</b>	Topic: <b>ICT-29-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>CNECT/A/04</b>
Total costs (€): <b>3.891.263,75</b>	EU requested grant (€): <b>3.891.263,75</b>	

**Free keywords:** *quantum cascade laser, external cavity,  $\mu$ EC-QCL, MOEMS, waveguide, infrared spectroscopy, hydrocarbon monitoring, water sensing, waste water, drinking water, online, inline, Microoptics, Photonics*

### **Abstract:**

AQUARIUS proposes disruptive improvements in laser based water sensing employing MIR quantum cascade lasers (QCLs). It is motivated by

- i) the EC Water Framework Directive (2000/60/EC) where hydrocarbons are identified as priority hazardous substances,
- ii) the industrial and regulatory need for fast and continuous detection of contaminants and
- iii) the current state-of-the-art of measuring these substances using QCLs as defined by project partner QuantaRed Technologies and described in ASTM D7678.

AQUARIUS will improve this offline method by developing pervasive online and inline sensing strategies based on advanced photonic structures. For improved specificity a broadly (200 cm<sup>-1</sup>) tunable MOEMS based  $\mu$ EC-QCL source will be developed into a core spectrometer. High power, mode-hop free operation and unprecedentedly fast data acquisition (1000 spectra/s) will assure high S/N-ratios and thus high sensitivity. The system for online sensing (LOD: 1ppm) is based on automated liquid-liquid extraction and will be validated by project partner OMV for process and waste water monitoring. It will also be tested for identifying different sources of contaminations by project partner KWR in their water treatment and purification facilities. The system for inline sensing will be based on integrated optical circuits (IOC) including waveguides for evanescent wave sensing. Switching between individual waveguides of the IOC will enable quasi-simultaneous sample and background measurement and thus assure excellent long-term stability. By enrichment of analytes in polymer layers LODs as required for drinking (0.5ppb) and groundwater (50ppb) will be reached.

AQUARIUS covers the supply chain from research institutes to system integrator and end users. It will push the online system from TRL 3 to 7 and the inline system from TRL 2 to 4 and thus reinforce the industrial leadership of the project partners regarding QCL based liquid sensing and photonic components (source, detector and IOCs).

<b>PTwist</b>		<b>780121</b>
Title: <b>PTwist: An open platform for plastics lifecycle awareness, monetization, and sustainable innovation</b>		
Call Id: <b>H2020-ICT-2017-1</b>	Topic: <b>ICT-11-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>CNECT/E/03</b>
Total costs (€): <b>2.178.353,75</b>	EU requested grant (€): <b>1.824.683,38</b>	

**Free keywords:** *blockchain technologies, gamification, plastics reuse inventions, environment, circular economy, market innovation, communities empowerment, rewarding mechanisms*

### **Abstract:**

PTwist aims to design, deploy, and validate an open platform which will twist plastic reuse practices, by boosting citizens awareness, circular economy practices, and sustainable innovation inline with the new plastics economy vision. This will be achieved by offering : a) crowdsourcing tools to enable generation of an evolving plastic materials reuse taxonomy and an open plastic reuse machinery designs repository; b) a monetary system of PCoins and PWallets maintained by a blockchain based architecture which will safeguard trusted plastics reuse transactions among citizens and inventors (such as fablabs); c) a citizens and communities rewarding and engagement experiences by interactive and collaborative gamification which embeds Pcoins crediting; d) a virtual marketplace for exhibiting and commercializing of PTwist inspired plastics reuse products monetized in the proposed PCoins unit. Cutting edge gamification, analytics, and circular economy mechanisms will be integrated under an open platform to be validated and stress tested under a common use cases methodology. Three local and globally synchronized pilots will intensify all stakeholders (citizens communities, inventors, innovators, and entrepreneurs) involvement and engagement, with emphasis on the social gains and sustainability potential. PTwist will largely impact : citizens and grassroots groups co-creation, innovative and trusted collaboration and knowledge transfer by increasing all stakeholders awareness; plastics as an asset potential due to increasing its circular economy re-entering; and blockchain based novel routes to markets. Innovation activities in PTwist will be based upon existing open source, blockchain, gaming, crowdsourcing components, open data solutions and developments to the largest possible extent.

<b>C-VoUCHER</b>		<b>777773</b>
Title: <b>Circularize ValUe CHains across European Regional Innovation Strategies</b>		
Call Id: <b>H2020-INNOSUP-01-2017-twoStage</b>	Topic: <b>INNOSUP-01-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>4/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>EASME/A/01</b>
Total costs (€): <b>5.210.220,64</b>	EU requested grant (€): <b>4.999.393,50</b>	

**Free keywords:** *circular economy, disruptive SMEs, key enabling technologies, vouchers, circularization, rooted industries, adoptive SMEs, sustainability,*

### **Abstract:**

C-VoUCHER aims to develop new circular (cradle to cradle) value chains, disrupting traditional linear (cradle to waste) business models by means of cross-fertilization with Design Thinking experts and Circular Disruptors.

This approach is empowered by 6 Regional entities (2 leading ones from SE and DK and 4 learning ones from ES, FR, PL and RO), which together with their 41 clusters representing 5,763 SMEs (linked as 3rd Parties, including 11 gold, 4 silver and 7 bronze label ones) will work, at cross-border level, on embedding circular economy (CE) model in their Smart Specialization Strategies.

C-VoUCHER is the proof-of-concept framework where 24 selected Classic SMEs from traditional industries (Agro-Food, Health, Sea, Textile, and Manufacturing), will be offered an innovative 4-phase Circularity Program to develop 12 Circularity Solutions, to be then introduced in 42 Adopter SMEs with similar challenges. The regional CE Champions will be showcased to create ‘school’ at Regional Level and beyond. The project will leverage €6M of complementary funding for CE Champions and Adopters (provided by private and public investors). Also, a ‘Circular Design Toolkit for Regions’ will be produced to mainstream the methodology in the other EU Regions.

The project will be coordinated by FBA, the European leader in Financial Support to Third Parties and supported by BLUMORPHO (Business and LEAN Innovation Accelerator) and Fundingbox Communities (expert in online marketing and community building). Industry actors: MADE (representing manufacturing companies), ARLA (biggest Scandinavian dairy producer), Green Ship of the Future (private partnership working for cleaner maritime industry), Neuca (Polish entity from Health sector), Lifestyle & Design Cluster (specializing in Textiles), will help to define the industry challenges.

C-VoUCHER will demonstrate how Europe can disrupt traditional value chains and become the Europe of entrepreneurial regions.

<b>BRINE MINING</b>		<b>739507</b>
<b>Title: Applying circular economy solutions in industrial wastewater management: request of SME Associate to develop the necessary energy simulation tools for recovery of waste heat from industrial operations</b>		
Call Id: <b>H2020-INNOSUP-02-2016</b>	Topic: <b>INNOSUP-02-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>12 months</b>	Unit: <b>EASME/A/01</b>
Total costs (€): <b>82.000,00</b>	EU requested grant (€): <b>82.000,00</b>	

**Free keywords:** *brine; management; waste heat; simulation; energy recovery; circular economy; resource efficiency;*

### **Abstract:**

Global competition for water is increasing and is expected to lead to social, economic, environmental and geo-political

consequences. Desalination provides a promising solution for the water crisis. However, current desalination technologies cause serious environmental impacts, due to the wastewater effluent called "brine". At the same time, this brine contains valuable materials which can, if recovered, create significant value and job opportunities for our economies. BRINE-MINING project aims to develop the 1st Circular Economy Plan for closing the loop of desalination wastewater, by applying an eco-innovative technology developed in previous EU projects in industrial environment, while exploiting waste heat available. The company is commercializing an eco-innovative technology that was demonstrated successfully at pilot scale, within the European project SOL-BRINE (BEST LIFE 2015 ENVIRONMENT project). The research was further advanced through a second EU funding, to elaborate a feasibility study (SME Project No. 674455).

To do so, our company needs expertise in advanced simulation tools that will allow integration of our technology in the industrial environment, by making optimal use of the waste heat available. This is expected to reduce drastically the operating expenditure of the solution provided, achieving competitive prices and thus empowering our unique selling proposition. The ultimate goal will be to recruit a talented researcher in the position of Senior Software Development Engineer, who will be able to apply his expertise in order to realize our innovation potential. This is expected to contribute significantly to the growth of our company, creating approximately 6 new job positions and the possibility to collaborate with the SME Associate on a permanent basis towards our game changing path of making desalination circular.



<b>CRNPE</b>		<b>739775</b>
Title: <b>Chemical Recycling for the New Plastic Economy</b>		
Call Id: <b>H2020-INNOSUP-02-2016</b>	Topic: <b>INNOSUP-02-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>10/12/2017</b>	Duration: <b>12 months</b>	Unit: <b>EASME/A/01</b>
Total costs (€): <b>78.727,50</b>	EU requested grant (€): <b>78.727,00</b>	

**Free keywords:** *plastic waste, plastic, gas filtration, research, waste management, fuel, chemical engineering*

### **Abstract:**

Global production for plastic has grown to over 300Mt/year and rising. However, only 14% of plastic packaging is collected for recycling, and plastic packaging with an economic value of €70-110 billion is lost annually to the economy after just a short use. The vast majority of plastic is still disposed of by incineration or landfill, with in excess of 8Mt leaking into the oceans each year. It is estimated that by 2050 there will be more plastic than fish in the ocean.

Recycling Technologies Ltd. has developed a process that recycles end-of-life mixed plastic waste [MPW] into a commercially valuable hydrocarbon called Plaxx. The technology is capable of processing varied types of MPW. Plaxx produced by the process can be used as a substitute for Heavy Fuel Oil but with the advantage of being very low sulphur.

However, rigid food containers and items such as drinks cartons etc., use laminates of differing polymers. The widespread use of dyes, fillers and other additives, alongside contamination from the contents of the original packaging, presents challenges for our process. Currently, our process is designed to process MPW with low levels of contamination. Capability to process a higher level of contamination through our process opens up markets 2-3 times bigger than at present. Therefore the aim of this project is to further develop the gas filtration system of the technology, and the recruitment of an Associate with the level of expertise to realise this innovation opportunity is therefore essential. During the project, the Associate will research on widely used gas filtration technologies and recommend the ones which are suitable and scalable for our process.

The success of this project underpins RT's vision - to establish a commercially attractive process that will ultimately eliminate landfilling, incineration and the leakage of plastics into the oceans.

<b>Torero</b>		<b>745810</b>
Title: <b>TORrefying wood with Ethanol as a Renewable Output: large-scale demonstration</b>		
Call Id: <b>H2020-LCE-2016-RES-IA</b>	Topic: <b>LCE-19-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>15.849.490,00</b>	EU requested grant (€): <b>11.472.915,63</b>	

**Free keywords:** *torrefied wood biomass feedstock for bioethanol*

### **Abstract:**

Torero will demonstrate a cost-, resource-, and energy-efficient technology concept for producing bioethanol from a wood waste feedstock, fully integrated in a large-scale, industrially functional steel mill:

- Wood waste is converted to biocoal by torrefaction
- Biocoal replaces fossil powdered coal in a steel mill blast furnace
- Carbon monoxide in blast furnace exhaust fumes is microbially fermented to bioethanol
- Material and energy loops of the process are closed to a very large degree

Every steel mill that implements this concept will be able to produce at least 80 million litres of bioethanol per year. This project creates a value chain for wood waste, which currently has no attractive applications. The technology concept is open ended: in the future, stakeholders may replicate the concept with other feedstocks and for producing other types of fuels.

The business case the Torero project will produce a competitive process for non-food feedstock bioethanol production. Compared with the current first generation production based cellulosic bioethanol solution the Torero innovation the OPEX of Torero is 1/3 lower with a same CAPEX. This will allow scale up of torrefaction technology when successfully demonstrated.

Most importantly, together with sister project Steelanol, Torero will be the only H2020 project to demonstrate a biofuel production process that is integrated in an existing, fully functional large-scale industrial facility. All other H2020 solutions will need to be newly built if they ever reach full industrial scale. Torero is add-on technology that can be used to upgrade existing facilities of the steel sector, an industry that is actively scouting for technological solutions to make its production processes more sustainable. The consortium consist of full value chain, industry ArcelorMittal and Van Gansewinkel, two expert research organisations Joanneum Research and Chalmers Technical University and torrefaction technology supplier Torr-Coal.

<b>TO-SYN-FUEL</b>		<b>745749</b>
Title: <b>The Demonstration of Waste Biomass to Synthetic Fuels and Green Hydrogen</b>		
Call Id: <b>H2020-LCE-2016-RES-IA</b>	Topic: <b>LCE-19-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>14.511.922,50</b>	EU requested grant (€): <b>12.250.528,13</b>	

**Free keywords:** *Organic Waste, Thermal Conversion, Fuel Upgrading, Hydro De.Oxygenation, Green Hydrogen*

### **Abstract:**

TO-SYN-FUEL will demonstrate the conversion of organic waste biomass (Sewage Sludge) into biofuels. The project implements a new integrated process combining Thermo-Catalytic Reforming (TCR©), with hydrogen separation through pressure swing adsorption (PSA), and hydro deoxygenation (HDO), to produce a fully equivalent gasoline and diesel substitute (compliant with EN228 and EN590 European Standards) and green hydrogen for use in transport . The TO-SYN-FUEL project consortium has undoubtedly brought together the leading researchers, industrial technology providers and renewable energy experts from across Europe, in a combined, committed and dedicated research effort to deliver the overarching ambition. Building and extending from previous framework funding this project is designed to set the benchmark for future sustainable development and growth within Europe and will provide a real example to the rest of the world of how sustainable energy, economic, social and environmental needs can successfully be addressed. This project will be the platform for deployment of a subsequent commercial scale facility. This will be the first of its kind to be built anywhere in the world, processing organic industrial wastes directly into transportation grade biofuels fuels which will be a demonstration showcase for future sustainable investment and economic growth across Europe. This project will mark the first pre-commercial scale deployment of the technology processing up to 2100 tonnes per year of dried sewage sludge into 210,000 litres per year of liquid biofuels and up to 30,000 kg of green hydrogen. The scale up of 100 of such plants installed throughout Europe would be sufficient to convert up to 32 million tonnes per year of organic wastes into sustainable biofuels, contributing towards 35 million tonnes of GHG savings and diversion of organic wastes from landfill. This proposal is responding to the European Innovation Call LCE-19.

<b>Heat-To-Fuel</b>		<b>764675</b>
Title: <b>Biorefinery combining HTL and FT to convert wet and solid organic, industrial wastes into 2nd generation biofuels with highest efficiency</b>		
Call Id: <b>H2020-LCE-2017-RES-CCS-RIA</b>	Topic: <b>LCE-08-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>5.896.987,50</b>	EU requested grant (€): <b>5.896.987,50</b>	

**Free keywords:****Abstract:**

Heat-to-Fuel will deliver the next generation of biofuel production technologies towards the decarbonisation of the transportation sector. Heat-to-fuel will achieve competitive prices for biofuel technologies (<1€/l) while delivering higher fuel qualities and significantly reduced life-cycle GHG reductions. Heat-to-fuel will result in increased Energy production savings (>20%) and enhanced EU's energy security by the use of local feedstocks which in turn ensured local jobs are preserved and increased. The benefit of combining technologies like in Heat-to-Fuel is, that the drawbacks of the single technologies are balanced. FT and APR are promising technologies for the efficient production of 2nd generation fuels. But currently the economic border conditions don't allow the implementation, similar to many other biofuel technologies. The radical innovation of combining an APR with a FT reactor is the basis to overcome this barrier. The large organic wastes (from HTL or other streams) can be conveniently treated with APR to produce H<sub>2</sub>. Both dry and wet organic wastes can be integrated, with mutual advantages, i.e. steam production for gasification, HTL and APR preheating; FT heat cooling without external utilities. Using the synergies between these technologies maximizes the total process efficiency. Heat-to-fuel aims will be met thanks to the diversification of the feedstock for biofuels production, reducing the supply costs and upgrading the efficiencies of promising and flexible conversion.

<b>BIO4A</b>		<b>789562</b>
Title: <b>Advanced sustainable BIOfuels for Aviation</b>		
Call Id: <b>H2020-LCE-2017-RES-IA</b>	Topic: <b>LCE-20-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>16.860.911,25</b>	EU requested grant (€): <b>10.002.520,13</b>	

**Free keywords:** *Biojet, aviation, sustainable alternative fuels, GHGs, green aviation, targets, production capacity*

### **Abstract:**

Decarbonising & reducing aviation dependence on fossil fuel requires biofuels. BIO4A will produce at least kt of sustainable biojet for its use in aviation at commercial scale for accelerating its deployment within the aviation sector, increasing their attractiveness and contributing to the achievement of the EU targets. BIO4A targets HEFA pathway from wastes, aiming to move the full value chain from TLR 6 to 7. BIO4A will demonstrate the full value chain, enabling a production capacity of 2-300 kt/y of biojet in a First Of A Kind new biorefinery in France. The fuel will be distributed using the existing infrastructures and conventional aircraft fuelling systems for commercial flights. Special attention will be directed to the supply of sustainable feedstock, focusing on waste streams (UCO). In parallel, long-term R&D work will address marginal land in EU MED (low ILUC biofuels). Relevant environmental (inc. GHG and energy balance), economic and social data (inc. health and safety issues, impacts and benefits) will be assessed against targets. Since the current main barrier to the commercial production of biojet is the price gap, BIO4A will explicitly address performance and cost targets vs. relevant key performance indicators. The final goal is to prove the business case, identifying potential issues of public acceptance, market or regulatory risks and barriers (feedstock, technological, business, process) along the entire value chain, taking advantage of previous projects and proposing potential mitigation solutions. Offtake agreements have been signed with KLM and Airfrance. Additional off-take agreements could also be signed to open the participation to more airlines. Regulatory framework is also limiting today the development of the sector and an additional goal is recommendations to policies makers. The proposal will be defined at EU/National level, involving the major sector stakeholders and opening with a profitable dialogue with Member States and the EC.

<b>FlexJET</b>		<b>792216</b>
Title: <b>Sustainable Jet Fuel from Flexible Waste Biomass</b>		
Call Id: <b>H2020-LCE-2017-RES-IA</b>	Topic: <b>LCE-20-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>4/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>15.033.205,00</b>	EU requested grant (€): <b>9.999.732,51</b>	

**Free keywords:****Abstract:**

FlexJet will build a pre-commercial demonstration plant for the production of advanced aviation biofuel (jet fuel) from waste vegetable oil and organic solid waste biomass (food waste), successfully demonstrating the SABR-TCR technology (traditional transesterification (TRANS) and Thermo-Catalytic Reforming (TCR) combined with hydrogen separation through pressure swing adsorption (PSA), and hydro deoxygenation (HDO) and hydro cracking/ isomerisation (HC)) to produce a fully equivalent jet fuel (compliant with ASTM D7566 Standards). This project will deliver respective environmental and social sustainability mapping and it will validate a comprehensive exploitation business plan, building on already established end user interest with existing offtake agreements already in place with British Airways. The project plant installed at the source of where the waste arises in BIGA Energie at Hohenstein (Germany) will produce 1,200 ton of jet fuel from 3,482 tonnes of dried organic waste and 1,153 tonnes of waste vegetable oil per year. A subsequent scale-up first commercial plant would be constructed immediately after the project end to produce 25,000 tonnes per year of aviation fuel. The FlexJet project consortium has undoubtedly brought together the leading researchers, industrial technology providers including airline off takers and renewable energy experts from across Europe, in a combined, committed and dedicated research effort to deliver the overarching ambition. Building and extending from previous framework funding this project is designed to set the benchmark for future sustainable aviation fuel development and growth within Europe and will provide a real example to the rest of the world of how sustainable aviation biofuels can be produced at both large and decentralised scales economically whilst simultaneously addressing social and environmental needs.

<b>ABC-SALT</b>		<b>764089</b>
Title: <b>Advanced Biomass Catalytic Conversion to Middle Distillates in Molten Salts</b>		
Call Id: <b>H2020-LCE-2017-RES-RIA-TwoStage</b>	Topic: <b>LCE-06-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>4/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>3.998.025,50</b>	EU requested grant (€): <b>3.998.025,50</b>	

**Free keywords:** *middle distillate, biofuels, lignocellulosic waste, molten salts, hydrolysis, hydrodeoxygenation, TRL4, techno-economic assessment, ecological evaluation, LCA, biomass-to-liquid, social impact*

### **Abstract:**

ABC-SALT will validate at lab scale a novel route to produce sustainable liquid biofuels (middle distillates (MD)) from various lignocellulosic waste streams for the transport industry, both on roads (biodiesel) and in air (jet fuel), targeting a yield over 35 wt% in the middle distillate range, based on the biomass dry input, and a carbon yield of 55 %.

ABC-SALT will solve the following technical challenges: liquefaction and subsequent catalytic hydro-pyrolysis of the biomass in a molten salt environment, followed by the catalytic hydro-deoxygenation of the vapour phase using suitable catalysts to obtain a hydrocarbon product suitable for use as a MD biofuel. ABC-SALT will then operate an integrated lab scale reactor during over 100 hours to provide lab-scale validation of the whole process, bringing this technology to TRL 4.

The project includes technical aspects (such as substrate flexibility, biomass liquefaction and hydro-pyrolysis in molten salts and subsequent hydro-deoxygenation and their integration), but also a socio- and techno-economic viability study of the technology (substrate availability and supply chain, future end-users and economic sustainability of the process). This will ensure the future deployment of this new technology considering its social related issues, such as acceptance or modification of the perception of transport induced by such sustainable fuels. Such a holistic approach considering the full value chain, combined to communication with stakeholders during the course of the project, will provide valuable input for scale up and industry-oriented research after this project, maximizing the impact, amongst other in the biomass, biofuel and transport industry.

To reach its objectives, the project covers the whole value chain, from feedstock supplier to end-users (knowledge users (RUG, UG, AU, NMBU, DLR), technology users (BTG, Innventia), and middle distillates users (through DLR)), as well as an entity dedicated to SSH aspects (CIRPA).

<b>C2FUEL</b>		<b>838014</b>
Title: <b>Carbon Captured Fuel and Energy Carriers for an Intensified Steel Off-Gases based Electricity Generation in a Smarter Industrial Ecosystem</b>		
Call Id: <b>H2020-LC-SC3-2018-NZE-CC</b>	Topic: <b>CE-SC3-NZE-2-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>4.315.395,00</b>	EU requested grant (€): <b>3.999.840,00</b>	

**Free keywords:** *CO2 conversion, off-gases based power plant, circular economy, industrial ecology, carbon-captured energy carrier, renewable H2, formic acid, dimethylether, solid oxide electrolysis, membrane reactor*

### **Abstract:**

C2FUEL project aims to develop energy-efficient, economically and environmentally viable CO2 conversion technologies for the displacement of fossils fuels emission through a concept of industrial symbiosis between carbon intensive industries, power production, and local economy. This concept will be demonstrated at Dunkirk between DK6 combined cycle power plant, Arcelor Mittal steel factory and one of the major European harbor, a solid showcase for future replication.

The CO2 present in the blast furnace gas will be selectively removed and combined with green hydrogen generated by electrolysis fed with renewable electricity to produce two promising energy carriers. It will allow to simultaneously reuse CO2 emission from the steel-making factory, electricity surplus in the Dunkirk area and to improve the operational and environmental performance of the DK6 combined cycle. C2FUEL unique circular approach could contribute to mitigate up to 2,4 Mt CO2 per year.

Key technical and economic challenges to be tackled in the project are high temperature electrolysis, innovative production routes of DME and FA from renewable H2 and captured CO2. The developed processes will be integrated, demonstrated and validated in an industrial relevant environment and the produced fuel will be tested in real end-user systems. Technical-economic-environmental feasibility and societal acceptance will be carried out to ensure the replication potential.

C2FUEL key projected targets are an annual production of 2,4 Mt of formic acid, 100 kt of green hydrogen for seasonal storage using 3,6TWh of renewable electricity and 1,2 Mt of DME with 320 kt of green hydrogen using 11TWh of renewable electricity.

C2FUEL partnership gathers the whole value chain necessary for production and use of CO2 conversion to carbon-captured energy carriers : carbon captured supply, renewable hydrogen and fuel development, integration to power plant and operation, as well as end-users and international promoters.



<b>CO2Fokus</b>		<b>838061</b>
Title: <b>CO2 utilisation focused on market relevant dimethyl ether production, via 3D printed reactor- and solid oxide cell based technologies</b>		
Call Id: <b>H2020-LC-SC3-2018-NZE-CC</b>	Topic: <b>CE-SC3-NZE-2-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>42 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>3.994.950,00</b>	EU requested grant (€): <b>3.994.950,00</b>	

**Free keywords:** *CO2 utilisation, dimethyl ether, 3D printed reactors, multichannel reactors, solid oxide cell based technologies*

### **Abstract:**

The CO2Fokus project aims to realise the full potential of a number of concrete strategies to exploit the direct use of CO2 for the production of dimethyl ether (DME) by CO2 hydrogenation. With CO2 utilisation at its heart, CO2Fokus will seek to exploit the inherent advantages of both chemical and electrochemical systems to establish robust, industrially optimal proofs-of-concept, reaching TRL 6 by the end of the project. The project will explore energy-efficient processes for two separate, potentially integrated systems, namely a 3D printed multichannel reactor and a solid oxide fuel cell (for co-electrolysis and electrolysis/reverse operation). Both systems will be evaluated for operational flexibility in an industrial environment with a CO2 emission point source. H2, as a renewable energy source, will be supplied via the solid oxide cell operating in electrolysis mode,

The central focus will be on producing tangible improvements to the industrial processes in terms of energy efficiency and cost saving, by optimising the most promising conventional catalyst systems as well as innovative carbon-based ones. To this end, the catalyst will be printed and assembled as multi-channel arrays into modular, mobile prototype demonstration units. To enhance the effectiveness of the partners' innovation efforts and reach ambitious commercial goals, CO2Fokus draws on expertise from partners across the industrial value chain, from industrial CO2 emitters, experts in catalyst manufacturing, petrochemical process engineering, chemistry and fuel cell specialists, offering a wealth of inter-disciplinary and market-oriented experience.

<b>COZMOS</b>		<b>837733</b>
Title: <b>Efficient CO2 conversion over multisite Zeolite-Metal nanocatalysts to fuels and OlefinS</b>		
Call Id: <b>H2020-LC-SC3-2018-NZE-CC</b>	Topic: <b>CE-SC3-NZE-2-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>4.752.386,25</b>	EU requested grant (€): <b>3.997.163,75</b>	

**Free keywords:** *CO2 conversion, bifunctional, catalyst, nanocatalyst, zeolite, process, LCA, social assessment, propane, propene, high conversion, reactor design, single-reactor, CO2 to methanol, methanol to olefins*

### **Abstract:**

What if we were able to use CO<sub>2</sub> and H<sub>2</sub> from renewable energy sources as fuel and chemical feedstocks, and thus decrease CO<sub>2</sub> emissions and displace fossil fuels at the same time? COZMOS will develop an energy-efficient and environmentally and economically viable conversion of CO<sub>2</sub> to fuels and high added value chemicals via an innovative, cost effective catalyst, reactor and process. The concept will combine the sequential reactions of CO<sub>2</sub> hydrogenation to methanol and methanol to C<sub>3</sub> hydrocarbons, exploiting Le Chatelier's principle to overcome low equilibrium product yields of methanol. Complete conversion of CO<sub>2</sub> to a 85 % yield of C<sub>3</sub> hydrocarbons will be achieved by using an optimised bifunctional catalyst within a single reactor. The optimised catalyst will allow the combined reactions, that currently run at disparate temperatures and pressures, to operate in a temperature/pressure "sweet spot", which will reduce infrastructure and provide energy and production cost savings. The concept will allow tunable production of propane, an easily stored fuel used for heating, cooking and transportation, and the more valuable product propene, a base chemical primarily polymerised to lightweight plastics, depending on location, amount of available renewable energy and economic needs. The integrated technology will be demonstrated at TRL5 on off-gases from the energy intensive steel and refinery industries. Markets for both propane and propene are expected to grow in the coming years, such that the COZMOS technology will contribute to achieving a Circular Economy and diversified economic base in carbon-intensive regions.

Throughout the whole value chain development, emphasis will be placed on risk-mitigation pathways and strong industrial involvement, LCA and techno-economic analysis to maximise further exploitation and industrialisation of the results. Specific attention will be paid to social acceptance, including analysis of stakeholder and end-user interests.

<b>eCOCO2</b>		<b>838077</b>
<b>Title: Direct electrocatalytic conversion of CO2 into chemical energy carriers in a co-ionic membrane reactor</b>		
Call Id: <b>H2020-LC-SC3-2018-NZE-CC</b>	Topic: <b>CE-SC3-NZE-2-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>4.447.978,75</b>	EU requested grant (€): <b>3.949.978,75</b>	

**Free keywords:** *catalysis, process intensification, process industries, CCU technologies, ceramic electrolyte, aviation fuel, ionic conductor, zeolite, electrochemical reactor*

### **Abstract:**

GHG emissions reduction policies to mitigate the alarming climate change can impact carbon-intensive industrial sectors, leading to loss of employment and competitiveness. Current multistage CCU technologies using renewable electricity to yield fuels suffer from low energy efficiency and require large CAPEX. eCOCO2 combines smart molecular catalysis and process intensification to bring out a novel efficient, flexible and scalable CCU technology. The project aims to set up a CO2 conversion process using renewable electricity and water steam to directly produce synthetic jet fuels with balanced hydrocarbon distribution (paraffin, olefins and aromatics) to meet the stringent specifications in aviation. The CO2 converter consists of a tailor-made multifunctional catalyst integrated in a co-ionic electrochemical cell that enables to in-situ realise electrolysis and water removal from hydrocarbon synthesis reaction. This intensified process can lead to breakthrough product yield and efficiency for chemical energy storage from electricity, specifically CO2 per-pass conversion > 85%, energy efficiency > 85% and net specific demand < 6 MWh/t CO2. In addition, the process is compact, modular –quickly scalable- and flexible, thus, process operation and economics can be adjusted to renewable energy fluctuations. As a result, this technology will enable to store more energy per processed CO2 molecule and therefore to reduce GHG emissions per jet fuel tone produced from electricity at a substantial higher level. eCOCO2 aims to demonstrate the technology (TRL-5) by producing > 250 g of jet fuel per day in an existing modular prototype rig that integrates 18 tubular intensified electrochemical reactors. Studies on societal perception and acceptance will be carried out across several European regions. The consortium counts on academic partners with the highest world-wide excellence and exceptional industrial partners with three major actors in the most CO2-emitting sectors.

<b>GECO</b>		<b>818169</b>
Title: <b>Geothermal Emission Gas Control</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-13-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>18.220.330,50</b>	EU requested grant (€): <b>15.599.842,88</b>	

**Free keywords:** *CO2, CCS, CCU, carbon, geothermal, gases, mineralisation, utilisation, NCG*

### **Abstract:**

GECO will advance in the provision of cleaner and cost-effective non-carbon and sulphur emitting geothermal energy across Europe and the World. The core of this project is the application of an innovative technology, recently developed and proved successfully at pilot scale in Iceland, which can limit the production of emissions from geothermal plants by condensing and re-injecting gases or turning the emissions into commercial products. To both increase public acceptance and to generalise this approach, it will be applied by GECO in four distinct geothermal systems in four different European countries: 1) a high temperature basaltic reservoir in Iceland; 2) a high temperature gneiss reservoir in Italy; 3) a high temperature volcano-clastic reservoir in Turkey; and 4) a low temperature sedimentary reservoir in Germany. Gas capture and purification methods will be advanced by lowering consumption of resources, (in terms of electricity, water and chemicals) to deliver cheaper usable CO<sub>2</sub> streams to third parties. Our approach to waste gas storage is to capture and inject the soluble gases in the exhaust stream as dissolved aqueous phase. This acidic gas-charged fluid provokes the dissolution of subsurface rocks, which increases the reservoir permeability, and promotes the fixation of the dissolved gases as stable mineral phases. This approach leads to the long-term environmentally friendly storage of waste gases, while it lowers considerably the cost of cleaning geothermal gas compared to standard industry solutions. A detailed and consistent monitoring program, geochemical analysis, and comprehensive modelling will allow characterising the reactivity and consequences of fluid flow in our geologically diverse field sites letting us create new and more accurate modelling tools to predict the reactions that occur in the subsurface in response to induced fluid flow. Finally, gas capture for reuse will be based on a second stage cleaning of the gas stream, through amine separation and burn and scrub processes, producing a CO<sub>2</sub> stream with H<sub>2</sub>S levels below 1 ppm, which is the prerequisite for most utilisation pathways such as the ones that will be applied within the project.

<b>BioRen</b>		<b>818310</b>
Title: <b>Development of competitive, next generation biofuels from municipal solid waste</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-21-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>5.084.657,50</b>	EU requested grant (€): <b>4.971.313,50</b>	

**Free keywords:** *Organic waste conversion, GTBE, ethanol, waste-to-energy*

### **Abstract:**

The objective of BioRen is to develop techno-economical competitive drop-in biofuels for road transport from the organic fraction of municipal solid waste (OFMSW). A higher value fuel is targeted: glycerol tertiary butyl ether (GTBE) is a promising fuel additive to both diesel and gasoline that improves engine performance and cuts harmful exhaust emissions (i.e. fine dust). It can be blended in higher amounts than e.g. ethanol, without having to change the engine. Bio-ethanol and bio-isobutanol from OFMSW are required intermediaries in this innovation path towards GTBE. Their specific business case as second generation drop-in fuel will be compared to the bio-GTBE business case, to select the most sustainable option for building a demo plant. The project will develop a pretreatment method, industrial 2G *Saccharomyces* strains that produce ethanol and isobutanol respectively and chemical dehydration to convert isobutanol into isobutene. The isobutene is converted into GTBE by adding Category 1 glycerol, another problematic waste stream. The resulting fuels (ethanol, isobutanol and GTBE) will be tested in engine tests to provide feedback regarding their performance, emission results and fuel use. This ambitious project is continuously monitored by LCA, techno-economic, market and regulatory and IP analysis in order to come up with a realistic business plan. The developed processes will be integrated in a revolutionary MSW treatment plant that combines the most efficient technologies of material reuse, and is currently looking into optimising the profitability of its organic waste fraction. The project consortium has all the required players to succeed: 3 RTO's address the research challenges, 7 SMEs either bring in their technological developments or are a scale-up partner that bring the processes to min. TRL5. The project is led by a financial consultancy that invests in the MSW demonstration treatment plant.

<b>CONVERGE</b>		<b>818135</b>
Title: <b>CarbON Valorisation in Energy-efficient Green fuels</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-21-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>5.087.031,25</b>	EU requested grant (€): <b>5.087.031,25</b>	

**Free keywords:** *bbiodiesel, green methanol, tar cracking, BTX recovery, sorption-enhanced reforming, CO2 removal, electro-chemical compression, enhanced methanol membrane, process intensification*

### **Abstract:**

The CONVERGE project will validate an innovative value chain for the production of green biodiesel. The innovative configuration will reduce the total number of unit operations needed to achieve the conversion of secondary biomass and waste streams into green biodiesel, while simultaneously producing additional intermediate green refinery products. The CONVERGE project will demonstrate 5 unit operations in 3 grouped processing steps (pre-processing, valorization & enhanced methanol), taking these new combinations from the discovery stage (TRL3) to development stage (TRL5). The combination of these technologies will increase the biodiesel production from secondary biomass by 12% together with biodiesel production will be reduced by up to 2100 M€ across Europe. In this project, risks are mitigated from the very start; each unit can be implemented as a stand-alone function within a modified state-of-the-art technology chain and thus provide immediate performance and energy efficiency improvements. Moreover, the units when used together have synergies that allow even more efficiency gains. The new units to be taken from discovery to development are: CCT: Catalytic cracking of tars from a gasifier to below green C8, integrated with BITS: Recovery of refinery products including aromatics for green C6-C8 fraction (BTX). Then, SER: Sorption-Enhanced Reforming is adopted for H2 and CO2 separation, integrated with EHC: Highly efficient electrochemical compression of green H2 with by-product fuel EMM: Enhanced Methanol Membrane synthesis to ensure green biodiesel production. The technology will be validated for more than 2000 cumulated hours. The CONVERGE consortium covers the whole value chain from secondary biomass supply to biodiesel production, demonstrating the new unit operations on site within an ambitious 42 months period.

<b>NextGenRoadFuels</b>		<b>818413</b>
<b>Title: Sustainable Drop-In Transport fuels from Hydrothermal Liquefaction of Low Value Urban Feedstocks</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-21-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>5.074.876,25</b>	EU requested grant (€): <b>5.074.876,25</b>	

**Free keywords:** *HTL, catalytic upgrading, low value feedstock, bio-crude, biofuels, thermochemical*

### **Abstract:**

The objective of the NextGenRoadFuels project is to apply advanced HTL technology and subsequent upgrading to a selected range of low value/cost, concentrated biogenic residues from urban activity, in order to obtain cost competitive, sustainable drop-in quality synthetic gasoline and diesel fuels. From a highly efficient and validated baseline HTL process chain designed for lignocellulosics, new innovative process steps will be designed and existing steps optimized to address the additional challenges encompassed by such feedstocks, exemplified by sewage sludge, food waste and construction wood waste (termed urban feedstocks), with the objective to reach similar performance as for lignocellulosics. The main optimization targets are - To establish fundamental pretreatment process and parameters to provide highest possible organic dry matter content in feedstock slurry and efficiently remove valuable inorganics that can have added value as organic fertilizers and/or soil improvers. - To establish HTL processing parameters giving highest possible carbon and energy yields to oil phase - To establish efficient upgrading schemes to bring the HTL intermediate bio-crude to drop-in gasoline and diesel fuels - To close material and energy streams to and from the individual process steps in order to obtain maximum internal utilization and minimal environmental impact - To establish MFSP scenarios demonstrating cost-competitiveness, socio-economic benefits and superior LCA and GHG reduction effects in a pan-European as well as global perspective. Specific targets of the NextGenRoadFuels project are to demonstrate the potential to convert more than 100 M tons urban feedstock per year into almost 500,000 barrels per day of drop-in diesel and gasoline fuels (more than 10 % of the current use in the EU), at a cost of approximately 50-60 Euro-cent per liter. This will generate 50,000 direct and 300,000 indirect jobs within the EU, and reduce GHG emissions by more than 70%.

<b>Pulp and Fuel</b>		<b>818011</b>
Title: <b>Pulp and Paper Industry Wastes to Fuel</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-21-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>4.954.341,25</b>	EU requested grant (€): <b>4.954.341,25</b>	

**Free keywords:** *Biogenic wastes, Gasification, Fischer-Trosch*

### **Abstract:**

The transport sector is dominated by the use of fossil fuels, and alternative fuels represent currently only 5% of fuel consumption in EU. The EU objective for the share of renewable energy in the transport sector is 10% in 2020. To achieve this goal, new advanced biofuels are needed and must be produced from alternative feedstocks. The Pulp&Fuel concept is to develop a simple and robust fuel synthesis process taking advantage of the synergy between super critical water gasification (wet gasification) and fixed bed gasification (dry gasification). For the Pulp&Fuel project, we have chosen to study the integration of the full process on a pulp mill. The developed process will take advantage of low to negative value wet and dry resources on a paper mill to add value to the overall process. The yield of biofuels will be significantly increased to 28 % compared to a classic approach that would only yield 18 %. The Pulp&Fuel final objective is to produce biofuels below 1 €/L without having a negative impact on the existing operations of the pulp mill. To achieve these goals a team of 10 partners, leaders in their field, from 4 EU-member states, will join efforts. To this end, we have defined five ambitious specific objectives: - Improve the efficiency of the dry gasification process from 70 to 80 % - Improve the carbon conversion of the wet gasification process to above 90 % - Improve fuel synthesis to obtain carbon efficiencies above 50 % (state of the art 45%) - Integration of the full process and synergy between dry and wet gasification - Integrated assessments will show that biofuels can be produced below 1 €/L Related work packages, tasks, milestones and risks are considered in order to achieve these objectives. The Pulp&Fuel project addresses the topic “liquid diesel- and gasoline-like biofuels from biogenic residues and wastes through either chemical, biochemical and thermochemical pathways, or a combination of them” of the LC-SC3-RES-21-2018 call.



<b>WASTE2ROAD</b>		<b>818120</b>
Title: <b>Biofuels from WASTE TO ROAD transport</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-21-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>4.996.155,00</b>	EU requested grant (€): <b>4.996.155,00</b>	

**Free keywords:** *biogenic waste, municipal waste, industrial waste, Hydrothermal liquefaction, HTL, pyrolysis, hydrotreating, Fluid Catalytic Cracking, Co-FCC, biofuels, risk governance, co-refining, conversion, wood*

### **Abstract:**

WASTE2ROAD will develop a new generation of cost-effective biofuels from a selected, well-defined range of low cost and abundant biogenic residues and waste fractions. Through optimisation of European waste recycling logistics and development of efficient low-risk conversion pathways, high overall carbon yields > 45% can be obtained while reducing greenhouse gases emissions > 80%.

The established consortium covers the full value chain, from a) waste management and pre-treatment based on designated streams from households; b) the subsequent transformation of waste to bio-liquids through fast pyrolysis and hydrothermal liquefaction, c) production of advanced biofuels through intermediate refining processes combined with existing downstream refinery co-processing technologies deploying sustainable hydrogen production, and d) assessment of the end-use compatibility of the obtained biofuels for road transport applications.

Correlations will be established between the quality and properties of diverse waste fractions, the relevant process parameters and final properties of the biofuel's: aiming to provide a unique understanding of the technical aspects related the whole value chain, as well as to assess and optimize the environmental, economic and social benefits.

Throughout the whole value chain development, emphasis will be on risk-mitigation pathways to maximize further exploitation of the results in industrial implementation. Specific attention will be paid to risk management, while establishing connections with stakeholders and relevant standardisation bodies to secure the future exploitation of the project's results.

<b>AgroBioHeat</b>		<b>818369</b>
Title: <b>Promoting the penetration of agrobiomass heating in European rural areas</b>		
Call Id: <b>H2020-LC-SC3-2018-RES-SingleStage</b>	Topic: <b>LC-SC3-RES-28-2018-2019-2020</b>	Type of Action: <b>CSA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>36 months</b>	Unit: <b>INEA/H/01</b>
Total costs (€): <b>2.998.043,75</b>	EU requested grant (€): <b>2.998.043,75</b>	

**Free keywords:** *agrobiomass, Ecodesign regulation, rural areas, heating sector, agro-industries, straw, prunings, by-products, residues, agriculture*

### **Abstract:**

AgroBioHeat project aims to produce a mass deployment of improved and market ready agrobiomass heating solutions in Europe. Agrobiomass is a large, underexploited and indigenous resource, which can support the achievement of the European Energy and Climate targets, while promoting rural development and circular economy. AgroBioHeat actions will take place mostly in 6 EU countries (GR, ES, FR, RO, HR, UA; 5 EU28+Ukraine) where extensive engagement actions are foreseen. Engagement and matchmaking actions will lead to trigger more than 80 initiatives on agrobiomass for heat, 8 of which will be closely accompanied. To generate trust to market actors, the project will detect more than 100 cases running on agrobiomass and 12 will be approached, documented, visualized and visited by potential early adopters. Simultaneously, the project will perform more than 44 tests, covering different market heating technologies and agrobiomass in order to generate reliable data on its emissions and operational performance, and to show the market and community the existing improved technologies. On the EU level, these results will contribute to the anticipated review of the Ecodesign regulation for agrobiomass boilers, while providing suggestions for suitable emission limits in the 500 kW-1 MW range facilities; thus a harmonization of EU legislation will be achieved. Strategic plans for the deployment of agrobiomass for heating market will be drafted and discussed with more than 240 policy makers in the 6 countries. Promotion of the market includes agrobiomass corners at 15 fairs and a dedicated Observatory tool to visualize cases and technology. 60 technicians from ESCOs and installers in the 6 countries will be trained to be ready to adopt mature agrobiomass heating solutions. Social research capturing perceptions of at least 3,500 people will feed into the formulation of a tailored dissemination campaign, aiming to bring the agrobiomass heating solutions to a wider audience.

<b>DRIVE 0</b>		<b>841850</b>
<b>Title: Driving decarbonization of the EU building stock by enhancing a consumer centred and locally based circular renovation process</b>		
Call Id: <b>H2020-LC-SC3-EE-2018</b>	Topic: <b>LC-SC3-EE-1-2018-2019-2020</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/01</b>
Total costs (€): <b>4.738.908,75</b>	EU requested grant (€): <b>3.999.519,00</b>	

**Free keywords:** *Circular renovation*

### **Abstract:**

DRIVE 0 aims to come to a decarbonization of the EU building stock and to accelerate deep renovation processes by enhancing a consumer centred circular renovation process in order to make deep renovation more attractive for consumers and investors, more environmental friendly. This by combining the need for a circular building industry with the identification of specific local or national drivers to trigger and to motivate end-users for deep renovation, supported by an anthropology based and environmentally friendly approach to make it customer-centred and respectful of local geo-material areas, by following 4 steps:

1. Developing proven deep renovation products and concepts for example from several recent EU projects, further to circular renovation products and concepts based on local available materials and components, with emphasis on easy to install Plug & Play prefab solutions for envelope elements and building services.
2. Developing attractive consumer centred business models based on circular renovation concepts supported by digitalization and gamification.
3. Providing occupants with attractive and understandable information on total building performances in use.
4. Providing stakeholders evidence of performance of the developed solutions by local study and demonstration cases initiated by 'local drivers'.

The objectives are:

- 1: To develop proven Plug & Play prefab deep renovation solutions for building elements and building services towards circular renovation products.
- 2: To provide consumers and potential investors of deep renovation projects with attractive and understandable information of real total performances (energy use, indoor environment and well-being).
- 3: To demonstrate circular renovation solutions in combination with local drivers in live demonstration cases.
- 4: To foster new consumer centred business models for circular circular renovation concepts.

5: To roll out the concept on a wider EU scale by involving EU interest groups.

<b>AMPHIBIAN</b>		<b>720853</b>
Title: <b>Anisometric permanent hybrid magnets based on inexpensive and non-critical materials</b>		
Call Id: <b>H2020-NMBP-2016-two-stage</b>	Topic: <b>NMBP-03-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>4.948.707,50</b>	EU requested grant (€): <b>4.948.707,50</b>	

**Free keywords:** *permanent magnets, ferrites, energy product, rare-earth substitution*

### **Abstract:**

Permanent magnets are crucial in modern technology as they allow storing, delivering and converting energy. They are able to transform electrical energy into mechanical and vice versa, which means that improving their performance entails transforming energy in a more efficient and sustainable way.

The best magnets are based on rare-earths (RE), however, their status as a Critical Raw Material (CRM) has brought forward the realization that it is of great strategic, geographic, environmental and socio-economic importance to consider alternative magnets that present a reduced amount (or absence) of RE. One of the most sought approaches towards this goal consists on constructing composite magnetic materials magnetically coupled at the interface.

In the framework of the success of a previous European Project (FP7-SMALL-NANOPYME-310516), focused on improving ferrite-based magnets, we developed a low-cost novel approach (Patent P201600092) that exploits the magnetostatic interactions within these composites and that yielded extremely promising results in the form of an experimental proof-of-concept.

The goal of this project is to implement up-scalable and cost-efficient methods for fabrication of ferrite-based dense anisotropic magnets with a 40% enhanced magnetic performance (energy products above 55 kJ/m<sup>3</sup>) with respect to commercial ferrites. We aim at producing improved magnets that retain the advantages of ferrites –availability, sustainability, cost, recyclability, eco-friendliness- and which have the potential to substitute currently used RE magnets (CRM) in the electric power system.

Our targeted application is an electric energy storage device: we will substitute RE magnets by AMPHIBIAN ones in a demonstrator of a flywheel and evaluate its performance against cost, eco-friendliness and resource efficiency criteria.

CREATE		721065
Title: <b>Critical Raw materials Elimination by a top-down Approach To hydrogen and Electricity generation</b>		
Call Id: <b>H2020-NMBP-2016-two-stage</b>	Topic: <b>NMBP-03-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>4.480.978,02</b>	EU requested grant (€): <b>4.318.478,02</b>	

**Free keywords:** *Fuel cell, electrolysis, anion exchange membrane, bipolar membrane, electrochemistry, electrocatalysis*

### **Abstract:**

CREATE aims at developing innovative membrane electrode assemblies for low-temperature polymer-electrolyte fuel cell (FC) and electrolyzer (EL) with much reduced cost. This will be achieved via elimination or drastic reduction of critical raw materials in their catalysts, in particular platinum group metals (PGM).

Key issues with present low-temperature FC & EL are the high contents of PGM in devices based on proton-exchange-membrane (PEM) and the need for liquid electrolytes in alkaline FC and EL. To overcome this, we will shift from PEM-based cells to 1) pure anion-conducting polymer-electrolytes and 2) to bipolar-membrane polymer electrolytes. The latter comprises anion and proton conducting ionomers and a junction. Bipolar membranes allow adapting the pH at each electrode, thereby opening the door to improved performance or PGM-free catalysts. Both strategies carry the potentiality to eliminate or drastically reduce the need for PGM while maintaining the advantages of PEM-based devices.

In strategy 1, novel anion-exchange ionomers and membranes will be developed and interfaced with catalysts based on Earth-abundant metal oxides or metal-carbon composites for the oxygen reactions, and with ultralow PGM or PGM-free catalysts for the hydrogen reactions.

In strategy 2, novel bipolar membrane designs, or designs unexplored for FC & EL, will be developed and interfaced with catalysts for the oxygen reactions (high pH side of the bipolar membrane) and with catalysts for the hydrogen reactions (low pH side). The ionomers and oxygen reaction catalysts developed in strategy 1 will be equally useful for strategy 2, while identified PGM-free and ultralow-PGM catalysts will be implemented for the hydrogen reactions on the acidic side.

Polymer-electrolyte FC & EL based on those concepts will be evaluated for targeted applications, i.e. photovoltaic electricity storage, off-grid back-up power and H<sub>2</sub> production. The targeted market is distributed small-scale systems.

<b>NEOHIRE</b>		<b>720838</b>
<b>Title: NEDymium-Iron-Boron base materials, fabrication techniques and recycling solutions to Highly REDuce the consumption of Rare Earths in Permanent Magnets for Wind Energy Application</b>		
Call Id: <b>H2020-NMBP-2016-two-stage</b>	Topic: <b>NMBP-03-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>4.532.638,75</b>	EU requested grant (€): <b>4.443.888,75</b>	

**Free keywords:** *Permanent magnets, sintered magnets, bonded magnets, neodymium, CRM, wind turbines, Rare earth elements, REE, dysprosium, wind turbine generator, wind power*

### **Abstract:**

Regarding NdFeB PM technology for WT, it is still necessary to break through 3 important barriers: Strong dependence on China for supply and high price of REE present in PM, high difficulty of substitution of REE in PM, and technical and economic barriers that avoid establishing commercially viable, large-scale REE recycling framework.

In this context, NEOHIRE main objective is to reduce the use of REE, and Co and Ga, in WTG. This objective is mainly achieved through the development of: a) New concept of bonded NdFeB magnets able to substitute the present state-of-the-art sintered magnets for WT, and b) New recycling techniques for these CRM from the future and current PM wastes. In this way, the EU external demand of REE and CRM for PM in WTG will be reduced in a 50%.

The specific objectives are: i) To develop a new NdFeB material solution that reduces the use REE and CRM amount in PM for WTG (100% of HRE, 30% of LRE Nd/Pr, and 100% of CRM Co and Ga), ii) To increase the deliverable electric power in wind power electric generators from current 2.74 MW to 3.56 MW per 1Tn of REE owing to novel electric machine designs, iii) To research and develop two recycling processes to highly increase the CRM recycling rates in NdFeB PM wastes for sintered PM from current WT (increase from 0 to 70% the recovered Nd, separate 100% of Dy and recover 90% of Co) and novel Bonded NEOHIRE PM (recycling almost 95% of Nd), iv) To achieve an economic and technically feasible large-scale framework for NdFeB PM commercial recycling, and v) To ensure the economic and technical sustainability of NdFeB resin-bonded PM developed technologies.

NEOHIRE will count on PM material RTD experts (CEIT, UOB), material recycling experts (UOB, KU LEUVEN), material characterisation RTD experts (CEIT, UPV, LBF), JP Powder manufacturer (AICHI), PM manufacturer (KOLEKTOR), LCA experts (UNIFI) and WT manufacturer (INDAR). AICHI (Japan) will be involved by providing advice and raw materials to the project.

<b>STARCELL</b>		<b>720907</b>
Title: <b>Advanced strategies for substitution of critical raw materials in photovoltaics</b>		
Call Id: <b>H2020-NMBP-2016-two-stage</b>	Topic: <b>NMBP-03-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>6.009.798,75</b>	EU requested grant (€): <b>4.832.185,00</b>	

**Free keywords:** *kesterite, CZTS, solar cells, In, Ga, sustainable, thin film PV*

### **Abstract:**

STARCELL proposes the substitution of CRM's in thin film PV by the development and demonstration of a cost effective solution based on kesterite CZTS ( $\text{Cu}_2\text{ZnSn}(\text{S,Se})_4$ ) materials. Kesterites are only formed by elements abundant in the earth crust with low toxicity offering a secure supply chain and minimizing recycling costs and risks, and are compatible with massive sustainable deployment of electricity production at TeraWatt levels. Optimisation of the kesterite bulk properties together with redesign and optimization of the device interfaces and the cell architecture will be developed for the achievement of a challenging increase in the device efficiency up to 18% at cell level and targeting 16% efficiency at mini-module level, in line with the efficiency targets established at the SET Plan for 2020. These efficiencies will allow initiating the transfer of kesterite based processes to pre-industrial stages. These innovations will give to STARCELL the opportunity to demonstrate CRM free thin film PV devices with manufacturing costs  $\leq 0.30$  €/Wp, making first detailed studies on the stability and durability of the kesterite devices under accelerated test analysis conditions and developing suitable recycling processes for efficient re-use of material waste. The project will join for the first time the 3 leading research teams that have achieved the highest efficiencies for kesterite in Europe (EMPA, IMRA and IREC) together with the group of the world record holder David Mitzi (Duke University) and NREL (a reference research centre in renewable energies worldwide) in USA, and AIST (the most renewed Japanese research centre in Energy and Environment) in Japan. These groups have during the last years specialised in different aspects of the solar cell optimisation and build the forefront of kesterite research. The synergies of their joined efforts will allow raising the efficiency of kesterite solar cells and mini-modules to values never attained for this technology.



<b>PRESTIGE</b>		<b>761112</b>
Title: <b>Design-driven integration of innovative PPrinted functional matERialS into inTeractive high-end and fashion consumer Goods addressing tomorrow's societal challEnges</b>		
Call Id: <b>H2020-NMBP-2017-two-stage</b>	Topic: <b>NMBP-05-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>7.783.352,00</b>	EU requested grant (€): <b>6.590.357,91</b>	

**Free keywords:** *design-thinking, user-centred innovation, artistic expression, printed materials, electroactive polymers, organic photovoltaics, printed batteries, haptic effect, energy harvesting, smart packaging*

### **Abstract:**

Design thinking has become crucial for high added-value product development, especially in the field of creative industries (automotive, art, fashion, luxury, sports...). More specifically, in the context of globalisation, consumers demand greater variety and customization in product offering such as higher aesthetics, functionalities, integrability, reconfigurability or sustainability. Advanced materials and manufacturing processes are key enabling technologies to answer these requirements.

The PRESTIGE project aims at bringing together design-thinking innovation strategies with advanced printed functional materials developments (electroactive fluorinated polymers, photoactive materials, electroactive organic moieties, fluorinated relaxor terpolymers, tailor-made polymers for overmoulding and organo-mineral coating) and integration to demonstrate high-end interactive and aesthetics final products at TRL7 tackling tomorrow's societal challenges.

Five demonstrators will be developed and disseminated. Three business cases : (i) a haptic steering wheel for enhanced driving-experience (answering safe mobility challenge), (ii) energy harvesting and storage capacities for wearables (answering health, well-being and fashion challenges), (iii) e-plastic labels and oleophobic coatings for a more sustainable multi-use packaging (answering waste management: a major environmental challenge). Moreover, an artistic case (iv) to reach a wide audience of societal stakeholders and a design showcase (v) to increase awareness of designers about new materials.

In PRESTIGE a consortium of 16 partners all along the value chain from designers, material and process scientists, material suppliers, manufacturers, systems integrators, end-users to artists and societal stakeholders has been set-up to stand as a unique European reference in the future fostering design-driven innovation in creative industries and beyond, by promoting their achievements through an SME-oriented cluster of excellence.

<b>FBD_BModel</b>		<b>761122</b>
<b>Title: A Knowledge-based business model for small series fashion products by integrating customized innovative services in big data environment (Fashion Big Data Business Model)</b>		
Call Id: <b>H2020-NMBP-2017-two-stage</b>	Topic: <b>NMBP-22-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>12/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>3.763.474,00</b>	EU requested grant (€): <b>3.747.374,00</b>	

**Free keywords:** *interactive design platform, production and supply chain management platform, data-based services, knowledge-based business model*

### **Abstract:**

FBD\_BModel aims at creating a digital technology platform for delivering small series innovative functional garment products through a European Union-based local textile supply chain, meeting consumers' personalized requirements in terms of fashion and functional performances. This new supply chain will permit to get through the information channel from fabric materials to consumers via various processes, in order to dynamically organize design and production in the big data environment. This technology platform will integrate two interconnected knowledge-based sub-systems (an Interactive Design System (IDS) and a Supply Chain and Production Management System (SCPMS)). The platform will provide a range of data-based services (product and design recommendation, supplier selection, dynamic tasks planning, production simulation, ...) dedicated to consumers and concerned professionals (producers, designers, retailers, ...) of the supply chain. An extended virtual space will be created for visually displaying and evaluating fashion and functional performances (thermal comfort, skin touch comfort and skin pressure comfort in relation to body movements) of designed products in order to integrate consumers' lifestyle into the product design process. This platform will enable the direct connection of the professional networks of producers, designers and retailers and optimize all activities of the supply chain. Based on this platform, a novel B2B2C business model will be built by establishing the economic viability and overall exploitation strategy, developing a detailed business plan, along with a full exploitation strategy and associated risk analysis, and performing a series of extensive pilot operations and market replication actions. This business model will be helpful for creating customized textile production in Europe, promoting material innovations of European SMEs with connected professional networks, and preserving and updating professional knowledge in Europe.

<b>FENIX</b>		<b>760792</b>
<b>Title: Future business models for the Efficient recovery of Natural and Industrial secondary resources in eXtended supply chains contexts</b>		
Call Id: <b>H2020-NMBP-2017-two-stage</b>	Topic: <b>NMBP-22-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>3.995.125,00</b>	EU requested grant (€): <b>3.995.125,00</b>	

**Free keywords:** *Circular Economy, Secondary Resources, Added-Value Product-Service Systems, Additive Manufacturing, Demanufacturing, Biometallurgy, Digitalization, End User Engagement, Sustainability*

### **Abstract:**

The European Union faces several challenges caused by globalization. Both the delocalization of production plants (leading to more imported products) and the instability characterizing several industrial sectors force economies to re-think their business models and re-adapt them in a new context, where the sustainability of products and processes is more relevant. Within this overall framework, the need to think about innovative business models and industrial strategies, able to answer to these new requirements is mandatory. One chance is the exploitation of digital technologies. Another is the exploitation of secondary (and critical) resources that, currently, are wasted without any recovery. The project FENIX wants to consider both these issues and their potential at the same time, proposing something that could allow Europe to re-appropriate its pertaining position in the global market. The idea is to study innovative business models and industrial strategies (based on the circular economy paradigm) enabling the development of new product-services through the definition of novel supply chains, resulting from an unconventional mix of current ones. This could allow the easy re-use, reconfiguration and modularization of production systems, the exploitation of overcapacity and the renaissance of industrial poles all over the Europe. Furthermore, the circular economy driven business models and industrial strategies proposed by project FENIX will be demonstrated in existing pilot plants, adequately reconfigured and integrated based circular economy needs.

<b>MANU-SQUARE</b>		<b>761145</b>
Title: <b>MANUfacturing ecoSystem of QUALified Resources Exchange</b>		
Call Id: <b>H2020-NMBP-2017-two-stage</b>	Topic: <b>NMBP-22-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>3.956.188,75</b>	EU requested grant (€): <b>3.956.188,75</b>	

**Free keywords:** *Marketplace, Servitisation, Resource-efficiency, Start-ups*

### **Abstract:**

The MANU-SQUARE project creates a European platform-enabled responsible ecosystem acting as a virtual marketplace, bringing available manufacturing capacity closer to production demand to achieve their optimal matching thus fostering, on the one hand, fast and efficient creation of local and distributed value networks for innovative providers of product-services and, on the other hand, reintroduction and optimization in the loop of unused capacity that would be wasted otherwise.

In a wider perspective the MANU-SQUARE project pursues a paradigm shift that disrupts the traditional static supply chain model and establishes dynamic value networks that can be arranged on-demand to couple the needs of buyers and the availability of sellers of manufacturing capacity. In so doing, this latter becomes an easily and efficiently tradable commodity towards lowered production costs for European companies and improved manufacturing ecosystem actual productivity.

<b>DAFIA</b>		<b>720770</b>
Title: <b>Biomacromolecules from municipal solid bio-waste fractions and fish waste for high added value applications.</b>		
Call Id: <b>H2020-NMBP-BIO-2016</b>	Topic: <b>BIOTEC-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.430.196,25</b>	EU requested grant (€): <b>6.430.196,25</b>	

**Free keywords:** *Municipal solids waste, Marine rest, fermentation, microbial, dicarboxylic acid, diamines, polyamides, nucleic acid, flame retardant, coating, gelatine, green chemistry.*

### **Abstract:**

Municipal solids waste (MSW) are collected by municipalities and represents more than 500 kg/capita (EU-27 average), 300 million tonnes overall every year in the EU-32. Currently, approximately 50% of this volume is landfilled. More than 1.3 million tonnes of Marine rest raw material (MRRM) are generated in Europe each year. Some countries, such as Norway and Denmark, have traditionally for animal feed. It will therefore be a challenge for the industry to develop methods to turn fish viscera and skin, currently considered as undesirable raw materials for hydrolysis and human consumption, into profitable products.

DAFIA will exploit MSW and MRRM as feedstocks for high value products. The parallel exploitation of the two feedstocks may create synergies. This expertise will be utilised in process development from MSW, while at the same time, new added-value products may be identified from both feed stocks.

The main objective of the DAFIA project is to explore the conversion routes of municipal solid waste (MSW), and marine rest raw-materials (MRRM) from the fish processing industries, to obtain high added value products, i.e. flame retardants, edible/barrier coatings and chemical building blocks (dicarboxylic acids and diamine) to produce polyamides and polyesters for a wide range industrial applications.

Different value-chains and products will be selected and explored based on the potential commercial value and the technical feasibility including new microbial strains and processes for conversion of major feedstock fractions, enzymatic and chemical modifications of components isolated from the feedstock or produced in microbial processes.

Up to four cost-effective molecule groups suitable for the final selected applications will be targeted (nucleic acids, dicarboxylic acids, diamines and gelatine), & two value-chains (MSW & MRRM) will be evaluated at pilot scale to reach TRL5.

<b>FALCON</b>		<b>720918</b>
Title: <b>Fuel and chemicals from lignin through enzymatic and chemical conversion</b>		
Call Id: <b>H2020-NMBP-BIO-2016</b>	Topic: <b>BIOTEC-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.555.883,75</b>	EU requested grant (€): <b>6.148.783,75</b>	

**Free keywords:****Abstract:**

The transition to a biobased economy puts strong challenges on researchers and industry to develop sustainable processes. 2G biofuel plants use waste streams as substrates, but themselves generate a new waste stream of lignin-rich sludge that is left after saccharification of the carbohydrates. This waste stream is expected to exponentially increase with an increasing number of 2G bioethanol plants being built, according to a report of the International Energy Agency.

FALCON aims to convert this lignin-rich industrial waste of 2G biofuel plants to higher value products, in particular shipping fuels, fuel additives and chemical building blocks. This would be the next consecutive step in turning waste to products, thus minimizing waste and simultaneously providing new alternatives for fossil resource based processes. The FALCON process is based on enzymatic and mild chemical conversion of the lignin waste stream, providing a more environmentally friendly approach to the production of fuels and chemical building blocks.

FALCON takes full advantage of the lessons learned over the last 150 years in the petrochemical industry with respect to design of the processes. This implies an initial treatment at the 2G bioethanol plant, converting the waste to a lignin oil that can be more easily transported and also directly used as a low sulphur shipping fuel. It will be further converted into fuel additives and chemical building blocks in centralized facilities.

To achieve this, FALCON has formed a consortium of industry (3), SME (4) and academics (2) covering the whole value chain from a 2G biofuel plant delivering the lignin waste to enzyme producers, chemists and process engineers to depolymerize the lignin to oil. End-users are a fuel and chemicals producer and a ship engine developer. This unique combination of expertise and infrastructure will ensure the development of three new value chains with a strong emphasis on the economical sustainability.

<b>VOLATILE</b>		<b>720777</b>
<b>Title: Biowaste derived volatile fatty acid platform for biopolymers, bioactive compounds and chemical building blocks</b>		
Call Id: <b>H2020-NMBP-BIO-2016</b>	Topic: <b>BIOTEC-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.565.926,25</b>	EU requested grant (€): <b>6.565.926,25</b>	

**Free keywords:** *Biowaste, Volatile Fatty Acids, Biopolymer, Single Cell Oil, Bioactive compounds*

### **Abstract:**

VOLATILE aims in the development of an innovative Volatile Fatty Acids Platform for the bioconversion of municipal solid bio-waste fraction and sludgy biowaste from other industries. The platform will be integrated in anaerobic digestion. The volatile fatty acids will be recovered continuously using sophisticated membrane technology and will be provided as feedstock / carbon source for value added fermentation approaches such as biopolymer PHA to be tested in material applications, single cell oil as precursor for oleochemical industry as well as long chain unsaturated health-promoting Omega-3 fatty acids to be used as food ingredient or nutraceutical. PHA will be obtained by bacterial fermentations, single cell oil from yeast cultivation and Omega-3 fatty acids via heterotrophic microalgae. The process development will be accompanied with sophisticated LCA study in order to ensure environmental friendly process design.

The project will also work on solutions to typical barriers beside others such as quality requirements, continuous and sufficient feedstock supply or interaction between members of value chain using agent-based modelling. Also the effect of legal stimuli and restrictions and subsidies and taxes will be studied and a link between product requirements and markets will be established. VOLATILE will prepare a Roadmap indicating future research needs but also giving suggestion for legislative improvements. A CEN workshop will be initiated to discuss with external stakeholders rules for the VFAP & to set up standard requirements in the form of a CEN workshop Agreement.

<b>BIOCONCO2</b>		<b>761042</b>
Title: <b>BIOTEchnological processes based on microbial platforms for the CONversion of CO2 from ironsteel industry into commodities for chemicals and plastics</b>		
Call Id: <b>H2020-NMBP-BIO-2017</b>	Topic: <b>BIOTEC-05-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.999.886,25</b>	EU requested grant (€): <b>6.999.886,25</b>	

**Free keywords:** *CO2 reuse, Microbial Cell Factories, biotechnology, fermentation, Biocatalytic processes, low-energy, 3-butanediol, 3-hydroxypropionic acid, formic acid, lactic acid, Clostridium, Acetobacter*

### **Abstract:**

The main objective of BIOCON-CO2 is to develop and validate in industrially relevant environment a flexible platform to biologically transform CO2 into added-value chemicals and plastics. The versatility and flexibility of the platform, based on 3 main stages (CO2 solubilization, bioprocess and downstream) will be proved by developing several technologies and strategies for each stage that will be combined as puzzle pieces. BIOCON-CO2 will develop 4 MCFs based on low-energy biotechnological processes using CO2 from iron&steel industry as a direct feedstock to produce 4 commodities with application in chemicals and plastics sectors using 3 different biological systems: anaerobic microorganisms (C3-C6 alcohols by Clostridia), aerobic microorganisms (3-hydroxypropionic acid by Acetobacter) and enzymes (formic acid by recombinant resting E. coli cells and lactic acid by multi-enzymatic system). The technologic, socio-economic and environmental feasibility of the processes will be assessed to ensure their future industrial implementation, replicability and transfer to other CO2 sources, such as gas streams from cement and electricity generation industries. BIOCON-CO2 will overcome the current challenges of the industrial scale implementation of the biotechnologies routes for CO2 reuse by developing engineered enzymes, immobilization in nanomaterials, genetic and metabolic approaches, strain acclimatization, engineered carbonic anhydrases, pressurized fermentation, trickle bed reactor using advanced materials and electrofermentation. The project aims to capture at least 4% of the total market share at medium term (1.4Mtonnes CO2/year) and 10% at long term (3.5Mtonnes CO2/year) contributing to reduce EU dependency from fuel oils and support the EU leadership in CO2 reuse technologies. Policy recommendations and public perception and acceptance will be explored and a commercialization strategy will be executed by a detailed exploitation plan and technology transfer.



<b>BioRECO2VER</b>		<b>760431</b>
Title: <b>Biological routes for CO2 conversion into chemical building blocks</b>		
Call Id: <b>H2020-NMBP-BIO-2017</b>	Topic: <b>BIOTEC-05-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.990.937,56</b>	EU requested grant (€): <b>6.812.187,50</b>	

**Free keywords:** *CO2 conversion, enzymatic capture, microbial platforms, new reactor concepts*

### **Abstract:**

The high-level goal of BioRECO2VER is to demonstrate the technical feasibility of more energy efficient and sustainable non-photosynthetic anaerobic and micro-aerobic biotechnological processes for the capture and conversion of CO<sub>2</sub> from industrial point sources into 2 valuable platform chemicals, i.e. isobutene and lactate. To overcome several of the existing technical and economic barriers for CO<sub>2</sub> conversion by industrial biotechnology, the project will focus on minimizing gas pretreatment costs, maximizing gas transfer in bioreactors, preventing product inhibition, minimizing product recovery costs, reducing footprint and improving scalability. To this end, a hybrid enzymatic process will be investigated for CO<sub>2</sub> capture from industrial point sources and conversion of captured CO<sub>2</sub> into the targeted end-products will be realized through 3 different proprietary microbial platforms which are representative of a much wider range of products and applications. Bioprocess development and optimization will occur along 2 lines: fermentation and bioelectrochemical systems. The 3 microbial platforms will be advanced to TRL 4, and the most promising solution for each target product will be validated at TRL 5 on real off gases. To prepare for industrial implementation and contribute to public acceptance, the technological activities will be complemented with virtual plant design, economic and sustainability assessments and extensive dissemination.

All activities will be executed by a well-balanced and experienced group of 2 Research and Technology Organizations, 2 universities, 4 SMEs and 4 large industries.

<b>ENGICOIN</b>		<b>760994</b>
<b>Title: Engineered microbial factories for CO<sub>2</sub> exploitation in an integrated waste treatment platform</b>		
Call Id: <b>H2020-NMBP-BIO-2017</b>	Topic: <b>BIOTEC-05-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.986.910,00</b>	EU requested grant (€): <b>6.986.910,00</b>	

**Free keywords:** *biogas, CO<sub>2</sub>, hydrogen, lactic acid, PHA, acetone*

### **Abstract:**

The ENGICOIN proposal aims at the development, from TRL3 to TRL5, of three new microbial factories (MFs), integrated in an organic waste anaerobic digestion (AD) platform, based on engineered strains exploiting CO<sub>2</sub> sources and renewable solar radiation or H<sub>2</sub> for the production of value-added chemicals, namely:

MF.1) the cyanobacteria *Synechocystis* to produce lactic acid from either biogas combustion flue gases (CO<sub>2</sub> concentration ~ 15%) or pure and costless CO<sub>2</sub> streams from biogas-to-biomethane purification.

MF.2) the aerobic and toxic metal tolerant *Ralstonia eutropha* to produce PHA bioplastics from biogas combustion flue gases and complementary carbon sources derived from the AD digestate.

MF.3) the anaerobic *Acetobacterium woodii* to produce acetone from the CO<sub>2</sub> stream from biogas-to-biomethane purification.

High process integration will be guaranteed by taking advantage of low-grade heat sources (e.g. from cogenerative biogas-fired engine or an tailored PEM electrolyser), exploitable side gas streams (e.g. O<sub>2</sub> from electrolysis, CO<sub>2</sub> from biomethane purification), low-price electricity produced during night-time by a biogas-fired-engine cogeneration unit or even intensified operation conditions (e.g. up to 10 bars pressure for the anaerobic acetone production bioreactor; led-integrated photo-bioreactor). This is an essential feature, alongside with the high conversion rates enabled by synthetic and systems biology on the above microorganisms, to achieve competitive selling prices for the key target products (1.45 €/kg for lactic acid; 3.5 €/kg for PHA; 1 €/kg for acetone).

Notwithstanding the key application platform (anaerobic biorefinery based on organic wastes) the innovative production processes developed have a great exploitation potential in other application contexts: flue gases from different combustion appliances (e.g. cement kilns), alcoholic fermentation CO<sub>2</sub> streams (e.g. lignocellulosic biorefineries, breweries), etc.

<b>BioCatPolymers</b>		<b>760802</b>
<b>Title: Sustainable and efficient bio-chemical catalytic cascade conversion of residual biomass to high quality biopolymers</b>		
Call Id: <b>H2020-NMBP-BIO-2017</b>	Topic: <b>BIOTEC-06-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.351.985,08</b>	EU requested grant (€): <b>4.362.047,56</b>	

**Free keywords:** *mevalonate; bio-monomers; isoprene; 3-methyl 1,5-pentenediol; bio-polymers; fermentation; hybrid bio-chemocatalytic process*

### **Abstract:**

The overall objective of BioCatPolymers is to demonstrate a sustainable and efficient technological route to convert low quality residual biomass to high added-value biopolymers. The technology is based on an integrated hybrid bio-thermochemical process combining the best features of both. The biological step consists of the efficient conversion of biomass-derived sugars to mevalonolactone (MVL). MVL can be then converted to bio-monomers via highly selective chemocatalytic processes. BioCatPolymers is specifically aiming at the efficient and economic production of isoprene and 3-methyl 1,5-pentenediol (3MPD), two monomers with very large markets that can be further processed in the existing infrastructure for fossil-based polymers for the production of elastomers and polyurethanes, respectively.

This ambitious target will be attained by optimizing and demonstrating the entire value chain on 0.5 ton of biomass/day scale, starting from the pretreatment of lignocellulosic biomass to hydrolysis and biological fermentation to MVL, separation of MVL from fermentation broth, selective catalytic conversion to the targeted monomer and finally purification to polymer grade quality. The novel approach we propose in this project surpasses the impediments of traditional solely bio-based approaches. It aims at producing bio-isoprene at 50% cost reduction and 3MPD at 70% cost reduction compared to average market prices, by optimizing the platform cell factories and all downstream processes and integrating the process modules, thereby increasing the competitiveness of biological processes in terms of economics.

The BioCatPolymers consortium consists of highly qualified and experienced researchers with complementary expertise. Trans-disciplinary considerations are strongly involved in the project. The strong industrial leadership-driven innovation potential is reflected through the fact that the large majority of the partners are from industry.

<b>ELECTRA</b>		<b>826244</b>
Title: <b>Electricity driven Low Energy and Chemical input Technology foR Accelerated bioremediation</b>		
Call Id: <b>H2020-NMBP-BIO-CN-2018</b>	Topic: <b>CE-BIOTEC-04-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.635.281,43</b>	EU requested grant (€): <b>4.995.056,25</b>	

**Free keywords:** *Bio-electro chemical systems, 3-D printed biofilms, nanoparticles, microbial consortia, China, field experiments*

### **Abstract:**

The ELECTRA project is a EU-China RTD joint initiative that will deliver 2 innovative sets of novel electromicrobiology based environmental biotechnologies, facilitating/improving electron transfer during microbial degradation processes. Our approach will accelerate the elimination of several classes of pollutants and mixtures thereof in contaminated wastewater, groundwater, sediment and soil. The first set of biotechnologies employs bioelectrochemical systems requiring low energy input and no chemical addition. The second set comprises biotechnologies, which necessitate no energy input and minimal chemical amendment using electromicrobial concepts. ELECTRA biotechnologies will build on recent groundbreaking advances in biotechnology to develop them for environmental bioremediation applications and test the 4 most advanced technologies during field trials under various environmentally relevant conditions in both Europe (4 sites with contaminated wastewater, groundwater, soil, and sediment) and China (4 sites: mirroring tests concept) to prove their efficiency and robustness. The ELECTRA project deliberately addresses the accelerated elimination of compounds representative of hydrocarbons and derivatives, emerging pollutants, metals and nutrients and mixtures thereof in environmentally relevant concentration as a wise and careful approach taking into account the real problem of contaminations by organic and inorganic pollutants as well as nutrients. ELECTRA is a consortium of European and Chinese partners for a 4-year project. The EC-funded consortium gathers 17 partners from 6 EU countries, 1 Associated Country. 1 large Chinese company is part of the EC consortium without claiming any funding from the EC since NSFC finances only fundamental research and does not allow for the inclusion of companies as partners in NSFC projects. This company has a key/essential role in replicating field test experiments from European sites to Chinese sites. The NSFC-funded consortium is constituted by five research institutions acting as international partners.

<b>GREENER</b>		<b>826312</b>
Title: <b>InteGRated systems for Effective ENvironmEntal Remediation</b>		
Call Id: <b>H2020-NMBP-BIO-CN-2018</b>	Topic: <b>CE-BIOTEC-04-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>3/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.511.485,25</b>	EU requested grant (€): <b>4.964.168,25</b>	

**Free keywords:** *bioremediation, water, soil, bio-electrochemical systems, mixed cultures, biopile, ecopile, phytoremediation, hybrid systems, hydrocarbons, heavy metals, emerging contaminants, validation, scale-up*

### **Abstract:**

Increasing chemical pollution seriously compromises the health of ecosystems and humans worldwide. Hazardous compounds, such as polycyclic aromatic hydrocarbons, heavy metals and emerging pollutants contaminate soils/sediments, ground and surface waters. To prevent/minimise the risks associated with the accumulations of these chemicals in the environment it is key to establish low-cost/green methodologies for the treatment and redevelopment of contaminated areas. Several physico-chemical methods have been explored to remove pollutants in the environment, but these are complex, energy consuming or expensive. The exploitation of the capability of bacteria, fungi and phototrophs to transform toxic contaminants into harmless end-products, can lead instead to cheap and sustainable bioremediation alternatives.

GREENER proposes the development of innovative, efficient and low-cost hybrid solutions that integrate bioremediation technologies with bio-electrochemical systems (BES). BES, such as microbial fuel cells, break down organic contaminants through the action of electroactive bacteria while generating electrical current. We will investigate the synergetic effect of different bioremediation strategies and demonstrate effective pollutants removal in water and soil/sediments, while generating side products of interest, such as bioelectricity. The type and entity of contamination, along with the specific physico-chemical/microbial characteristics of the environment to be depolluted, will feed into a decision-making toolbox. The latter will allow the establishment of ad hoc integrated solutions, which will take into account effectiveness of biodegradation, costs, environmental risks and social aspects. Fundamental research will be performed at lab-scale, while pilot-tests will be used to proof the scaling-up feasibility for field applications. Environmental benefits and risks, compared to standard remediation approaches, including energy efficiency, will be investigated.

<b>FUTURING</b>		<b>723633</b>
Title: <b>Futuring European Industry</b>		
Call Id: <b>H2020-NMBP-CSA-2016</b>	Topic: <b>NMBP-36-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>18 months</b>	Unit: <b>RTD/D/01</b>
Total costs (€): <b>1.470.126,25</b>	EU requested grant (€): <b>1.470.126,25</b>	

**Free keywords:** *Reindustrialization*

### **Abstract:**

FUTURING aims at contributing to define the strategy for the re-industrialization of Europe, by focusing on the role of Research and Innovation within the framework of other dimensions – Economy, Society, Environment, Globalization, geopolitics– and incoming paradigms such as Circular Economy.

It explores 2030 future scenarios, concerning EU Industry, through the use of foresight and other Policy Intelligence tools, to identify critical factors on which action should be taken in order to overcome barriers and to foster opportunities for the EU re-industrialization process.

A large variety of experts and stakeholders, both directly as partners and externals, representing the main dimensions of the landscape in which the EU re-industrialization is going to take place, are participating.

Given the number of participants, their location in different countries of Europe, it is expected that the output of the project will be widely disseminated among relevant stakeholders throughout Europe. In particular, Recommendations will provide Policy Makers, at European, National and Regional level, guidelines for future Research and Innovation activities.

<b>HR-Recycler</b>		<b>820742</b>
Title: <b>Hybrid Human-Robot RECYcling plant for electriCal and eLEctRonic equipment</b>		
Call Id: <b>H2020-NMBP-FOF-2018</b>	Topic: <b>DT-FOF-02-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>12/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.986.573,75</b>	EU requested grant (€): <b>6.986.573,75</b>	

**Free keywords:** *Human-robot collaboration, factory orchestration, AI perception methods, smart mechatronics, WEEE management*

### **Abstract:**

The technological advances that have been achieved over the past decades have led to a tremendous increase of both the types and the total amount of electrical and electronic equipment that is manufactured. Despite the importance of Waste Electrical and Electronic Equipment (WEEE) management, the issue of the WEEE recycling has not received that increased industrial attention. HR-Recycler will target the development of a 'hybrid human-robot recycling plant for electrical and electronic equipment' operating in an indoor environment. The fundamental aim of the system (and its great innovation potential) will be to replace multiple currently manual, expensive, hazardous and time-consuming tasks of WEEE materials pre-processing with correspondingly automatic robotic-based procedures (categorization of electric/electronic devices, disassembling them, sorting of device components), before the materials are eventually provided as input to a fine shredding machine and conventional material separation steps are applied (using air/water flows, oscillating movements, magnets, etc.). More specifically, the overall goal of HR-Recycler is to create a hybrid collaboration environment, where humans and robots will harmoniously share and undertake at the same time different processing and manipulation tasks, targeting the industrial application case of WEEE recycling. The primary output of the envisaged system will be to extract sorted electric/electronic device components [e.g. Printed Circuit Boards (PCBs), Cu coils, capacitors, etc.] and concentrated fractions (e.g. copper, aluminium, plastics, etc.) of increased economic and environmental value; hence, contributing to the fundamental goal of the 'European circular economy' project and boosting economic activity in secondary markets. Additionally, mixed fractions (i.e. fractions with low concentration in valuable materials) will be collected, in order to be sent to other facilities for further dedicated recycling process.

<b>IQONIC</b>		<b>820677</b>
<b>Title: Innovative strategies, sensing and process Chains for increased Quality, re-configurability, and recyclability of Manufacturing Optoelectronics</b>		
Call Id: <b>H2020-NMBP-FOF-2018</b>	Topic: <b>DT-FOF-03-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.997.968,75</b>	EU requested grant (€): <b>7.997.968,75</b>	

**Free keywords:** *Assembly, Zero-defect, Life-cycle, Recycling, Opto-electronics*

### **Abstract:**

Advances in optoelectronics technologies is causing a revolution in consumer electronic goods, solar energy, communications, LED, industrial laser, and other fields. At present, the optoelectrical manufacturing is facing significant challenges in dealing with the evolution of the equipment, instrumentation and manufacturing processes they support. The industry is striving for higher customisation and individualisation, implying that systems configurations need to change more frequently and dynamically.

IQONIC will offer a scalable zero defect manufacturing platform covering the overall process chain of optoelectrical parts. IQONIC covers the design of new optoelectrical components and their optimised process chain, their assembly process, as well as their disassembly and reintroduction into the value chain. IQONIC will therefore comprise new hardware and software components interfaced with the current facilities through internet of things and data-management platforms, while being orchestrated through eight (8) scalable strategies at component, work-station and shopfloor level. The IQONIC technologies will be demonstrated in 4 demo sites covering a wide range of products and processes.

The impact of IQONIC to the European optoelectronics manufacturing industry, but also the society itself, can be summarised in the following (with a horizon of 4 years after project ends): (i) increase of the in-service efficiency by 22%, (ii) increased flexibility with 16% faster reconfiguration times, (iii) 10% reduction in production costs through recycled components and materials, (iv) improved designs for assembly and disassembly and, (v) about 400 new jobs created and (vi) over 39 MEUR ROI for the consortium. To do that we have brought together a total of seventeen (17) EU-based partners, representing both industry and academia, having ample experience in cutting-edge technologies and active presence in the EU photonics and manufacturing.



<b>DESTINY</b>		<b>820783</b>
<b>Title: Development of an Efficient Microwave System for Material Transformation in energy Intensive processes for an improved Yield</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-02-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.442.000,00</b>	EU requested grant (€): <b>7.058.006,25</b>	

**Free keywords:** *Microwave firing process, cement industry, ceramic industry, steel industry, cellular kiln, rotary kiln, fluidized bed feeding, mobile plant, energy efficiency, environmental friendly.*

### **Abstract:**

The DESTINY project aims to realize a functional, green and energy saving, scalable and replicable solution, employing microwave energy for continuous material processing in energy intensive industries. The target is to develop and demonstrate a new concept of firing granular feedstock for materials transformation using full microwave heating as alternative and complement to the existing conventional production.

The DESTINY system is conceived as cellular kilns in mobile modular plant, with significant advantages in terms of resource and energy efficiency, flexibility, replicability and scalability with reduced environmental footprint.

The DESTINY concept will be proved in two demo sites located in Spain and Germany, covering high energy demanding sectors of strategic interest as Ceramic (Pigments), Cement (Calcined clay) and Steel (Sinter, Iron Pellets/DRI, ZnO), to validate the critical parameters of the developed technology in relevant environment (TRL 6). It will be implemented 2 feeding modules per demo site and 1 mobile microwave kiln module and product treatment.

Influence of the DESTINY solutions in terms of stability, process efficiency and characteristics of raw materials, intermediate/sub/final products will be investigated to improve performance of the industrial processes addressed and guarantee the required quality of products. Numerical simulation tools will be used to drive the design and support the testing activities

The industrialization and sustainability of DESTINY high temperature microwave technology will be assessed through the evaluation of relevant KPIs, with Life Cycle Methodologies. With the final aim of ensuring a large exploitation and market penetration for DESTINY, technology-based solutions business model, economic viability and replicability analysis will be conducted. For guaranteeing industrial transferability appropriate exploitation and dissemination activities have been defined during and even after the end of the project.

<b>LIBERATE</b>		<b>820735</b>
Title: <b>Lignin Biorefinery Approach using Electrochemical Flow</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-02-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>10.047.734,85</b>	EU requested grant (€): <b>8.763.489,00</b>	

**Free keywords:** *Electrochemical, lignin, biorefinery, flow reactor,*

### **Abstract:**

Liberate represents a powerhouse consortium, including three major multinational chemical companies, Evonik (ERE), Perstorp (PER), Oxiris (OXI), SMEs (Chimar, Megara, NX Filtration, Condias, Enso, Idener and gate to growth), four internationally regarded research and technology organisations (ECN, Fraunhofer, Leitat and Sintef), and European leading universities (University of Mainz and University of Alicante). LIBERATE will overcome the technical developments, pilot line scale up and commercial exploitation barriers of the next generation of biorefineries. Highly efficient and selective anodic electrochemical oxidation will be applied to the depolymerisation of lignin and the synthesis of propyladipic acid from cyclohexanol to deliver a range of biosustainable feedstocks for drop in replacements or for superior product performance.

Liberate will deliver a pilot scale electrochemical plant to demonstrate the commercial opportunities of converting low cost lignin feedstocks in high value biosustainable chemicals. Liberate will model and physically integrate renewable energy sources to deliver a process that is capable of synthesising chemicals with zero CO<sub>2</sub>. The renewable energy integration will open up new business models for biorefinery operators to utilise peak renewable energy at discounted rates.

Liberate will deliver the following benefits:

- An electrochemical depolymerisation of kraft lignin to synthesise vanillin with a 7% yield.
- An electrochemical depolymerisation of organosolv lignin to synthesise mixed phenolic derivative oligomers with a yield of > 35%
- An electrochemical oxidation of biosustainable cyclohexanol to synthesise propyl adipic acid with a yield of up to 80%.
- A biorefinery process capable of accommodating RES fluctuations without loss in efficiency
- A biorefinery process that exhibits a 95% improvement in the energy efficiency of the process
- A biorefinery process that is capable of producing 29times less CO<sub>2</sub>

<b>PERFORM</b>		<b>820723</b>
Title: <b>PowerPlatform: Establishment of platform infrastructure for highly selective electrochemical conversions</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-02-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.874.987,50</b>	EU requested grant (€): <b>7.368.068,75</b>	

**Free keywords:** *Electrochemistry, bio-based feedstock, selectivity, open access pilot*

### **Abstract:**

The technologies to be developed in the PERFORM project are directed towards highly efficient and integrated electrochemical systems which substantially improve oxidative chemical transformations based on bio-based feedstocks. PERFORM provides solutions for the need for the electrification of the chemical industry and will establish a flexible PowerPlatform pilot plant to be used also after the end of the project, allowing for continuing innovations and impact. Moreover, multi-step chemical conversions can be shortcut and performed in a single electrochemical cell, such that this can be considered as a disruptive technology. Therefore, the implementation of electrochemical production methods for value-added compounds will be a game changer, leading to more efficient and sustainable production.

<b>SIMPLIFY</b>		<b>820716</b>
Title: <b>Sonication and Microwave Processing of Material Feedstock</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-02-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>10.417.488,75</b>	EU requested grant (€): <b>8.521.826,25</b>	

**Free keywords:** *process intensification, ultrasound, microwave, multiphase processes, polymerization, crystallisation, pilot-scale*

### **Abstract:**

SIMPLIFY, the Sonication and Microwave Processing of material Feedstock project, aims at enabling the electrification of the chemical process industry – and in particular the specialty chemicals industries. SIMPLIFY's vision is that of intensified processes, where alternative energy sources enable flexible continuous technologies to achieve localized ultrasound and microwave actuation of multiphase, flow reactors powered by electricity from renewable sources for the purpose of high-value product synthesis.

SIMPLIFY has selected three major classes of specialty processes to work on:

- i. The class of chemical processes involving highly viscous streams, with MW/US-assisted reactive extrusion of polyurethane as representative;
- ii. The class of chemical processes involving suspensions, in particular those requiring long residence times (up to hours), with US/MW-assisted reactive crystallization of zeolite microparticles in a continuous oscillatory baffle reactor (COBR);
- iii. The class of chemical processes involving suspensions, in particular those with inherently high reaction rates (residence times of seconds to minutes), with MW/US-assisted reactive crystallization of titania nanoparticle synthesis in a plug flow reactor (PFR).

SIMPLIFY advances the technology readiness level (TRL) of flow technology for these multiphase streams involving suspensions or viscous products from TRL4 (technology validation in lab) to TRL6 (industrial demonstration), thus pushing the transition from chemical reactions with poor resource – both material and energy – efficiency and variable product quality to processes with high resource efficiency and excellent, uniform product properties.

<b>BAMBOO</b>		<b>820771</b>
Title: <b>Boosting new Approaches for flexibility Management By Optimizing process Off-gas and waste use</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-03-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>18.688.328,75</b>	EU requested grant (€): <b>11.360.303,77</b>	

**Free keywords:** *Energy and materials flexibility, energy management, sustainable planning, energy efficiency, waste heat recovery, valorisation, monitoring systems*

### **Abstract:**

BAMBOO aims at developing new technologies addressing energy and resource efficiency challenges in 4 intensive industries (steel, petrochemical, minerals and pulp and paper). BAMBOO will scale up promising technologies to be adapted, tested and validated under real production conditions focus on three main innovation pillars: waste heat recovery, electrical flexibility and waste streams valorisation. These technologies include industrial heat pumps, Organic Rankine Cycles, combustion monitoring and control devices, improved burners and hybrid processes using energy from different carriers (waste heat, steam and electricity) for upgrading solid biofuels. These activities will be supported by quantitative Life Cycle Assessments.

In order to maximize their application and impact to plant level, flexibility measures will be implemented in each demo case towards energy neutrality and joined in a horizontal decision support system for flexibility management. This tool will analyse, digest and interchange information from both, the process parameters and the energy market, including the BAMBOO solutions. As a result, the operation of the plants will be improved in terms of energy and raw materials consumption, and will lay the foundation of new approaches in the energy market. BAMBOO will empower intensive industries to take better decisions to become more competitive in the use of natural resources in a broader context, in the spirit of facilitating the use of larger variability and quantity of RES.

BAMBOO consortium comprises strong industrial participation; 6 large companies as final users and 3 SMEs as technology providers, working with experienced RTOs and supporting entities. The private investment associated to BAMBOO is over 7M€ along the execution of the project. Lastly, the transferability potential of BAMBOO is extremely relevant as targeted process and plant improvements offer very high potential applications in other intensive industries.

<b>CIRMET</b>		<b>820670</b>
<b>Title: Innovative and efficient solution, based on modular, versatile, smart process units for energy and resource flexibility in highly energy intensive processes</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-03-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>10.185.820,75</b>	EU requested grant (€): <b>7.012.782,85</b>	

**Free keywords:** *Energy and resource flexibility, valorization of industrial wastes, metallurgy furnace, heat recovery system, advanced control,*

### **Abstract:**

The project aims to design, develop and validate an innovative solution, the CIRMET solution, to provide energy and resource flexibility to Energy Intensive Industries (EIIs)

The CIRMET solution will be validated in an operational environment (TRL7) in an existing process plant (non-ferrous sector) while the replicability of the solution will be assessed in three additional energy intensive sectors (steel, cement and water sector). For this purpose, three new demonstrators will be build up, plus the retrofitting of existing industry process unit. The new demonstrators or modules will be: EFFIMELT furnace, a new concept of flexible and modular process unit for industrial wastes treatment, RECUWASTE heat recovery unit, for flue gas heat recovery and transformation into compressed air to re-used in the same plant, having also the possibility of storing the excess energy and AFF40 (Analytic For Factory 4.0) platform, to improve process plant competitiveness, to increase energy and resource efficiency by controlling and optimizing process units. The retrofitting of an existing process unit (Metallo S.L process furnace) will be done to implement and validate the complete CIRMET solution.

A well-balanced consortium formed by academia, research organization, SMEs and energy intensive industries ensures the whole value chain needed to achieve project objectives and paves the way for future exploitation of the solution. The effective dissemination of project outcomes to the current and next generation of citizen and employees through the development of learning resources with flexible usage to be carried out by education/training experts within the consortium is eventually also an important objective of the consortium.

<b>PreMa</b>		<b>820561</b>
<b>Title: Energy efficient, primary production of manganese ferroalloys through the application of novel energy systems in the drying and pre-heating of furnace feed materials.</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-03-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>11.822.130,00</b>	EU requested grant (€): <b>10.073.272,50</b>	

**Free keywords:** *Manganese alloys, energy efficiency, renewable energies applied to the industry, solar energy innovative technologies, sustainable process industries, circular economy.*

### **Abstract:**

Global Manganese-alloys (Mn) are highly linked to the steel sector for key engineering applications in Europe. In 2017, Mn-alloy production was approx. 4 Mio tons, required 12,200 GWh electrical energy and emitted around 14.2 Mio tons of CO<sub>2</sub>. Therefore, an energy intensive and inherent cross-sectorial value chain that is, nowadays, led by the Asian market demand. PREMA is an ambitious initiative that aims at demonstrating an innovative suite of technologies (involving heat recovery and solar technologic approaches) that allow to pre-treat Mn ores, utilising more efficiently energy and material streams and decreasing direct and indirect CO<sub>2</sub> emissions (along with SO<sub>2</sub> and NO<sub>x</sub>). LCA and LCCA methodologies will be implemented from early stages to ensure the technical, economic and environmental viability of the solution across the whole Mn-alloys' value chain. The vision of PREMA is thus to make the Mn-alloys sector in Europe more flexible, sustainable and attractive. In order to cover the whole value chain, there is a strong presence of South African (SA) partners in the consortium, SA being the top 1 in high quality Mn ores' extraction and exports worldwide. A win-win situation in order to strengthen the Mn-alloys and steel value chains in Europe. PREMA consortium puts together a total of 11 production facilities spread over Europe and SA among 4 Mn producers, representing an aggregated process capacity of 380 MW (Transalloys in SA, Eramet in France and Norway, Ferroglobe in Norway and Spain and OFZ in Slovakia). The innovative character of the project is brought by major players in R&D across Europe and SA, with the Norwegian organisation SINTEF as coordinator. Last but not least, clustering with other EU initiatives, including other SPIRE projects, will be paid special attention in order to create awareness of the project developments from early stages of the demonstration.

<b>iCAREPLAST</b>		<b>820770</b>
Title: <b>Integrated Catalytic Recycling of Plastic Residues Into Added-Value Chemicals</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-10-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/15/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.919.307,50</b>	EU requested grant (€): <b>6.507.043,25</b>	

**Free keywords:** *aromatics, catalysis, pyrolysis, plastic mix, artificial intelligence, CO2 capture, membranes, LCA, recycling, urban waste*

### **Abstract:**

Approximately 70% of European plastic waste (18.5 mt/year) is not being recycled due to technical or economic reasons and are thus sent to landfill (27%) or incinerated (42%). This situation affects negatively the environment in terms of pollution and greenhouse gases emissions, as well as social perception regarding waste management, consumer's products industry and policy makers.

iCAREPLAST addresses the cost and energy-efficient recycling of a large fraction of today's non-recyclable plastics and composites from urban waste. Heterogeneous plastic mixtures will be converted into valuable chemicals (alkylaromatic) via chemical routes comprising sequential catalytic and separation steps. This multistage process will also yield carbon char and a pure CO<sub>2</sub> stream as products, whilst it will present improved economic sustainability, operational flexibility and lower CO<sub>2</sub> footprint thanks to (i) the energetic valorisation of gas by-products through innovative oxycombustion units integrated with efficient heat recovery; and (ii) the use of AI predictive control and real time optimisation. iCAREPLAST aims to demonstrate (TRL-7) the whole technology for plastic waste valorisation in a pilot plant able to process >100 kg/h of plastic. Advanced upstream waste sorting, pre-treatment and pyrolysis is strongly backed by previous demonstration activities and knowhow of the consortium, with profound knowledge of waste management and recycling market.

iCAREPLAST solution will enforce circular economy by substantially increasing the amount of recycled plastics to produce commodity products that can be used for virgin-quality polymers production or as raw materials for other processes in petrochemicals, fine chemicals, automotive and detergent/surfactants industries. As a result of its initial exploitation we will treat 250,000t of plastic waste which otherwise would have become landfill, converting it into 1,500t of alkylaromatics and 1,000t of aromatics.



<b>ISOPREP</b>		<b>820787</b>
Title: <b>Ionic Solvent-based Recycling of Polypropylene Products</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-10-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.782.006,25</b>	EU requested grant (€): <b>6.315.555,00</b>	

**Free keywords:** *Ionic polymer solvents, polypropylene recycling, low emissions in recycling, low energy consumption in recycling, virgin polypropylene from non-fossil sources, renewable plastics*

### **Abstract:**

This project addresses the call topic CE-SPIRE -10-2018: Efficient recycling processes for plastics containing materials.

A method (ISOPREP) is proposed for recycling polypropylene (PP) products into virgin quality PP and hence reusable for the production of the highest grade PP products. The method exploits a novel ionic polymer solvent designed for highly tuned solubility of PP, patented within the partnership, with the key advantages/innovations:

- (1) A performance identical to PP resin freshly manufactured from fossil sources
- (2) Cost effective compared with producing PP from fossil sources
- (3) Reduces the reliance of PP production on fossil resources
- (4) Achieves a step reduction on life cycle emissions and energy compared with the use of fossil resources
- (5) Is entirely closed loop with negligible loss of solvent per cycle and hence negligible emissions thus non-polluting
- (6) The solvent is non-toxic and non-flammable in the process temperature range
- (6) Removes dyes, colours and impurities
- (7) Prevents sending end of life PP products to landfill and avoids them polluting both land and sea

PP is used in a huge variety of products such as automobile interiors, consumer goods packaging, electronics, construction materials, carpets and other home furnishings. The global PP market, accessible by the ISOPREP system, was estimated at €65bn per annum in 2017, totaling approximately 23% of the entire plastics market. Given the typically short life of PP products, only 1% of which are recycled, there is a great need to implement innovative and disruptive technologies to mediate this trend.

## CE relevant projects - Horizon 2020 calls 2016-2018

Although applicable to a wide range of products, the concept will be developed and demonstrated at pilot plant stage for recycling polypropylene carpet at TRL7, based on prior and patented knowledge within the partnership at TRL5.

<b>MMAtwo</b>		<b>820687</b>
Title: <b>Second generation Methyl MethAcrylate (MMAtwo)</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-10-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.927.432,50</b>	EU requested grant (€): <b>6.664.702,76</b>	

**Free keywords:** *Recycling, Depolymerization, PolyMethyl MethAcrylate, PMMA, Thermal, Monomer, Polymer, Methyl Methacryla, MMA, Plastic waste, Plastics technologies, Sustainable design, waste management, materials engineering*

### **Abstract:**

PolyMethylMethAcrylate (PMMA) is a well-established polymer for its optical properties. Although PMMA can be turned back into its monomer, the technology has limited applications. Currently what is collected and reprocessed are mostly production scraps, which is about 10 % of the annual PMMA production but a much larger amount of recyclable product is available. On a world scale basis, 10 % of post-industrial scraps and the equivalent of 10 % of post-consumer products represent a potential of a Billion € market. The MMAtwo project main objective is to construct a novel and fast growing PMMA recycling value chain through depolymerization and recovery of a monomer grade sold at 90 % of virgin MMA price. MMAtwo targets to reduce the energy needs by more than 70 % and the CO<sub>2</sub> emissions by more than 60 %. To achieve its objective, MMAtwo integrates representative players along the value chain. During the project, PMMA will be collected from production scraps, but also from End-of-Life vehicles, Electronics goods, construction.... The lead-free depolymerization process will be validated at TRL7 enabling the possibility of a first commercial unit soon after the end of the project. A versatile purification process will be validated through repolymerization of the produced monomer. MMA grades produced will be validated in several optical and non-optical applications. The inorganic fractions from PMMA composites will also be valorized. The project will establish standards for post-consumer and post-production PMMA based products in order to facilitate the recycling. Training and education activities will be organized in order to prepare the next generation of Engineers and Researchers in the field of closed-loop polymer recycling. The new value chain will benefit to the entire PMMA industry, as post-production and post-consumer products will be collected and processed by and independent company servicing the major PMMA producers and their customers.

<b>MultiCycle</b>		<b>820695</b>
Title: <b>Advanced and sustainable recycling processes and value chains for plastic-based multi-materials</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-10-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>9.724.668,75</b>	EU requested grant (€): <b>7.681.576,90</b>	

**Free keywords:** *flexible pilot plant, solvent-based recycling, composites, textiles, fibres, films, multilayer, packaging, PAT, process and composition monitoring, circular business model, reprocessing, LCA, LCC*

### **Abstract:**

Plastics bring unprecedented value in terms of convenience, versatility of design and lightweight to European consumers as well as increasingly advanced performances even in high end applications. But only 31% of plastic packaging are currently recycled due to infra-developed technologies or to their unsatisfactory economic viability. This is in fact aggravated by considering plastics as commodity where their economic value is linked to a single use, often not taking into account the potentially generated end of life hurdles. In line with the just released Plastic Strategy for Europe, the time has come to stop the depletion, landfilling and incineration and shift to a Circular Model in the plastic sector improving the recycling rate but also the value of secondary raw materials from plastic recycling.

As such, with an overarching mission to maximise the valorisation of our finite plastic resources, based on the CreaSolv process patented by the partner FRAUNHOFER, which will be upscaled and digitised, MultiCycle will deliver an industrial recycling pilot plant for thermoplastic-based multi-materials. This is a solvent based selective extraction process which allows recovering pure plastics in mixed wastes but also fibres without downgrading. The later compounding of recovered materials will also be optimised in terms of process and formulation. Our economically and environmentally sustainable MultiCycle process will be demonstrated in 2 main large volume sectors (as providers of waste to recycle and end users of the recycled materials):

-Multilayer packaging but also flexible films that cannot be recycled cost effectively to date and altogether account for around 50% of plastic packaging, i.e. ca. 10 millions tons/year in EU.

-Fibre reinforced thermoplastic composites for the automotive sector from which plastics constitute around 16% of End-of-Life Vehicles weight, i.e. ca. 1 million tons/year in EU.

<b>POLYNSPIRE</b>		<b>820665</b>
Title: <b>Demonstration of Innovative Technologies towards a more Efficient and Sustainable Plastic Recycling</b>		
Call Id: <b>H2020-NMBP-SPIRE-2018</b>	Topic: <b>CE-SPIRE-10-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>9.947.515,00</b>	EU requested grant (€): <b>7.944.009,27</b>	

**Free keywords:** *Polymer, SPIRE, Chemical Industry, Steel Industry, vitrimers, automotive, polyamide, polyurethane, polyolefin, microwave, magnetic catalyst, recycling*

### **Abstract:**

The main objective of POLYNSPIRE is to demonstrate a set of innovative, cost-effective and sustainable solutions, aiming at improving the energy and resource efficiency of post-consumer and post-industrial plastic recycling processes, targeting 100% waste streams containing at least 80% of plastic materials. To this end, three innovation pillars are addressed at TRL7: A) Chemical recycling assisted by microwaves and smart magnetic catalysts as a path to recover plastic monomers and valuable fillers (carbon or glass fibres), B) Advanced additivition and high energy irradiation to enhance recycled plastics quality and C) Valorisation of plastic waste as carbon source in steel industry. Innovations A and B can lead up to 34% of fossil fuel direct reduction for PA and 32% for PU. Approach C can lead to reductions of around 80% of fossil carbon sources in electric arc furnaces. The demonstration is completed by the performance of a rigorous holistic environmental and economic analysis (LCA and LCC) to ensure the industrial feasibility and the accomplishment of environmental restrictions. Efforts are dedicated to analyse non-technological barriers (legislative or standardization) that could hinder the proper innovations deployment.

POLYNSPIRE also implies the development of a comprehensive business plan, gathering 7 business models and establishing a cross-linked relation between plastic, chemical and steel manufacturing industries. Its consortium, coordinated by CIRCE, ensures POLYNSPIRE success through the involvement of 4 RTOs, 1 university, 9 large companies, 6 SMEs and 2 multiplier associations. To that end, chemical companies (REPSOL QUIMICA, ARKEMA, NOVAMONT, NUREL and KOR), plastic compounders (BADA) and converters (MAIER), waste managers (IDS), technology developers (CIRCE, NIC, ION, AITIIP, TUE, CSM), equipment and steel manufacturers (FM, CPPE, HTT, FENO), exploitation (VTG), standardisation (DS) and dissemination (EUPC and IKMIB) entities are involved in the consortium.

<b>BIZEOLCAT</b>		<b>814671</b>
<b>Title: Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-24-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>6.571.837,50</b>	EU requested grant (€): <b>6.571.837,50</b>	

**Free keywords:** *Propane dehydrogenation, Butane dehydrogenation, Alkanes aromatization, catalyst, petrochemical industry, alkanes, olefins, zeolite, nanoparticles, nanoclusters, membrane reactor*

### **Abstract:**

In the past there have been a number of semi-industrial trials and even commercial processes to obtain on-purpose petrochemical feedstocks from methane and/or propane (more generally, C1-C4 hydrocarbons). However, their commercial success has been limited due to several reasons: from technical drawbacks (low conversions and selectivity) to economics (high capital investment and high operation costs are often obtained). Furthermore there is a need for lowering the carbon footprint of gas and oil industry, i.e. refining industry, contributing to an evolving scenario of sustainable economy in such field. BIZEOLCAT is addressing the use of light alkanes as raw material for specialty chemical industry and not as feedstock for fuels in the current oil refining process, becoming part of this transition.

BIZEOLCAT will aim developing 4 new processes of light alkanes (methane, propane and butane) conversion to olefins (propylene, butadiene) and to aromatics demonstrating higher performance, cost efficiency and environmental sustainability, using innovative methodologies for catalysts preparation and membrane reactor design. A refining company, TUPRAS, will run the pilot unit experiments. Two large companies, CEPESA and PERSTORP, will validate propylene and propylene and benzene, respectively as part of TR5 validation.

sLCA have demonstrated that the expected reduction in the greenhouse emissions related to the manufacturing of propane dehydrogenation developed within the project and also the Aromatization process in comparison to current Oleflex® and benzene production from a reformat plant is far over the target value of 20%.

A joint venture creation is part of BIZEOLCAT exploitation plan.

The BIZEOLCAT consortium comprises 14 partners: 2 technology centres, 2 research institutes, 3 universities, 1 Standardization body, 1 international association and finally 4 large industry and 1 SME from 10 countries (7 EU members, 2 associated countries to H2020, 1 third country).

<b>C123</b>		<b>814557</b>
Title: <b>Methane oxidative conversion and hydroformylation to propylene</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-24-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>50 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>6.353.373,75</b>	EU requested grant (€): <b>6.353.373,75</b>	

**Free keywords:** *Catalyst, MOF, metal-organic framework, oxidative conversion of methane, OCM, propylene, hydroformylation, high conversion, micro-kinetic modelling, thermal control, reactor design, modular*

### **Abstract:**

Propylene production is classified as the 4th largest emitter of greenhouse gases among the major chemical compounds. As the polypropylene market is huge and still growing, it is essential to find alternatives to current, energy-intensive production processes to meet the European environmental challenges. Other C3 derivatives, more specifically propanol and propanal, are also very high added-value chemicals with growing markets, obtained via waste-generating and energy-consuming processes.

Today, unused carbon resources are widely available and most of the time wasted. The C123 project's main goal is the validation in a relevant environment (TRL5) of an efficient and selective transformation of current generally accessible, unexploited, cheap methane resources (stranded gas (CH<sub>4</sub>) and biogas (CH<sub>4</sub>+CO<sub>2</sub>)) to propylene in particular and C3 products in general.

To this aim, C123 will develop new catalytic materials in novel process configurations and related operating procedures allowing the conversion of these resources to propylene through Oxidative Conversion of Methane, leading to an ethylene, carbon monoxide, and hydrogen mixture with an optimised composition for further HydroFormylation into propanal and/or propanol, ultimately being dehydrated into propylene, either in an integrated manner or as a stand-alone step.

C123 will adopt an integrated approach, not studying each step separately but considering the process as a whole, optimising recycling, avoiding separation, using variable feedstocks, and increasing resource and carbon efficiency.

The process will be evaluated and validated for implementation both as decentralised localised units (~10 kt/y) – the modular route, and in existing large facilities (>140 kt/y) – the add-on route.

Throughout the development and thanks to the perfect complementarity of the partners and the very strong industrial commitment, emphasis will be put to maximise further exploitation of the results through industrial implementation.

<b>ZEOCAT-3D</b>		<b>814548</b>
Title: <b>Development of a bifunctional hierarchically structured zeolite based nano-catalyst using 3D-technology for direct conversion of methane into aromatic hydrocarbons via methane dehydroaromatization</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-24-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>4/1/2019</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>6.764.020,00</b>	EU requested grant (€): <b>6.764.020,00</b>	

**Free keywords:** *catalyst, zeolite, nano-oxides, 3D-printing, MDA*

### **Abstract:**

The goal of the project ZEOCAT-3D is the development of a new bi-functional (two types of active centers) structured catalysts, achieving for the first time a tetramodal pore size distribution (micro-, meso1-, meso2-, macro-porous) and high dispersion of metal active sites for the conversion of methane, coming from different sources as natural gas and biogas, into high value chemicals such as aromatics (benzene, naphthalene, among others) via methane dehydroaromatization (MDA). The main drawbacks associated with this process are: Low methane conversion, low selectivity towards the desired products and the quickly deactivation due to carbon deposition onto catalyst. These problems will be overcome by the use of hierarchical zeolites structures synthesized by 3D-printing and loaded with doped molybdenum nano-oxides. The methodology of the project will go from laboratory to pilot scale demonstration in a real environment. Catalyst design and operation conditions will be optimized for different methane feedstock at lab-scale and then upscaling and construction of a final prototype will be carried out. The optimisation of these catalytic processes will bring enormous advantages for increasing the exploitation of natural gas and biogas, since ZEOCAT-3D is very well in accordance with the programme topic NMBP-24, regarding development industrial process to obtain high value chemicals at the same time that the dependence from the current fossil fuel is reduced.



<b>DECOAT</b>		<b>814505</b>
Title: <b>Recycling of coated and painted textile and plastic materials</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-26-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>49 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>5.974.457,50</b>	EU requested grant (€): <b>5.901.707,50</b>	

**Free keywords:** *coated plastics, coated textiles, recycling, debonding-on-demand, automotive, household electronics, outdoor gear*

### **Abstract:**

The main goal of DECOAT is to enable circular use of textiles and plastic parts with (multilayer) 'coatings', which are typically not recyclable yet. These 'coatings' comprise functional and performance coatings and paints as well as adhesion layers. Therefore, novel triggerable smart polymer material systems and the corresponding recycling processes will be developed. The triggerable solutions will be based on smart additives (like microcapsules or microwave triggered additives) for the 'coating' formulations that will be activated by a specific trigger (heat, humidity, microwave, chemical).

A continuous recycling pilot plant will demonstrate the novel DECOAT principle that allows upgrading existing mechanical recycling by adding tools for sorting by and activation of the trigger. The optimal use of the Creasolv® process for recycling of coated parts will be assessed. The focus is on recycling of the bulk material, but re-use of the coatings materials themselves will also be tackled. Using these recycling processes, circular use of demo cases for outdoor gear, household electronics and automotive parts will be validated.

The novel triggerable DECOAT technologies will create new markets for additives, coatings, paints and adhesives fulfilling the recycling need. The concepts will support designers and product developers for making 'recyclable-by-design' products. This will create direct business opportunities for the DECOAT partners and serve as examples for promoting DECOAT solutions to the wider stakeholder community.

The targeted products (parts) are coated plastic from cars, electrical and electronic equipment and coated textiles which produce annually almost 3.5 million tons waste. DECOAT will lead to a decrease in landfilling of ca. 75% and a reduction in the carbon footprint by at least 30% for these products. By enabling their recycling, DECOAT is expected to generate on medium term a novel market of over 150 million in Europe (or ca 500 jobs).

<b>PUReSmart</b>		<b>814543</b>
Title: <b>PolyUrethane Recycling towards a Smart Circular Economy</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-26-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>5.998.573,75</b>	EU requested grant (€): <b>5.998.573,75</b>	

**Free keywords:** *Polyurethane, flexible foam, chemolysis, sorting, design, covalent adaptable networks, polyurethanes, vitrimers, spectroscopic, thermoset, circular, TAD-indole click chemistry, optical sorting*

### **Abstract:**

Thermosetting Polyurethanes (PU) provide a unique combination of durability, light weight, high strength and flexibility to high value consumer goods and other applications. PU thermosets have grown to a global market of 50 billion €, ultimately resulting in high volumes of waste mostly disposed via landfill or incineration as the SOA of the recycling technology is limited. PUReSmart will bridge the gap between the current PU linear economy to a circular model by designing smart polyurethane materials that can be reshaped into new products with undiminished quality. PUReSmart will provide solutions for the identified three scientific-technological urgent needs that require conceptual breakthroughs:

- 1) Smart DESIGN of covalent adaptable polyurethanes (CAPU) to bridge the gap between thermosets and thermoplastics, thanks to thermally reversible bonds; these CAPU are reprocessable, similarly to thermoplastics.
- 2) Smart SORTING, using the unique spectroscopic fingerprints of conventional PU and smart building blocks to create a validated and cost effective PU sorting platform with high specificity and sensitivity; this enables driving CAPUs to reprocessing and PU to chemolysis.
- 3) Smart CHEMOLYSIS with mass balanced and minimized input of virgin chemicals, maximal purity and efficient isolation of the obtained building blocks resulting in full re-utilization of all obtained fractions for PU or CAPUs;

PUReSmart will integrate CAPU chemistry with monomers obtained by next-generation chemolysis processes, using well-sorted feedstocks, aiming at scalable industrial products (TRL 5) with social and economic value assessed by a Life Cycle Analysis for 'cyclic' PU.

The project encompasses a concerted effort of partners along the value- and revalorization chain: PU producers, producers of the building blocks, technology providers for physical sorting, and research institutions focusing on design of new PU types and on innovative chemolysis methods for existing PU types.

<b>Repair3D</b>		<b>814588</b>
Title: <b>Recycling and Repurposing of Plastic Waste for Advanced 3D Printing Applications</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-26-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>49 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>5.998.832,50</b>	EU requested grant (€): <b>5.998.832,50</b>	

**Free keywords:** *Additive Manufacturing, Carbon Fibre Reinforced Thermoplastics, Circular Economy, Thermoplastic recycling, CFRP recycling, Design for Recycling, Recycling-by-design CFRPs*

### **Abstract:**

The project aims at the development of innovative reclamation and repurposing routes for end-of-life plastic and carbon fibre reinforced polymer (CFRP) components. This will be achieved by employing advanced nanotechnology solutions, Additive Manufacturing (AM) and recycled resources, for the production of high added value 3D printed products with advanced functionalities. In this way, the combination of AM, polymer processing and recycling technologies could constitute a new paradigm of a distributed recycling process, easily implemented at local scale in collaboration with the industrial sector and collection facilities, in order to create competitive, highly customisable products at lower production costs, in a flexible digital environment that fully unravels the potential of eco-design and allows for integration of smart intrinsic self-sensing, self-repairing and recycling options. The project aims to address all aspects and stages of thermoplastic and CF reinforced thermoplastic 3D printing material development from recycled resources, starting with the selection of suitable waste streams, strategies for material repair, compatibilization and upgrade towards AM processing, compatibility between different thermoplastic matrices and the reinforcing fibres and nanoparticles, comparative assessment of various AM thermoplastic processing technologies and closed-loop material optimisation in terms of processability and performance.

<b>TERMINUS</b>		<b>814400</b>
Title: <b>in-built Triggered Enzymes to Recycle Multi-layers: an INnovation for USes in plastic-packaging</b>		
Call Id: <b>H2020-NMBP-ST-IND-2018</b>	Topic: <b>CE-NMBP-26-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>49 months</b>	Unit: <b>RTD/D/03</b>
Total costs (€): <b>5.737.013,75</b>	EU requested grant (€): <b>5.737.013,75</b>	

**Free keywords:** *Enzymes, PUR adhesives, multilayers, packaging, biodegradable polymers, polymer formulation, smart additives, bio-based polymers, life-cycle analysis, polymer compounding, plastics recycling*

### **Abstract:**

TERMINUS addresses the challenge of unlocking recycling and reuse of flexible multi-layer and multi-compounds packaging materials used for food, beverages, cosmetics, pet food, fertilisers, any perishable goods in general. It will develop a range of smart enzyme-containing polymers with triggered intrinsic self-biodegradation properties, acting as adhesives or tie layers in the design and manufacturing of multi-layer plastics for food and non-food applications. The technology will be applied to biodegradable PUR-based adhesives for adhesive lamination and extrusion coating lamination, and polymers and tie layers (PBS, PLA, PPC or PCL) in blown extrusion.

TERMINUS will base its innovative and challenging objectives on a cross-disciplinary team of renowned organizations with expertise in enzymatic biodegradation of polymers, thermal protection of enzymes using nm organosilica and layered double hydroxide, cyclodextrins, UV and water triggered enzymatic activity, formulation of advanced polymers, manufacturing of multilayer plastic packaging, plastics recycling.

TERMINUS is based on TRL3 technologies and will reach TRL5. It will result in major market opportunities for European industrials in several well established markets ready for market opportunities: plastic packaging (TPPS, STTP), industrial enzyme applications (BIOPOX), PUR adhesives (COVESTRO), biodegradable plastics (IPC), biotech plants (OWS), mechanical recycling (SIGMA). At least 15% of improvement of economic efficiency vs. current solutions (landfilling, incineration) are expected. A reduction of landfilling for multi-layer plastic packaging over 80% together with a reduction of overall plastic landfilling by 55% will be achieved with a minimum decrease by 65% of the overall CO2 footprint. TERMINUS will be a breakthrough in reaching the 2030 European Commission objective to recycle 100% plastic packaging.

<b>FAirWAY</b>		<b>727984</b>
Title: <b>Farm systems that produce good Water quality for drinking water supplies</b>		
Call Id: <b>H2020-RUR-2016-2</b>	Topic: <b>RUR-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>4.999.865,00</b>	EU requested grant (€): <b>4.999.865,00</b>	

**Free keywords:** *Farm management, nitrate, pesticides, drinking water, governance models, best management practices*

### **Abstract:**

Safe drinking water is vital for human health. Diffuse pollution of nitrogen and pesticides from agriculture is the main obstacle to meet drinking water quality targets. Policies to protect drinking water resources have not achieved a consistent effectiveness in all member states. The objective of FAIRWAY is to review policy, governance and farm water management approaches to protect drinking water resources in the EU and to identify and further develop innovative measures and governance approaches which will simultaneously increase the sustainability of agriculture. The FAIRWAY partners form a unique blend of researchers, farm advisers and consultancies and is built on 13 case studies ('living labs') in 11 different EU countries, which will form the core of a multi-actor platform, underpinning all FAIRWAY work packages. Equally important is the upscaling of successful practices from case studies to the regional, national, and EU scales, emphasising the role of effective communication and extension tools developed in FAIRWAY. The outputs will provide a blueprint for multi-actor engagement across different scales, which will allow agriculture and water policies to be addressed in a more integrated way. FAIRWAY will i) increase the scientific understanding of the relationship between agriculture and drinking water protection, ii) increase the understanding for the social, technical and economic barriers to practical implementing of measures (iii) deliver innovative measures and tools to overcome these barriers, iv) develop protocols and data-sets for monitoring of farming practices and water quality, v) develop effective governance approaches for small to large water supplies, and vi) increase awareness and involvement of farmers and other citizens in the monitoring and governance of water supplies. The FAIRWAY results will be widely disseminated to a range of targeted audiences using state-of-the-art technologies, social media and workshops.

<b>WATERPROTECT</b>		<b>727450</b>
Title: <b>Innovative tools enabling drinking WATER PROTECTioN in rural and urban environments</b>		
Call Id: <b>H2020-RUR-2016-2</b>	Topic: <b>RUR-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>4.997.006,50</b>	EU requested grant (€): <b>4.997.006,50</b>	

**Free keywords:** *Water governance*

### **Abstract:**

High-quality, safe, and sufficient drinking water is essential for life: we use it for drinking, food preparation and cleaning. Agriculture is the biggest source of pesticides and nitrate pollution in European fresh waters. The overarching objective of WATERPROTECT is to contribute to effective uptake and realisation of management practices and mitigation measures to protect drinking water resources. Therefore WATERPROTECT will create an integrative multi-actor participatory framework including innovative instruments that enable actors to monitor, to finance and to effectively implement management practices and measures for the protection of water sources. We propose seven case studies involving multiple actors in implementing good practices (land management, farming, product stewardship, point source pollution prevention) to ensure safe drinking water supply. The seven case studies cover different pedo-climatic conditions, different types of farming systems, different legal frameworks, larger and smaller water collection areas across the EU. In close cooperation with actors in the field in the case studies (farmers associations, local authorities, water producing companies, private water companies, consumer organisations) and other stakeholders (fertilizer and plant protection industry, environment agencies, nature conservation agencies, agricultural administrations) at local and EU level, WATERPROTECT will develop innovative water governance models investigating alternative pathways from focusing on the 'costs of water treatment' to 'rewarding water quality delivering farming systems'. Water governance structures will be built upon cost-efficiency analysis related to mitigation and cost-benefit analysis for society, and will be supported by spatially explicit GIS analyses and predictive models that account for temporal and spatial scaling issues. The outcome will be improved participatory methods and public policy instruments to protect drinking water resources.

<b>NUTRIMAN</b>		<b>818470</b>
Title: <b>Nutrient Management and Nutrient Recovery Thematic Network</b>		
Call Id: <b>H2020-RUR-2018-1</b>	Topic: <b>RUR-15-2018-2019-2020</b>	Type of Action: <b>CSA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>30 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>1.999.927,50</b>	EU requested grant (€): <b>1.999.927,50</b>	

**Free keywords:** *Networking, nitrogen, phosphorus, nutrient recovery, innovative fertilisers, biochar, struvite, best practices, knowledge transfer, agri practices, EIP-AGRI, agri practitioner ash, compost, digestate*

### **Abstract:**

Agriculture and food industry having a high dependence on resources in their production and striving for long-term sustainability. In this context there is an urgent need to optimise resource use and smooth the transition to a knowledgedriven agriculture. The NUTRIMAN is a Nitrogen and Phosphorus thematic network compiling knowledge “ready for practice” for such recovered product applications, practices and technologies, interconnecting applied science and industrial practice, for the user interest and benefits of the agricultural practitioners. There is an urgent need to spread knowledge and network information towards agricultural practitioners about the insufficiently exploited N/P recovery innovative research results (technologies, products, practices). The project objective is to improve the exploitation of the N/P nutrient management/recovery potential for the ready for practice cases not sufficiently known by practitioners. Our action will open new opportunities for farmers to develop connections between applied researches with practical usefulness results and farming practice in the priority area of nutrient management and nutrient recovery. Uses a bottom-up approach to identify incentives and bottlenecks for adoption and to prioritise between technologies/products and will ensure larger willingness to adopt innovations and improve multiplier effects. Large scale take up of the recovered N/P innovative fertilisers targeted, produced from un-exploited resources of organic or secondary raw materials in line with the circular economy model, and economical/environmental efficiently used by farmers. Effective dissemination and exploitation promoted by multilingual web platform, other communications and best practice field demonstrations for farmers. This action is contributing to the successful deployment of the vast reservoir of existing scientific/practical knowledge on the N/P recovery theme, including multi lingual abstracts in EIP-AGRI format.

<b>SuWaNu Europe</b>		<b>818088</b>
Title: <b>Network for effective knowledge transfer on safe and economic wastewater reuse in agriculture in Europe</b>		
Call Id: <b>H2020-RUR-2018-1</b>	Topic: <b>RUR-15-2018-2019-2020</b>	Type of Action: <b>CSA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>30 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>1.999.926,25</b>	EU requested grant (€): <b>1.999.926,25</b>	

**Free keywords:** *water reuse agriculture, circular economy, rural developement, sustainable water management, practitioners, multi-actor approach, networking,*

### **Abstract:**

Reclaimed water has a strong potential for complementing conventional water resources. According to the European Commission communication “Closing the loop - An EU action plan for the Circular Economy” (COM(2015)0614): “in addition to water-efficiency measures, the reuse of treated wastewater in safe and cost-effective conditions is a valuable but under-used means of increasing water supply and alleviating pressure on over-exploited water resources in the EU”. Water reuse is especially relevant in agriculture as this is one of the main water consumers, having additional benefits for farmers: lower cost compared to other solutions (e.g. desalination), reliability of supply regardless of season, climatic conditions and associated water restrictions, and nutrients contribution of the treated wastewater that can supplement or replace conventional fertilizers. Based on the results of a previous EU project called SuWaNu (contract number 319998) whose main result was to set research driven clusters in the field of water reuse in 5 target countries: Malta, Spain, Germany, Greece and Bulgaria, SuWaNu Europe is intended to bridge the current innovation gaps and achieve an effective implementation of reuse solutions in agriculture. SuWaNu Europe will extend the geographical coverage of its predecessor and will summarize, share and present existing and upcoming knowledge and skills in the field of water reuse in agriculture to the relevant stakeholders such as farmers and farming advisory groups. SuWaNu Europe will also create regional working groups for the development of action plans. These action plans will set strategies at regional level with the objective of boosting innovation in the agricultural and water sectors, improving best practice development and identifying the most appropriate channels to reach stakeholders. In addition to this, dissemination and training will create the capacity and competencies needed to implement these results.



<b>LEX4BIO</b>		<b>818309</b>
Title: <b>Optimizing Bio-based Fertilisers in Agriculture – Knowledgebase for New Policies</b>		
Call Id: <b>H2020-RUR-2018-2</b>	Topic: <b>CE-RUR-08-2018-2019-2020</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>5.999.968,75</b>	EU requested grant (€): <b>5.999.968,75</b>	

**Free keywords:** *Policy requirements*

### **Abstract:**

Imported mineral phosphate and fossil energy-intensive nitrogen fertilisers cause major detrimental impacts on the environment, whilst nutrient-rich side-streams/organic waste remain under-utilised. By optimising usage of bio-based fertilisers (BBF) from side-streams, ensuring their safety, building evidence-based trust in their usage and developing legislative framework for their use, it will be possible to reduce dependence upon mineral/fossil fertilisers, benefiting the environment and the EU's economy.

LEX4BIO aims to achieve this by collecting and processing regional nutrient stock, flow, surplus and deficiency data, and reviewing and assessing the required technological solutions. Furthermore, socioeconomic benefits and limitations to increase substitution of mineral fertiliser for BBFs will be analysed. A key result of LEX4BIO will be a universal, science-based toolkit for optimising the use of BBFs in agriculture and to assess their environmental impact in terms of non-renewable energy use, greenhouse gas emissions and other LCA impact categories. LEX4BIO provides for the first time connection between production technologies of BBFs and regional requirements for the safe use of BBFs.

The large variation between EU regions in nutrient flows and regional requirements for fertilisers will be estimated by harmonised methods to produce the knowledge basis needed to set up feasible ways to redirect the nutrient flows where needed. This will be followed by classifying the best available technologies for producing regionally tailored BBFs to secure high agricultural productivity, as well as environmental protection, food safety and human health.

In LEX4BIO, the knowledge basis and recommendations will be gathered and processed together with stakeholders across Europe, providing best solutions for decreasing the dependency on imported fertilisers, closing the nutrient cycles and improving sustainability of European farming systems.

<b>4PRIMA</b>		<b>724060</b>
Title: <b>Partnership for Research and Innovation in the Mediterranean Area</b>		
Call Id: <b>H2020-SC5-2016-OneStageA</b>	Topic: <b>SC5-12-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>5/1/2016</b>	Duration: <b>22 months</b>	Unit: <b>RTD/I/02</b>
Total costs (€): <b>1.999.378,75</b>	EU requested grant (€): <b>1.999.378,75</b>	

**Free keywords:** *food systems and water resources, partnership for research and innovation, Strategic Research and Innovation Agenda, implementation plan, cooperation between EU and Mediterranean Partner Countries*

### **Abstract:**

The 4PRIMA Coordination and Support Action will create the bases and will develop a set of activities aimed at supporting the establishment of a long-term, well-structured and integrated partnership for research and innovation (R&I) on food systems and water resources, among countries from both sides of the Mediterranean Sea (“PRIMA Initiative”). In order to enable a sustainable development in this area, 4PRIMA will facilitate the establishment of favourable and stable conditions for a reinforced international cooperation on food systems and water research, based on a better coordination, collective ownership of R&I programmes and, consequently, clear and tangible mutual benefits.

4PRIMA will develop a Strategic Research and Innovation Agenda (SRIA) and an associated implementation plan, as a result of an extensive participatory process that will target a critical mass of key players at international level and all relevant stakeholders of the food and water sectors. To achieve this main objective, 4PRIMA will take advantage of a wide portfolio of results and relationship generated in previous and on-going EU projects, as well as it will seek cooperation between EU and Mediterranean Partner Countries (MPCs), in coherence with the activities of the Strategic Forum for International Cooperation.

Given the strategic relevance of an appropriate development and uptake of the SRIA to establish a long lasting partnership in the region, 4PRIMA science diplomacy actions will be essential to ensure the support to R&I policy dialogue addressing sensitive challenges between EU and MPCs. Moreover, in order to maximise its expected impact, 4PRIMA project will explore avenues for awareness raising and development of strategic alliances with key stakeholders, including EU, AC and MPCs countries that did not take part to the PRIMA joint programming process, with the goal to enlarge the participation to the “PRIMA Initiative”.

<b>T2gE</b>		<b>724052</b>
Title: <b>Transition to the Green Economy</b>		
Call Id: <b>H2020-SC5-2016-OneStageA</b>	Topic: <b>SC5-24-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>6/1/2016</b>	Duration: <b>9 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>317.143,96</b>	EU requested grant (€): <b>285.688,96</b>	

**Free keywords:** *Presidency event, policy options, recommendations.*

### **Abstract:**

The main objective of the project is to contribute to a transition towards a green economy in Europe through organization of the international conference “Transition to a green economy” (T2gE). This international conference will be an event of major strategic nature during the Slovak Presidency of the European Council. Conference will bring together a broad spectrum of stakeholders. Its ambition is to improve understanding of the green economy concept, identify conclusions and pathways for transition as well as to involve and mobilise various actors and stakeholders in the discussions of possible future actions. The conference also aims to strengthen synergy among various recent initiatives and programmes launched by the European Commission (i.e 7EAP, Circular economy package, Energy Union, Juncker Commission’s priorities etc) and by the Member States, to the benefit of the overall coherence.

The conference will aim to bring together policymakers from various EU countries, as well as a range of stakeholders from international organizations, academia, business, and civil society and encourage an open debate around key green economy issues. At the end of the conference, draft conclusions, for both the national and the European level, will be approved which will be useful tool for implementation of policy in the field of green economy. Parallel breakout sessions will be devoted to various relevant subjects with the involvement of representatives from civil society, policymakers, business, science and innovations, and regional and local authorities. The participants will present examples of the green economy approaches from successful countries, which will be discussed and reflected in the conclusions to ensure that green economy policy conclusions are relevant to countries’ needs. Part of the conference will be oriented on practical demonstration of Slovak examples of green/circular economy – field trip.

<b>IC4WATER</b>		<b>730264</b>
Title: <b>Tackling Water Challenges in the International Context</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-11-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>60 months</b>	Unit: <b>RTD/I/02</b>
Total costs (€): <b>2.289.000,00</b>	EU requested grant (€): <b>2.289.000,00</b>	

**Free keywords:** *international cooperation; mapping; UN SDGs; cooperation models; water challenges*

### **Abstract:**

The Joint Programming Initiative Water Challenges for a Changing World, the Water JPI, is an intergovernmental initiative which strives to achieve sustainable water systems for a sustainable economy in Europe and abroad.

IC4WATER's objectives include supporting agencies in stepping up international cooperation: through the sharing of best practices, networking, closer coordination of existing activities, and the establishment of new relationships to facilitate multidisciplinary networking across the water challenges at a wider scale, both with respect to research and geographical areas. A mapping of the existing research cooperation models (mainly bilateral – between a Member State or the European Commission and some Beyond Europe countries) and a comparative analysis of existing cooperation models will be issued to identify barriers and challenges to transnational collaboration, and formulate successful mechanisms for working together efficiently beyond this bilateral approach.

In order to become more than a 'network of networks' and a dialogue platform for research programmes and to bring genuine added value to the current cooperation models, IC4WATER will be focusing on key topics of the Water JPI Strategic Research & Innovation Agenda. As an initial focus, the Water JPI Governing Board, which endorsed the IC4Water concept in November 2015, has agreed a plan to pilot new principles of international transnational cooperation through concrete joint programming, focusing on the theme of UN Sustainable Development Goals related to Water challenges. A shortlist of key 'UN SDG thematic' RDI areas will be scoped in more detail and will serve as recommendations for joint activities (opportunities for cooperation with funding RDI governmental institutions or for RDI support for market development, first domains of development of the Water JPI knowledge hub, joint transnational call with partners willing to commit additional national / regional funds for RDI projects).

<b>CHROMIC</b>		<b>730471</b>
Title: <b>effiCient mineral processing and Hydrometallurgical RecOverY of by-product Metals from low-grade metal contalning seCondary raw materials</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.869.687,50</b>	EU requested grant (€): <b>4.869.687,50</b>	

**Free keywords:** *critical and by-product metals, cost-/energy-/material-efficiency*

### **Abstract:**

Europe is faced with the challenge of sustaining a secure supply of by-product metals, which play a fundamental role in the competitiveness of the manufacturing sector and innovations in high-tech sectors. To loosen the growth restrictions imposed by the inflexible supply from primary mining, alternative sources for these metals must be explored. At the same time a wealth of metals is entrapped within the vast amounts of secondary resources still being landfilled or used in applications where their intrinsic value is not fully utilized. To unlock the potential of these resources, a radically new approach to metal recovery must be deployed. Crucial factor within this new value chain is the zero-waste approach, which captures not only the contained metals but also valorises the residual matrix (often >95% of the bulk material). Such an approach requires the development of innovative, highly selective metal recovery technologies that fully capture the metal-value without impairing the properties of the residual matrix material for valorisation.

CHROMIC aims to develop such new recovery processes for critical (Cr, Nb) and economically valuable (Mo, V) by-product metals from secondary resources, based on the smart integration of enhanced pre-treatment, selective alkaline leaching and highly selective metal recovery across the value chain. An overarching assessment of the related economic, environmental and health and safety aspects will be carried out in an iterative way to ensure that the developed technologies meet the requirements of the circular economy whilst being in line with current market demand. The technology will be developed for two models streams (stainless steel slags and ferrochrome slags) with the potential of replication to numerous industrial residues across Europe. Involvement of society from early on will smooth the path towards implementation, so that the CHROMIC processes can contribute to securing Europe's supply of critical raw materials.

<b>IMPACT</b>		<b>730411</b>
<b>Title: Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.991.820,00</b>	EU requested grant (€): <b>6.991.820,00</b>	

**Free keywords:** *rapid sustainable and innovative mining solutions*

### **Abstract:**

The current mining paradigm promotes extraction from large ‘world-class’ deposits that have required innovations in mining techniques to deal with low grades, large infrastructure to deal with high throughputs and large feasibility studies to prove long-term commercial viability. High investment in operations is no longer available in the current economic climate and many small companies have ceased to trade, concentrating production and limiting the ability of the raw materials market to respond to increased demand for raw materials or shortages in raw material supply. The problem is most extreme for critical raw materials that are produced in small quantities relative to traditional metal commodities because the potential return on investment is too low. The IMPACT project proposes a solution that develops a new switch on-switch off (SOSO) mining paradigm to improve the viability of many critical metal and other small complex deposits.

The whole systems approach that we have adopted to realise the SOSO mining paradigm centres around technological innovations in mining equipment design and mine planning that would reduce the feasibility studies required, throughput of extracted material, infrastructure, land use, resource consumption and waste. Successful business models for SOSO mining require that mining and processing technologies can be adapted to multiple deposits and commodities. Risks that are associated with the approach concern geological uncertainty, metallurgical variability and social acceptance. The work programme aims to develop the proof-of-concept of total and sustainable mining and processing solutions using case studies in the West Balkans, and subsequently to examine the step-changes that would be required for the technology to be applied globally. The companies involved in the project intend to commercialise the results. Dissemination activities include feedback to European and national policy makers, and the mining industry in general.

<b>ITERAMS</b>		<b>730480</b>
Title: <b>Integrated mineral technologies for more sustainable raw material supply</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.915.364,25</b>	EU requested grant (€): <b>7.915.364,25</b>	

**Free keywords:** *water quality, geopolymerization*

### **Abstract:**

The aim of ITERAMS is to develop a proof of concept for more environmentally friendly and economic mine site operations, in Europe and globally. For that, the ITERAMS project focuses on the isolation of process waters completely from the adjacent water systems. This will require development of new methods for optimising and controlling water qualities at each process step. As a bonus, this will also facilitate the recovery of additional valuable constituents.

The ITERAMS project will develop research and dimensioning protocols suitable for use at the mines processing different ores. In this context, validation of the concepts will have an essential role. In the planned project, it will be performed at selected mine sites processing sulphide ores, although the concepts will be generic and thus also suitable for other types of ores like gold, rare earth, and phosphate ores.

The closure of water cycles at each process stage will inevitably increase their thermodynamical and kinetic instability (as is also the case with conventional tailing ponds). In addition, water temperatures will also increase, causing higher bacterial growth, especially for iron and sulphur oxidising species. This will result in a dynamic situation that has never so far been worked on. The ITERAMS project will create new academic and industrial knowledge and capabilities to tackle such questions. The tightly closed water cycles can be realised only if the tailings can be filtered and stacked dry. ITERAMS will demonstrate the use of geopolymerisation to create water and oxygen tight covers on the deposited tailings. For that, the tailings streams will be modified for their easier geopolymerisation.

The ITERAMS water and waste efficient methods will be validated at mine sites in Finland, in Portugal and additionally either in Chile or South Africa.

<b>PLATIRUS</b>		<b>730224</b>
Title: <b>PLATInum group metals Recovery Using Secondary raw materials</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.994.210,00</b>	EU requested grant (€): <b>6.994.210,00</b>	

**Free keywords:** *PGM recovery, metallurgy, hydrometallurgy, solvometallurgy, ionometallurgy*

### **Abstract:**

The PLATIRUS project aims at reducing the European deficit of Platinum Group Metals (PGMs), by upscaling to industrial relevant levels a novel cost-efficient and miniaturised PGMs recovery and raw material production process. The targeted secondary raw materials will be autocatalysts, electronic waste (WEEE) and tailings and slags from nickel and copper smelters, opening-up an important range of alternative sources of these critical raw materials, with the potential to substitute a large amount of primary raw materials which are becoming more and more scarce in Europe.

For the first time five of the major research centres in Europe will collaborate in developing and fine tuning the most advanced recovery processes for PGMs. This joint effort will lead to a unique exchange of know-how and best practices between researchers all over Europe, aiming at the selection of the recycling process and the preparation of the Blueprint Process Design that will set the basis for a new PGM supply chain in the EU.

Two primary and secondary material producers with a consolidated business model will carry out validation of the innovative recovery processes in an industrially relevant environment by installing and testing them in an industrially relevant environment and benchmarking with the currently adopted recovery processes. A recycling company will provide a link to market introduction by manufacturing autocatalysts with second-life PGMs obtained via the PLATIRUS technology. Two large automotive companies will validate the material produced through the new recovery process, and ensure end-user industry driven value chains for recovered PGM materials. LCA, economic and environment assessment of the whole process will be led by a specialized consultancy company. Finally, the PLATIRUS project will be linked to European and extra-European relevant stakeholders, research activities and industries, with a solid dissemination, communication and exploitation plan.



<b>SCALE</b>		<b>730105</b>
<b>Title: Production of Scandium compounds and Scandium Aluminum alloys from European metallurgical by- products</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>12/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>7.706.625,00</b>	EU requested grant (€): <b>7.000.000,00</b>	

**Free keywords:** *Scandium production, Bauxite Residue, TiO2 Acid waste, REE, CRM, AL-SC ALLOY*

### **Abstract:**

Scandium (Sc) is one of the highest valued elements in the periodic table and an element which is usually grouped in REEs as it shares many characteristics with Yttrium. Scandium technological applications are unique, as it is a key component in producing Solid Oxide Fuel Cells (Scandia-Stabilized-Zirconia solid electrolyte layer) or high strength Aluminum alloys used in aerospace and 3D printing applications (SCALMALLOY®). Yet Scandium supply is limited due to its scarcity and the high cost of its production, which currently takes place in Asia and Russia.

Europe has no production of Scandium, but is home to many Sc industrial end-users (Airbus, II-VI, KBM Affilips and others). In fact end-users like Airbus, are not deploying their Sc applications due to the lack of a secure Sc supply. The SCALE project sets about to develop and secure a European Sc supply chain through the development of technological innovations which will allow the extraction of Sc from European industrial residues.

Bauxite Residues from alumina production (5 Million tons on dry basis per year in Europe) and acid wastes from TiO<sub>2</sub> pigment production (1.4 Million tons on dry basis per year in Europe) have Sc concentrations which are considered exploitable, given a viable extraction technology. SCALE develops and demonstrates the value chain starting from residue and finishing to high tech end-product. In more detail:

- SCALE develops innovative technologies that can extract economically and sustainably Sc from dilute mediums (<100 mg/L) and upgrade them to pure oxides, metals and alloys at lower energy or material cost.
- SCALE extracts along with Sc all other REEs found in the by-products (AoG's BR on an annual base contain 10% of the European REE raw material imports)

The industrially driven SCALE consortium covers the entire Sc value chain with 7 major European industries and further features 8 academic and research institutes and 4 engineering companies with track records in RTD.

<b>SLIM</b>		<b>730294</b>
<b>Title: Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-13-2016-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.979.200,00</b>	EU requested grant (€): <b>6.979.200,00</b>	

**Free keywords:** *Small mining, Complex ore, Rock fragmentation, Rock Blasting, Low impact mining.*

### **Abstract:**

The main economic, technological and environmental challenges of small mining include reducing high investment costs, reducing generation of waste and large tailings, identifying and addressing environmental impacts, and improving flexibility, automation and safety of operations. However, at the moment, there is no quick-fix available to reduce the environmental impact from mines, and it is neither realistic to expect production solutions very distant from today's technologies. Considering that the present mining technology is based on rock blasting and mobile mining equipment for loading and transportation, the major challenge is to generate a new sustainable systemic solution that affects positively the relevant mining value chain.

SLIM aims to develop a cost-effective and sustainable selective low impact mining solution based on non-linear rock mass fragmentation by blasting models, airborne particulate matter, vibration affections and nitrate leaching mitigation actions for exploitation of small mineral deposits (including those with chemically complex ore-forming phases) through a new generation of explosives and an advanced automatic blast design software based on improved rock mass characterisation and fragmentation models for optimum fragmentation and minimum rock damage and far-field vibrations.

SLIM consortium is led by UPM (es), with LTU (se), MUL (at) and TUG (at) as Research Institutions, 3GSM (at - Rock fragmentation and blasting software), MAXAM (es - Explosives), ORGIVA (es - Fluorite mine) and ERZBERG (at - Iron mine) and ARNO (es - Quarry) as validators in relevant environment. BRGM (fr), INVESTORNET (dk), MINPOL (at), and ZABALA (es) complement the Environmental and Economic assessments, the Communication and Dissemination activities and Social Awareness actions.

SLIM addresses the following issue: a) Sustainable selective low impact mining (2016), it has a planned duration of 48 months and a budget of €6,979,200 requesting €6,979,200 of EU funding.

<b>SCRREEN</b>		<b>730227</b>
Title: <b>Solutions for CRITICAL Raw materials - a European Expert Network</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-15-2016-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>30 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>2.999.500,00</b>	EU requested grant (€): <b>2.999.500,00</b>	

**Free keywords:** *critical raw materials*

### **Abstract:**

Since the publication of the first list of Critical Raw Materials (CRM) in 2010 by the Ad-hoc Working Group on CRM, numerous European projects have addressed (part of) the CRMs value and several initiatives have contributed to gather (part of) the related community into clusters and associations. This led to the production of important knowledge, unfortunately disseminated. Numerous databases have also been developed, sometimes as duplicates.

For the first time in the history, SCRREEN aims at gathering European initiatives, associations, clusters, and projects working on CRMs into along lasting Expert Network on Critical Raw Materials, including the stakeholders, public authorities and civil society representatives.

SCRREEN will contribute to improve the CRM strategy in Europe by (i) mapping primary and secondary resources as well as substitutes of CRMs, (ii) estimating the expected demand of various CRMs in the future and identifying major trends, (iii) providing policy and technology recommendations for actions improving the production and the potential substitution of CRM, (iv) addressing specifically WEEE and other EOL products issues related to their mapping and treatment standardization and (vi) identifying the knowledge gained over the last years and easing the access to these data beyond the project.

The project consortium also acknowledges the challenges posed by the disruptions required to develop new CRM strategies, which is why stakeholder dialogue is at the core of SCRREEN: policy, society, R&D and industrial decision-makers are involved to facilitate strategic knowledge-based decisions making to be carried out by these groups. A specific attention will also be brought on informing the general public on our strong dependence on imported raw materials, on the need to replace rare materials with substitutes and on the need to set up innovative and clean actions for exploration, extraction, processing and recycling.

<b>CIRCULAR IMPACTS</b>		<b>730316</b>
Title: <b>Measuring the IMPACTS of the transition to the CIRCULAR economy</b>		
Call Id: <b>H2020-SC5-2016-OneStageB</b>	Topic: <b>SC5-25-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>501.280,00</b>	EU requested grant (€): <b>501.280,00</b>	

**Free keywords:** *Circular Economy, Transition, Impact assessment*

### **Abstract:**

The EU 2020 targets of the European Union and international commitments of the EU make it mandatory for the EU to reduce its environmental impact while at the same time to make its economy more productive and more competitive. One important pathway to achieve both objectives is making the European economy more circular, meaning that the use of non renewable material resources is reduced, while at the same time the European economy is further developed and more jobs are created.

CIRCULAR IMPACTS aims to provide European policy makers with the knowledge to guide and foster the transition to a more circular economy by developing an overarching impact assessment of that transition and at the same time make the evidence base available for policy makers to develop impact assessment for their own specific policy proposals. As the circular economy is an ambition with a very wide and not precisely defined application area, CIRCULAR IMPACTS will start by defining the circular economy, identifying the most important application areas, understanding the policy needs of the area and developing a methodology for assessing the macroeconomic and societal impacts. It will then focus on assembling the available evidence for impact assessments and make this evidence base available for policy makers and the project itself with a web based search tool. This search tool will also help to make several relevant information collections funded by past EU research framework programs visible again, by connecting their evidence base to the circular economy agenda. The project will then collect missing information in case studies in order to understand the processes of the circular economy and the processes it might replace in more detail. To achieve that CIRCULAR IMPACTS has already assembled a Steering group of industry experts which will be able to provide the connections and the industry knowledge to the impact assessment.

<b>COLLECTORS</b>		<b>776745</b>
Title: <b>waste COLLECTiOn systems assessed and good pRacticeS identified</b>		
Call Id: <b>H2020-SC5-2017-OneStageB</b>	Topic: <b>SC5-15-2016-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>12/1/2017</b>	Duration: <b>31 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>1.498.400,00</b>	EU requested grant (€): <b>1.498.400,00</b>	

**Free keywords:** *Waste collection systems; paper and packaging waste; WEEE; construction & demolition; extended producer responsibility; raw materials*

### **Abstract:**

Five tonnes of waste per capita are generated every year in the EU. These annual 2.5 billion tonnes of waste contain large volumes of valuable materials for Europe's industrial base. Proper collection of waste is a pre-condition for their optimal recovery. The current trend of increasing higher collection rates is promising, but progress is uneven between Members States and between regions.

Good regional practices have the potential to serve as good practice examples for other regions. So far, however, results of existing studies and good practices have not been effective enough in supporting the implementation of better-performing systems elsewhere. The main objective of the COLLECTORS project is to overcome this situation and to support decision-makers in shifting to better-performing collection system.

COLLECTORS will therefore:

- (1) Increase awareness of the collection potential by compiling, harmonizing and presenting information on systems for packaging and paper waste, WEEE and construction products via an online information platform.
- (2) Improve decision-making on waste collection by the assessment of twelve good practices on their performance on: (1) quality of collected waste; (2) economics; (3) environment; (4) societal acceptance.
- (3) Stimulate successful implementation by capacity-building and policy support methods that will increase the technical and operational expertise of decision-makers on waste collection.
- (4) Engage citizens, decision-makers and other stakeholders throughout the project for validation of project results and to ensure the usability of COLLECTORS-output.

The COLLECTORS consortium is well-equipped to achieve these impacts as it is directly connected to more than 30 PROS and 2000+ authorities spread across the EU. In addition, the project is embedded in the full secondary raw material value chain ensuring alignment with waste management, recyclers and producers.

<b>ORAMA</b>		<b>776517</b>
Title: <b>Optimising quality of information in RAW Materials data collection across Europe</b>		
Call Id: <b>H2020-SC5-2017-OneStageB</b>	Topic: <b>SC5-15-2016-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>12/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>1.731.230,00</b>	EU requested grant (€): <b>1.731.230,00</b>	

**Free keywords:** *Data collection, Critical Raw Materials, Primary Raw Materials, Mining waste, Secondary Raw Materials, End of Life Vehicles, Batteries, Waste Electrical and Electronic Equipment, INSPIRE, RMIS*

### **Abstract:**

The ORAMA project focuses on optimising data collection for primary and secondary raw materials in Member States. A cornerstone to the EIP on Raw Materials is the development of the EU knowledge base on primary and secondary raw materials, commenced by a series of European-funded projects. As the next iteration, ORAMA addresses specific challenges related to data availability, geographical coverage, accessibility, standardisation, harmonisation, interoperability, quality, and thematic coverage in Member States.

ORAMA will analyse data collection methods and recommendations from past and ongoing projects to identify best practices, develop practical guidelines and provide training to meet specific needs. These actions will demonstrate how to improve datasets for mineral occurrences, minerals intelligence data, economic, technical, environmental and social data for primary and secondary raw materials.

For primary raw materials, the focus is on harmonisation and improved coverage of spatial and statistical data, ensuring compliance with the INSPIRE Directive where appropriate. For Mining Waste, Waste Electrical and Electronic Equipment, End of Life Vehicles and Batteries, the focus is on developing 'INSPIRE-alike' protocols. The unified data model from the Minerals4EU and ProSUM projects will be applied to the datasets and outcomes will be combined with primary raw materials data. ORAMA will demonstrate how to create more robust Material Systems Analysis studies and reliable Sankey diagrams for stocks and flows of specific raw materials. Information is made accessible and compatible with the JRC's Raw Materials Information System to feed, for instance, future Raw Materials Scoreboard and Criticality Assessment studies.

In the long term, ORAMA empowers the wider EU raw materials community with necessary facts to support policy decisions and sustainable investments in the primary and secondary raw material industries.

<b>POSIDON</b>		<b>776838</b>
Title: <b>POLLUTED SITE DECONTAMINATION - PCP</b>		
Call Id: <b>H2020-SC5-2017-OneStageB</b>	Topic: <b>SC5-26-2017</b>	Type of Action: <b>PCP</b>
Project start date: <b>2/1/2018</b>	Duration: <b>50 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.190.075,00</b>	EU requested grant (€): <b>5.000.000,00</b>	

**Free keywords:** *buyer group enlargement network, PCP, soil decontamination*

### **Abstract:**

POSIDON gathers 5 European procurers facing similar problems in the sites they manage, affected by analogous pollutants (2 front-runners-Trieste, IT and Bilbao, ES-and 3 observers - Spaque, BE; Vitoria Gasteiz, ES; Baja do Tejo, PT), leveraging public demand to identify fit-for-purpose and cost-effective innovative and sustainable solutions to soil contamination.

The common challenge faced by the buyers' group is identifying a new, life-cycle cost-effective technology for soil and groundwater remediation, capable of decontaminating heterogeneous anthropic soils in brownfields with a mixture of industrial waste (blast furnace slags, construction & demolition waste, filling soils polluted by petroleum hydrocarbons) and soils consisting of clays and sands of marine origin, highly polluted by petroleum hydrocarbons (TPHs and PAHs) and heavy metals (arsenic and lead). Studies on the state of the art, patent analysis, foresight scanning and early market engagement meetings, show that no available technology can meet all identified needs, thus appropriate remediation technologies cannot be acquired through traditional off-the-shelf procurement. With PCP, procurers aim to achieve ambitious improvements in terms of quality and effectiveness, efficiency and sustainability of new technology to bring to the market.

R&D will be split into three phases: solution design, prototyping, original development and testing of 2 prototypes. Evaluations after each phase progressively identify solutions offering the best value for money. This phased approach allows successful contractors to improve their offers for the next phase based on feedback from procurers.

POSIDON intends to create a critical mass through the consolidation of a pan-European network of procurers who, sharing their needs and efforts, can enable the development - through PCP - and subsequent deployment - through a PPI - of novel technologies aimed to cover bigger market challenges in areas of common European interest

<b>CROCODILE</b>		<b>776473</b>
Title: <b>first of a kind commercial Compact system for the efficient Recovery Of COBalt Designed with novel Integrated LEading technologies</b>		
Call Id: <b>H2020-SC5-2017-TwoStage</b>	Topic: <b>SC5-14-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>14.890.408,75</b>	EU requested grant (€): <b>11.625.289,01</b>	

**Free keywords:** *cobalt, critical raw material, batteries recycling, bioleaching, solvometallurgy, ionometallurgy, pyrometallurgy, hydrometallurgy, electrochemistry*

### **Abstract:**

The CROCODILE project will showcase innovative metallurgical systems based on advanced pyro-, hydro-, bio-, iono- and electrometallurgy technologies for the recovery of cobalt and the production of cobalt metal and upstream products from a wide variety of secondary and primary European resources. CROCODILE will demonstrate the synergetic approaches and the integration of the innovative metallurgical systems within existing recovery processes of cobalt from primary and secondary sources at different locations in Europe, to enhance their efficiency, improve their economic and environmental values, and will provide a zero-waste strategy for important waste streams rich in cobalt such as batteries. Additionally, CROCODILE will produce a first of a kind economically and environmentally viable mobile commercial metallurgical system based on advanced hydrometallurgical and electrochemical technologies able to produce cobalt metal from black mass containing cobalt from different sources of waste streams such as spent batteries and catalysts. The new established value chain in this project will bring together for the first time major players who have the potential of supplying 10,000 ton of cobalt annually in the mid-term range from European resources, corresponding to about 65% of the current overall EU industrial demand. Therefore, the project will reduce drastically the very high supply risk of cobalt for Europe, provide SMEs with novel business opportunities, and consolidate the business of large refineries with economically and environmentally friendly technologies and decouple their business from currently unstable supply of feedstocks.



<b>NEMO</b>		<b>776846</b>
<b>Title: Near-zero-waste recycling of low-grade sulphidic mining waste for critical-metal, mineral and construction raw-material production in a circular economy</b>		
Call Id: <b>H2020-SC5-2017-TwoStage</b>	Topic: <b>SC5-14-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>14.941.396,50</b>	EU requested grant (€): <b>12.407.294,63</b>	

**Free keywords:** *secondary ore, bioleaching, alkaline leaching, cementitious materials, REE, metal recovery*

### **Abstract:**

With an estimated volume of 600 Mtonne/yr and a historic stockpile of 28,000 Mtonne, sulphidic mining waste from the production of Cu, Pb, Zn and Ni, represents the largest volume of extractive waste in Europe. When poorly managed, these “tailings” may cause major environmental problems such as acid mine drainage. In 2016 EIP Raw Materials launched a “call to arms” to transform the “extractive-waste problem” into a “resource-recovery opportunity”, as “tailings” still contain valuable & critical metals. Using a “4 PILOTS – 2 case-studies” concept NEMO develops, demonstrates and exploits, therefore, new ways to valorise sulphidic tailings. The 2 cases are the Sotkamo Ni-Cu-Zn-REE/Sc mine in Finland and the Las Cruces Cu-mine in Spain; the 4 PILOTS are located at key points in the near-zero-waste flowsheet, encompassing the recovery of valuable & critical metals, the safe concentration of hazardous elements, the removal of sulphur as sulphate salts, while using the residual mineral fraction in cement, concrete and construction products. NEMO has established an interdisciplinary consortium, including 8 industrial partners (2 mining, 4 engineering, 1 machine manufacturing & 1 construction material company), 4 research institutes, 2 universities and 1 civil society group. NEMO’s near-zero-waste technology will provide the EU with both direct and long-term, indirect advantages. The former range from new resources (e.g. base metals: Cu, Zn, Ni, Pb; critical metals: Sc, Nd, Y, Sb; SCM and aggregates etc.), CO<sub>2</sub> savings from metal recovery and the replacement of Ordinary Portland Cement), new job creation (> 150 FTEs), new revenues (> 200 M€/yr) while the latter represent the multiplication of the former benefits (cf. 28,000 Mtonne of these tailings), while eradicating acid-mine drainage and other environmental issues, and ensuring an enhanced dialogue (framework) between industry and civil society, to obtain and maintain the License to Operate mines in EU.

<b>RemovAL</b>		<b>776469</b>
Title: <b>Removing the waste streams from the primary Aluminium production and other metal sectors in Europe</b>		
Call Id: <b>H2020-SC5-2017-TwoStage</b>	Topic: <b>SC5-14-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>14.658.966,25</b>	EU requested grant (€): <b>11.481.599,13</b>	

**Free keywords:** *Bauxite Residue, red mud, SPL, Ga, REE, Fe-Si, construction materials*

### **Abstract:**

The answer to the current Raw Material supply challenge faced today in Europe, lies in technological innovations that increase the efficiency of resource utilization and allow the exploitation of yet untapped resources such as industrial waste streams and metallurgical by-products. One of the key industrial residues which is currently not or poorly valorised is Bauxite Residue (BR, more commonly known as “red mud”) from alumina refineries. Bauxite residue reuse solutions do exist as stand-alone but pooling them together in an integrated manner is the only way to render bauxite residue reuse viable from an economical point of view and acceptable for the industry

The RemovAl project will combine, optimize and scale-up developed processing technologies for extracting base and critical metals from such industrial residues and valorising the remaining processing residues in the construction sector.

In term of technological aspects, RemovAl will process several by-products from the aluminium sector and from other metallurgical sectors in Europe (SiO<sub>2</sub> by-products, SPL, fly ash, and others). The different waste streams will be combined to allow for optimal and viable processing in different technological pilot nodes. The technologies and pilots in most cases have already been developed in previous or ongoing projects and through RemovAl they will be pooled together and utilized in a European industrial symbiosis network.

In term of societal or non-technological aspects, RemovAl will gather key sectors like the non-ferrous metal and cement sectors in order to secure a true industrial symbiosis through a top-down approach considering also legislation and standardisation at European level in order to facilitate the implementation of the most promising technical solutions.

<b>SecREEs</b>		<b>776559</b>
Title: <b>Secure European Critical Rare Earth Elements</b>		
Call Id: <b>H2020-SC5-2017-TwoStage</b>	Topic: <b>SC5-14-2016-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>17.224.132,31</b>	EU requested grant (€): <b>12.880.031,87</b>	

**Free keywords:** *Rare earth elements, permanent magnets,*

### **Abstract:**

Rare Earth Elements (REEs) are critical and non-substitutable raw materials with high economic importance for European industry, as they are crucial components for a broad range of advanced products. The main goal of the SecREEs project is to establish a stable and secure supply of critical REEs based on sustainable extraction from European apatite sources used in fertiliser production. Pilot processes will be developed for the innovative extraction, separation and transformation of REEs. Rare Earth (RE) metals will be supplied to application areas like electric vehicles, industrial motors and wind turbines. Replication potential will be demonstrated in medical diagnostics, Fluid Catalytic Cracking and consumer products. The main objective of the project is to demonstrate a new integrated value chain for the optimal extraction, refining and production of REEs in Europe. This will be achieved through the development and demonstration of a number of innovative technologies:

- Utilise efficiently a novel industrial sidestream process in fertiliser production to extract the REEs
- Separate REEs by a novel chromatographic process into distinct nitrate salts
- Realise electrochemical production of metals and alloys from the above targeted RE oxides
- Demonstrate the market value and relevance of the produced RE metals in permanent magnets and its downstream products
- Validate market acceptance of the RE oxides not processed to metals
- Create an industrial symbiosis between two value chains
- Demonstrate the economic, environmental and societal sustainability as well as safety of the pilot units

SecREEs pilots will focus on Pr, Nd and Dy metals used in permanent magnets as these are extremely critical for the European economy. Industrial implementation of the pilots developed in SecREEs will lead to a supply of at least 3000 tonnes annually of REEs to European industries in 2023, with 75 M€ in estimated value.

<b>CICERONE</b>		<b>820707</b>
Title: <b>ClrCular Economy platfoRm for eurOpeaN priorities strategic agEnda</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>CE-SC5-05-2018</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>2.027.611,25</b>	EU requested grant (€): <b>1.998.860,00</b>	

**Free keywords:** *sustainability, SRIA, programme owners*

### **Abstract:**

CICERONE brings together programme owners, research organizations and other stakeholders to create a platform for efficient Circular Economy programming. The priority setting and the organization of the future platform will be driven by Programme Owners (POs), involved either as project partners, or via a stakeholder network. Diversity of national / regional situations is reflected in the partnership. The work will be carried out in close cooperation with research & technology organisations (RTOs), which contribute with their expertise of the main scientific and technological challenges. Consultation mechanisms will also ensure that all stakeholders will be able to actively contribute (civil society, industry, innovative SMEs, startups, cities, investors, networks, etc.). An initial benchmarking exercise will be carried out for a deeper understanding of the state of the art, mapping stakeholders, existing RDI priorities as well as funding and legal mechanisms. A prioritisation methodology will be developed to support an analysis of the current performance: synergies, gaps and duplications will be characterised, and pathways for improvements will be formulated. Identified best practices will drive the definition of policy recommendations. Once the state of the art has been clearly mapped out, the actual prioritisation work will be carried out. This includes building a Strategic Research and Innovation Agenda (SRIA), performing an ex-ante impact assessment of joint programming on circular economy R&I, and developing a policy toolkit to promote the priorities and foster adoption by policy-makers. The project will also set the grounds for the future PO platform, starting with defining its strategic role in the existing landscape. The next step will be to specify governance and possible legal frameworks, as well as creating a financially sustainable model. It is a key objective that the platform be sustained after the end of the project.

<b>CEWASTE</b>		<b>820859</b>
Title: <b>Voluntary certification scheme for waste treatment</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>CE-SC5-08-2018-2019-2020</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>1.924.717,50</b>	EU requested grant (€): <b>1.924.717,50</b>	

**Free keywords:****Abstract:**

The CEWASTE project contributes to an improved recovery of valuable and critical raw materials (CRMs) from key types of waste through traceable and sustainable treatment processes in the entire supply chain of secondary raw materials. As such, CEWASTE will address the specific challenge to secure the sustainable access to CRMs for the EU economy and objectives set by the EU action plan for the Circular Economy, the issue of illegal trade of wastes within the EU and to non-EU countries and the need to support the development of environmentally and socially sound recycling systems globally. Specifically, the project will develop, validate and launch a voluntary certification scheme for collection, transport and treatment facilities of key types of waste containing significant amounts of valuable and critical raw materials. To ensure a comprehensive approach and a robust result, the project will be developed along the following six specific objectives: Objective 1 - Understand existing recovery practice, standards and verification schemes; Objective 2 - Develop sustainability and traceability requirements; Objective 3 - Develop an assurance system and related verification procedures; Objective 4 - Validate the new voluntary scheme; Objective 5 - Ensure long term sustainability of the scheme; Objective 6 - Ensure a transparent stakeholder process.

<b>WoodCircus</b>		<b>820892</b>
Title: <b>Underpinning the vital role of the forest-based sector in the Circular Bio-Economy</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>CE-SC5-08-2018-2019-2020</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>2.973.953,75</b>	EU requested grant (€): <b>2.973.953,75</b>	

**Free keywords:** *wood construction; process efficiency; cascade use of wood; recycling; waste management; good practices; stakeholders engagement; SMEs; construction and demolition; bioeconomy; LCA; trade-offs;*

### **Abstract:**

The main goal of the WoodCircus is to increase knowledge, raise awareness and improve conditions for an uptake of resource efficient processing and recycling in wood-based value chains, fostering increased competitiveness of the European woodworking sector. WoodCircus identifies, evaluates and disseminates the outstanding good practises in process efficiency, wood waste collection, management and recycling in the woodworking value chains in Europe with a focus on construction with wood. Achieving a thorough evaluation of the overall system's performance and a validation of the most relevant transferable solutions, WoodCircus produces sound, critical evidence and tangible decision support information for market actors, stakeholders and policymakers. WoodCircus establishes a well-integrated network between wood processing industries and the waste management sector engaging excellence for future-oriented joint promotion of the wood sector in the Circular Bioeconomy. WoodCircus implements the EU Action Plan for the Circular Economy and the EU Bioeconomy Strategy targets ensuring intelligent utilisation of forest resources and sets up an interface to the EC Raw Materials Information System and the JRC Bioeconomy Knowledge Centre . WoodCircus major outcomes are: 1) Good practice database; 2) Open competition on individual good practice showcases and award to SMEs; 3) Performance and sustainability assessment; 4) Validated best performing supply chain typology for broad transfer; 5) RDTI plan wood industries towards the Circular Economy;(6) White Paper including policy recommendations and communication strategies; 7) WoodCircus Network, established on solid commitments from partners and stakeholders for follow-up beyond the project lifetime. WoodCircus is based on a balanced mix of leading RTO and companies with proven expertise all along the woodworking and construction value chains including waste valorisation and associations at local, national and international level.

<b>INDIA-H2O</b>		<b>820906</b>
Title: <b>bio-mimetic and phyto-techNologies Designed for low-cost purificAtion and recycling of water</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2019</b>	Duration: <b>54 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.433.356,00</b>	EU requested grant (€): <b>2.551.348,00</b>	

**Free keywords:** *Desalination, Forward Osmosis, Reverse Osmosis,*

### **Abstract:**

INDIA-H2O will develop, design and demonstrate high-recovery, low-cost water treatment systems for saline groundwater and industrial wastewaters. The focus for developments will be in the arid state of Gujarat, where surface water resources are very scarce. We will develop novel batch-reverse osmosis technology for a 10-fold reduction in specific energy consumption with high fractions of water recovery (80%) reducing /m<sup>3</sup> operating costs to below €0.35/m<sup>3</sup> (<30 rupees/m<sup>3</sup>). Forward osmosis will be developed and piloted for use in wastewater recovery applications including hybrid arrangements with reverse osmosis for further reduction in energy consumption. These solutions will be demonstrated in small-scale rurally relevant low-cost systems for brackish groundwater treatment for use as safe drinking water, which will be extended to include phyto-technology solutions for rural domestic wastewater treatment. Systems will remove salinity and emerging pollutants (e.g. agricultural chemicals), valorise rejected brines in halophytic crop cultivation. For specific industrial wastewater in textile, desalination and dairy we will develop and demonstrate cost-effective high-efficiency hybrid technologies for water recycling with minimum liquid discharge, using advanced membrane technologies to achieve the required water quality for recycling. A centre of excellence will be established in water treatment membrane technologies, design operation and monitoring. Activities such as supply chain mapping and EU India collaboration on developing industrial scale forward osmosis membranes and batch-RO systems will support the development of business models to exploit the developed solutions to mutual EU/India economic advantage. We will analyse and produce policy briefs on economic models and governance arrangements for viable adoption of the developed systems.

<b>LOTUS</b>		<b>820881</b>
<b>Title: LOw-cost innovative Technology for water quality monitoring and water resources management for Urban and rural water Systems in India</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.480.477,50</b>	EU requested grant (€): <b>2.500.237,50</b>	

**Free keywords:** *Monitoring, water quality, sensor, decision support system, water distribution system, irrigation systems, groundwater, river, waste water treatment.*

### **Abstract:**

LOTUS will: (a) Co-design and co-produce, with the cooperation of EU and Indian partners, an innovative water quality chemical sensor, as an advanced solution for water quality monitoring in India, using advanced technologies (carbon nano-tubes), capable of concurrently monitoring at real time multiple contaminants, expandable and suitable for multiple and diverse Use Cases in India, which will reduce the cost of sensors by a factor of at least 10; (b) Develop a suite of software tools (off- and online), organised and combined in a platform with cloud-based implementation, implementing sensor measurements (quality and quantity), the specific needs of diverse Use Cases (e.g. intermittent supply, tanker distribution) and advanced technologies in the ICT domain to improve water management; (c) Demonstrate and showcase the LOTUS solution in a wide variety of use cases, across the whole value chain of water (urban and rural areas, drinking and irrigation systems, river and groundwater monitoring, treated wastewater quality), taking into account the existing infrastructure, the capabilities of the sensor and the specific water challenges in India (socio-economic and technical); (d) Investigate, co-design and plan the business model and market uptake of the LOTUS solution, with industrial production and further development and production of the sensor in India, ensuring an advanced but affordable, low cost product and solution for monitoring water quality, after the end of the project; (e) promote social innovation, by introducing co-creation, co-design and co-development with multiple local stakeholders, as a paradigm of successful EU-India Cooperation in the water sector, with lasting social, technological and business impacts for water quality in India, leading to viable, affordable and (socially) acceptable products and solutions, capacity development, job creation, contribution to wider issues and initiatives and wide outreach activities.



<b>PANI WATER</b>		<b>820718</b>
Title: <b>Photo-irradiation and Adsorption based Novel Innovations for Water-treatment</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.969.748,50</b>	EU requested grant (€): <b>3.576.532,50</b>	

**Free keywords:** *Rural peri-urban communities*

### **Abstract:**

About 2.1 Billion people live without access to safe water sources. Contaminants of Emerging Concerns (CECs) such as pharmaceuticals, personal care products, pesticides and nanoparticles are increasingly being detected in wastewater and in drinking water around the world, in addition to geogenic pollutants, pathogens, antibiotic resistant bacteria and antibiotic resistance genes. Water treatment systems that remove CECs and common contaminants from wastewater and drinking water are therefore urgently needed.

PANI WATER will develop, deploy and validate in the field six prototypes for the removal of contaminants, including CECs, from wastewater and drinking water. The prototypes for wastewater treatment will consist of (i) a 20,000 L/day multifunctional oxidation reactor, (ii) a 10 L/day photoelectrochemical system, and (iii) a 100 L/day solar photolytic plant. The prototypes for drinking water treatment will consist of (iv) a 300 L/hour filtration, adsorption, and UVC LED system (v) a 20 L transparent jerrycan for solar water disinfection, and (vi) a 2,000 L/day electrocoagulation, oxidation, and disinfection system. These prototypes will be deployed in peri-urban and rural areas in India. The consortium will work closely with the communities at the fieldsites, and carry out water quality analyses, health and social impact assessments, and advocate for safe reuse of treated wastewater for irrigation, and preservation of drinking water sources. PANI technologies can find promising application among the agricultural sector, water-demanding businesses (e.g. textile, pharmaceutical), and the Indian water utilities.

<b>PAVITR</b>		<b>821410</b>
<b>Title: Potential and Validation of Sustainable Natural &amp; Advance Technologies for Water &amp; Wastewater Treatment, Monitoring and Safe Water Reuse in India</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.446.073,00</b>	EU requested grant (€): <b>2.807.142,50</b>	

**Free keywords:** *High Resolution Management*

### **Abstract:**

The increased demand for drinking water from habited zones combined with continued pollution of freshwater sources due to inadequate collection and treatment of wastewater, is a statement of challenge and also a window of opportunity common to India and Europe. Unlike in Europe, the water and sanitation scenario in developing countries like in India is a matter of serious concern and more challenging. The main aim of this project is to validate, deploy or develop cost-effective & sustainable solutions to tackle water challenges and ensure the provision of safe water reuse, rejuvenate water quality of rivers, and restore ecosystems in India. This will be achieved by deploying & developing water / wastewater technologies, and use of sensors for emerging and traditional contaminants. Further, it also aims to develop new management & planning strategies and enable better monitoring of pollution levels in real-time modes. This will not only contribute to the development of sustainable technologies to cope with water shortages in rural and urbanised areas in India, but also in Europe, where climate change is expected to induce a changing and uncertain precipitation pattern and an enhancement in temperature. It will assess and enhance the potential of natural and technical water treatment systems to suit the local hydro-geological conditions. Moreover, the projects will assess and validate different wastewater and water management plans. Besides the technical aspects, research will also cover financial, environmental and institutional sustainability of those systems in order to develop and bring to the market a cost-efficient multi-barrier water management approach by building capacity.

<b>PAVITRA GANGA</b>		<b>821051</b>
<b>Title: Unlocking wastewater treatment, water re-use and resource recovery opportunities for urban and peri-urban areas in India</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date: <b>2/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.731.647,50</b>	EU requested grant (€): <b>3.074.821,25</b>	

**Free keywords:****Abstract:**

India's water resources are under severe stress resulting from overexploitation and pollution. The Indian government has started the Namami Gange programme in line with the sustainable development goals (SDG), including the improvement of wastewater treatment. PAVITRA GANGA links directly to these programmes and builds on existing cooperation between EU/India, supported by national governments. The objective is to fulfil SDG6 by unlocking the environmental and economic potential of municipal wastewater treatment and reuse solutions for urban and peri-urban areas in India. By focussing on three pillars we ensure maximum impact:

- People: we create social awareness through a participatory monitoring approach. We target social vulnerable groups by providing treatment solutions for open drains. We create a community of practitioners by the establishment of open innovation test sites and a training & learning network.

- Planet: we focus on rejuvenation of the river by removing organic pollution, heavy metals and emerging compounds that have the biggest impact on Indian streams. We provide technology innovations to upgrade existing wastewater infrastructure and to add treatment systems to open drains, resulting in improved quality of receiving rivers.

- Profit: we apply the principles of the Circular Economy and exploit the economic opportunities of waste-to-energy, water reuse and resource recovery. Solutions are cost efficient and require limited investments making them particularly suited for the Indian market.

In collaboration with local stakeholders and supported by industrial partners we will set-up two pilot sites at the Barapullah Drain (New Delhi) and the Jajmau plant (Kanpur). The dynamics of a business and technology platform combined with a learning network will form strong Indian water professionals, in line with Skill India, while also training EU experts in understanding Indian challenges. This will accelerate the transition to an EU-India level playing field.

<b>Saraswati 2.0</b>		<b>821427</b>
<b>Title: Identifying best available technologies for decentralized wastewater treatment and resource recovery for India</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.339.846,25</b>	EU requested grant (€): <b>2.009.472,50</b>	

**Free keywords:** *affordability, economic and institutional aspects, planning, policies, regulations, social acceptance*

### **Abstract:**

The aim of SARASWATI 2.0 is to identify best available and affordable technologies for decentralized wastewater treatment with scope of resource/energy recovery and reuse in urban and rural areas. Further, it addresses the challenge of real time monitoring and automation. The previous SARASWATI project has shown that a number of decentralized wastewater treatment plants in India do not perform properly and that there are few plants that would meet the more stringent standards as those proposed by the Indian Government in 2015. Thus, in many cases not even CATNAP (the cheapest available technology narrowly avoiding prosecution) has been applied, leading to high pollution levels. The SARASWATI project therefore proposed to adopt the principle of BAT (best available technologies) in a more flexible way, adapting the definition of BAT to the local context, based on complementing the treatment efficiency with the costs of the treatment technology and affordability, and local context in the location of application. This will allow to identify BATs with more stringent standards if required and suitable for the location. Thereby, ten pilot technologies in 7 Indian States demonstrating enhanced removal of organic pollution (BOD, TSS), nutrients (particularly Nitrogen), organic micro-pollutants and pathogens have been proposed (WP1). Further, all pilots allow for resource recovery contributing to the principles of a circular economy and will undergo a comprehensive performance assessment (WP2) complemented by an extended sustainability assessment informed by recent ISO standards (WP4). This will allow identification of BATs for the Indian context. In addition, suitable automation and control strategies will be tested and recommended, taking into account the presence of operators and their level of knowledge and expertise (WP3). Finally, WP5 is dedicated to dissemination and exploitation of results. The consortium is comprised of a well-balanced EU-Indian team of 18 partners.

<b>SPRING</b>		<b>821423</b>
<b>Title: STRATEGIC PLANNING FOR WATER RESOURCES AND IMPLEMENTATION OF NOVEL BIOTECHNICAL TREATMENT SOLUTIONS AND GOOD PRACTICES</b>		
Call Id: <b>H2020-SC5-2018-1</b>	Topic: <b>SC5-12-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>3.116.948,75</b>	EU requested grant (€): <b>4.707.266,53</b>	

**Free keywords:** *microbial sensors, real-time monitoring, remote sensing.*

### **Abstract:**

The overall aim of the SPRING project is to present an integrated water resource management for reliable water supply for all needs that involve; developing innovative simple to operate bio oxidation systems for treatment of polluted water bodies (stagnant and flowing), cost effective real time monitoring tools and finally by implementing good practices in water planning for treatment, supply and usage. SPRING aims at improving and developing technologies for the elimination of pollutants from water using a bioremediation approach.

In particular, SPRING aims at improving and developing bioremediation technologies for the removal of organic micro-pollutants present in groundwater and surface water at low concentrations, and which are currently treated using expensive physicochemical technology. Innovation also revolves around provision of simplified water quality monitoring methods and developing novel microbial technology to monitor pollutants in water. The Project will also develop real time detection systems to highlight different pollutants risks and flooding/water insufficiency scenarios.

Field trials of the developed prototype in urban and rural settings will be carried out with the help of Municipality and NGOs.

In addition, an inclusive decision-making process will contribute to democracy and will lend the decision legitimacy. Acceptance of remediation schemes during implementation will be enhanced by involving stakeholders and the public in the decision-making stage and thus, stakeholders decision making and management framework in the form of an NGO and a local Governing Body (Municipality) will be formed. Successful implementation and demonstration of the developed systems involving all stakeholders will help to achieve wide public acceptance towards reuse and recycling of wastewater through the developed bioremediation technology

<b>CIRCULAR FLOORING</b>		<b>821366</b>
Title: <b>New products from waste PVC flooring and safe end-of-life treatment of plasticisers</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.387.770,75</b>	EU requested grant (€): <b>5.387.770,75</b>	

**Free keywords:** *PVC-P, plasticizer, phthalate, DEHP, Sn, Pb, flooring*

### **Abstract:**

CIRCULAR FLOORING aims to enable circular use of plasticized PVC (PVC-P) from waste flooring by developing recycling processes that eliminate plasticizers including hazardous phthalic acid esters (e.g. DEHP). We will demonstrate the project results via production of highquality recycled PVC at TRL 5-6, reprocessing of eliminated plasticizers to new phthalate-free plasticizers and re-use of recycled polymers and additives in new flooring applications. Waste flooring will be subjected to the CreaSolv® Process, which dissolves PVC-P from the material mix and eliminates undissolved matter as well as co-dissolved plasticizers in an extractive purification step (>99%). Pure PVC is recovered from the solution and solvents will be reused completely in the process. Using a controlled catalytic reaction, extracted phthalate ester plasticizers will be converted completely (> 99%) to harmless compounds with plasticizing properties. Together with tailor-made additives, both recovered products are integrated in novel PVC flooring designed for circularity. Chemical and mechanical product analysis, process simulation, LCA, SEA, and business modelling will support process development, upscale and product design. The approach addresses exactly the scope of the call because (i) innovative solutions are developed for removing undesirable substances from secondary raw materials, (ii) removed plasticizers and additives pose health or environmental risks and would adversely affect the quality of the recycled materials and (iii) the hazardous compounds are handled safely and destroyed completely. Addressing the 500.000 t PVC flooring market with recommendations on design for recycling and novel circular materials produced at TRL 5-6, the expected impact on the flooring value chain will be substantial. An interdisciplinary team of 4 RTO, 6 industrial partners (3 SME) and 1 non-profit company will finally implement the new circular economy approach into the PVC flooring industry.

<b>CREAToR</b>		<b>820477</b>
<b>Title: Collection of raw materials, Removal of flAme reTardants and Reuse of secondary raw materials</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.985.853,75</b>	EU requested grant (€): <b>4.985.853,75</b>	

**Free keywords:** *removal of flame-retardants, WEEE, continuous purification technologies, supercritical CO<sub>2</sub>, twin-screw extruders, optimised logistic concept*

### **Abstract:**

CREAToR focusses on process development and demonstration (to TRL 5) to remove hazardous, already banned bromine-containing flame-retardants from waste streams using continuous purification technologies (supercritical CO<sub>2</sub> and cost-effective solvent-based processes using natural deep eutectic solvents (NADES)) in twin-screw extruders. CREAToR will cover the whole value chain, starting from collecting thermoplastic waste streams from building and construction (B&C) and from waste electrical and electronic equipment (WEEE). Respective recyclers and sorters of both industries are part of the CREAToR consortium. The project will implement ways to collect secondary raw materials, identify the presence of hazardous flame retardants, remove these contaminants from the materials and finally reuse the materials. As case studies they will be reused as valuable secondary raw materials for new B&C insulation panels, closing the circle of economy, for automotive interior application, and for producing 3 D printed parts for aerospace applications. The respective end user partners are also part of the CREAToR consortium. For further increasing the economic feasibility of the approach an optimised logistic concept and a harmonized material quality classification scheme will be developed and applied. CREAToR will create a circular economy solution, transforming waste streams that are currently incinerated at costs of >180 €/t (especially from the B&C and WEEE sector) into value-bringing secondary raw materials. The economic viability of CREAToR will be validated through material benchmarking and LCA/LCC assessment for the whole value chain resulting in next generation products. The strong industrial/recycler presence in the consortium (12 industrial partners, among them three recyclers, six SMEs, and six large enterprises) will ensure the market relevance of the developments and the rapid commercialisation of the results within 1-2 years after the end of the project.

<b>NONTOX</b>		<b>820895</b>
Title: <b>Removing hazardous substances to increase recycling rates of WEEE, ELV and CDW plastics</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.998.076,25</b>	EU requested grant (€): <b>4.998.076,25</b>	

**Free keywords:** *Plastic recycling; polymers; ecodesign, safe handling; flame retardants; thermolysis; WEEE, ELV, CDW*

### **Abstract:**

The overall objective of NONTOX is to increase the recycling rates of plastics waste containing hazardous substances by developing and optimising recycling processes to produce safe and high quality secondary plastic materials and by optimising the overall process economics by integration. Increasing recycling rates is crucial for the implementation of a circular economy as clearly stated in the EU Plastic Strategy. NONTOX focuses on the removal of hazardous and undesired substances from plastic waste taking into account the whole value chain: sorting and pre-treatment techniques, recycling technologies but also post-treatment techniques. Valorisation of by-products and removed substances is also considered to enhance potential applications. NONTOX will target material recovery of plastics originating from WEEE, ELV and C&DW streams containing hazardous additives or undesired compounds such as flame-retardants, stabilizers, fillers, etc. Main secondary plastic outputs will include for example, ABS, EPS, PS, HIPS, PE, PP. The market for these polymers is massive as together they represent about half of the EU demand for plastics and yet a significant portion of these valuable plastics is landfilled or incinerated. NONTOX will further develop two different technologies (Extruclean and CreaSolv<sup>®</sup>) to remove hazardous substances from aforementioned plastic waste streams, allowing for increased recycling rates. NONTOX will also improve knowledge and state of the art concerning pre-treatment and sorting of plastic waste containing hazardous substances. Thermochemical conversion of non-target plastics and side streams from the main recycling processes will be investigated to increase system efficiency by integration and widen the range of final products and applications. NONTOX is conceived by a multidisciplinary consortium including internationally renowned RTOs, universities, key industrial partners and recyclers as well as product design experts.



<b>PLAST2bCLEANED</b>		<b>821087</b>
Title: <b>PLASTtics to be CLEANED by sorting and separation of plastics and subsequent recycling of polymers, bromine flame retardants and antimony trioxide</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.500.830,00</b>	EU requested grant (€): <b>4.500.830,00</b>	

**Free keywords:** *plastics, additives, superheated, bromium, recycling, WEEE*

### **Abstract:**

1.2 Million tons of mixed plastics arise from Waste Electrical and Electronic Equipment (WEEE) treatment in Europe and this quantity is still growing. WEEE plastics often contain undesired additives that hamper recycling in Europe. 75% of WEEE is currently exported to Asia where it is recycled to secondary plastics containing undesired (hazardous) substances or ending up in landfill where leaching occurs. Hence for WEEE plastics a closed loop solution is needed.

PLAST2bCLEANED's aim is to develop a recycling process for WEEE plastics in a technically feasible, environmentally sound and economically viable manner. To fulfil this aim, PLAST2bCLEANED addresses the recycling of the most common WEEE plastics acrylonitrile butadiene styrene (ABS) and high impact polystyrene (HIPS) that contain up to 20wt% brominated flame retardants (BFR) and up to 5wt% of the synergist antimony trioxide (ATO). PLAST2bCLEANED will close three loops: (1) polymer, (2) bromine, and (3) ATO.

Key technologies developed within the project are: (1) improved sorting of HIPS and ABS that contain BFR from other polystyrene and ABS fractions; (2) dissolution of WEEE plastics in superheated solvents; (3) separation of additives to concentrate BFR and ATO fractions for recycling; (4) energy efficient recovery of solvent and of polymer. The developed technology will be integrated in a pilot facility with capacity of 2 kg/hr (TRL 6) delivering polymer samples. The developed technology can be applied to similar waste streams from other sectors, e.g. automotive.

The combination of improved sorting and use of superheated solvents offers an economic and environmental advantage. First calculations indicate a sound business case: ABS can be recovered with the superheated solvent dissolution process at a cost of 470 €/ton compared to 890 €/ton for the alternative process Creasolv.

The consortium is well equipped to develop this technology and consist of partners to cover the whole value chain.

<b>PureNano</b>		<b>821431</b>
<b>Title: A purification/regeneration process of spent plating baths base on functionalized magnetic nanoparticles.</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.246.490,00</b>	EU requested grant (€): <b>4.246.490,00</b>	

**Free keywords:** *Magnetic Nanoparticles (MNPs), Functionalization, Plating Industry, Electroless, Electroplating, spent plating baths.*

### **Abstract:**

The surface treatment industry plays a major role in extending the life of metallic components used in various industrial sectors, as well as on providing high aesthetics in consuming products. The surface treatment sector is a relatively small sector compared to the whole of mechanical engineering and metal working, but it is one of the most significant cross-sectorial manufacturing branches in the European economy. The Global metal finishing market is growing at a CAGR of 6.50% during the period 2014-2020. Among all the segments in the market the inorganic metal finishing market dominates the rest in terms of both market share and volume. Due to the increasing demand from end user industries such as Automotive, Electronics, Aerospace and Consumer goods the global market for inorganic metal finishing technologies was worth 64.2 € billion in 2014 and is expected to reach 95.8 € billion with a CAGR of 6.91% by the end of 2020. Among the inorganic metal finishing technologies inorganic metal finishing processes have the largest share of market worth 42.1 € billion in 2014. PureNano proposes an innovative, low cost, sustainable method for purification of plating baths which will lead to a significant extension of their lifetime (up to 10 times) that will have as a result decrease of operation expenditures of plating shops, decrease of environmental risks from transportation of spent baths and increase of process efficiency and products quality. It is based in the timely treatment of plating baths with functionalized magnetic nanoparticles that can absorb in their surface the contaminants and chemical species that are accumulated.

<b>REACT</b>		<b>820869</b>
Title: <b>REcycling of waste ACrylic Textiles</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>3.267.696,25</b>	EU requested grant (€): <b>3.267.696,25</b>	

**Free keywords:** *Acrylic fabric; Circular Economy; sustainable innovation; environment, resources and sustainability; awnings; LCA; Legacy substances; NIR; Investigation techniques; Furnishing; Finishing Removal*

### **Abstract:**

Recycle is a common word used always more and more but continues to be low in the EU, while landfill and incineration rates remain high. One of the major problems is to have secondary raw material similar to virgin one. This is because of contamination, treatments, and so on, that lower product performance.

The REACT proposal will address the management of waste acrylic textiles coming from outdoor awnings and furnishing. A key issue is the analysis and removal of finishing substances (fluorocarbons, melamine and acrylic resins, anti-mold agents) that affect the secondary raw material purity and their management. Then a mechanical recycling process will be implemented to obtain second life fiber and fabrics, which performance will be tested for best application.

A full environment friendly process to remove hazardous materials on finishing of waste acrylic textile will be investigated and developed to enhance their recycling, improve sustainability and reduce environmental and health risk. The removing of finishing products via chemical reaction will involve the combination of many factors and has never been studied in this sector.

Final goal is a fully compatible recycled acrylic textile for reuse and guidelines for hazardous chemicals removing from finished textile with innovative investigation techniques.

The main objectives of this proposal, 36 months long, are therefore: to remove those substances up to 93%; re-use the acrylic textiles as raw material for other production cycles, also in combination with virgin fibres to reach 3,300 tons total of waste prevented from disposal; reduce the amount of landfill and incineration of acrylic textiles of at least 30% for the outdoor sector (awnings and furnishing).

At the end of the project, we aim to set recommendations on the design and manufacturing of materials for recyclability and on the recycling process for standardization of the whole process, that would be applied on other sectors.

<b>REMADYL</b>		<b>821136</b>
<b>Title: Removal of Legacy Substances from polyvinylchloride (PVC) via a continuous and sustainable extrusion process</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-01-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.832.976,25</b>	EU requested grant (€): <b>4.832.976,25</b>	

**Free keywords:** *PVC (polyvinylchloride), legacy substances, recycling, extractive extrusion, melt filtration, lead, DEHP, phthalates, heavy metals*

### **Abstract:**

REMADYL aims at recycling so-called ‘old PVC’, i.e. PVC additivated with hazardous legacy substances (LS) such as low molecular weight phthalate plasticisers (mainly DEHP) and heavy metal based stabilisers (mainly lead). This ‘old PVC’ constitutes most of current hard (e.g. window frames, tubes) and soft (e.g. flooring or cables) PVC post-consumer waste. The presence of LS is a persistent barrier for PVC recycling as there are currently no economically viable solutions for their removal.

To tackle this major challenge, REMADYL will develop a breakthrough single step continuous process based on extractive extrusion technology in combination with novel solvents and melt filtration, which has the potential of rejuvenating ‘old PVC’ into REACH compliant high purity PVC tuned towards the demands of various soft and hard PVC products at market competitive cost (ca €570/ton, CAPEX and OPEX included). The process also has potential for other plastics applications, e.g. removal of (halogenated) flame retardants.

Using this process, REMADYL will demonstrate the circular use of PVC for window profiles and waterproofing sheets, providing a flagship example for the circular economy. The extracted phthalate plasticizers will be safely disposed (with energy valorisation) and the lead will be re-used in batteries.

REMADYL will deliver a breakthrough support to the Circular Economy Package and resource efficiency targets for Europe as recovered PVC will reduce incineration and landfilling. Assuming we recycle 400kton/year of ‘old PVC’ waste within 5 years after REMADYL, this will result in a reduction of ca 800ktons CO<sub>2</sub>eq and 8ktons lead emissions. This also implies the creation of ca 800 new jobs and a turnover of ca €280million. Safety aspects will be studied, leading to best practices, standardisation input and policy recommendations.

REMADYL consortium consists of 15 multidisciplinary partners, including 9 companies, and covers all expertise to maximise project impact.

<b>PROMPT</b>		<b>820331</b>
Title: <b>PRemature Obsolescence Multi-Stakeholder Product Testing Program</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-02-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>4.997.778,00</b>	EU requested grant (€): <b>4.997.778,00</b>	

**Free keywords:** *consumer product resting, consumer data acquisition, design for repair, enhancement of maintenance, design for longevity*

### **Abstract:**

Waste production and resource use is increasing for electric and electronic consumer products. At the same time many critical materials cannot be recovered in recycling processes. Therefore a promising strategy would be to lengthen the lifetimes of these products in order to get closer to a Circular Economy.

The project PROMPT is going to support the development of more durable and longer lasting products by lowering the asymmetry of information between consumer and manufacturer and thereby to allow consumers to make better choices. This is achieved by the development of an integral testing programme for electric and electronic consumer products that takes into account the main key issues of product failures and premature obsolescence:

- Product durability and reliability
- Adaptability, upgradability, and reparability
- User behaviour and market

PROMPT takes a multi-stakeholder approach by including different consumer, test, repair and research organisations in the consortium who will carry out the work. Consequently, results will be achieved that are viable for different stakeholders and independent from manufacturers. With the help of an Advisory Board, additional stakeholder input will be gathered. The board will consist of experts from industry, retail, design, environmental, science and consumer sectors.

A baseline of research will be established by collecting empirical data on technical issues, design shortcomings, market obstacles and replacement causes for premature obsolescence. These results will give input to the development of a range of specific testing methods addressing the three fields of issues outlined above. The results will be synthesized in an integral testing programme for premature obsolescence that will be validated and benchmarked through test cases. Results will be analysed and prepared to give validated input to standardisation, product design, consumer communication and policy recommendations.

<b>CIRCuIT</b>		<b>821201</b>
Title: <b>Circular Construction In Regenerative Cities (CIRCuIT)</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-03-2018</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>10.627.875,00</b>	EU requested grant (€): <b>9.814.612,50</b>	

**Free keywords:** *Circular construction, urban mining, urban planning, refurbishment, design for disassembly, data platform, CIRCuIT Academy, co-creation, value chain partnership, governance, liveability, transform*

### **Abstract:**

To this day, many techniques, tools and approaches have been developed and tested either on a lab scale or in pilot buildings around Europe. These demonstrations have served as great showcases for circular built environments, but they are yet to be demonstrated at higher level. Copenhagen, Hamburg, Helsinki region (City of Vantaa) and Greater London have teamed up with partners from the entire built environment value chain. The results will have a direct uptake in the value chain and enable cities to initiate circular transition. CIRCuIT will demonstrate three innovative solutions in the four cities: dismantle buildings to reuse materials; transformation and refurbishment; and design for disassembly and flexible construction. CIRCuIT will develop urban planning instruments to support cities in implementing circular construction solutions and initiate changes at system level; implement a Circularity Hub, a data platform to evaluate progress of circular economy and regenerative capacity; and set up a knowledge sharing structure, the CIRCuIT Academy, to promote upscaling of solutions. London, Hamburg, Helsinki region and Copenhagen have the ambition to bridge the implementation gap from individual pilots to the actual circular and regenerative city, by demonstrating the application of current and future developed tools and instruments for circular built environment at a city level in 36 demonstration projects. It is the intention to boost the regenerative capacity of the three cities and Helsinki region, and finalise the development of an advanced set of indicators for impact measurement in an effective and cross-European monitoring programme. The aim is to increase the regenerative capacity in the four cities, and to reduce the yearly consumption of virgin raw material by 20% in new built environments, and to show cost savings of 15%.

<b>CityLoops</b>		<b>821033</b>
Title: <b>Closing the loop for urban material flows</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-03-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>10.646.230,25</b>	EU requested grant (€): <b>9.991.600,00</b>	

**Free keywords:** *Circular City Scan, construction/demolition waste, soil, organic waste, procurement, stakeholder engagement, participatory planning*

### **Abstract:**

CityLoops brings together six ambitious European cities to demonstrate a series of innovative tools and urban planning approaches, aimed at closing the loops of urban material flows and increasing their regenerative capacity. Demonstration actions will be implemented in relation to construction/demolition waste, including soil, and organic waste. During the inception phase, a circular city scan methodology and indicators will be developed and implemented in each city, by adapting current MFA and Urban Metabolism methods to include context-specific data and challenges, to adjust planned demonstration actions, provide an evaluation framework for the measures and monitor their progress towards a circular economy. A series of further innovative decision support tools will be developed (such as City Lab, a GIS based city planning tool, and a pre-demolition resource-mapping tool) for specific demonstration actions. In each city, a Local Stakeholder Partnership will be established at project outset, involving citizen groups, businesses communities, and other relevant partners, to guide planning and implementation. In each case, public procurement actions will also be analysed to assess potential supportive measures. As the selected cities are small to medium sized cities (pop. 50,000 – 600,000), Apeldoorn, Bodø, Mikkeli, Porto, Seville and Roskilde/Høje-Taastrup, the tools, approaches and solutions demonstrated should be replicable in a large number of cities across Europe. Replication is embedded throughout the project. At city level, all demonstration cities will prepare scale-up plans. At a regional level Collaborative Learning Networks will be established, consisting of other municipalities, public bodies, and other relevant regional institutions, to prepare regional upscaling plans. At a European level, a series of Replication Zones will be recruited over the course of the project to prepare replication plans. Guidance on replication will also be produced.

<b>Pop-Machina</b>		<b>821479</b>
Title: <b>Collaborative production for the circular economy; a community approach</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-03-2018</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>11.046.105,00</b>	EU requested grant (€): <b>9.999.592,50</b>	

**Free keywords:** *makers, collaborative production, factory of the future, urban planning, makerspaces*

### **Abstract:**

POP-MACHINA aims to demonstrate the power and potential of the maker movement and collaborative production for the EU circular economy. We draw from a number of cut-edge technologies (factory-of-the-future, blockchain) and disciplines (urban planning, architecture) to provide the support necessary to overcome scaling issues; a typical drawback of collaborative production; to find the areas more in need of our intervention and to reconfigure unused spaces. We put forth an elaborate community engagement program to network, incentivize and stimulate through maker faires and events existing and new maker communities in all our municipalities. We build upon the current informal curriculum for maker skills development by nurturing the social side and we put educators and makers together to exchange ideas on the training modalities. A particular focus on the skill development of women and vulnerable groups will aim to empower these (underrepresented) segments to partake actively in collaborative production. In every pilot area we will demonstrate business oriented collaborative production of feasible and sustainable concepts from secondary raw material or other sustainable inputs, based on the needs and preferences of the local stakeholders. A thorough impact assessment framework with increased scope (e.g. social) will be co-designed with stakeholders after short basic assessment trainings and will be used in the assessment of our pilot work. Based on the findings we will kick-start a series of policy events to discuss openly – without pushing our results – the tax and legal barriers that hamper collaborative production.



<b>REFLOW</b>		<b>820937</b>
Title: <b>constRuctive mEtabolic processes For material FLOWs in urban and peri-urban environments across Europe</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-03-2018</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>10.505.435,00</b>	EU requested grant (€): <b>9.794.935,00</b>	

**Free keywords:** *circular metapolis, new business models, governance, decision support, incentive mechanisms, waste, packaging, plastic, water, wood, agrifood, textile, public spaces, blockchain, Big / Open data*

### **Abstract:**

The vision of REFLOW is to develop circular and regenerative cities through the re-localisation of production and the re-configuration of material flows at different scales. More specifically, it will use Fab Labs and makerspaces as catalysers of a systemic change in urban and peri-urban environments, which enable, visualize and regulate “four freedoms”: free movement of materials, people, (technological) knowledge and commons, in order to reduce materials consumption, maximize multifunctional use of (public) spaces and envisage regenerative practices. Concretely, REFLOW aims at providing realistic best practices aligning market and government needs in order to create favourable conditions for the public and private sector to adopt circular principles. In order to provide critical examples of ways in which cities can adopt a CE model and reach the 2030 Sustainable Development Goals, REFLOW will create new CE business models (Distributed Design Market model, On-Demand System, Corporate Hacking and Corporate Pyramid) within 6 pilot cities (Amsterdam, Berlin, Milan, Paris, Vejle and Cluj-Napoca) and assess their social, environmental and economic impact. The project will make use of blockchain technologies in order to incentivise the circular practices in local ecosystems and data visualisation tools to enable continuous monitoring and optimisation of “urban metabolic” processes and rapid interventions management. Networks of sensors, urban computing and geo-localisation will capture data ensuring accuracy, integrity and interoperability of relevant data infrastructures, while data visualisation and standard templates will be available for effective communication, public consultation, and exchange of experiences.

<b>BIORECOVER</b>		<b>821096</b>
Title: <b>Development of an innovative sustainable strategy for selective biorecover of critical raw materials from Primary and Secondary sources</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-06-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.337.277,50</b>	EU requested grant (€): <b>6.337.277,50</b>	

**Free keywords:** *International cooperation, Resources efficiency, Sustainable innovation*

### **Abstract:**

The objective of BIORECOVER is the R&D of a new sustainable & safe process, essentially based on biotechnology, for selective extraction of a range of Critical Raw Materials, from relevant unexploited secondary & primary sources:

-Rare Earths from Bauxite Residue from Greece (MYTILINEOS)

-Magnesium from Mg wastes of low grade minerals and calcination by-products- from Spain (MAGNA)

-Platinum Group Metals from flotation tailings from South Africa (UWITS) & PGM slags, dusts and press cake from United Kingdom (JM)

To this end, BIORECOVER will be based on the integration of 3 main stages to reach the expected recovery rates (90%), selectivity (95%) & purity (99%) (TRL from 2-3 to 5):

(1) Remove the major impurities presents in raw materials sources to achieve the greater availability of the target metals for their recovery.

(2) Mobilise these metals through specific and improved microorganisms to get a leachate enriched with the target CRMs.

(3) Development of a specific technology for recovering metals with high selectivity & purity that meet the quality requirements for its reuse.

Downstream processes will be also studied of the recovered metals for their reuse (brakes pads, oxygen sensors, powder Mg & catalysts). The different stages of the process provide it modular capacity increasing its adaptation flexibility and thus, further market penetration.

LCA & LCC and a Decision Making Framework will support these aims. The awareness, trust & acceptance of the society about the importance of raw materials will be addressed by an awareness campaign and public perception studies. The project results will contribute to EU bio-mining knowledge (RMIS) and a communication with other key project will be also set up.

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To achieve this ambitious project, a multidisciplinary consortium covering the whole value chain (from suppliers to end users) will be involved, being represented 7 member states across EU (ES, DK, FR, LE, PT, SE & UK) and effective international cooperation with ZA

<b>ION4RAW</b>		<b>815748</b>
Title: <b>Ionometallurgy of primary sources for an enhanced raw materials recovery</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-06-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.684.450,00</b>	EU requested grant (€): <b>5.684.450,00</b>	

**Free keywords:** *by-product recovery, primary sources, raw materials, critical raw materials, ionometallurgy, ionic liquids, deep eutectic solvents*

### **Abstract:**

The Ion4Raw project proposes an energy-, material- and cost-efficient new mineral processing technology to recover by-products from primary sources by means of innovative Deep Eutectic Solvent (DES) ionic liquids and advanced electrorecovery as an only step. A joint recovery of by-products from primary sources which belong to the Cu-Ag-Au group is proposed. Most of the targeted by-products elements are Critical Raw Materials as bismuth (Bi), germanium (Ge), indium (In), cobalt (Co), platinum (Pt) and antimony (Sb). Accompanying major product metals, e.g. copper (Cu), silver (Ag) and gold (Au), may also be recovered by this process. The flexibility of the process (to be demonstrated to TRL 5 through a prototype) increases its market penetration potential as a sound systemic solution.

The technical feasibility of this concept is supported by the TRL 2-3. From this starting point, the Ion4Raw project aims to reach TRL 5 by implementing a process prototype at TECNALIA (TEC) facilities. Furthermore, to produce a sound systemic solution, comprehensive by-product potential mapping will be carried out to link the Ion4Raw process with suitable sources.

Finally, Ion4Raw project has a very promising business potential since it will allow mining and mineral processing companies to fully exploit by-product potential by recovering them at their own facilities. This will contribute to unlocking the full potential of Europe's inner wealth by converting new and currently unexploited resources into reserves.

<b>TARANTULA</b>		<b>821159</b>
<b>Title: Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-06-2018</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.946.607,50</b>	EU requested grant (€): <b>6.946.607,50</b>	

**Free keywords:** *refractory metals; flexible recovery; prototype validation*

### **Abstract:**

The extraordinary properties of refractory metals, the unlikeliness of their future substitution and their use in booming industries will sustain a high EU demand for tungsten (W), niobium (Nb) and tantalum (Ta). Despite all three being classified as Critical Raw Materials (CRM) by the European Commission (EC), fractions of these indispensable metals are dissipated as by-products in mining waste streams as well as process scrap. To stimulate their recovery from such complex, low-grade resources, TARANTULA will develop a suite of cost-effective, scalable and eco-friendly – bio-, hydro-, iono-, solvo-, pyro- and electro-metallurgical – processes with high selectivity and recovery rates. These novel technologies, each representing an alternative for one or more process steps of state-of-the-art (SoA) processing lines, will form new routes towards market-ready metals, metal oxides and metal carbides. Flexibility will be the cornerstone of the overall process flowsheet to enable recovery of all three elements (W, Nb, Ta), thereby minimising the CAPEX required for future processing installations. Following systematic research and innovation activities at lab scale, the envisioned technologies will be brought to TRL3-5 and, based on performance, validated at prototype level by experienced industrial partners. In parallel, future by-product recovery will be supported by carrying out a comprehensive identification and assessment of existing un/underexploited secondary sources of W, Nb and Ta. The generated information – in compliance with all pertinent laws and regulations - will feed into the Raw Materials Information System (RMIS) which will boost the impact of the project far beyond the current consortium. Finally, TARANTULA will blueprint tailored Communication, Dissemination and Civil Society Engagement strategies with respect to obtaining and maintaining the “Social License to Operate” for future heavy-duty metallurgical processing.

<b>SUSMAGPRO</b>		<b>821114</b>
<b>Title: Sustainable Recovery, Reprocessing and Reuse of Rare-Earth Magnets in a Circular Economy (SUSMAGPRO)</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-07-2018-2019-2020</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2019</b>	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>14.741.593,00</b>	EU requested grant (€): <b>12.977.445,62</b>	

**Free keywords:** *Recycling, neodymium-iron-boron (NdFeB), rare earth magnets, efficient extraction, critical materials, pilot scale, netshape manufacture, circular economy,*

### **Abstract:**

The aim of this project is to develop a recycling supply chain for rare earth magnets in the EU and to demonstrate these new materials on a pilot scale within a range of application sectors.

Rare earth magnets based upon neodymium-iron-boron (NdFeB, also containing dysprosium) are used in a wide range of products, including for example clean energy technologies (wind turbines and electric vehicles) and high tech sectors such as electronics. However in recent years the supply of these materials has come under considerable pressure and neodymium and dysprosium are now deemed to be of greatest supply risk for all elements.

The EU imports far more NdFeB magnets than it manufactures (>1,000 tonnes manufactured per annum). It has been estimated that ~ 2,000-3,000 tonnes/annum of NdFeB will be available by 2020 for recycling, which presents a significant opportunity. The aim of this project is to identify, separate, recycle and demonstrate recycled magnets at a pilot scale with a multidisciplinary team located across the EU. The project will target three of the main application sectors including automotive, electronics and wind turbines.

The project will develop new sensing and robotic sorting lines for the identified EoL products, building upon technologies developed in the FP7 project Remanence. New hydrogen based technologies will be demonstrated at scale for separating and purifying NdFeB powders from the robotically sorted parts and this technology will be duplicated at another partner in the project. The separated powders will be re-manufactured into sintered magnets, injection moulded magnets, metal injection moulded magnets and cast alloys, at 4 different companies across 3 countries, building upon work in the Repromag Horizon 2020 project. A techno economic assessment will be performed for each potential recycling route alongside a life cycle assessment to assess the environmental benefits over primary production.

<b>WOOL2LOOP</b>		<b>821000</b>
Title: <b>Mineral wool waste back to loop with advanced sorting, pre-treatment, and alkali activation</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>CE-SC5-07-2018-2019-2020</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>36 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>6.716.690,50</b>	EU requested grant (€): <b>5.294.937,86</b>	

**Free keywords:** *Mineral wool; construction and demolition waste; waste separation; geopolymers; alkali-activation; additive manufacturing; alkali-activated concrete; construction industry; alternative raw materials*

### **Abstract:**

Mineral wool within construction and demolition waste (CDW) is considered largely unrecyclable. It is formed at a rate of 2.5 Mt/year and although it is only 0.2 % of total CDW, it requires disproportionately large space due to low density. The WOOL2LOOP project aims to close this material loop by introducing novel technology and value chain to CDW sorting, pretreatment, and processing. The quality of sorted mineral wool is upgraded by comparing and combining the following approaches: pre-demolition audit, robotized demolition and sorting, novel on-site analysis with time-gated Raman spectroscopy, and smart demolition practices. Pre-treatment involves logistical considerations and milling of the mineral wool waste to sufficiently small particles. Processing utilizes alkali-activation (i.e., geopolymers) technology to convert reactive silica and alumina of the mineral wool into new building material products. Alkali-activation in this context is a completely new approach and it enables to diversely adjust the resulting material properties. Therefore, a broad selection of products were selected for WOOL2LOOP, ranging from relatively low to high value products: hollow core and pavement slabs, facade elements, acoustic panels, dry concrete, floor screed and 3D-printing equipment, for instance. All the required technologies and product manufacturing cases will be demonstrated in large-scale pilots with a wide geographic coverage within the EU. The consortium includes several leading large construction material enterprises and innovative SMEs to cover the whole value chain. Safety, health, environmental, and economic aspects are considered throughout the project. According to the preliminary calculations, there is a strong business potential in the WOOL2LOOP concept. Finally, the constantly increasing landfilling costs (approx. 250 M€ for mineral wool in the EU) create a clear economic driver for the project.

AISIcal		820911
Title: <b>Towards sustainable mineral and metal industry: ZERO Bauxite Residue and ZERO CO2 from co-production of Alumina, Silica and precipitated Calcium carbonate by the Aranda-Mastin technology</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>SC5-09-2018-2019</b>	Type of Action: <b>RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.888.235,00</b>	EU requested grant (€): <b>5.888.235,00</b>	

**Free keywords:** *Mineral processing, resources efficiency, raw materials, technology development, low carbon print, environmentally friendly, environment, resources and sustainability*

### Abstract:

AISIcal is an ambitious Research and Innovation effort to make the mineral and metal industry more sustainable and environmentally sound. The project will further research, develop and de-risk a groundbreaking concept; the patented Aranda-Mastin (AM) technology. This technology enables the co-production of three essential raw materials (alumina, silica and precipitated calcium carbonate), using new resources - e.g. anorthosite, abundantly available worldwide - whilst generating ZERO Bauxite Residue and ZERO CO2. Today's production of these raw materials is a long way from being environmentally friendly: they are obtained through traditional processes that generate large CO2 emissions, and bauxite residue in the case of alumina production from bauxite by the Bayer process.

AISIcal will research and develop the innovative AM technology that allows:

- Green co-production of 3 essential raw materials, in a single process and from one source, with synergetic environmental and economic benefits
- Efficient use of anorthosite, a mineral abundant in Europe and worldwide
- Integrated CO2 use and capture for ZERO CO2 emissions from production
- ZERO Bauxite Residue generation from alumina production

AISIcal will de-risk and develop (from TRL 3-4 to TRL 4-5) the AM technology under sustainability and efficiency principles. It will assess and quantify the: techno-economic feasibility, potential value creation for Europe, Life Cycle Analysis, impact and risks of this technology upon the key sustainability pillars: economy, society and environment.

AISIcal will be performed by a balanced team of R&D and industrial partners representing the whole value chain. AISIcal will set a roadmap for exploitation of the project results, to foster the later commercialization of the technology. Targeted dissemination and communication actions will contribute to increasing social and industrial engagement for developing innovative sustainable technologies for mineral processing.



<b>DWC</b>		<b>820954</b>
Title: <b>DIGITAL-WATER.city - Leading urban water management to its digital future</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>SC5-11-2018</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>42 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.903.513,75</b>	EU requested grant (€): <b>4.999.557,15</b>	

**Free keywords:** *Urban Water Systems*

### **Abstract:**

digital-water.city's (DWC) main goal is to boost the integrated management of waters systems in five major European urban and peri-urban areas, Berlin, Milan, Copenhagen, Paris and Sofia, by leveraging the potential of data and smart digital technologies. DWC will create linkages between the digital and the physical worlds by developing and demonstrating 18 advanced digital solutions to address current and future water-related challenges; namely the protection of human health, the increase of performance and return on investment of water infrastructures and the involvement of citizens in urban water management. Areas of application of DWC digital solutions range from groundwater management, sewer maintenance and operation, wastewater treatment and reuse to urban bathing water management. DWC combines cutting-edge digital technologies such as augmented reality, open source software, cloud computing, real-time sensors, artificial intelligence, predictive analytics and decision support systems. DWC integrates the development of digital solutions in a dedicated guiding protocol to cover the existing gaps regarding ICT governance, interoperability, ontology and cybersecurity. Ultimately, DWC will provide an interoperable free flow of information among stakeholders and across the water value chain. DWC will generate the necessary conditions for co-creation and open innovation by the establishment of Community of Practices aiming at integrating stakeholder knowledge, ensuring the transferability of the digital solutions in other European or international contexts, supporting knowledge transfer beyond DWC and creating durable binding between European cities. The large scale assessment and communication of the benefits provided by the digital solutions in five major cities will serve as lighthouse, raising the awareness of European cities for a necessary digital transformation, and opening new market opportunities for DWC partners and European providers of digital solutions.

<b>SCOREwater</b>		<b>820751</b>
Title: <b>Smart City Observatories implement REsilient Water Management</b>		
Call Id: <b>H2020-SC5-2018-2</b>	Topic: <b>SC5-11-2018</b>	Type of Action: <b>IA</b>
Project start date:	Duration: <b>48 months</b>	Unit: <b>EASME/B/02</b>
Total costs (€): <b>5.787.650,50</b>	EU requested grant (€): <b>4.998.590,50</b>	

**Free keywords:** *Resilience, urban drainage, organisational science, open platform, sewer sociology, water-safe construction projects, flooding resilience, data market*

### **Abstract:**

SCOREwater focuses on enhancing the resilience of cities against climate change and urbanization by enabling a water smart society that fulfils SDGs 3, 6, 11, 12 and 13 and secures future ecosystem services. We introduce digital services to improve management of wastewater, stormwater and flooding events. These services are provided by an adaptive digital platform, developed and verified by relevant stakeholders (communities, municipalities, businesses, and civil society) in iterative collaboration with developers, thus tailoring to stakeholders' needs. Existing technical platforms and services (e.g. FIWARE, CKAN) are extended to the water domain by integrating relevant standards, ontologies and vocabularies, and provide an interoperable open-source platform for smart water management. Emerging digital technologies such as IoT, Artificial Intelligence, and Big Data are used to provide accurate real-time predictions and refined information. We implement three large-scale, cross-cutting innovation demonstrators and enable transfer and upscale by providing harmonized data and services. We initiate a new domain "sewage sociology" mining biomarkers of community-wide lifestyle habits from sewage. We develop new water monitoring techniques and data-adaptive storm water treatment and apply to water resource protection and legal compliance for construction projects. We enhance resilience against flooding by sensing and hydrological modelling coupled to urban water engineering. We will identify best practices for developing and using the digital services, thus addressing water stakeholders beyond the project partners. The project will also develop technologies to increase public engagement in water management. Moreover, SCOREwater will deliver an innovation ecosystem driven by the financial savings in both maintenance and operation of water systems that are offered using the SCOREwater digital services, providing new business opportunities for water and ICT SMEs.

<b>SUSFOOD2</b>		<b>727473</b>
Title: <b>ERA-Net Cofund on Sustainable Food production and consumption (SUSFOOD2)</b>		
Call Id: <b>H2020-SFS-2016-1</b>	Topic: <b>SFS-19-2016-2017</b>	Type of Action: <b>ERA-NET-Cofund</b>
Project start date: <b>1/1/2017</b>	Duration: <b>60 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>14.269.217,00</b>	EU requested grant (€): <b>4.708.841,61</b>	

**Free keywords:** *Sustainability, Food production, Consumption, food chain, Food processing, loss, waste, environment, consumer, agribusiness,*

### **Abstract:**

The aim of SUSFOOD2 is to foster research and innovation in the field of sustainable food systems through enhanced cooperation and coordination between EU member and associated states. It will thereby contribute to the overall EU objective of building the European Research Area as well as a newly emerging Food Research Area.

Major challenges will influence future food chains asking for innovative solutions to

- respond to increased demand for food by increasing production sustainably (Food and Nutrition Security)
- make optimal use of resources while mitigating impact on the environment
- reducing losses and waste
- follow a whole food chain approach from production to consumption
- improving competitiveness of the European agri-food-business

SUSFOOD2 focusses on sustainability in post-harvest food production, thus covering relevant fields from natural sciences to food engineering and social sciences.

Building on the achievements of its predecessor in FP7, SUSFOOD2 Cofund will strengthen efforts to support and fund excellent research in the food area by one co-funded call of around 14 Mio. €. The consortium also aims at implementing other additional activities in a three-fold approach:

- i) strengthening networking and knowledge transfer among various stakeholders (i.e. by workshops, stakeholder events etc.)
- ii) additional funding activities without EU co-fund (preferably linked with other initiatives)
- iii) implementation and further advancement of the SUSFOOD SRA (developed in FP7)

With the outlined approach SUSFOOD2 will contribute to

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- maximizing impact of transnational cooperation pooling resources (material and intellectual) and implementing best practice
- using synergies and reducing overlap by interacting with related (international) initiatives (especially JPIs HDHL and FACCE)
- Promoting the outputs of SUSFOOD2 network and funded projects via targeted dissemination thus sharing common vision and creating awareness for the field of food sustainability.

<b>GLOPACK</b>		<b>773375</b>
Title: <b>Granting society with LOw environmental impact innovative PACKaging</b>		
Call Id: <b>H2020-SFS-2017-1</b>	Topic: <b>SFS-35-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>6.658.650,36</b>	EU requested grant (€): <b>5.560.785,48</b>	

**Free keywords:** *Packed Food Sustainability, active and intelligent packaging, biodegradable packaging materials, food environmental footprint*

### **Abstract:**

GLOPACK proposes a cutting-edge strategy addressing the technical and societal barriers to spread in our social system, innovative eco-efficient packaging able to reduce food environmental footprint.

Focusing on accelerating the transition to a circular economy concept, GLOPACK aims to support users and consumers' access to innovative packaging solutions enabling the reduction and circular management of agro-food, including packaging, wastes. Building from existing key enabling but simply applicable technologies, GLOPACK will focus on increasing the TRL of the three main promising advances in the food packaging area: (1) bio-circular (biodegradable materials issued from agro-food residues conversion) packaging materials, (2) active packaging to improve food preservation and shelf-life without additives and (3) RFID enabled wireless food spoilage indicator as new generation of self-adjusting food date label.

GLOPACK strategy will tackle the diffusion of these innovation through the whole stakeholders chains, from the researcher up to the consumer, i.e. the uptake by packaging industry through pilot and large-scale processing for the selected technologies, by food companies through the deployment of a software tool for decision making and for providing proof of usefulness to all stakeholders, by others users (e.g. retailers) and consumer through user-driven adoption strategies, cost-benefit analysis and validation and retro-active adjustment in close to real conditions. Validation of the solutions including compliance with legal requirements, economic feasibility and environmental impact will push forward the three technologies tested and the related decision-making tool from TRL 3-4 to 7 for a rapid and easy market uptake contributing therefore to strengthen European companies' competitiveness in an always more globalised and connected world.

<b>MYPACK</b>		<b>774265</b>
Title: <b>Best markets for the exploitation of innovative sustainable food packaging solutions</b>		
Call Id: <b>H2020-SFS-2017-1</b>	Topic: <b>SFS-35-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>42 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>5.709.892,50</b>	EU requested grant (€): <b>4.649.860,91</b>	

**Free keywords:** *BIODEGRADABLE AND COMPOSTABLE PACKAGING, PACKAGING FROM RENEWABLE RESSOURCES, ELABORATED (HIGH BARRIER AND ACTIVE) PACKAGING TECHNOLOGIES*

### **Abstract:**

Mypack general objective is to help sustainable food packaging technologies to reach or to extend their market. It will provide general guidelines to select the best market for a new technology and to ensure the best commercial development, through (i) the best environmental efficiency (direct impacts of packaging, food waste impacts, optimized recycling composting combusting end life, preserved consumer health), (ii) the best consumer acceptability, and (iii) an optimized industrial feasibility.

In order to do so, 3 ambitious SMART key objectives with associated KPIs will be considered during the Mypack project to promote the commercial development of:

- Biodegradable and compostable packaging.
- Packaging from renewable resources.
- Elaborated (high barrier and active) packaging technologies.

Barriers and challenges are clearly identified and solutions to overcome them are presented. 7 innovative sustainable food packaging solutions are considered of which 5 will be developed and exploited. The sustainable food packaging state of the art is comprehensively described and it is made clear how Mypack solutions will extend beyond it.

Appropriate measures, in line with the work program, were selected to maximize the impact of the project. Mypack project targets the scope of the call throughout this proposal and is thus fully in line with the call objectives. A convincing exploitation plan is presented in the form of 7 work packages, 5 of which are technical in nature. Appropriate milestones and risks are considered in order to complete the project objectives in the due time.

The Mypack consortium is composed of 18 partners, covering the academic, scientific and industrial world, including SMEs. Major stakeholders have provided letters of intent, showing their interest in the Mypack approach which will have essential impact in order to define the best markets for the exploitation of innovative sustainable food packaging solutions.

<b>YPACK</b>		<b>773872</b>
<b>Title: HIGH PERFORMANCE POLYHYDROXYALKANOATES BASED PACKAGING TO MINIMISE FOOD WASTE</b>		
Call Id: <b>H2020-SFS-2017-1</b>	Topic: <b>SFS-35-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>7.277.671,25</b>	EU requested grant (€): <b>5.996.591,02</b>	

**Free keywords:** *Food waste; PHA; PHBV; Prototyping; Environment, resources and sustainability; Food safety; Sustainable design; Life Cycle analysis; Piloting; Sustainable innovation; Market uptake assessment.*

### **Abstract:**

The main objective of YPACK is the pre-industrial scale up and validation of two innovative food packaging solutions (thermoformed tray and flow pack bag) based on PHA, with active and passive barrier properties. New packaging will use food industry by-products (cheese whey and almond shells), assure the biodegradability and recyclability, and reduce food waste, in the frame of the EU Circular Economy strategy.

YPACK will use a holistic approach and methodology involving different knowledge areas: Development of packaging solutions (Production of PHBV layers, compounding, prototyping, Industrial Validation), Product Validation (Quality / Shelf life), Social approach (Customer profiling, Dissemination, Policies & Regulatory) and Market Assessment (Business study and Risk assessment). YPACK is aligned with the EU Circular Economy strategy, including the use of raw bio-based food industry by-products, LCA studies, recyclability & biodegradability of packaging and trying to reduce Food Waste. The project is constructed in line with the Responsible Research and Innovation guidelines of the European Commission.

The project has a total duration of 36 months. Several processes related to the production of multilayered passive and active systems based on raw PHBV will be optimised and scaled up to pre-industrial size to validate the production of the proposed packaging solutions for extend the shelf life of selected food products. They consist in:

- i) a multilayer tray involving an inner active layer, and
- ii) a multilayer flow pack with improved barrier properties. A consumer profiling and market study will be performed at the first stage of the project in order to identify consumers' preferences, market needs and match them with the new EU regulations and packaging materials breakthroughs.

<b>SiEUGreen</b>		<b>774233</b>
Title: <b>Sino-European innovative green and smart cities</b>		
Call Id: <b>H2020-SFS-2017-1</b>	Topic: <b>SFS-48-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>8.377.867,50</b>	EU requested grant (€): <b>6.999.999,38</b>	

**Free keywords:** *Resilience, smart cities, inclusion, social innovation, EU-China cooperation, food security, food literacy, resource efficiency, land use, urban design, environmental and economic impact*

### **Abstract:**

SiEUGreen aspires to enhance the EU-China cooperation in promoting urban agriculture for food security, resource efficiency and smart, resilient cities. Building on the model of zero-waste and circular economy, it will demonstrate how technological and societal innovation in urban agriculture can have a positive impact on society and economy, by applying novel resource-efficient agricultural techniques in urban and peri-urban areas, developing innovative approaches for social engagement and empowerment and investigating the economic, environmental and social benefits of urban agriculture. In order to achieve its objectives, SiEUGreen brings together a multi-disciplinary Consortium of European and Chinese researchers, technology providers, SMEs, financiers, local and regional authorities and citizen communities. The project consists in the preparation, deployment and evaluation of showcases in 5 selected European and Chinese urban and peri-urban areas: a previous hospital site in Norway, community gardens in Denmark, previously unused municipal areas with dense refugee population in Turkey, big urban community farms in Beijing and Central China. Throughout SiEUGreen's implementation, EU and China will share technologies and experiences, thus contributing to the future developments of urban agriculture and urban resilience in both continents. The impact measurement during and especially beyond the project period is a key component in the project's design. Information and results obtained from the project will be disseminated through diverse communication and dissemination tools including, social media, an innovative app enhancing urban co-design, stakeholder conferences, hand-on training workshops, showcase demonstration forums, municipality events. A sustainable business model allowing SiEUGreen to live beyond the project period is planned by joining forces of private investors, governmental policy makers, communities of citizens, academia and technology providers.



<b>Circular Agronomics</b>		<b>773649</b>
Title: <b>CIRCULAR AGRONOMICS - Efficient Carbon, Nitrogen and Phosphorus cycling in the European Agri-food System and related up- and down-stream processes to mitigate emissions</b>		
Call Id: <b>H2020-SFS-2017-2</b>	Topic: <b>SFS-30-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>9/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>7.032.749,04</b>	EU requested grant (€): <b>6.999.795,50</b>	

**Free keywords:** *Agri-food chain; Greenhouse Gas Emissions; Nutrient recycling; Manure; Nitrate; Agriculture; Food waste; Climate change; Life Cycle Assessment; Bioenergy; Carbon management; Policy Briefing*

### **Abstract:**

Circular Agronomics (CA) provides a comprehensive synthesis of practical solutions to improve the current Carbon (C), Nitrogen (N) and Phosphorus (P) cycling in European agro-ecosystems and related up- and down-stream processes within the value-chain of food production. The proposed solutions would constitute a further step towards making agriculture an integral part of a circular economy by increasing resource efficiency while simultaneously addressing associated environmental challenges such as greenhouse gas and ammonia emissions as well as eutrophication of water bodies. Along 7 work packages and 6 case-studies, representing locations with different biogeographic conditions and environmental challenges typical for the European agricultural sector, the objective of CA is to contribute to a development towards sustainable, resilient and inclusive economies that are part of circular and zero-waste societies. The involved multi-actor and international consortium aims (i) To increase the understanding of C, N, P flows and the related potential to reduce environmental impacts at farm and regional level under different biogeographical conditions; (ii) To close loops within cropland farming, from livestock to cropland farming and to increase the reuse of waste/wastewater from food-industry to improve soil fertility and to increase nutrient use efficiency; (iii) To highlight the performance of different prototypes of agro-ecological systems and increase sustainability of food production in the EU; and (iv) To contribute to the improvement of the European Agricultural Policies by providing evidence based, farmer led and consumer relevant recommendations for the agri-food chain. Cross-cutting social, economic and environmental evaluation ensure the overall sustainability of the investigated solution.

<b>Nutri2Cycle</b>		<b>773682</b>
Title: <b>Transition towards a more carbon and nutrient efficient agriculture in Europe</b>		
Call Id: <b>H2020-SFS-2017-2</b>	Topic: <b>SFS-30-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>7.048.003,75</b>	EU requested grant (€): <b>6.850.050,50</b>	

**Free keywords:** *GHG abatement, agriculture, nutrient recycling, agro processing, demonstration, soil OC*

### **Abstract:**

NUTRI2CYCLE will use an integrated approach to enable the transition from the current (suboptimal) nutrient household in European agriculture to the next-generation of agronomic practices, characterized by an improved upcycling of nutrients and organic carbon.

The project is deeply rooted in previous national and European projects, in which the consortium members were actively involved. The underlying principle is that Nutrient Use Efficiency can be significantly improved by integrating on-farm techniques and systems that allow better reconnection between 1) animal husbandry provided flows and 2) plant production requirements. At the same time this reconnection itself will serve a better C-return to soil and GHG-reduction by avoided emissions optionally combined with energy production for self-consumption on-farm.

UTRI2CYCLE aims to (i) benchmark mass flows of nutrients, organic carbon and GHG-footprint, (ii) provide an assessment frame (toolbox) for evaluating potential impact of proposed innovations, (iii) actively support concepts, techniques and scenarios put forward in EIP-Operational Groups, (iv) optimize these (+ in-consortium developed) scenarios using the toolbox, (v) showcase the most promising developments via prototypes and demos. Finally, using the experience gained at a local/regional scale, NUTRI2CYCLE will elaborate strategic scenarios to identify the effect of these innovations at European scale.

NUTRI2CYCLE brings together the extensive expertise of leading experts in the field of nutrient cycling. This collaboration originates from the EIP-Focus Group on Nutrient Recycling, closely interacting with the EIP Operational Groups in the individual EU member states. Better nutrient stewardship engaging all actors across the value chain as envisaged in NUTRI2CYCLE will increase the C, N and P recycling rate significantly and will improve the overall sustainability and innovation capacity of European agricultural systems.

<b>GAIN</b>		<b>773330</b>
Title: <b>Green Aquaculture Intensification in Europe</b>		
Call Id: <b>H2020-SFS-2017-2</b>	Topic: <b>SFS-32-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>42 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>6.109.648,75</b>	EU requested grant (€): <b>5.998.795,00</b>	

**Free keywords:** *Ecological intensification, Circular economy, Management optimisation*

### **Abstract:**

GAIN is designed to support the ecological intensification of aquaculture in the European Union (EU) and the European Economic Area (EEA), with the dual objectives of increasing production and competitiveness of the industry, while ensuring sustainability and compliance with EU regulations on food safety and environment. Eco-intensification of European aquaculture is a transdisciplinary challenge that requires the integration of scientific and technical innovations, new policies and economic instruments, as well as the mitigation of social constraints. Successful eco-intensification of aquaculture will provide more and better aquatic products, more jobs, and improve trade balance by reducing imports.

GAIN, besides looking at innovative ways of integrating cultured species, will seek integration with other sectors, in order to promote the implementation of the principles of circular economy in Aquaculture. The GAIN Consortium includes a wide range of complementary expertise and a well blended mix of research institutes and industrial partners, which will ensure the achievement of the following specific objectives:

- (i) Develop and optimize sustainable feeds, without increasing the pressure on land and fish stocks;
- (ii) Add value to cultivation, by means of innovative processes, which turn both by-products and side-streams into valuable secondary materials, thus increasing profits and minimizing the environmental footprint;
- (ii) Improve the management of finfish and shellfish farms, in terms of FCR, fish welfare and reduction of wastes, through the use of sensors, biomarkers, Big Data, IoT (Internet of Things) and predictive mathematical models;
- (iv) Support integrated policies and address current barriers to the implementation of the principles of circular economy in aquatic production.

<b>IMPAQT</b>		<b>774109</b>
Title: <b>Intelligent management system for integrated multi-trophic aquaculture</b>		
Call Id: <b>H2020-SFS-2017-2</b>	Topic: <b>SFS-32-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>6.218.180,00</b>	EU requested grant (€): <b>5.883.180,00</b>	

**Free keywords:** *Integrated Multi-Trophic Aquaculture (IMTA) concept; multi-purpose, multi-sensing and multi-functional monitoring system; IMTA management system; Semantic Aquaculture; Fish and seafood quality*

### **Abstract:**

The Integrated Multi-Trophic Aquaculture (IMTA) is acknowledged as a promising solution for the sustainable development of aquaculture. However, IMTA has been only tested at very small scale in Europe, while management of large-scale IMTA areas remains difficult.

The high level ambition of Impaqt project is to drive a paradigm shift in the EU Industry and its , paving the way to both a more environmentally friendly and more efficient/higher yielding European Industry. To that respect, Impaqt proposes an intelligent management platform for IMTA. Impaqt will develop and deploy novel sensors and data sources, together with smart systems required for long term autonomous monitoring in the field. An advanced IMTA model will be provided which yields spatially explicit information on how the different farm components interact with the environment on the scale of an ecosystem and that can be used for planning decisions by both farmers and regulators. Last but not least, an integrated management system, operating at the scale of an IMTA farm and comprising analytics and decision support functionalities, will be developed to enable enhanced operational decisions for animal welfare, production optimization, environmental protection and food quality assessment.

Impaqt systems and models will be validated in 6 pilots (Scotland, The Netherlands, Ireland, Turkey and China), addressing inland, coastal and offshore aquaculture. Impaqt will demonstrate the eco-intensification of EU aquaculture, by demonstrating the eco-efficiency and the environmental impacts minimized, the socioeconomic benefits and ecosystem services enabled, as well as the transition towards a circular economy business model. Impaqt brings together a considerable range of partners including 14 academic/research organizations, 4 SMEs and 3 large industries, all leaders in their respective fields/business, while aims to effectively transfer the project's results to relevant stakeholders through training activities.

<b>SHui</b>		<b>773903</b>
<b>Title: Soil Hydrology research platform underpinning innovation to manage water scarcity in European and Chinese cropping systems</b>		
Call Id: <b>H2020-SFS-2017-2</b>	Topic: <b>SFS-47-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>9/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>5.562.745,00</b>	EU requested grant (€): <b>4.884.493,75</b>	

**Free keywords:** *Research platform, stakeholders, socioeconomics, ecosystem services, sustainable intensification*

### **Abstract:**

SHui is conceived as a network integrating long-term experiments of its 19 academic and SME partners across different environmental conditions and cropping systems in the EU and China. It provides a platform for research on soil-water resources management under water scarce conditions, to better understand the linkages between agricultural soil hydrology and sustainability and for a systematic assessment of adaptation and mitigation methods. It will develop and implement new strategies to increase water use efficiency and yield, based on sustainable intensification through integrated use of soil and water across different spatial scales. At farm level, this includes digital agriculture solutions integrating in situ and remote sensors and simulation models to exploit an improved understanding of the relationship between crop yield variability and soil hydraulic properties, optimizing circular approaches to re-use water and using waste water sources. These technical approaches are reliant on optimum data utilization and transdisciplinary research with multiple stakeholders. At regional scales, the aggregation of biophysical and socioeconomic variables in dynamic models will evaluate the impact of different policy strategies, to support decision makers to evaluate different scenarios of land-use dynamics, economic context and current and future climate in EU and China, including assessments of water and carbon footprint. SHui will exploit scientific, technological and social innovations by disseminating and communicating these to multiple stakeholders, and implementing novel technological packages from farm to large regional scales. It aims to make a significant contribution to the EU and China Research Agenda for Agriculture in providing food security and optimum use of scarce soil and water resources. Training a cohort of early career scientists in soil conservation and water-saving practices, SHui's legacy will extend beyond the project duration.

<b>SCALIBUR</b>		<b>817788</b>
Title: <b>SCALABLE TECHNOLOGIES FOR BIO-URBAN WASTE RECOVERY</b>		
Call Id: <b>H2020-SFS-2018-1</b>	Topic: <b>CE-SFS-25-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>12.005.922,50</b>	EU requested grant (€): <b>9.999.391,39</b>	

**Free keywords:** *waste collection, organic fraction, bioplastics, proteins, energy, business models, circle economy*

### **Abstract:**

SCALIBUR creates a holistic consortium to cut urban biowaste and replace it with a new production chain of biomaterials, forming a partnership of end users to recover and transform biowaste from three municipalities, namely Madrid (ES), Albano (IT) and Kozani (EL), into value added products. During SCALIBUR a complete study of the quality, logistics and management schemes for municipal solid waste (MSW) and urban sewage sludge (USS) will be performed, to integrate innovative systems and technologies and obtain high-value biobased products. In SCALIBUR, HORECA waste will be transformed to proteins, lipids and chitin from insect rearing, while the organic fraction of MSW will generate biopesticides and bioplastics by high-solid enzymatic hydrolysis followed by fermentation. The resulting biogas from MSW and USS will be upgraded by bioelectrochemical treatment to produce commodity chemicals and bioplastics, such as PHBV. By cutting traditional linear waste management, new business models are created for the resulting circular value chains, applying a sustainable approach to generate new activities and benefits. These new profit sources will be created from a baseline analysis of existing waste management data and business models for each municipality, generating social innovation and favouring the adaptation and uptake of new opportunities along the entire urban value cycle. Continuous tests and development along SCALIBUR will create and fine tune new business models based on innovative processes, and feedback will be obtained from all stakeholders, in order to improve the definition, performance and integration of value, to minimize waste and maximize its benefit. With social engagement strategies, key communities will participate in all aspects of the new value creation, calibrating the returns of the project both for the generation of jobs and improved urban welfare, such as reducing the dependence from outside materials and the environmental impacts.

<b>VALUEWASTE</b>		<b>818312</b>
Title: <b>Unlocking new VALUE from urban bioWASTE</b>		
Call Id: <b>H2020-SFS-2018-1</b>	Topic: <b>CE-SFS-25-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>11/1/2018</b>	Duration: <b>48 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>10.863.876,25</b>	EU requested grant (€): <b>8.375.472,25</b>	

**Free keywords:** *Circular economy, protein, resource efficiency, waste management, new business models, bioeconomy, consumer awareness, citizens engagement, social innovation, critical raw materials*

### **Abstract:**

On average, each European citizen produces approximately 200 kg of municipal biowaste per year, representing between 118 and 138 million tonnes of biowaste annually arising in the EU. The main municipal biowaste management systems currently existing in Europe represent one-way flow systems in which materials and resources are underused, limiting its potential recovery into high-value products. VALUEWASTE proposes an integrated approach in urban biowaste upcycling for the production of high-value biobased products, developing the first complete solution to fully valorise biowaste that can be replicated across Europe. We will implement three new value chains that will use urban biowaste as raw material for its valorisation into high-value end products in a cascading process, generating economic, social and environmental benefits: food & feed proteins and other ingredients, and biobased fertiliser. VALUEWASTE will be developed at two very different European locations, Murcia (ES) and Kalundborg (DK) with the purpose of finding a solution both technical and socially adapted to the different socio-economic contexts existing across Europe. Social initiatives will be created to increase consumer awareness and acceptance of urban biowaste-derived products. End-user products applications and new market opportunities will be demonstrated. Outcomes of the project will contribute to new standardisation, and will be useful information for EU policy makers in terms of waste management and in the adoption of new policies.

<b>WTUP!</b>		<b>818308</b>
Title: <b>Value chains for disruptive transformation of urban biowaste into biobased products in the city context</b>		
Call Id: <b>H2020-SFS-2018-1</b>	Topic: <b>CE-SFS-25-2018</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2019</b>	Duration: <b>42 months</b>	Unit: <b>REA/B/02</b>
Total costs (€): <b>11.664.322,50</b>	EU requested grant (€): <b>9.344.732,63</b>	

**Free keywords:** *urban biowaste; biowaste utilisation;*

### **Abstract:**

WTUP! aims to demonstrate the establishment of new value chains for urban biowaste utilisation for the production of higher value purpose products (i.e. bio-based products, including food and feed ingredients), through a multi-stakeholder approach in line with circular economy. The project will showcase a portfolio of new ‘urban biowaste to bio-based products’ processes starting from different feedstocks i.e. fish and meat waste, spent coffee grounds, household source separated biowaste, used cooking oils, cellulosic waste derived from municipal wastewater and waste treatment plants and sewage sludge. Pilot demonstration will take place in several European cities i.e. Valencia (Spain), London (UK), Alicante (Spain), Prague (Czech Republic), Athens (Greece), L’ Alcudia (Spain), Terni (Italy) and Crete (Greece). The processes will result in the production of food and feed additives, flavours, insect protein, coffee oil, bioethanol, biosolvents, polyhydroxyalkanoates, ethyl lactate, long chain dicarboxylic acid, bioplastics and biochar. End-product characterisation and safety assessment will be implemented. Life Cycle Assessment of the value chains will be conducted to assess their environmental impact. WTUP! will develop and implement a behavioural change approach with citizens and local communities by improving the current perception of citizens and local communities on urban biowaste as a local resource; enhancing the active participation of citizens in the separate collection of urban biowaste; and improving customer acceptance of urban bio-waste derived products. New profitable business models will be developed preparing market entry of the technology solutions demonstrated as well as of the end-products resulting from them. Finally, the project will provide guidance for city managers on adopting new organizational models supporting the valorisation of urban biowaste, as well as evidence-based EU level policy recommendations for decision makers.



<b>ALS2</b>		<b>822464</b>
Title: <b>AcidLess Separation 2.0</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>7/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.875.250,00</b>	EU requested grant (€): <b>1.312.675,00</b>	

**Free keywords:** *Precious metals refining, critical raw materials, circular economy, supply chain, gold, silver, platinum, PGM, WEEEs, metal recovery, metal separation, metallurgy*

### **Abstract:**

The ALS2.0 project will develop an innovative chemical-less separation technology for the refining of gold and other precious metals.

The final goal of the project is to eliminate the obsolete chemicals and electrochemical processes used in gold prerefining since 1883.

The original AcidLess Separation technology developed by IKOI (currently at TRL6) permits to obtain an effective separation of gold from precious metals alloys without using any chemicals. The separation of precious metals from an alloy is permitted thanks to the differential evaporation and condensation of metals in nearly vacuum conditions. The raw materials are heated via an electrical inducted crucible while the components separation is permitted by a special filter. Behind the absence of chemicals, this technology permits a very fine control of the process parameters that can be managed via a digital interface.

This introduces a 100% chemical free precious metals pre-refining process in a market worth hundred billions of euro. The application of ALS at large-scale is therefore expected to bring several impacts on the entire precious metals value chain thus reducing the capital

investment, operative costs and also lowering the environmental impacts of refining. Further, the low-cost viability of AcidLess separation equipment will foster the development of a circular supply chain with a more efficient recyclability of precious metals from waste materials and allowing SMEs to access this market. ALS technology is also suitable of further implementations.

Scope of the projects is exactly to implement a 2.0 version of the AcidLess separation concept. The aims are to introduce advanced automation functionalities, permit a more effective separation of metals and improve the process parameters for the recovery of precious metals from electronic waste alloys (WEEEs) or other valuable metals like Platinum Group Metals (PGMs) considered as critical raw materials.

<b>AQUOLIVE</b>		<b>830202</b>
Title: <b>Improving Aquaculture production with bioactives from olive oil processing by-products.</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.492.182,25</b>	EU requested grant (€): <b>1.744.527,57</b>	

**Free keywords:** *Aquaculture, fish feeding, natural extracts, circular bio-economy*

### **Abstract:**

Natac Biotech S.L. is the R&D division of a group of 8 companies (Natac Group S.L.) with headquarters in Spain and international presence in EU, LATAM and the USA. Our group is a leading firm of the natural extracts sector and we have developed and operated the first olive biorefinery at a global level. Thanks to this, we can obtain high added value bioactive ingredients from residues of olive oil production (circular bio-economy) at industrial quantities and very competitive prices.

In our effort to continue innovating and expanding, the AQUOLIVE project is now the most strategic project for us, as a way to become a leading player of the animal nutrition market. The AQUOLIVE project is aimed at offering the aquaculture sector a high-performance feed additive based on our patented formulation of bioactive phytochemicals obtained from olive oil production by-products (production method also patented). This solution will help Fish farmers to increase their productivity and profitability, while reducing the use of hazardous antimicrobial chemicals in intensive aquaculture practices.

Thanks to the clear benefits AQUOLIVE will bring to fish farmers and the industry need for this type of solution, we see in the AQUOLIVE project a clear investment opportunity, in which we seek entering the fast-growing aquaculture feed market. This market was value globally at €156 Billion in 2015 and project to €209 Billion by 2019. More precisely, AQUOLIVE will target the salmon feed market, with a global production of 7 MTON in 2017 and that accounts for a total of 11% share of the total production of aquafeed products globally. In this growing market scenario, our 3-years business plan after this Phase 2 project will mean a 3-years cumulative cash flow of €9.02 Million meaning a 3-years after-tax ROI of 362% for a total investment of €2.49 Million in the Phase 2 project (€1.74 M of EU contribution).

<b>BlockPLA</b>		<b>811532</b>
Title: <b>Innovative nanostructured PLA polymer to expand suitable uses of biodegradable packaging</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>5/1/2018</b>	Duration: <b>28 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.413.573,75</b>	EU requested grant (€): <b>989.501,63</b>	

**Free keywords:** *blue ocean, high growth business, disruptive innovation, business innovation*

### **Abstract:**

Bioplastics are an essential part of our efforts to reduce pollution and increase sustainability. Of these, the most ecoefficient bioplastic is PLA as it is biodegradable, requires 50% less energy and produces 10 times less emissions in comparison to standard thermoplastics like PET and PP. Furthermore, as it does not need to be recycled, it not only saves the energy and cost involved, but also the fact that only a fraction of the plastic produced reaches the recycling plant, the rest ending up in landfill or the sea.

However, biodegradable plastics only make up approximately 0.2% of plastics produced in 2014. This is because conventional PLA has certain technical limitations which reduce the number of marketable applications where it can be used. For example, it cannot compete with standard thermoplastic grades used in packaging applications (such as PET and PE), in terms of oxygen and water vapour barrier and thermal properties, which are the most demanded properties for packaging requirements.

Advanced & Functional Technologies for Biocomposites S.L (ADBIOCOMPOSITES) has developed an innovative, biodegradable PLA grade named BlockPLA which has enhanced technical properties: oxygen and water vapour barrier, thermal stability, transparency and flexibility. BlockPLA solves the drawbacks that PLA currently shows for packaging applications. In addition, BlockPLA has food contact approval and requires less energy to be produced. Production costs are slightly lower than conventional PLA. Therefore, BlockPLA is a real biodegradable alternative to PET, PP and PLA for packaging applications in the food and beverage industry, pharmaceutical and biomedical industry, home care packaging, cosmetics industry and others.

ADBIOCOMPOSITES aims to use the SME instrument to scale up the production of BlockPLA and bring it to the packaging market, generating 37 new jobs and above €10 million revenues.

<b>Branbox</b>		<b>849052</b>
Title: <b>Biodegradable and waterproof take-away containers made of wheat bran</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>1/1/2019</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.197.250,00</b>	EU requested grant (€): <b>2.238.075,00</b>	

**Free keywords:****Abstract:**

The plastic's invasion on our planet have become our every day's life. The amount of plastics is immense and starts to play a significant role on World's ecosystem. Most of the plastics are the packages. The problem has been addressed by some biodegradable solutions such as bioplastic, paper or even bamboo containers. However, they still need at least half a year to degrade. From the other side, there is also immense amount of wheat bran which is a side product of the milling industry. The only use of that bran is feed for animals, otherwise it becomes waste in a few weeks. Hence, its efficient disposal is problematic, and - in result - bran has very low market value. Biotrem's mission is to solve both the problems at the same time. We invented the proprietary technology which allows to use the wheat bran to make the containers. In this project we introduce water resistant and edible take-away food containers, which are biodegradable within 30 days - Branboxes. Currently, the major issue for the containers is the water resistance and biodegradability which is a great challenge to achieve at the same time in the single product. Bringing the product to the market at the small scale will not give the desired environmental results. Hence, we will introduce the scaled-up production (by licensing) and commercialization.

The market for such biodegradable packaging is worth at the moment €11B and is quickly growing at the CAGR of 16%, and is going to reach €20B within next decade.

Our end-users (each of us) will benefit from the plastic-free environment. Our customers – distributors, food chains and packaging producers, and mills will benefit from the new business opportunities. Our extensive distribution network will help us to fully exploit opportunities to commercialize the Branbox.

The prototype was already tested by big players on the market, and now we apply for SMEI funding to accelerate full scale commercialisation of the Branbox.

<b>CHBTECH</b>		<b>848596</b>
<b>Title: Sulphur-free production method for non-food biopolymers (dissolving pulp, hemicellulose and lignin)</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.061.250,00</b>	EU requested grant (€): <b>2.142.875,00</b>	

**Free keywords:** *dissolving pulp, hemicellulose, lignin, wood fractions, bio-based materials, nano-cellulose, renewable materials, textile fibers, bio-based composites, bio-based plastics*

### **Abstract:**

Wood-based biomass is one of the richest sources of bio-chemicals on Earth. Of the main constituents of wood – cellulose (40-50%), hemicellulose (20-30%) and lignin (20-30%) – mainly cellulose/pulp is utilised today. Rest of the biomass is disposed as waste. The main obstacle for wider use and further development of these hemicellulose and lignin is the lack of availability. Furthermore, current fractionation methods (based on Kraft process) use sulphur, which destroys the material properties of valuable bio-chemicals.

CH-Bioforce Oy has developed a sulphur-free biomass fractionation technology, which allows the extraction of all three wood-based biomass constituents in an economically sound way, with extremely high purity, and in industrial scale. Technology is flexible in size, and can utilize practically any kind of wood as raw material, e.g., birch, pine, spruce, eucalyptus, even wheat straw and bagasse. The process works well even with low quality wood, such as sawdust and logging residues, which are not suitable for commonly used pulping processes.

CH-Bioforce's technology offers a renewable and cost-competitive option to replace fossil and food-based raw materials in a wide variety of applications, e.g in textiles, chemicals, and plastics. Company has conducted an intensive material testing and evaluation for dissolving pulp, polymeric hemicellulose and sulphur-free lignin produced by their pilot plants, and has already attracted several global corporations in energy, pulp&paper, and chemical industries. Business model for CH-Bioforce is to licence its technology to companies, who aim to produce and sell bio-based raw materials. Aim of this proposed project is to develop CH-Bioforce's technology from current TRL-7 to TRL-9, to prepare the business scale up, and to convince the first customer to make the investment decision by the end of the project.

<b>Circlenergy</b>		<b>848757</b>
<b>Title: Production of renewable methanol from captured emissions and renewable energy sources, for its utilisation for clean fuel production and green consumer goods</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>1/1/2019</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.610.543,75</b>	EU requested grant (€): <b>1.827.380,63</b>	

**Free keywords:** *energy, green fuel, methanol, synthetic, advanced fuels, carbon dioxide capture, CO<sub>2</sub>, electrolisis, ethanol, biofuel competition, renewable energies, curtailment, chemical building block, blended fuel*

### **Abstract:**

Methanol, needed in industry as a chemical building block (plastics, solvents, additives) and as transportation fuel, has been traditionally produced from coal or natural gas, dependent on fossil fuels (limited supply), contaminating land (mining, drilling) and emitting CO<sub>2</sub> to the atmosphere (global warming effect). Nowadays, crop-based biofuels are also used with the same purposes, but consume huge water and land resources for their production.

Carbon Recycling International (CRI), founded in 2006 in Iceland, produces renewable methanol (currently 4 kt/year in the George Olah plant) from industrial CO<sub>2</sub> emissions and Renewable Energy Sources (RES), through a novel process of clean fuel production (Vulcanol®). This proprietary technology is called Emissions-to-Liquids (ETL) and is certified ISCC Plus by the International Sustainability and Carbon Certification system. While conventional production of methanol emits up to 4 t CO<sub>2</sub>/t methanol, our ETL plant fights global warming by consuming 1.4 t CO<sub>2</sub>/t of Vulcanol® produced and requires approximately 1500 times less land and up to 15,000 less water than crop based biofuel, eradicating ethical concerns about competition between biofuels and human food production. Vulcanol® is an efficient energy carrier that can be used to easily store and transport off-peak renewable energy, stabilizing the power grid and supporting expansion of RES. ETL helps to fulfil stricter EU regulations regarding the use of advanced renewable fuels and RES; improves air quality in industrial areas, thus, health of their population and employees and supports employment creation (25 skilled jobs per ETL plant). During this phase 2, CRI aims to a) scale up the technology and adapt ETL plants to economically operate with RES, b) to attract investment to build and operate ETL plants and c) to close distribution agreements for the produced Vulcanol®, which by 2024 will provide an annual profit of €95.4 million and an 8.2 years payback.

<b>EcoMDF</b>		<b>822720</b>
Title: <b>Bringing EcoMDF to the market</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2018</b>	Duration: <b>18 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.703.906,25</b>	EU requested grant (€): <b>1.192.734,00</b>	

**Free keywords:****Abstract:**

MDF is used in large quantities by the construction industries, 2.5 million m<sup>3</sup> in 2015, but it is currently unrecyclable. We at Biprocel have developed an eco-sustainable, functional and design material, called EcoMDF that can be used as a direct substitute for MDF in construction. It is made from cellulosic waste generated by the paper industry that would otherwise be sent to landfill or burnt.

EcoMDF is 100% recyclable. When its use has come to an end, it can be recycled an unlimited number of times within the same manufacturing process, hence assuring its sustainability throughout its whole life-cycle (cradle-to-cradle). This is particularly relevant for green buildings. What is more, it has excellent technical properties. EcoMDF is water resistant, flame resistant, a natural sound insulator and durable. Having successfully completed a feasibility study, we will now use the SME instrument phase 2 to scale up production of EcoMDF to an industrial level and to demonstrate the characteristics of the new material to the construction industry. After the project, we will establish EcoMDF production facilities as joint ventures with paper mills. This will allow us to increase our production capacity and our impact, reaching expected revenues of 37M€ by 2025, with 3 production facilities employing 50 staff.

<b>FlexPack2Circle</b>		<b>830508</b>
Title: <b>Transfer of Multimaterial Flexible Packaging to Circular Economy</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>12/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.845.520,00</b>	EU requested grant (€): <b>1.991.864,00</b>	

**Free keywords:** *recycling, circular economy, flexible packaging*

### **Abstract:**

On January 16, 2018 the first-ever European Strategy for Plastics in a Circular Economy has been published. The Commission strives for solutions to get all plastic packaging recyclable by 2030. FlexPack2Circle is a timely action to address the EU directives to stop incineration and landfilling and to recover secondary raw materials. Saperatec is worldwide the first company offering a holistic approach to transfer flexible packaging waste (FlexPack) into the circular economy by a breakthrough technology to recover ALL materials of multimaterial laminates. The patented technology separates PE/aluminum/PET composites in a gentle way without material loss receiving high purity materials. For its innovative approach Saperatec has been awarded with several prizes, such as the Greentech award, Europe's most renowned environmental and business prize. During FlexPack2Circle the pilot line proven processes will be transferred to industrial scale resulting in a 1st unique recycling plant with a capacity of 18.000 t/a. The business and commercialisation plans are finalized. On short-term Saperatec focuses on the recycling of post-industrial waste from the packaging industry, the market of which is with 400.000 t/a large enough to start the business. More than 200% of the annual yearly plant capacity are already secured by LOIs from potential infeed and outbound customers. The Saperatec business is high risk due to the large capital investments needed. However, currently Saperatec is in the final phase of term sheet preparation with the investors. With the support of the European commission Saperatec is able to accelerate the upscaling and to keep R&D and pilot line activities on high level to further upgrade the material quality, to develop a new packaging design with compatible adhesives and to expand the infeed package portfolio to postconsumer waste. Moreover, FlexPack2Circle is a great chance to extend the Europe- and worldwide contacts to potential customers.



<b>freeCr6plat</b>		<b>829535</b>
Title: <b>Chrome plating without toxic Cr(VI). An ecofriendly electroplating for automotive plastic parts.</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>9/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.764.410,00</b>	EU requested grant (€): <b>1.235.087,00</b>	

**Free keywords:** *electroplating, chromium, plastics, metallisation*

### **Abstract:**

Electroplating is one of the most advanced techniques to create plated plastics with wide industrial applications. However, current electroplating techniques use hexavalent chromium (Cr [VI]) as etching agent. Hexavalent chromium has been proved to have toxic, mutagenic and cancerogenic effects for human health. As a result, the European Union has included this compound within the list of restricted substances under the Directive 76/769/EEC (REACH Directive) and banned its use from 2017 onwards, while strengthening environmental, health and safety legislations on hazardous waste. This has left the plating industry in a very delicate position with dark future prospects unless new solutions that are both effective and environmentally friendly are discovered. freeCr6plat is an advanced and demonstrated technology that applies a patented Molecular Self Assembly (SAM) technique for 'direct metallization' of a wide variety of plastic surfaces, eliminating the use of Cr (VI) and simplifying the number of steps in the plating process. This allows to reduce the use of chemicals (-30%), rinsing water inputs and wastewater generation and associated treatment (-35%), and energy consumption (-50%), resulting in environmental performance and time (-20%) optimization, while reducing overall plating and wastewater treatment costs by 20% compared to the conventional system. Besides, this technique maintains adhesion promotion within the process, resulting in high quality finishing results comparable to the conventional process. freeCr6plat project aims to reach short term market uptake for automotive applications by adapting the process to automotive plating lines, obtaining specific certifications required by the sector and strengthening our environmental awareness, commercial and networking strategy. We expect Cr6-FreePlat to reach a market penetration from 6% to 16% in five years, with M€105.6 cumulative turnover and M€ 21.1 profits, resulting in a ROI of 8.6.

<b>FRESHDETECT</b>		<b>822732</b>
Title: <b>FRESHDETECT – food safety – fast and reliable</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.972.337,50</b>	EU requested grant (€): <b>1.380.636,25</b>	

**Free keywords:****Abstract:**

600 million (about 1 in 10 people) in the world fall ill after consuming bacteria contaminated food. Of these, 420,000 people die, including 125 000 children under the age of 5 years.

Worldwide approximately 1/3 of all food produced is lost or wasted, requiring cropland area the size of China and being responsible for 8% of all global Greenhouse Gas Emissions. In the EU, every year 88 million tonnes of food are wasted related with costs estimated to be 143 billion euros. FreshDetect GmbH aims to contribute to a solution of these problems with the first mobile handheld device developed for rapid determination of the microbiological quality of food (currently meat products). The FreshDetect device enables non-invasive microbiological testing without additional operational or maintenance costs. For the first time, the handheld allows hygiene monitoring through the complete meat production process and creates a new dimension of food safety. Moreover, the FreshDetect technology offers a so far unmatched level of food process control allowing an optimization of the food production and minimizing food waste.

The current determination of total microbial count in laboratories outlined by §64 of the LFGB (German Food and Feed Code) takes about 72 hours to properly determine contamination. This renders impossible any process control that is based on food contamination. The FreshDetect handheld device needs only 5-10 sec. for the same process, is much less costly and does not need scientific trained operators or lab technician.

Starting with pork meat and having analysed the top 10 food processing European countries, FreshDetect's market potential is 284,000 devices with a market volume of € 3.5 billion. The target users are slaughterhouses, cutting plants, meat processing companies, retailers, wholesalers and butchers. The goal of the project is to bring our current prototype (TRL7) to business success with commercialization to these users.

<b>FRESHTRAY</b>		<b>812001</b>
Title: <b>New multi-active cardboard packaging solution to extend the shelf-life of fresh fruits and vegetables by 40%.</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2018</b>	Duration: <b>20 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>838.750,00</b>	EU requested grant (€): <b>587.125,00</b>	

**Free keywords:** *multi-active packaging, nanotechnology, essential oils,  $\alpha$ -cyclodextrins,  $\beta$ -cyclodextrins, food waste, cardboard, corrugated cardboard, shelf-life, fresh fruits and vegetables*

### **Abstract:**

In the EU28, 5% of the fresh fruits and vegetables (FF&V) yearly traded never make it to the supermarket shelves due to spoilage. This means a waste of 3.9 Mt of food and the loss of 8,970 M€. FF&V spoilage is caused by the contamination of micro-organisms activity (bacteria and fungi) and the F&V's release of ethylene gas.

We have developed FreshTray a cost-effective solution to significantly diminish FF&V discards in Europe. FreshTray is a multi-active cardboard packaging to extend the shelf-life of fresh FF&V by +40%. It consists on the application of a patented multi-active coating – made of natural substances – over the inner surface of the cardboard. This coating has proved antimicrobial, antioxidant and ethylene scavenger functions over the F&V contained in the packaging. We have successfully tested the solution in tomato and pepper.

Besides its effectiveness and the price, there are two key additional advantages of our solution against our competitors: (i) easy implementation by users and (ii) versatility of the solution that can be adapted to any FF&V company need.

F&V companies will be willing to adopt our solution, since it (i) will provide them more flexibility and bargaining power, (ii) will increase their competitiveness against regular products, (iii) will increase their benefits and (iv) will loss on average 50% less of F&V along the supply chain.

In our company SAECO – cardboard packaging manufacturers since 1974 – we enjoy a privilege location close to more than 600 target users (some of them are current customers), since we are based in the south-east of Spain, a region known as the “European’s orchard”. FreshTray will be first launched in Spain and in further stages of commercialization we will reach other EU28 countries.

This project will give us the possibility to add value to our products and to open new markets. We will upgrade from selling cardboard, to market advanced multi-active packaging solutions to F&V industries.

<b>Grass Paper</b>		<b>829282</b>
Title: <b>Grass Fibre as raw material for innovative Grass Paper products: the new economic and ecological resource for the European paper industry</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.757.500,00</b>	EU requested grant (€): <b>1.930.250,00</b>	

**Free keywords:** *grass, Grass Paper, Grass Fibre, alternative fibre source, virgin fibre, pulp, non-wood paper, eco-friendly, forest protection, paper revolution, packaging*

### **Abstract:**

With GRASPAP Grass Fibre Creapaper introduces a highly innovative, sustainable and cost-efficient alternative raw material for the European paper industry. About half of the 400 million tonnes paper produced worldwide every year are based on wood pulp. This consumes about 40% of the global industrial wood harvest. Moreover, transport and processing of the wood consume a lot of water, chemicals and energy. Costs and impact to nature are severe. Creapaper provides an unique solution to this problems by introducing Grass Fibres, produced by a novel patented mechanical process, as a new resource for the paper industry. This innovative material will reduce the raw material costs of paper mills by 50-70 % (compared to wood pulp) and is compatible to their standard production equipment. Grass Paper products made from these fibres are free of noxious substances, printable and have a distinctive sustainable, yet premium appearance. They are therefore very attractive for food and non-food packaging, tissue and print media applications. Several awards in the packaging industry and first orders from large, well-known brands confirm these USPs of Grass Paper products. While Creapaper's primary customers are paper mills, also brand owners and retailers will be addressed. This will increase the demand for Grass Paper and Grass Fibres rapidly and allow a fast scale-up in the European key markets. According to independent experts, the grass fibre material has the potential to become the paper industry's third raw material source besides wood pulp and waste-paper. Creapaper currently installs the first grass fibre production line and will transfer the stationary production process into a versatile mobile solution during this project. This will decrease the dependence on weather conditions during the grass harvesting as well as allow the extraction and commercialisation of vegan proteins from the grass in the future, making the whole process even more sustainable and cost-efficient.

<b>H2S Analyzer</b>		<b>849704</b>
Title: <b>Market launch of an autonomous and online based hydrogen sulfide (H2S) Analyzer for the implementation of IIoT - digitalization of the sewer system</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.497.500,00</b>	EU requested grant (€): <b>1.748.250,00</b>	

**Free keywords:** *water-analytical device, H2S Analyzer, hydrogen sulphide, groundwater protection, sulphuric acid corrosion, waste water industry, waste water infrastructure, IIoT, digitalization waste water*

### **Abstract:**

There is a huge environmental problem in our sewers: hydrogen sulphide (H<sub>2</sub>S). H<sub>2</sub>S causes massive ecological problems and economic damage, which arise to more than €250 bn per year in Europe. Currently, high levels of chemicals such as Nutriox are used in the sewer to eliminate H<sub>2</sub>S. However, the use of chemicals could be drastically reduced if measures are taken at the point of origin, the waste water collection point. This requires an autonomous measuring method that can detect even the smallest H<sub>2</sub>S concentrations on site and online. We as ECH have developed such an Analyzer. The H<sub>2</sub>S Analyzer (TRL 7) is based on a new, patented measurement method - gas extraction with coupled detection. A higher-level control system connects several H<sub>2</sub>S Analyzer with each other and always determines the required quantities of waste water chemicals precisely on the basis of the measurement results. We make the waste water industry digital with this technology and enable a complete real-time monitoring of the whole system. Target customers are municipal and private companies in the wastewater industry, but also contract laboratories (market volume Europe: €1.5 bn). Our advantages are:

#### 1. Automate online measurements

- H<sub>2</sub>S can be measured autonomously at various points in the wastewater pipe without personnel.
- real-time Monitoring and targeted influencing

#### 2. Exact and reproducible measuring method

- Measurement of H<sub>2</sub>S occurrences from 0.01 ppm

#### 3. Environmentally friendly

- Proven significant reduction of at least 40-50% in the use of chemicals to treat H<sub>2</sub>S
- Increased service life wastewater system to 100 years (currently 10-60)

#### 4. Economic viability

- Decreasing costs for replacement investments in wastewater infrastructure

## CE relevant projects - Horizon 2020 calls 2016-2018

- Cost savings of >40%

The H<sub>2</sub>S analyzer is seen as a key factor in ECH and leads to significant increase of sales and employees and, in the long term, a reduction in the use of chemicals in the wastewater industry. H<sub>2</sub>S Analyzer - Good for you and the Environment.

<b>HTCycle</b>		<b>823124</b>
Title: <b>Sewage sludge reuse with Phosphate recovery and heavy metal absorption with an innovative HTC technology.</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>9/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.962.000,00</b>	EU requested grant (€): <b>1.373.400,00</b>	

**Free keywords:** *Sewage sludge treatment and reuse, hydrothermal carbonization, heavy metal removal, phosphate recovery, resource efficiency, eco-innovation*

### **Abstract:**

Efficient municipal waste-water treatment, such as the systems currently in place in most European municipalities, produces vast amounts of sewage sludge. The latest data collected show a yearly production of 9.637 thousands of tons in the EU28 countries. Sludge treatment issues are often neglected in comparison with water-related parameters which results in serious technical difficulties and highly expensive disposal methods. As a result, an energy efficient, environmentally sound and economically viable process for sludge disposal and reuse of valuable resources e.g. phosphorus hardly exists.

The most common disposal methods for sludge are spreading on agricultural soil, composting and incineration. Land-filling has been long banned, the use as fertilizer, although very moderate in costs, is being banned in many regions due to concerns about contamination of soils with heavy metals and endocrine disruptive compounds. Composting raises the same concerns, and it is a labour-intensive and unsafe process, which leaves incineration as the most used option, albeit an expensive and not effective one. Incineration entails the highest costs (80-110 € /ton), but is also considered the safest disposal method and is fast growing and widely adopted. It presents also technical difficulties, such as the low overall efficiency of the process, the huge logistic efforts required to transport the sludge to the incineration plants, or the disposal of the ashes after the sludge has been incinerated.

In this situation, our company, AVA has the objective to demonstrate and commercialize our proprietary technology for hydrothermal carbonization (HTC) of sewage sludge, showing clearly technical and economic ad-vantages against the current sludge incineration method. We aim to increase the amount of sludge converted into high value products such as fuel, activated carbons for water treatment, recovered phosphorus, soil remediation material, carbon sequestration schemes and other applications. The HTCycle process turns the present sewage sludge disposal (incineration) from a costly process into an income-generating activity.

<b>iMEC</b>		<b>822134</b>
<b>Title: Real-time assessment of toxic sulphide in wastewater – market maturation of an Industrial Micro Electrochemical Cell</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.181.250,00</b>	EU requested grant (€): <b>1.526.875,00</b>	

**Free keywords:** *H2S electrochemical sensor, H2S management, Sewer corrosion, Wastewater management, Asset management, toxic gas*

### **Abstract:**

The number one cause influencing the lifetime of wastewater (WW) industry assets and hampering the pervasive implementation of a High Performing Asset Management (HPAM) strategy is the hydrogen sulphide (H2S) occurrence and the lack of tools to manage it.

The H2S prevalence is highly problematic, because it is highly toxic, entails odour nuisances and it leads to corrosion and collapse of sewer systems, pumps and other equipment. The annual worldwide cost of asset corrosion in WW industry exceed €1.4 trillion and billions are overspent to handle H2S consequences. This industry spends 88.4% of its budget in asset management.

Existing solutions measure H2S in the gas phase, however, these sensors underestimate the H2S levels leading to its inefficient management. The alternative is to add neutralization agents in excess, which entails an unsustainable economic burden and does not solve the problem regarding the lack of data to implement a HPAM strategy.

To target this market need, Unisense A/S developed and patented a disruptive, auto-calibrated industrial Micro Electrochemical Cell sensor (iMEC) for measuring dissolved H2S that can save up to €150,000 in chemical expenses per WW utility, while the savings resulting from enabling a HPAM strategy can lead to €0.5M – €1.3M savings in an average WW utility

In an initial phase, we expect that most of iMEC sold will be used as feedback for dosing pumps or as tool to diagnose H2S problems. As the market confidence increases, iMEC will be increasingly purchased to monitoring the overall state of the network enabling a HPAM approach.

Besides giving to Unisense a technological leap with the consequent competitive advantage and export potential, the iMEC project will assist Europe in achieving objectives for environmental and quality of life policy. Overall, this opens an important economic opportunity for Unisense (expecting €18M in cumulative profits, 5 years' post-project) and leads to a more sustainable WW industry.



<b>Is it fresh</b>		<b>812242</b>
Title: <b>Is it fresh. Keeping it fresh digitally</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.924.510,00</b>	EU requested grant (€): <b>1.347.157,00</b>	

**Free keywords:** *Food waste, smart-packaging, IoT*

### **Abstract:**

Roughly 1/3 of produced food is wasted globally. A significant amount of this waste is a result of inefficient logistics of food and perishables in general. In addition to the issue of food waste, the food industry around the globe is regularly hit by various food scandals, also often caused by improper storage or logistics.

For example, cold chain is often broken in transit by transportation companies to save costs by switching off refrigeration.

To overcome this issue, one requires low-cost tracking capabilities to enable all the participants along the food value chain, from manufacturers to logistic companies, retailers, and customers, to monitor the product freshness. Among the monitored parameters, there shall be not only manufacturing date and the temperature but also additional biochemical parameters providing the product's freshness status in real time. Nowadays, a product often spends most of its lifetime in transit or storage, actual monitoring during these stages is still missing though.

Is it fresh wireless sensor technology will enable affordable food freshness data on a single packaging unit scale. Every package will be able to report its freshness status for the product inside in real time. This will provide each partner in the food value chain with unique and wirelessly accessible data about product's current freshness status as well as origin and transport logs. In addition, it will give the end customer a valuable insight into the freshness status of their food products, for example, by addressing the sensors via a fridge or smart shelf. We have a contract in place with The willingness to pay is guaranteed by a contract with a major packaging company (you are using their products on a daily basis more likely than not), in which after our product is market ready, they are obliged to equip 5% of their production with freshtags – up to 10% if they want to keep us in exclusivity. This would mean up to 3 billion units of freshtags annually.

<b>MOGU floor</b>		<b>823392</b>
Title: <b>Natural-Grown Flooring for Circular Buildings</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.147.570,00</b>	EU requested grant (€): <b>1.503.299,00</b>	

**Free keywords:** *Circular economy, Bio-economy, Mycology, Green building*

### **Abstract:**

The green building market is anticipated to be among the fastest growing industries worldwide. Driven by citizen and building owner demand for sustainability and operational cost reduction, the green building market is, indeed, doubling every three years. To satisfy the market demand for sustainable and functional building solutions we developed MOGU floor, a disruptive product for the resilient flooring market. MOGU floor is a 100% biobased tile made from agricultural or industrial residual biomass. It outperforms the competing solutions already available on the market in terms of safety, fire resistance, thermal insulation, shock and noise absorption. The entire lifecycle of MOGU floor, including production, installation, maintenance and disposal, represents a new circular value chain for the building market, highly sustainable and profitable. Moreover MOGU floor has a distinctive and attractive design and tactile feeling that make it a perfect solution for luxury living environments at a target price typical of inferior market segments. To take advantage of all the unique selling points of MOGU floor we developed a market strategy aiming at quickly gain international market share and become in the mid-term a reference player for innovation, sustainability and design in the flooring market. To achieve such result, we elaborated a number of actions in collaboration with highly influential stakeholder of the building market to increase customer awareness and demand for MOGU floor. Now we are applying to the SME instrument ph2 as part of our fundraising strategy to finalize the development of the first MOGU floor collection and accelerate its market uptake. During the 24 months workplan we elaborated we are going to certify MOGU floor with strategic green labels, upscale our production capacity, reinforce our IPR and market positioning and start the b2b collaborations to promote, commercialize and distribute MOGU floor.

<b>REBICOM</b>		<b>849533</b>
Title: <b>New innovative REcyclable and Blo-COMpostable film for flexible packaging</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>18 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.051.336,25</b>	EU requested grant (€): <b>1.435.935,38</b>	

**Free keywords:** *Advanced materials, compostable, biodegradable*

### **Abstract:**

Plastics are an iconic example of the traditional, linear economic model, based on a 'take- make-consume-throw away' pattern, flexible bags, sachets, packaging, etc. made of plastic film are daily used by consumers in a single use in several sectors like post mail. The increasing environmental concern/preferences are driving the demand for biodegradable and compostable films, but existing solutions hardly can cover the business need. REBICOM® is a new innovative reusable, recyclable and bio-compostable film not using agricultural production but biodegradable and compostable 100% aerobically plastic biodegrade in less than 180 days, becoming water, humus and CO<sub>2</sub> in an industrial, environmental and economic global competitiveness (Asia). Polymers from vegetal origin present technical difficulties to be transformed into films in high capacity plants with bi-oriented film lines production, which are the most industrially efficient. This industrial process requires that the polymers used have high resistance to the stretching and the temperature, which do not possess the vegetal origin films and that raises its price (50% higher) and higher density (i.e. PLA-1,24 gr/cm<sup>3</sup> vs PP-0,90), which significantly reduces the performance of the film not economically viable for the industry and increasing by 38% the weight of plastic material used for the application. Conclusions from a deep market study indicates that this is our market opportunity. IFS team of 35 people (engineers, production, business developers...), has patented and demonstrated REBICOM® at one of the main customer manufacturers, with significant better properties than competing solutions (15% weight, 14% thickness and 5% production costs reduction), and better price (3,15€/Kg). REBICOM® has a total addressable market potential of €1.000M in flexible packaging segment, growing the company EBITDA from 10% to 29% in 5 years, creating 104 jobs and contributing to enhance 2030 EU targets.

<b>REGMAX</b>		<b>811514</b>
Title: <b>An innovative and sustainable process for reducing the environmental impact of stainless steel production, enabling impressive recovery rates and cost savings.</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.525.316,25</b>	EU requested grant (€): <b>2.467.721,38</b>	

**Free keywords:** *acid regeneration, waste acid, sustainable steel production, steel pickling, resource efficiency*

### **Abstract:**

Pickling is a metal surface treatment used in the stainless steel industry to remove impurities from steel and obtain optimal services. Every hour, approximately 300,000 litres of acid are used in pickling, resulting in huge quantities of waste acid.

Alongside the damaging environmental impact, steel pickling works suffer from high operational costs to manage the disposal or regeneration of said acid. SUSTEC has developed the REGMAX system, a new acid regeneration process to provide a sustainable low-cost solution to this problem. The REGMAX system increases acid regeneration rate to over 97% and reduces operational costs by up to 91%. Within the overall project, SUSTEC intends to scale-up regeneration capacity; and commission a pilot plant for a large scale demonstration and validation of the technology in industrial conditions.

<b>SensaSticker</b>		<b>829943</b>
Title: <b>Improving the global cold chain with cutting-edge temperature monitoring solution</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.004.690,00</b>	EU requested grant (€): <b>1.403.283,00</b>	

**Free keywords:** *Food Cold Chain; Cold Chain Temperature Monitoring, RFID technology; Embedded temperature logger in printed stickers; automatic, customizable, transparent and low-cost monitoring of shipments.*

### **Abstract:**

The aim of SensaSticker is to mature, validate and commercialise the first end-to-end cold chain monitoring platform, based on our disruptive Radio Frequency Identification Temperature Logger Sticker (SensaSticker). Our commercial focus is on the global chilled and frozen food sector, to deliver the first ultra low-cost, disposable, fully automatic and customizable temperature logger in the market.

One third of the food produced for human consumption globally, 1.3bn tonnes per year, is lost or wasted. In the EU alone, estimated food losses due to poor cold chain management are of 8.8 million tonnes per year, equivalent to 14.3 billion euros (10% of total EU food wastage, 24.9 million tonnes of CO2 equivalent).

SensaSticker is a disposable sticker with an integrated temperature logger. It will be 10x cheaper, 7x thinner and 3x lighter than today's best performing loggers and will allow end-users to carry out a customized follow-up of each individual food packaging, thereby eliminating 30-40% of their economic losses, with ROI within 1 year after its implementation.

SensaSticker commercial viability demands further technology and market maturation activities. The project management team overseeing the project implementation has a proven track record in managing and scaling high-tech companies. Through the Phase 2 project we will pilot our solution and achieve reference from leading, global companies able to establish SensaSticker as an industry standard.

Global cold chain market has an expected CAGR of 7% towards 2022 for a total value of €249bn, with cold chain temperature monitoring systems worth €3.3bn. Through this project we will generate €367m in revenues, €150m in accumulated profits and 219 full time employments within 5 years after SensaSticker market launch. SensaSticker roll-out will reduce our end-users' costs for a total value of €3.38bn and will contribute to achieve the EU2020 strategy and EU2050 environment targets.

<b>SMILE</b>		<b>812411</b>
Title: <b>A smile in return</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.705.375,00</b>	EU requested grant (€): <b>1.893.726,50</b>	

**Free keywords:** *Waste, reverse supply chain, e-commerce returns, retail, big data*

### **Abstract:**

The European e-commerce market amounts to ~80 million purchases per day. About 15% of purchased products do not live up to consumers' expectations and are returned to the vendor. Whether in perfect condition or not, their status as returned product makes items suddenly worth a lot less. What a waste! Not only to e-tailers, who typically lose +80% of the value of returned products, but also to the environment, which is impacted by 4 billion pounds of disposed products and 11 million metric tons of carbon emissions. The problem is expected to grow as ecommerce is gaining market share fast (13.3% growth in 2016).

BuyBay helps to solve the problem. The tech-company is developing a data-driven solution that revolutionises the management, processing and resale of returned items. It uses highly innovative pricing software and is unique in its ability to connect inventory management and re-product grading to multiple third party sales channels.

The prototype of the Buybay platform is complete and qualified and has recently been tested in real world settings in the Netherlands and Belgium. Demonstrations have shown that Buybay's prototype platform has potential for unmatched value recovery (~56% instead of 19.6% of the original retail price currently). Installation of BuyBay's platform increases re-product revenues for e-tailers, reduces the need to dispose of returned goods and has the potential to reduce re-product selling related carbon emissions of up to 31%.

To ensure complete commercial scalability and enable international acceptance by e-tailers of different sizes and in different sectors across Europe, Buybay's platform requires additional infrastructure development, optimisation through businesses intelligence analysis and scale up testing in operational environments. With the support of leading international etail companies Buybay aims to develop the new standard for returned goods.

<b>StemSense</b>		<b>848361</b>
<b>Title: A precise irrigation monitoring system to provide an accurate measurement of water status in crops</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.102.350,00</b>	EU requested grant (€): <b>1.471.645,00</b>	

**Free keywords:** *Precision irrigation, crop water status, stem water potential, sustainable water use*

### **Abstract:**

There is an increasing global pressure on water resources and ensuring there is a sufficient supply in the face of climate change. This is of particular prevalence within the agriculture industry where irrigation is becoming increasingly important. Farmers typically overwater plants by 20% due to insufficient knowledge of plant water status resulting in significant wastewater and lowering plant yields. Saturas have developed StemSense, a unique sensor device that measures Stem Water Potential (SWP). SWP is scientifically proven to provide the most accurate data on plant water status. Saturas' system then interprets this data, incorporating external factors such as meteorological data and provides recommended levels of irrigation to farmers. Farmers using the StemSense sensor experience up to 20% higher income, significant water savings and reduced costs. The overall objectives of the Phase 2 project are to design and engineer a miniaturised sensor that can be deployed in a wide variety of plants; to optimise the communication system and user interface; to scale-up production of StemSense with a contract manufacturer; and to demonstrate and validate the technology in in-field trials with farmers across Europe. The overall objective is to reach full commercialisation of StemSense as a reliable innovation validated by the relevant end-users, farmers.

<b>SULACHANGE</b>		<b>829681</b>
Title: <b>Microplastic-free Sulapac-material challenges plastic</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>11/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.763.125,00</b>	EU requested grant (€): <b>1.934.187,00</b>	

**Free keywords:** *eco-package, microplastic-free, biomaterials, plastic waste*

### **Abstract:**

The extensive use of plastic in packaging is a growing global challenge. Over 30% of the 78 million tons produced annually ends up polluting our environment. There is not a great alternative for the plastic yet in the mass market: biodegradable bioplastics degrade too slowly and non-biodegradable bioplastics pollute the world with microplastic.

Finnish SME Sulapac has created the most sustainable packaging solution in the world. It is 100% biodegradable and contains 0% microplastics. Sulapac® has all the benefits of plastic, but without the waste problem. The renewable wood-based material has a low carbon footprint, yet it is similar to plastic in terms of price, formability and functionality.

Sulapac® is a fast biodegrading water, oil and oxygen resistant material solution. It is suitable for mass manufacturing of rigid and flexible packaging such as jars and tubes. It can also be used for light weight packaging. Sulapac is a real alternative to plastics used in high-volume cosmetics and food industries.

The aim of the SULACHANGE project is to finalise our product offering to capture the full potential of our unique material and prepare for global scale market introduction. We will optimise our recipe and barrier coatings for high volume cosmetic and food industries, apply for required certificates, do customer pilots and create a licensing model. As a result of the project, the company will grow to annual revenues of €90 million within a few years.



<b>TAPP X</b>		<b>830150</b>
Title: <b>The world's first Sensor-Based Water Filter to Purify and Analyse Tap Water</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>9/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.771.350,00</b>	EU requested grant (€): <b>1.239.945,00</b>	

**Free keywords:** *Water filter; Single use Plastic reduction; Internet of Things; Big Data; Water Quality;*

### **Abstract:**

Magnus Jern and Alex Schwartz founded TAPP Water in 2014 and since then have tested over 50 different filters and technologies, while conducting blind tests among test panels and installation tests and analysis by water institutes. Based on our findings, we developed a new filter system that provides the cleanest and best tasting tap water in the world: TAPP, combining the best of Scandinavian design, German engineering and Spanish water filtration expertise.

For now, our short term goal is to lower the environmental impact of clean drinking water and replace at least 1 Billion bottles by 2020 by empowering people to easily get clean and healthy water from tap. To achieve this goal, we have already sold two tap filters (TAPP 1 and 1S) in 5 countries, while TAPP 2 is being prepared for launch in June 2018.

TAPP X is the world's first household water filter that contains sensors to analyse tap water quality in real time. With TAPP X we intend to alter consumers' behaviour once and for all by taking away prejudices about (filtered) tap water in the form of an evidence-based approach. In addition, we will use this data to inform water providers and municipalities about tap water quality in their area. TAPP X is the next step in providing affordable, clean drinking water to all, while creating awareness about water consumption and battling harmful plastic waste.

With an estimated 1 Billion households worldwide having access to tap water, we initially target about 62 Million households in Europe and North America with TAPP X. Successful implementation and of TAPP X in our current portfolio of water filters by 2021 will boost our company not only financially, but also create new positions, further enhance tap water quality and reduce plastic bottle waste with 2 Billion bottles per year.

<b>ULTRAWAT</b>		<b>811908</b>
Title: <b>Ultrapure Water Technology - nanoparticle free water for the advanced nanoelectronics industry enabling further miniaturization of electronic devices</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date: <b>7/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.855.975,00</b>	EU requested grant (€): <b>1.299.182,50</b>	

**Free keywords:** *Nanoelectronics, nanoparticles, yield rate, semiconductors, IC, Integrated circuit, transistors, microchip, defects, Ultrapure water, Chips, fabs, nodes, nm, electronics, wafers, lithography, tran*

### **Abstract:**

The ULTRAWAT project will commercialize a new advanced technology system, proven to remove sub-20 nanoparticles from ultrapure nanoelectronic process water and from industrial waste water. Type 1 Ultrapure Water (UPW) is water treated to highest levels of purity. It is used in the nanoelectronics industry for surface treatment of microchips. Sub-20 nm particles are called "killer particles". They are difficult to remove and can cause damage to advanced devices by causing short circuits. Removing killer particles from process water will enable further miniaturization of electronic devices.

The global consumption of UPW in nanoelectronics industry is estimated at 2000 billion litres per year. State-of-the-art UPW systems cannot remove sub-20 nanoparticles efficiently and reuse both the water and valuable minerals and chemicals. Recognizing a significant business opportunity, XZERO has developed a new Key Enabling Technology for the complete removal of "killer particles". The technology enables Zero Liquid Discharge. ZLD saves large quantities of water, enables the extraction of valuable materials and stops dangerous contaminants from polluting the environment.

The targeted users are water system integrators (WSI) and nanoelectronics manufacturers. WSIs will get access to innovative technology that will boost the added value of their systems. Nanoelectronics manufacturers will remove the threat to profitable manufacture from nanoparticles and minimize their environmental footprint. XZERO's crucial strategy is to capitalize on this strong industrial need. We acquired huge commercial interest.

The project is aimed at turning tested prototypes [TRL 6] into fully functional commercial systems [TRL 9] that can be easily deployed and integrated with production equipment in the nanoelectronics industry. The technology has a potential to boost the development of the nanoelectronics sector in Europe that is striving to reclaim its position among world leaders.

<b>WATERSIGN</b>		<b>848537</b>
Title: <b>WATERSIGN: Smart Water Monitoring &amp; Leakage Detection</b>		
Call Id: <b>H2020-SMEInst-2018-2020-2</b>	Topic: <b>EIC-SMEInst-2018-2020</b>	Type of Action: <b>SME-2</b>
Project start date:	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.013.616,00</b>	EU requested grant (€): <b>2.109.531,20</b>	

**Free keywords:** *water conservation, water monitoring, sensors, flow fluctuation, leak detection*

### **Abstract:**

To enable a more efficient use of water and limit wasteful usage, real time monitoring and alerts in case of burst, blockage or leakage is needed to empower consumers to take corrective action as quickly as possible. Tavlit's Watersign System's disruptive patented technology reduces water wastage and maximizes the efficient use of water, thereby preserving scarce resources, by enabling real time monitoring of water supply lines and irrigation systems. The system is simple and economical, making it an ideal solution for water management. Using the water itself as the medium to transfer the data, the system detects leakages, bursts, blockages, water theft and unauthorized connections, identifying the specific point/location of the disturbance, and alerts the user immediately so that corrective action can be taken. The system analyses water consumption patterns and sends alerts in the case of irregular behaviour, as well as immediately sending an alert when non-potable water enters a potable water system. The system is comprised of just one sensor located at the inlet of the water system being monitored, while each individual water outlet is equipped with a Watersign-marker, a mechanical device operated by the water flow, creating small flow/pressure fluctuations in the water, generating a unique signature at every outlet, identifying each user by small fluctuations in the water flow/pressure. The water itself is used as the medium to transmit information from all markers simultaneously to the sensor located at the inlet of the system. A smart algorithm separates between signals and identifies each user, sending an immediate alert in case of irregular behaviour.

The project's objective is to bring the Watersign System to full commercialisation using Tavlit's global market presence and reputation. Throughout the project, pilot sites will be operational, including agricultural, landscape & turf and golf course sites, as well as rural village and water utility pilots.

<b>Madaster</b>		<b>779024</b>
<b>Title: Towards a circular economy: Eliminate waste through an open platform that facilitates material passports</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-01-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>5/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.539.089,16</b>	EU requested grant (€): <b>2.477.362,41</b>	

**Free keywords:** *construction, real-estate, Material Passport, circular economy, platform, ICT, BIM, architecture, sustainable building*

### **Abstract:**

Our planet is a closed system with finite resources. The current economic system is strongly based on consuming and discarding these materials and products. Combined with the growing population and strong economic growth this leads to a rapid depletion of the earth's valuable resources while creating huge amounts of waste. To overcome this, it is essential to change our current linear economy and move towards a sustainable circular economy in which resources are reused and recycled while eliminating the production of waste.

Many circular initiatives have failed to create sustainable material cycles due to a lack of usable information on material contents. This information is of utmost importance to allow re-use and recycling of materials and thus, to maintain the material's value. Consequently, this will result in the thoughtful deconstruction of products, maintaining their valuable materials and subsequent re-use or recycling, minimizing waste.

To facilitate this highly needed information exchange and to facilitate the vital transition towards a circular economy, Madaster Services BV and Winvision BV have developed the disruptive Madaster ICT Platform which, for the first time, is able to precisely document and store material-related information of products. This innovative solution specifically focusses on the construction sector with the strong ambition to eliminate waste.

The following project objectives are defined:

1. Produce Material Passports of construction objects in an operational setting;
2. Develop protocols for data extraction and integration of resource-related information of construction;
3. Create an open-standard IT infrastructure to enhance interoperability with other systems that will make use of the resource-related information of construction objects in the database;
4. Develop a clearly defined business strategy for the Madaster Platform, the Material Passport and data services.

<b>CGM</b>		<b>805997</b>
<b>Title: A next generation nano media tailored to capture and recycle hazardous micropollutants in contaminated industrial wastewater.</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-02-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>4/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.953.701,25</b>	EU requested grant (€): <b>1.367.590,88</b>	

**Free keywords:** *micropollutants; contaminants; heavy metals; clean water*

### **Abstract:**

Customem Ltd is a company founded with the long term vision to harness nature's capacity to make biomaterials to promote human health in alignment with sustainable development goals. A next generation nanomedia that can be tailored to capture and recycle specific micropollutants in contaminated industrial wastewater. Lack of access to clean water is predicted to affect 47% of the world's population by 2030. Contamination of water supplies by micropollutants such as metal ions, pesticides and pharmaceuticals is a major contributor to this water stress. These pollutants are released by industrial processes in the textile and manufacturing industries. Existing water treatment removes 99.96% of contaminants, but does not remove the 0.04% of micropollutants. Although the remaining contaminants seem small, they are a major problem as they are exceptionally difficult to capture but also highly toxic to humans and animals. CustoMem have developed a customisable selective nanocellulose media called CustoMem Granular Media (CGM) that is bioengineered to capture and remove all micropollutants including the 0.04% that cannot currently be removed. Customers benefit from a simple, low cost, low energy solution that is low maintenance. It allows removal of all micropollutants resulting in clean water supplies. The company is headquartered in the Imperial College Incubator UK and currently has 6 employees. The company is currently in talks with companies in the EU who have shown an active interest in the project. The Phase 2 project will allow CustoMem to finalise CGM development and accelerate its market introduction.

<b>Cronogard</b>		<b>783696</b>
Title: <b>HIGH PERFORMING ADVANCED MATERIAL PLATFORM FOR ACTIVE AND INTELLIGENT FOOD PACKAGING: CRONOGARD™</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-02-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.576.240,00</b>	EU requested grant (€): <b>1.103.368,00</b>	

**Free keywords:** *active and intelligent packaging; disposable; coating; biodegradable; food safety; shelf life; biocompatibility; environmental sustainability.*

### **Abstract:**

Nice Filler (NF) is working to introduce on the market for food packaging solutions an innovative advanced material technology platform (cronogard) based on an organic-inorganic active filler, edible and biocompatible, characterized by a lamellar structure able to intercalate with ionic bonds active molecules (antimicrobial, antioxidant, antibacterial), capable of maintain or improving the quality of food and to extend the food shelf life. Indeed, cronogard can be applied with different techniques (coating, injection molding, spray dyeing) to all kind of food packaging solutions (boxes, trays, cans, films) thus bringing value to the entire value chain, from the packaging industry, to the food industry, to the large organized distribution, to the final consumer of fresh goods.

The market for active and intelligent packaging is enormous and based on large volumes. In Europe it is expected to grow from \$17.28 billion in 2014 to \$19.68 billion by the end of 2020 at a CAGR of 2.19%. NF, with its proprietary and patented technology, aims at becoming a leader in the provision of the filler for all kind of packaging solutions, dealing with the most relevant players to offer an extraordinarily performing packaging solution, to the benefit of the European food industry, which is traditionally rich of fresh, high-quality products (dairy, fruits, meat).

Once the project activities will be completed and cronogard will enter the market, NF is expected to grow significantly through sales of the filler and to reach estimated revenues in the range of 40 M € in 2022, with an international reach, a 46% enticing EBITDA, and an ambitious hiring plan for over 20 qualified professionals. Through control of the production facilities and the related know-how, the company will retain a competitive edge and a leadership position in Europe and abroad, proudly concurring to the economic growth, but also the reduction of food waste in a world of changing food consumption habits.

<b>INDALG</b>		<b>733718</b>
<b>Title: Development of an innovative algae based tertiary wastewater treatment and value recovery system</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-03-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2016</b>	Duration: <b>30 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.098.983,75</b>	EU requested grant (€): <b>1.469.288,63</b>	

**Free keywords:** *Sustainable; Wastewater treatment; Material recovery; Algae; Biotechnology; Water; Chemical free*

### **Abstract:**

Industrial Phycology (IPHYC) has developed a wastewater treatment (WWT) process to meet tightening discharge consents for the concentration of nitrogen (N), phosphorus (P) and other materials in wastewater (WW) effluents. These nutrients & materials are linked to adverse environmental events e.g. eutrophication. WWT operators require a sustainable treatment process to remove / recover these materials to meet legislation.

IPHYC's novel patented WWT process uses microalgae (MA) to remove nutrients from WW effluents. MA reproduce rapidly when sufficient nutrients, light & CO<sub>2</sub> are supplied. The MA consume nutrients in the WW until depleted cleaning the effluent to the legislated discharge consent concentrations, allowing the operator to meet its statutory commitments & not risk financial penalties. The biomass is retained for reactor seeding or harvested for valorisation e.g. use for anaerobic digestion, animal feed, feedstock for bio-based industries.

The process has been validated by I-PHYC in a recent field trial at Wessex Water's Avonmouth WWT plant & a supporting feasibility study carried out through SME instrument phase 1 support. Through the phase 1 project, IPHYC engaged with the UK water industry to understand the market & end-user needs. From this IPHYC has worked with industry partners to identify the work required to prove its technology & develop its process to commercial readiness. IPHYC is applying for funding to enable it to achieve this by; building a commercial demonstrator of its process for the treatment of municipal wastewaters; optimising its process for the treatment of industrial effluents (e.g. mines); develop methods of recovering value from the algal biomass; further engage with key industry companies, decision makers and potential future customers; develop its commercial strategy for the delivering the technology to market. This outcomes of the project will enable IPHYC to enter the market with a credible and proven disruptive technology.

<b>Green-DROP</b>		<b>793325</b>
Title: <b>Precise subarea specific irrigation and fertilization system</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-07-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>4/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.384.237,50</b>	EU requested grant (€): <b>968.966,25</b>	

**Free keywords:** *Automatic system, fertigation, efficient use of resources, water savings, sensors, precise farming, low-cost, waste reuse, increase productivity, state-of-the-art technologies*

### **Abstract:**

Competitive global markets, rising fertilizer and energy costs, and growing uncertainties in water availability, due to a more and more uneven rainfall distribution, impose serious challenges on the European agricultural producers. Besides, wastes from farms with high nutrient availability as manure from animals, digestate from biogas plants and sewage sludge are becoming difficult and expensive to dispose.

In response to these challenges and in order to achieve an efficient application of resources more and more farmers are introducing approaches of “precision agriculture” technologies for farming practices, such as Green-DROP. Green-DROP uses a number of georeferenced layers with different information: crop type, topography, weather distribution, field capacity, soil type, etc. This information gives the precise and specific requirements of water and nutrients for each subarea of the holding to be fertigated. Green-DROP makes possible to meet the exact fertilizer and water demands for all types of soils and crops. Thus, Green-DROP enables the farmer to increase productivity, resource efficiency, compliance and competitiveness in the production of raw materials, while mitigating environmental impacts from water abstractions and fertilizer application. Additionally, Green-DROP project will recover nutrients from farming wastes, and will use them as input for the fertilization of the land to close the nutrient cycle (Nutrients in waste-Nutrients as fertilizers-Nutrients in plants). Green-DROP reduces water and fertilizers consumption by 20 % making the agricultural sector more independent and profitable. It is designed for farms of all sizes but it will focus on holdings and agricultural cooperatives with at least 50 ha of surface area.



<b>HYDROBLOOD</b>		<b>766747</b>
Title: <b>Innovative processing plant for optimal production of Decolourised Hydrolysed Protein (DHP). A secure, cost-effective and eco-friendly blood by-product solution.</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-07-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>5/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.854.416,25</b>	EU requested grant (€): <b>1.998.091,38</b>	

**Free keywords:** *animal by-products, animal blood, animal protein, hydrolysed protein, feed, feed additives, slaughterhouse, rendering plant, waste treatment, processing plant, blood rendering, blood processing.*

### **Abstract:**

Blood is a common by-product of the meat industry, which is obtained in large volumes especially in industrial slaughterhouses. Approximately 1,452 million pigs were processed worldwide for their meat in 2013. The annual available blood supply exceeds 4.35 million tonnes worldwide. Taking into account a typical protein content around 18%, 783k tonnes of protein could be produced worldwide.

In spite of the significance of this sum, an important part of the collected blood is not considered but a waste. The reason lies in the lack of suitable facilities in the slaughterhouses to properly collect and handle blood. Hence, a high percentage of the abovementioned amount of protein becomes a waste, which requires expensive decontamination treatments and large amounts of water. On the other hand, the collection of blood in most of the slaughterhouses where it is considered a by-product is carried out together with other by-products, treated un-specifically in large digesters. This process avoids part of the costs of elimination because it excludes the decontamination treatments, but the obtained end-product does not have a remarkable added value and the possibility of valorisation remains unexploited.

From TALLERES AZUARA we have identified the business opportunity behind this market weaknesses, and we have developed the HYDROBLOOD processing plant to solve all of them, which is a secure, cost-effective and eco-friendly system for blood collection and processing. With current technologies available into the market, only around 35% of the protein contained in blood can be recovered as an added-value by-product. With our innovative HYDROBLOOD processing plant, the 100% of protein content can be recovered from animal's blood, and converted into a high added-value product: The Decolourised Hydrolysed Protein (DHP). This will make a big impact within the European Protein Market, valued at 2,547,000 Mt in 2013, and estimated to increase by more than 40% the next 10 years.

<b>INFARM</b>		<b>739479</b>
Title: <b>The vertical farming revolution, urban Farming as a Service.</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-07-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>11/1/2016</b>	Duration: <b>18 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.759.835,00</b>	EU requested grant (€): <b>1.931.884,50</b>	

**Free keywords:** *urban farming*

### **Abstract:**

The global population is projected to reach 9.8 billion by 2050. National populations are expected to more than double in 40 countries. The global life expectancy is 73 years for women and 69 years for men—there are more people in the world and we are living longer. While industrial agriculture produces enough food to feed the world as a whole (2790 kcal/person/day in 2006-08), 32% of all food produced is wasted. The logistics of food production and transportation are largely to blame although in developed countries a substantial amount of food is wasted at the point of consumption. As a result, overall global food availability is lower than it would otherwise be, requiring the planet's agricultural system to produce additional food to compensate for the wasted food production. Consequently, The United Nations Food and Agriculture Organization estimates 795 million of the 7.3 billion people in the world, or one person in nine, suffer from chronic undernourishment.

In order to feed the population in 2050, we need to produce an additional 6,000 trillion kcal per year.

However, conventional industrial agriculture is not sustainable. It is one of the most harmful industries to our planet, responsible for:

- 70% of the planet's water use
- up to 24% of greenhouse gas emissions
- degradation of soil and groundwater pollution

Continual ploughing of fields, combined with heavy use of fertilizers, has degraded soils across the world to the point where arable land is now lost at the alarming rate of over 100,000 square kilometres every year, far outstripping the pace of the natural processes that replace diminished soil.

Thus, nearly a third of worldwide adequate or high-quality food-producing land has been lost.

Our solution to the problems with sustainable agriculture is to use hydroponics and proprietary lighting algorithms combined with indoor vertical farming and our patented 'growth trays' to create an incredibly efficient growing environment—the Microfarm.

<b>MILQAS</b>		<b>726665</b>
Title: <b>Milk quality antibiotics sensor</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-07-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>5/1/2016</b>	Duration: <b>35 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.429.250,00</b>	EU requested grant (€): <b>1.000.475,00</b>	

**Free keywords:** *Food waste, biosensor, agriculture, antibiotics detection, in line testing*

### **Abstract:**

With the project MILQAS (Milk quality antibiotics sensor), PlastiSens ApS brings a patented biosensor on the market. A novel testing device that meets a major need for reducing the waste of raw milk in the value chain. Every day truckloads of milk are spoilt by cross-contamination with antibiotic-polluted milk. Today, milk in tankers is analyzed upon arrival at the dairy in a lengthy 1--2 hour process. By then, milk from several farms has already been mixed in the same tank. PlastiSens' technology can in 1-2 minutes, analyze antibiotics in milk before it is loaded onto the truck, thereby potentially saving 80-90% of the cargo from cross contamination.

The dairy industry is very strong in Europe, and will therefore be the first target market. The dairy segment alone constitutes a market volume of € 500M. PlastiSens technology can also be adapted to for testing for other contaminants in both liquid and solid samples, and also for analyzing antibiotics in complex samples as milk. The MILQAS project will enable PlastiSens to create a solid revenue stream of nearly € 6M with the sale of analysis instruments and single-use test kits (chips) within two years after conclusion of the project. Arla A/S, the 7th largest dairy company in the world, has agreed to test our technology on milk trucks and at selected milk producing farms. We use selected subcontractors for 3th party validation and expect that the project will create an extra 50 full time jobs. 30 jobs will be created at PlastiSens and about 20 at our European sub-suppliers. Ten years from now, we envisage revenues around € 100M and 80-100 employees.

<b>VegeaTextile</b>		<b>805055</b>
Title: <b>Innovative biomaterials production from wine industry waste</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-07-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>3/1/2018</b>	Duration: <b>18 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>801.875,00</b>	EU requested grant (€): <b>561.312,00</b>	

**Free keywords:** *Bio-based products; Agricultural waste recovery, Green leather, Circular Economy*

### **Abstract:**

Vegea is a young start-up with a solid chemical background with long experience in natural polymers and industrial processes, constituted by researchers coming from the academy with a strong entrepreneurial inclination. It has already received several awards recognizing the value of its disruptive innovation, such as Start&Cup Award-2015, Start&Re-Start-2016, and H&M Global Change Award-2016 for a total funding of more than €300.000. The main scope of VegeaTextile project is the deployment of an absolute breakthrough innovation demonstrating a novel, cost-effective and eco-friendly process for the production of organic textile and introducing in the European leather goods market a new kind of bio-textile using a non-animal and renewable raw material, considered up today an agricultural waste: the grape marc. In fact, the production process can be classified “low impact” for the environment since it makes minimal use of chemical reagents or additional water, and at the contrary, it produces reusable water from the grape marc exsiccation (60% w/w). Our innovation will allow leather goods manufacturers to answer to the increasing customers’ awareness about environmentalist and animalist concerns, to propose a new product with same quality of common leather and, at the same time, to find an alternative and renewable raw material, helping them to overcome stringent regulations about animal treats and tanning processes. Upon project length we aim at industrializing the process production by 2022, reaching a forecasted production capability of 4.5 million m<sup>2</sup>/yr, the ambitious business objectives of € 8,64 million net profits over 4 yrs of commercialization (2022), and consequently a greater-than-market ROI (26%) and profitability (22%). For the launch of VegeaTextile by 2019, we foresee a total investment of more than €900.000, of which €801.875 budgeted for the Phase-2.

<b>ULTRAFISH</b>		<b>767839</b>
<b>Title: ECO-INNOVATIVE PROCESSING TECHNOLOGY FOR BETTER QUALITY AND SHELF LIFE OF FISH PRODUCTS</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-08-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.638.351,25</b>	EU requested grant (€): <b>1.146.845,88</b>	

**Free keywords:** *ultrasound technology, shelf life, food preservation, microbial inactivation, blue growth, fish processing industry, marine resources, management of fish stocks*

### **Abstract:**

Fish stock management in European waters is becoming increasingly important, as it is necessary to ensure the long-term sustainability of fish catch and conserve marine resources. The fish processing industry plays a key role in this strategy, being responsible for ensuring proper handling and preservation of fish products to retain its quality and to increase its shelf life in the market. Aligned with the "Blue Growth Strategy" (COM (2012) 494), Scanfisk, a Spanish company based in Zaragoza specialised in fish processing of fresh & frozen products, has developed ULTRAFISH. The project aims at improving today's processes related to handling and processing of fishery products (fresh and primary processed) by applying a green and innovative technique based on the use of ultrasound to eliminate the use of chemical additives for microbial inactivation. This safe and environmentally friendly processing technique will be implemented at different water-based stages to reduce the processing times and water waste generated in these stages in a cost-effective manner.

By implementing ULTRAFISH, Scanfisk will lower their costs and time of their processes, able to save time, money and energy, and to produce fishery products with longer commercial shelf life. This will enable them to increase their margin and market share, and to enter new markets which to date were not considered. The EU market will benefit from higher value-added products, to cope with increasing consumer demands, and it will be provided with a novel food treatment technology that significantly contributes to the sustainable management of fish stocks.

<b>BIOGASTIGER</b>		<b>783727</b>
Title: <b>BIOGASTIGER® system – turning global organic waste streams into smart and clean energy</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-09-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>11/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.043.375,00</b>	EU requested grant (€): <b>2.130.362,50</b>	

**Free keywords:** *CO2 reduction using biogenic residual materials for gaining renewable and flexibel energy, biogas machine, stable energy supply*

### **Abstract:**

The world's population is growing continuously - and waste generation too. In all areas where people live, enormous amounts of biogenic organic waste are generated (household waste, by-products food production, agriculture). In case rotting/composting is not under control, the emission of climate-damaging gases, e.g. CO<sub>2</sub>, is 50% higher than under controlled anaerobic fermentation.

The production of biogas is one of the most promising forms of energetic use of biomass. Biogas plants can make a significant contribution to a sustainable energy system, while at the same time significantly reducing the emissions of anthropogenic greenhouse gases in agriculture. However, the conversion of biomass to biogas currently represents a very high technical and financial expense. Today, the predominant plant technology is characterized by individual concepts which have a very negative impact on the quality and safety of the biogas plants. The solution to these problems is a completely new plant concept for the use of biomass. BIOGASTIGER® (TRL7) is a modular compact biogas plant in a transportable container construction. All components are standardized and industrially premanufactured in series, tested for quality before delivery and on site installed and commissioned with short assembly times. Our concept leads to the best cost to efficiency ratio, to the highest flexibility and stable energy supply on request.

With BIOGASTIGER® we address target customers from agriculture, the food industry and energy supplier. It is a continuously growing high-volume market with more than € 300 million turnover per year.

BIOGASTIGER® was conceived by F&W (experience in mechanical engineering, project management) in cooperation with FWE GmbH (highly experienced with energy concepts). With the global problem of not used organic waste streams and our innovative solution to produce safe, clean and carbon neutral energy, we want to make the world cleaner and safer. BIOGASTIGER®-the biogas machine.

<b>PigHeat</b>		<b>738874</b>
Title: <b>Utilizing Pig By-products as Heat Source to Save Recycling and Energy Cost.</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-09-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>11/1/2016</b>	Duration: <b>22 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.984.566,25</b>	EU requested grant (€): <b>1.389.196,38</b>	

**Free keywords:** *Pig hair, Pig fur, Roughing, Valorisation, Circular economy, Biomass, Environment, Environmentalfriendly, CO2 neutral, process efficiency, meat-sector, renewable Energy, animal byproduct.*

### **Abstract:**

BIGAS ALSINA, a family owned company specialized on machinery manufacturing for the Food sector, aims to commercialize PigHeat, a novel technology that allows processing pig fur and pig roughing. Right now, pig fur and roughing are simply dried in order to reduce weight and volume, and used as fertilizer in landfills. In other words, pig meat processing means that there is a waste that actually needs to be disposed of, which is the least desirable effect of waste. Not only does pig meat processing incur waste disposal, it also implies an important investment in energy to remove water as well as removal cost. This cost is directly paid by the slaughterhouse.

Through the proposed PigHeat processes, pig fur and roughing can be used as an alternative source of fuel that creates steam and service water instead of using gas, diesel or electricity. The meat processing industry consumes high amounts of energy. By using pig fur and roughing as fuel, an environmental waste problem is transformed into an important way to save 15% of heating energy, while promoting waste valorization and a circular economy within the sector. This is achieved in 4-steps: i) homogenization, ii) hydrolysis, iii) drying and iv) combustion. The obtained product is a Co2 neutral biomass with exceptionally high heating value (even higher than wood pellets) that can be used in the daily operations of the same installation.

Due to the stringent waste regulations, the 1,700 medium sized slaughterhouses in Europe are looking for a solution. Not only that, they are operating on very low margins and PigHeat will allow them to cut energy expenses, thereby increasing profits. Buying PigHeat implies certain costs for slaughterhouses, however the savings will fully have paid for the machinery in less than two years. Offering attractive payment modules, our innovative solution is likely to conquer the market swiftly.

<b>SHEPHERD</b>		<b>731695</b>
Title: <b>Energy-Efficient Activated Sludge Monitoring for Wastewater Treatment Plants</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-09-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.508.750,00</b>	EU requested grant (€): <b>1.756.125,00</b>	

**Free keywords:** *activated sludge, closed-loop monitoring, wastewater, microbial respirometer*

### **Abstract:**

The aeration of activated sludge accounts for 60% of the running cost of wastewater treatment plants, a staggering 2% of all electricity generated at country-level. The project will improve upon an existing prototype of on-line microbial respirometer with near real-time capability for monitoring the activity of the microbial population (biomass) in activated sludge, and suitable for industrial and municipal wastewater applications, with the following environmental and financial benefits:

- 20% reduction of greenhouse gas emission related to the aeration process (lower energy consumption)
- 5% reduction of nitrous oxide emission related to the denitrification process (better process parameters)
- 25 % reduction of energy costs and maintenance costs (better online monitoring of the process)

The solution reduces the costs and improves the reliability of the measurements, allowing small and midsize WWTPs to monitor the biological activity of the process. The integration with existing hardware sensors and SCADA systems, allows the system to control the plant automatically within design operating parameters and reacting in real-time to variable (diurnal and seasonal) loading or toxic events. The cloud-based implementation creates a central data repository accessible for operational purposes (remote access, alerts) and management purposes (benchmarking, continuous improvement, and design of new installations). The original prototype (TRL6) was tested in Anglian Water's Milton (Cambridge) wastewater treatment plant and gave operators information about the status of the active component (biomass) so that manual interventions could be made to improve efficiency. The project aims to take the technology forward, automate the process to a higher degree and demonstrate the solution in a large-scale pilot with four wastewater utilities over 10 plants across Europe and the USA (TRL 8). The project duration is 24 months and the requested EC funding 1.75M Euros.



<b>SmartWASTE</b>		<b>724613</b>
Title: <b>Smart logistics for WASTE and recycling operations in European cities</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-10-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2016</b>	Duration: <b>36 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.100.449,56</b>	EU requested grant (€): <b>1.470.314,70</b>	

**Free keywords:** *waste management, waste collection, smart logistics, recycling, route planning, routing, fill level monitoring, fleet optimization*

### **Abstract:**

The key problem in waste collection today is static routes and schedules: truck drivers are driving “blindly” from bin to bin and collecting containers that are either half empty or over filled. This adds up to a large amount of unnecessary costs, such as time spent, gas consumption and greenhouse gas emissions. Globally, over 400 million waste containers are being served by millions of trucks every day, and 50 % of the value in the market is in the logistics. Enevo is a growing Finnish technology company that aims to capitalise on this 12-billion-euro business opportunity and become the #1 supply chain platform company for waste and recycling operations worldwide.

As waste management plays a central role in the circular economy, Enevo is a key player in developing more efficient waste collection and management systems. Enevo helps its customers make their waste and recycling operations more efficient, leading to a more sustainable world. Enevo’s vision is to turn all waste in the world into a valued resource.

SmartWASTE project is addressing two significant EU-wide challenges:

- 1) optimising transport operations and tackling the environmental and logistical challenges that the European transport sector is facing
- 2) waste management in the circular economy context.

The objective of SmartWASTE proposal is to scale-up and expand the service into new European regions by piloting the solution with potential customers in 10 large scale pilots. Through piloting, Enevo gains important feedback that is provided back to product development to improve Enevo's offering and operations to be better suited for large scale regional expansion.

The proposal’s activities aim at creating a solid foundation for Enevo’s successful business in European market and accelerate its expansion globally. Enevo is targeting, by 2021, to generate a revenue of 916 M€ and employ 1 500 people globally of which 1 000 will be in Europe.

<b>TRANSAFELOAD</b>		<b>778897</b>
Title: <b>The European Leader Equipment for Packaging Testing</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-10-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.392.200,71</b>	EU requested grant (€): <b>974.540,50</b>	

**Free keywords:** *packaging, impact and stability testing, vibration simulation, compression testing*

### **Abstract:**

Nowadays big brand owners, packaging manufacturers and logistic companies faces losses of €50.000 million/year worldwide due to goods damages during transportation. At the same time, governments across the world are implementing rigorous guidelines to ensure quality of packed goods and safety during their delivery. Packaging testing is an integral part of these initiatives as it simulates the risk damages experienced by the packed goods (boxes, pallets or loads) during their distribution. In Europe, the European Commission has established the directive 2014/47/EU for safe shipment of goods. Next year, in 2017, this directive will force all the transport players to ensure the stability and safety of the loads from detrimental movements. In spite of the European concerns, currently in the market there is a lack of accurate and price competitive simulation equipment supporting the European goals. In the race to achieve "0 fatalities in road transport by 2050", established by 2011 Transport White Paper, we only find few American innovative technologies. Our solution is the first European tool to reproduce the transportation risks events such as drops, impacts, vibration and compression for packed goods. With TranSafeLoad we aim to launch to the market an integral solution 30% more price-competitive, with the broadest load range for packaging test simulation (from small boxes to 2 Ton loads) and able to reproduce real 3D movements, thanks to its patented mechanism. Furthermore, aligned with the environmental European regulatory D1994/62/CE for packaging waste reduction, our system will help the optimization of packaging material, reducing the extra material from the current 30% to 10% and saving at least €800 million/year.

<b>ALGAMATER</b>		<b>767333</b>
Title: <b>Using microalgae bioreactor technology to deliver the world's most cost-effective, energy-efficient and adaptable system for the treatment of toxic industrial and landfill wastewater</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.906.000,00</b>	EU requested grant (€): <b>2.034.200,00</b>	

**Free keywords:** *Wastewater treatment plant; microalgae, biological treatment processes*

### **Abstract:**

Bluemater CEO Nuno Gomes conceived this project inspired by the words of the inventor and author Buckminster Fuller: "Nature has no pollution. This is a word coined in human ignorance regarding the presence of the right chemicals being released in the wrong places..." While high concentrations of compounds such as ammonium, phosphates and sulphates can be deadly for aquatic ecosystems and their inhabitants, they are nutrients for algae and plants. This project harnesses components found in highly concentrated wastewaters to feed microalgae, which grow especially quickly by transforming ammonium and phosphates into proteins and other organic matter.

Since 2008 we have been developing this challenging concept into a viable commercial system for wastewater treatment at landfills and in industry. Following extensive testing at diverse wastewater treatment plants (WWTPs), and guided by feedback from target clients, our breakthrough microalgae technology – the first of its kind - was integrated with Bluemater's next-generation wastewater management systems in its current configuration. In these pilot tests, Algamater demonstrated decreased energy costs in wastewater treatment by more than 60% and lowered operational costs by more than 40% compared to traditional wastewater treatment plants. We are proud to introduce the Algamater Wastewater Treatment Plant: the world's most robust, flexible, cost-effective, and eco-friendly wastewater treatment system. Algamater is currently at a prototype stage (TRL7). In this project we will upgrade, scale up and integrate the Algamater components into a full-scale wastewater treatment plant capable of demonstrating our game-changing technology at an industrial level.

With the commercialization of Algamater we forecast strong, consistent growth for Bluemater, notable employment creation both inside our company and out, and significantly reduced environmental hazards in the wastewater treatment sector.

<b>ARENA</b>		<b>726618</b>
Title: <b>The first on-site mobile solution for complete synthetic grass recycling and materials reuse</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>7/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.527.383,75</b>	EU requested grant (€): <b>1.619.887,50</b>	

**Free keywords:** *Synthetic grass, artificial grass, recycling, reuse, EOL management*

### **Abstract:**

Boom in synthetic grass sporting fields in EU and USA in the last 15-years has led to huge environmental problem. 600 000 tonnes of rubber, sand and plastics mixed wastes are generated from used fields each year in EU alone. Based on the current market trends, the total wastes will increase by 5-times by 2030, leading to over 3 million tonnes of mixed wastes annually.

Despite the growing popularity of synthetic grass both in major football leagues and school grounds, there are no unified regulations or effective technologies for its sustainable EOL management. Current solutions enable only limited used grass recycling and materials reclaim and thus field owners currently landfill 90% of the used grass without any recycling.

ASIE, company with over 20-years of experience in synthetic grass fields, has developed the first on-site recycling solution that enables complete used synthetic grass recycling and materials reuse for environmental and economic sustainability. Compared to alternatives, we ensure:

- Used grass and infill high-quality re-installation
- 100% infill reclaim, separation, cleaning and sanitary treatment
- 4x faster old turf removal and 2x faster full field renewal
- 50% cost reduction of old field utilization and 50% savings from new installation

We aim to achieve a zero-waste concept and improve the environmental sustainability of synthetic grass installations. Our unique ARENA concept enables to eliminate current landfilling and reuse 100% of the materials in new fields or as recycled raw materials in other industries. As a result, we:

- Prevent 1 million tonnes of mixed wastes from landfilling annually
- Reduce field renewal transportation need by 10-times, leading to 95% less CO2 emissions

Our total targeted market in Europe is €350m annually, with very high growth potential in the next years. As a result of the innovation project, we will generate €125m total sales revenue and create 350 new jobs by 2023.

<b>CLEANTECHBLOCK2</b>		<b>766614</b>
Title: <b>Market maturation of CleanTechBlock technology</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.572.500,00</b>	EU requested grant (€): <b>1.100.750,00</b>	

**Free keywords:** *Construction material; Sandwich-block; Clay; Foamed recycled glass; Environmental sustainability; Thermal insulation.*

### **Abstract:**

Clay bricks are one of the preferred building materials in Europe, but they are facing numerous threats due tightened regulations on buildings' energy and raw material consumption levels and CO2 emissions. These threats together with market trends such as increasing environmental conscience, preference for green materials and an excellent clay bricks' public image creates a major market opportunity that Gråsten Brickworks (GB) aims to pursuit through the development of an innovative building component which will enable a paradigm change within the construction market and recycling in Europe.

GB vision is to take the final steps of commercial and technical development and product maturation towards the commercialization of CleanTechBlock (CTB) – a patented multifunctional sandwich-block based on the combination of two clay brick shells and foamed recycled glass. CTB's advantages over bricks are compelling as the insulation, strength properties and construction price are similar and it offers: an overall increase in the living area (3-5%), a reduction in the overall house wall construction time (5x faster), while reducing maintenance requirements and transportation costs. It also contributes to the mitigation of environmental problems due to an increase of glass waste recycling, decrease of raw material (clay) and energy consumption and CO2 emissions.

CLEANTECHBLOCK2 project is expected to significantly enhance the profitability and competitiveness of GB, with an expected sales turnover of €67M and profits of €15M, 6 years after commercialization in the environmentally conscious construction segment (both residential and non-residential) of primary targeted markets – Denmark, Sweden and Germany. Besides giving to GB a technological leap with the consequent competitive advantage and export potential, CLEANTECHBLOCK2 will assist Europe in achieving objectives for environmental and energy policy.

<b>ECOSHEET-PRO</b>		<b>766649</b>
Title: <b>An Eco-Innovative Alternative to Plywood</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>6/1/2017</b>	Duration: <b>22 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>3.183.977,50</b>	EU requested grant (€): <b>2.228.784,25</b>	

**Free keywords:** *Mixed waste plastics, recycling, eco-innovation, feedstock preparation, extrusion, construction formworks*

### **Abstract:**

ECOSHEET-PRO is an eco-innovative and cost effective alternative to plywood made from mixed plastic waste, suitable for high strength applications in the construction industry. This project will tackle two significant environmental challenges facing Europe, whilst also offering added value to the construction industry. The first issue addressed is that of mixed plastic waste. In Europe, in 2014, 18 million tonnes of post-consumer waste plastics were landfilled or incinerated, as they could not be easily separated and recycled. Alternative uses for such waste must be found. The second issue is the growth in the use of plywood, typically manufactured from slow-growing, tropical hardwoods. This material is a key, high volume commodity in construction industry formworks and an area the size of Madrid is deforested each year to meet Europe's demand.

ECOSHEET-PRO transforms mixed plastic that would otherwise be wasted into a competitive, reusable, plywood replacement. Previous attempts to create such boards have failed to deliver the required strength or cost effectiveness required by industry. We have overcome these barriers through an innovative manufacturing process, which will be scaled up and refined during this project.

ECOSHEET-PRO has the potential to re-define the €1.8 billion European plywood industry and help Europe meet its demanding plastic recycling targets, contributing to the circular economy. Our success stems from bringing together the complementary expertise of two eco-innovative SMEs from Italy and the UK, both with a strong ambition to grow and internationalise.

Across a network of 13 facilities in 2023, ECOSHEET-PRO will create 77 jobs, generate annual revenues of over €76.5 million, annual profits of €26.8 million, and transform >221,000 tonnes of waste into valuable products.

<b>HOME BIOGAS</b>		<b>777770</b>
Title: <b>Turning food industry's organic waste into value</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.292.500,00</b>	EU requested grant (€): <b>1.604.750,00</b>	

**Free keywords:** *Biogas, anaerobic digestion, digester, organic waste, food waste, clean energy, waste valorisation, resource efficiency, food industry*

### **Abstract:**

HOME BIOGAS LTD develops and markets advanced biogas systems that reduce our clients' waste management fees, energy expenses and environmental footprint by converting organic waste into biogas, a clean energy source. Since 2016, we commercialise HOME BIOGAS TG1, an advanced, cost-effective household biogas system. So far we have sold more than 540 units in 46 countries, generating over €400,000 in revenues. We have been financed by private investors (€2.5 million) and government funding (€700,000) while a successful crowdfunding campaign has demonstrated an ample public interest in our products by collecting 219% of the targeted funding. We participate as editors of the ISO TC255/WG3 Domestic Biogas International Standard.

There are more than 2.32 million food service and retail businesses in the EU, which annually generate over 15 million tonnes of food and kitchen waste. Waste management carries significant costs for them while public concern on the environmental impact generated by unsustainable waste management practices is growing. We aim to leverage the success of our household systems by offering these companies an affordable (€10,000), high performance biogas solution to fulfil their specific necessities: HOME BIOGAS TG6 will convert their organic waste (100 kg per day) into free clean energy (120 kWh per day), generating important savings (over €5,000 per year) and improving their environmental footprint and corporate image. HOME BIOGAS TG6 has been demonstrated at TRL6 through the successful development and commercialisation of our TG1 system and the development and trial of two different large (200-250 kg per day) business-to-business pilots. Thanks to HOME BIOGAS TG6, we will increase our profit by €31.7 million and hire 36 new employees by 2023.

<b>MUBIC</b>		<b>778065</b>
Title: <b>Mushroom and biogas production in a circular economy</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>4.185.022,50</b>	EU requested grant (€): <b>2.499.999,00</b>	

**Free keywords:** *Degasified biomass conversion to substrate, circular economy, waste to energy to food, sustainable raw materials, environment, resources and sustainability*

### **Abstract:**

The problems: Biogas is important for the European renewable energy transition as it turns waste streams such as manure and sewage into biogas, and provides CO<sub>2</sub>-neutral energy. But the efficiency is low because the methane producing bacteria in the biogas digester have trouble accessing the energy locked in fibrous materials such as cellulose and lignin. This fraction passes through the biogas plant unused and is incinerated or spread on agricultural land. At the same time, mushroom producers must buy substrate to grow mushrooms and pay to discard it after use.

The solution: The AST technology creates a resource cycle between biogas production and mushroom production, reducing costs of mushroom production by up to 50% and utilizing also the fibrous fraction in biogas plants. The innovation is a technology where the fibrous fraction from biogas is used for growing mushrooms, and then returned to the biogas plant, offering improved economy as well as significant environmental benefits to both the mushroom and biogas industry.

The project: The AST concept has already been proven in pilot scale, and the next step is a full scale demonstration plant. In this project two AST plants are scaled up and integrated with mushroom production facilities and a biogas plant, respectively. It is essential for the market introduction and thus the commercial success to demonstrate such commercial operation for customers to invest in such plants.

Impact: The project will increase the competitiveness of the European mushroom industry currently under strong pressure from China, as well as the biogas industry, suffering from high operational costs.

The market: Biogas plants are rapidly being established to support the renewable energy transition with more than 15,000 plants currently in operation in Europe. The European mushroom industry uses about 3 m tons of substrate annually and grows with 10%. The market for the innovation is large, has a growing trend and strong drivers.



<b>nanoHPcs</b>		<b>756165</b>
<b>Title: Sustainable nanoHVOF and nanoaxialPlasma coating solutions against wear problems of extrusion machines allowing an eco-efficient use of materials and the increase of recycling in the plastics industry</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>3/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.773.694,75</b>	EU requested grant (€): <b>1.941.586,32</b>	

**Free keywords:** *plastics industry, plastics waste, plastics extrusion, coating technology, thermal spraying technology, resource-efficiency in production, recycling of plastics materials*

### **Abstract:**

Company Thermico has developed the first technology that enables to highly increase the share of recycling in the EU plastics industry. This cost-effective coating technology – called nanoHPcs – solves wear and corrosion problems in critical components of plastics extrusion machines. Today, plastics and fibre-reinforced plastics have become the first material of use in many sectors (construction, automotive, aviation, etc.), being in many cases lighter, cheaper, more resistant and recyclable than metal. This highly affects the production equipment, as for plastics extrusion, machines must cope with increasing production amounts and requirements. Even more challenging is the extrusion of waste materials and of plastics aggregates with abrasive metal, ceramic, glass and wooden particles. The challenge in this industry is to make recycled plastics as pricely attractive as raw plastics material. Since recycled plastic is much more abrasive, extrusion machines must not lose any performance through incorporating the recycled material. Compared to conventional coating methods, nanoHPcs can enhance the share of plastics recycling in the industry by at least 10%, displaying a fantastic price-performance ratio, a reduction of more than 50% of production costs of critical components and of up to 70% of coating manufacturing and finish processing costs. With help of the SME-Instrument, Thermico expects by 2023 a turnover increase from currently €5.3 million to €40.2 million, a staff increase of 132 employees and a market share in its calculated addressable market of 15%. To guarantee a successful market introduction, Thermico will build strong references through numerous field tests at customers. Thermico could therefore acquire 4 launching customers: 1 OEM, 2 repairers and retailers of extruder components and 1 plastics producer. Introduction of the solution in the plastics extrusion market will occur in several steps: DACH countries, the EU and, later, North America and Asia.

<b>NUOVOpb</b>		<b>777780</b>
Title: <b>A unique Lead Acid Battery (LAB) recycling technology to reduce CO2 emissions by 89%, reduce waste by 81%, and transform the battery recycling industry</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>8/1/2017</b>	Duration: <b>18 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.863.000,00</b>	EU requested grant (€): <b>1.304.100,00</b>	

**Free keywords:** *lead acid batteries; hydrometallurgy; lead oxide; recycling; resource efficiency; circular economy*

### **Abstract:**

Lead Acid Batteries (LABs) are a vital and widely-used technology. The global LAB market is expected to grow by 59% to €71.6 billion by 2022 with Europe accounting for the second largest market share.

Waste LAB recycling rates are as high as 95% in Europe, but the current recycling process – smelting waste LABs in a furnace – consumes vast quantities of energy, is highly polluting, wasteful, large scale and expensive. Furthermore, smelted lead must be further processed to produce the essential LAB ingredient: the active lead oxide paste.

A new lead recycling process is needed that is energy efficient, non-polluting, low cost, scalable and produces LAB-ready lead products. Such process would meet EC priorities by addressing resource efficiency, the sustainable supply of raw materials and drive the circular economy. AEL has developed a novel hydrometallurgical process technology to recycle waste LABs in a highly energy efficient, non-polluting and cost effective way. NUOVOpb's commercial appeal lies in its low cost and scalability, and our ground-breaking ability to produce LAB-ready products that exceed the performance of current products on the market. Our LAB-ready paste can create new LABs with 22% greater energy capacity and 50% longer life.

The technology has the potential to transform the global battery recycling industry, which has an expected value of €9.5 billion in 2024. 5 years post project, we expect to be operating 18 NUOVOpb facilities across the world. These will be processing 490,000 tonnes of waste LABs (6% of the global waste LAB market) and avoiding 196,000 tonnes CO2 emissions every year. In doing so, AEL will secure annual revenues of €206 million, profits of €54 million, and will have created 200 jobs within AEL.

NUOVOpb is the most complete closed-loop recycling system in the world, providing significant commercial opportunities for businesses in both the LAB recycling and LAB manufacturing supply chain, globally.

<b>PFS</b>		<b>804453</b>
Title: <b>A cost- energy-efficient treatment technology to remove pharmaceutical pollutants from water</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>3/1/2018</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.962.500,00</b>	EU requested grant (€): <b>2.073.750,00</b>	

**Free keywords:** *wastewater, water treatment, WWTP, pharmaceuticals*

### **Abstract:**

Widely used pharmaceuticals (synthetic or natural chemicals found in prescription medicines, over-the-counter therapeutic drugs & veterinary drugs) are finding their way into the drinking water supply via wastewater treatment facilities, posing serious threats to public health globally. The problem is that modern wastewater treatment facilities are not designed for effective removal of pharmaceuticals or similar organic compounds. Upcoming EU legislation will make such removal mandatory.

Pharem Biotech brings to market PFS—the first patented enzyme-carrying filtration system capable of removing a large range of organic pollutants (pharmaceuticals and other biological active compounds such as bisphenol A, antibiotics, hormone disruptors, etc.). PFS is a filtration solution that can be easily installed at most of wastewater treatment facilities. Its compact size makes it particularly useful for urban wastewater treatment plants.

PFS is based on modified enzymes which are 200 times more effective than native enzymes, resistant to low temperature, resistant to low pH and with high levels of stability and activity. Compared to alternative purification methods, PFS is very cost-efficient, and requires no energy to run.

As the total EU yearly investments in its wastewater treatment facilities and related infrastructure are expected to reach €25bn per year in 2015-2020, Pharem Biotech is addressing the market of 70,000 facilities in EU processing 100bn litres of water per day in total.

During a successful Phase 1 project, Pharem Biotech validated the market and commercial feasibility of PFS, and selected the trial cases to validate the technology as well as key target markets to approach.

In this Phase 2 project Pharem Biotech will industrialize PFS, validate it in trial cases and prepare for commercial roll out with the objective is to deploy 50 PFS systems before 2020 and reach revenue of €34m.

The requested EC contribution is €2.07m.

<b>PHOSave</b>		<b>724586</b>
Title: <b>Innovative solution for phosphate recovery from exhausted extinguishing powders</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>7/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>2.733.767,50</b>	EU requested grant (€): <b>1.913.637,25</b>	

**Free keywords:** *Recovery of exhausted extinguishing powder, Phosphorus, Industrial pilot plant, Agriculture and wood sector, Specialty fertilizers*

### **Abstract:**

The aim of the PHOSave project is the recovery of exhausted extinguishing powder (polyvalent powder) via an eco-innovative, chemical/physical, solubilisation process. In particular, PHOSave aims at developing a system for the recovering of phosphate contained in exhausted extinguishing powder, in order to develop new products to use in fields such as the agriculture and wood sector. The PHOSave specific objectives are:

- 1) Developing an innovative eco-compatible method for removing the powders' oil component that is nowadays an unsolved industrial and environmental problem;
- 2) Implementing a pilot plant for the treatment of the exhausted extinguishing powder recovering phosphate included in them;
- 3) Contributing to the implementation of new eco-sustainable waste management methods, recovering a high added-value non-renewable raw material (phosphate) and being the first industrial level plant constructed in the world;
- 4) Obtaining fundamental raw materials for the formulation of specialty fertilizers for agricultural use achieving further environmental benefits in term of reduced greenhouse gas emissions;
- 5) The recovery of raw material will fit also into an already mature market: flame retardant chemicals and chipboard panel.

The widespread use of PHOSave technology will maximize profits and environmental aspects. The following goals will be achieved: a solution to the problem of exhausted extinguishing powder (which is a special waste); the reduction of CO<sub>2</sub> in the industrial chain and the recovery of raw materials in an almost pure form (phosphorus obtained at 95% at lab scale).

The project has already received several expressions of interest, also for the plant replication, from relevant international organizations in the field of fertilizers, agrochemicals and flame retardants for the wood panelling sector. The PHOSave strategic business plan will have a strong impact on the SMEs competitiveness and job growth in the market of waste management and disposal.

<b>Propelair</b>		<b>778742</b>
<b>Title: The refinement, miniaturisation and demonstration of an ultra low flush toilet capable of saving 2.8 billion litres of clean, potable water being unnecessarily wasted in Europe every day.</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>10/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.271.786,50</b>	EU requested grant (€): <b>890.250,00</b>	

**Free keywords:** *Toilet, WC, water saving, Propelair, waste water, ultra, low, flush,*

### **Abstract:**

As reported by the European Environment Agency, 70million people in Europe are living in water stressed areas. In the Mediterranean region that figure rises to 53%. Water shortages affect almost every country in Europe and the problem is getting worse. Water consumption per person is increasing significantly; by 55% in the last 25 years.

European flushing toilets (WCs) waste valuable, potable water on an unprecedented scale. The 392m installed base of toilets across the EU currently 'flush' away 102bn litres of clean water every day. That is enough to drain Lake Geneva every 20 hours.

There is clearly a pressing need for a novel technology to reduce the volume of water used in flushing toilets.

Existing toilets including the latest ultra low, dual flush units, do not offer the level of water reduction required. Since water volume is integral to their operational mode, they are compromised and all require significant flush volumes to clean effectively.

This project will demonstrate and bring to market readiness a 1.5L ultralow flush toilet that will reduce average toilet water consumption by 75% and directly save 2.8bn litres of water being unnecessarily wasted per day.

Propelair also provides attractive economic benefits and rapid payback to customers. It reduces water bills on average by 60%, (typically €344 per unit p.a.) delivering a payback within just 1.2 years.

This Dedicated SME Instrument project is essential for us to refine, miniaturise, demonstrate and cost reduce our prototype to overcome current barriers to market, including purchase price and lack of a proven long term demonstration.

A successful project delivery will allow us to achieve cumulative sales of €80.7m and an EBITDA of €31.5m by 2023. At a modest 0.5% market penetration, we will our save customers 2.8bn litres of water day or 1.04bn m3 p.a. worth over €1.98bn.

This proposal builds upon a previous proposal 755830 which scored 13.66 and received a Seal of Excellence.

<b>reNEW</b>		<b>783638</b>
Title: <b>Sustainable cleaning agent and organic fertilizer recovery from sewage sludge</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>11/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.980.613,75</b>	EU requested grant (€): <b>1.386.429,00</b>	

**Free keywords:** *Waste Water Treatment (WWT), compound recovery, sustainable WWTP operation*

### **Abstract:**

UTB Envirotec Zrt, is one of the Central European market leaders in engineering services for wastewater and organic waste treatment. In the past few years, we have developed a technology for sustainable valorisation of sewage sludge. The treatment of this sludge represents one of the biggest problems for small and medium sized wastewater treatment plants (WWTP) in Europe. In our process, called reNEW, the sewage sludge is biologically transformed into volatile fatty acids (VFA) and valuable nutrients (NPK), which are recovered. These products represent important market value: VFA as raw material for eco labelled cleaning agents, and NPK as fertilizer. With the aim of exploitation of the reNEW technology, we formed a spin-off company, Renew Technologies Ltd (RNT) in the UK. Our final aim is to roll-out the technology and widely implement it all over Europe, enabling the growth of our companies. We aim to realise the reNEW project in cooperation of the two companies: RNT being the technology owner and responsible for commercial exploitation, while UTB being the technology provider (design, building and implementation of plants). This initiative has received funding in the Horizon 2020 SME Instrument Phase 1, project number: 728932, duration: 01/07/2016-31/12/2016. We have successfully completed the feasibility study. We verified the technological feasibility as well as the economic viability of the project and further improved our business concept. We demonstrated the efficiency and economic value of the two products, VFA and NPK, respectively and made a scale-up design of our pilot operating currently at our premises (TRL=6). We have improved the proposal and discussed it with our clients, technical partners, and the Enterprise Europe Network (EEN). These discussions and the results of the feasibility assessment have reassured us regarding its merit.

<b>RUBSEE</b>		<b>756841</b>
Title: <b>Extending artificial intelligence revolution in the waste field beyond sorting</b>		
Call Id: <b>H2020-SMEINST-2-2016-2017</b>	Topic: <b>SMEInst-11-2016-2017</b>	Type of Action: <b>SME-2</b>
Project start date: <b>2/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>EASME/A/02</b>
Total costs (€): <b>1.800.176,75</b>	EU requested grant (€): <b>1.260.123,73</b>	

**Free keywords:** *Computer vision; artificial intelligence; detection; high-value waste recovery; PET; HDPE; municipal solid waste, Circular economy, Turning waste into money*

### **Abstract:**

Current WTPs (Waste Treatment Plants) aren't able to recover all the valuable waste they process, indeed more valuable materials are lost and landfilled or incinerated. The reason of this wasteful spending is clear: current methods do not allow an increase in material recuperation in a cost-effective way: the incremental cost of recovering more materials is bigger than the market value of the additional materials recovered. Losses can reach 2,5M€/yr of high-value waste PET/HDPE plastics, cans, cartons). Current technologies aren't enough to meet EU regulations like directive 2008/98/EC, which requires that 50% of household waste is recovered by 2020.

Based in our 1st product (Wall-B), SADAKO has developed RUBSEE, a disruptive real-time monitoring system (using Computer vision+Artificial intelligence) of waste flows in a WTP in order to optimize the performance/operation thereof and the recovery of different materials. RUBSEE will allow waste industry improve its economic, regulatory compliance and environmental performance with a solution that is cost efficient and complementary to actual solutions. In order to address present industry need, our goal is to scale from detecting just PET to HDPE, Cans and Bricks, increase/reach detection levels for each material up to >95%, and boost its TRL from 6 to 9.

An average WTP plant, processes 7tn/h of urban waste with 39% content of PET, HDPE and Cans and recovers 6000 tn/year of PET, HDPE & Cans. Thanks to RUBSEE data, current equipment performance can be improved up to 20% by adapting their parameters to the variability of the waste flow on real time. This means 1200 Tn/year, increasing revenues up to 421,200€/yr for an average customer. Assuming that the complete RUBSEE installation cost amounts 142,000 € (10 RUBSEE units + 6000 €/yr Maintenance costs), the investment payback will be 4.2 months for our clients.

Thanks to this RUBSEE project, we expect a boost of the incomes (NET profit associated to RUBSEE: 2,3M€ in 2022)

<b>INSPIREWater</b>		<b>723702</b>
<b>Title: Innovative Solutions in the Process Industry for next generation Resource Efficient Water management</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.621.135,00</b>	EU requested grant (€): <b>5.396.274,75</b>	

**Free keywords:** *water treatment, resource efficiency, holistic approach, membrane technology, catalyst, magnetic separator, innovation management,*

### **Abstract:**

INSPIREWATER demonstrates a holistic approach for water management in the process industry using innovative technology solutions from European companies to increase water and resource efficiency in the process industry. This will put Europe as a leader on the world market for segments in industrial water treatment which will create new high skilled jobs in Europe.

With extended collaboration between technology providers including innovative SME's, world-wide active companies in the chemical and steel industries and research organizations, this project also contributes to the aims of the SPIRE SRA, the European Innovation Partnership (EIP) on 'Water' and to the aims of the Commission's Roadmap on Resource efficiency, supporting effective implementation of European directives and policies in the water management area.

INSPIREWATER addresses non-technical barriers as well as technical, as innovation needs both components and demonstrates them in the steel and chemical industry. A flexible system for water management in industries that can be integrated to existing systems is worked out and demonstrated to facilitate implementation of technical innovations. Technical innovations in the area of selected membrane technologies, strong field magnetic particle separator, and a catalyst to prevent biofouling are demonstrated, including valorisation of waste heat. This will increase process water efficiency as well as resource, water and energy savings in the process industry.

The development and demonstration work is combined with a strong emphasis on exploitation and dissemination. Specific exploitation strategies are developed for the different solutions in INSPIREWATER. Dissemination targets different target groups: Stakeholders in different process industry also beyond the involved ones, e.g. Pulp and paper, but also policy makers based on the findings of the project.



<b>ReWaCEM</b>		<b>723729</b>
Title: <b>Ressource recovery from industrial waste water by cutting edge membrane technologies</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.781.631,25</b>	EU requested grant (€): <b>5.041.866,76</b>	

**Free keywords:** *Recovery of process water, Recovery of valuable salts, metals and minerals, Closed loop processes, energy efficiency, Metal industry, Metal plating industry*

### **Abstract:**

The ReWaCEM project aims at reducing water use, wastewater production, energy use, valuable metal resource recovery and water footprint by between 30-90% in the metal plating, galvanizing and printed circuit board industry. In order to achieve these goals, ReWaCem will adopt two cutting edge membrane technologies suitable for the requirements of closed material cycles approaches and recovery concepts in metal processing industry: Diffusion Dialysis (DD) and Membrane Distillation (MD) as an integrated hybrid process. This combination of existing technologies will be adapted to fit the requirements of 4 pilot demonstration sites in representative industrial applications of the metallurgical industry in order to evaluate the accomplishment of the ReWaCEM goals. Through the evaluation of the demonstration a highly attractive technological solution for low energy wastewater treatment will be available to be entered into the large and growing market of metal processing. This market will profit significantly from the technological outcome of the innovation action, with cost savings and environmental benefits as relevant rewards. In order to maximise impact, the project consortium was selected carefully to represent all relevant stakeholders in the quadrant of end users, scientific partners, associations and decision makers and SMEs. The consortium will establish a dissemination & exploitation board that will create a substantial network of interest groups from agencies, industry, research SMEs and research centres as well as universities. The successful exploitation of the results will lead to a post project up-scaling of the technology and a step by step market introduction. Part of ReWaCEM will be to mobilise all relevant stakeholders into promoting innovative membrane solutions for industrial water and resources management, leading to the effective implementation of European directives and policies while creating market opportunities for European industry and SMEs.

<b>SPOTVIEW</b>		<b>723577</b>
Title: <b>Sustainable Processes and Optimized Technologies for Industrially Efficient Water Usage</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-01-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>10/3/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.515.940,00</b>	EU requested grant (€): <b>6.863.359,63</b>	

**Free keywords:** *separation technologies, deionization, ultrafiltration, water reuse, heat pump; valuable substances recovery, microbial control, modelling, water footprint, Life Cycle Assessment, competitiveness*

### **Abstract:**

The objective of the SPOTVIEW project is to develop and demonstrate innovative, sustainable and efficient processes and technology components, in order to optimize the use of natural resources, especially water, in three industrial sectors (Dairy, Pulp and Paper and Steel) contributing to 44% of industrial water usage in EU. This resource optimization (including water, energy, raw materials and additives) is a key issue to maintain production competitiveness and sustainability. A total of 14 existing and new technologies will be assessed during the project, including solid/liquid separation, ultrafiltration, deionization, biological treatment, disinfection and chemical heat pump. The technology components will be assessed in simulated or operational environment for 9 new water management practices in the three industrial sectors. Up to 7 selected technologies demonstrators are planned in real industrial environment. The implemented process and technology will be evaluated in terms of environmental impacts and benefits, generated by achieving the SPOTVIEW targets (20% to 90% reduction of water usage, wastewater emissions, chemicals and energy use). The SPOTVIEW consortium covers the whole value chain, from technology development, assessment, supply and industrial applications in each targeted sector. Economic exploitation of the proposed technologies is pursued through a well described business case scenario and market penetration strategy. The market opportunities for future services and technology products beyond the SPOTVIEW project will generate up to 2800 new equipment and 7000 new jobs in Europe. The expected gains for the industrial sectors generated by the recovery of by-products and by energy, chemicals and additives savings represent annually 1.53b€ for Europe. The generated production capacity increase by companies has been estimated at 22.8b€. Dissemination and training activities are planned to maximize the impact of the project.

<b>COCOP</b>		<b>723661</b>
Title: <b>Coordinating Optimisation of Complex Industrial Processes.</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.898.913,75</b>	EU requested grant (€): <b>5.898.913,75</b>	

**Free keywords:** *process control, distributed control, model-predictive control, optimal scheduling, data analysis, decomposition, coordination, optimisation, co-creation, gamification, process automation*

### **Abstract:**

The vision of COCOP is that complex process-industry plants are optimally run by operators with the guidance of a coordinating, real-time optimisation system. COCOP will strengthen the global position of the European process industry, which represents 20 per cent of the European manufacturing base with around 450,000 companies generating €1.6 billion in turnover and 6.8 million jobs.

The project's objective is to enable plant-wide monitoring and control by using the model-based, predictive, coordinating optimisation concept in integration with plant's automation systems. This ambitious approach will be developed and verified in co-operation of European universities, research institutes and industry. The Consortium comprises two universities, three research organisations, the leading copper-plant technology provider, two large companies from the process industry (steel and special chemicals) and four SMEs providing automation solutions.

Technical objective is to define, design and implement a concept that integrates existing industrial control systems with efficient data management and optimisation methods and provides means to monitor and control large industrial production processes. The plant-wide monitoring and control comprehend computationally intensive data analysis and large scale optimisation. The social objective is to improve operator plant-wide awareness and reduce mental workload.

COCOP will liaise with standardisation bodies (automation) to ensure a sustained impact of the project's results. Commercialisation of the solution by its process-automation industry partners will allow plant operators to approach optimal production and result in reduced energy and resource consumption, and decreased on-site material handling time and greenhouse gas emissions.

<b>CoPro</b>		<b>723575</b>
Title: <b>Improved energy and resource efficiency by better coordination of production in the process industries</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>11/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.537.270,00</b>	EU requested grant (€): <b>6.059.645,00</b>	

**Free keywords:** *Plant-wide control, plant monitoring, site-wide coordination, inter-company coordination, efficient model development, integrated scheduling and control, IT integration platform, advanced HMI*

### **Abstract:**

The goal of CoPro is to develop and to demonstrate methods and tools for process monitoring and optimal dynamic planning, scheduling and control of plants, industrial sites and clusters under dynamic market conditions. CoPro will provide decision support to operators and managers and develop closed-loop solutions to achieve an optimally energy and resource efficient production.

In most plants of the process industries, the energy and resource efficiency of the production depends critically on discrete decisions on the use of equipment, shutdowns, product changeovers and cleaning or regeneration of equipment. CoPro will consider these discrete decisions in plant-wide dynamic optimization and develop integrated scheduling and control solutions. Advanced online data analytics will be developed for plant health and product quality monitoring. The detection of anomalies will trigger fast re-scheduling and re-optimization.

CoPro will demonstrate advanced plant-wide and site-wide coordination and control in five typical use cases that cover a wide range of sectors of the process industries, and the whole value chain:

- Petrochemical production site
- Base chemicals and polymer production site
- Recycling system in cellulose production
- Consumer product formulation and packaging plant
- Food processing plant

In addition, CoPro will develop methods for the coordination of plants in industrial parks that belong to different companies, thus providing a basis for future industrial symbiosis.

CoPro pays special attention to the role of operators and managers in plant-wide control solutions and to the deployment of advanced solutions in industrial sites with a heterogeneous IT environment. As the effort required for the development and maintenance of accurate plant models is the bottleneck for the development and long-term operation of advanced control and scheduling

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solutions, CoPro will develop methods for efficient modelling and for model quality monitoring and model adaption

<b>FUDIPO</b>		<b>723523</b>
Title: <b>Future Directions of Production Planning and Optimized Energy- and Process Industries</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.740.676,25</b>	EU requested grant (€): <b>5.740.676,25</b>	

**Free keywords:** *Robust, Learning systems, Modelling, Diagnostics, Optimization, Planning, Energy, Resource, Efficiency, Improvements*

### **Abstract:**

Machine learning have revolutionized the way we use computers and is a key technology in the analysis of large data sets. The FUDIPO project will integrate machine learning functions on a wide scale into several critical process industries, showcasing radical improvements in energy and resource efficiency and increasing the competitiveness of European industry. The project will develop three larger site-wide system demonstrators as well as two small-scale technology demonstrators. For this aim, FUDIPO brings together five end-user industries within the pulp and paper, refinery and power production sectors, one automation industry (LE), two research institutes and one university. A direct output is a set of tools for diagnostics, data reconciliation, and decision support, production planning and process optimization including model-based control. The approach is to construct physical process models, which then are continuously adapted using “good data” while “bad data” is used for fault diagnostics. After learning, classification of data can be automated. Further, statistical models are built from measurements with several new types of sensors combined with standard process sensors. Operators and process engineers are interacting with the system to both learn and to improve the system performance. There are three new sensors included (TOM, FOM and RF) and new functionality of one (NIR). The platform will have an open platform as the base functionality, as well as more advanced functions as add-ons. The base platform can be linked to major automation platforms and data bases. The model library also is used to evaluate impact of process modifications. By using well proven simulation models with new components and connect to the process optimization system developed we can get a good picture of the actual operations of the modified plant, and hereby get concurrent engineering – process design together with development of process automation.

<b>MONSOON</b>		<b>723650</b>
Title: <b>MOdel based coNtrol framework for Site-wide OptmizatiON of data-intensive processes</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-02-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.497.190,00</b>	EU requested grant (€): <b>5.497.190,00</b>	

**Free keywords:** *process industry, data driven methodologies, multiscale model based predictive control, big data analytics, process management, life cycle management, integrated training, development environment*

### **Abstract:**

The MONSOON vision is to provide Process Industries with dependable tools to help achieving improvements in the efficient use and re-use of raw resources and energy.

MONSOON aims at establishing a data-driven methodology supporting the exploitation of optimization potentials by applying multi-scale model based predictive controls in production processes.

MONSOON features harmonized site-wide dynamic models and builds upon the concept of the cross-sectorial data lab, a collaborative environment where high amounts of data from multiple sites are collected and processed in a scalable way. The data lab enables multidisciplinary collaboration of experts allowing teams to jointly model, develop and evaluate distributed controls in rapid and cost-effective way. Hybrid simulation and seamless integration techniques are adopted for rapid prototyping and deployment in real conditions.

MONSOON will be developed and evaluated in two sites from the aluminium and plastics domains. The aluminium scenario will be focused on predictive monitoring of potlines, targeting early detection of anomalies and identification of potential optimization gains. Aluminium cases will be implemented in the plant with the highest primary aluminium production in the EU-28, namely the AP Dunkerque smelter, France. The plastics scenario will focus on fusing data from data-intensive in-mould sensors with information from higher SCADA levels, enabling early and precise identification of potential issues. This use case will be implemented in the GLN plant in Maceira-Leiria.

MONSOON addresses the SPIRE vision, providing advantages for the European industry competitiveness and sustainability through the realization of an overarching monitoring and control infrastructure. MONSOON aims at creating synergies within and between the process industry sectors, boosting European industry in the worldwide race for competitiveness and sustainability.

<b>Bio4Products</b>		<b>723070</b>
<b>Title: 4x4, demonstrating a flexible value chain to utilize biomass functionalities in the processing industry</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-03-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.129.830,00</b>	EU requested grant (€): <b>4.335.393,00</b>	

**Free keywords:** *Bio-resources, optimal utilisation, flexible value chain, demonstration, key functionalities, process industry, pyrolysis, lignin, sugars*

### **Abstract:**

Biomass is a valuable, sustainable feedstock for the production of high added value chemicals and materials, and will play an important role in the transition of the European Process Industry to a Sustainable Process Industry. However, for the optimal utilization of these bio-resources the fractionation of the biomass on basis of functionalities is required. The innovative approach of BIO4PRODUCTS is to apply a short thermal treatment at elevated temperature enabling the fractionation of the bio-resource, but keeping the key chemical functionalities in separate, depolymerized fractions. Within the project the process will be demonstrated in a 3 t/d demo-plant. Subsequently, BIO4PRODUCTS will demonstrate the use of the resulting intermediate processing streams for the production of wood preservation products, furanic resins, phenolic resins and roofing material as cost-effective renewable alternatives for fossil resources in the conventional products (30-100% substitution). Each of the steps in the whole chain has at least been proven on bench-scale (TRL5) and should reach TRL 6-7 by execution of this project. The feedstock flexibility will be shown by demonstrating the complete chain for 4 different biomass resources representative for the majority of biomass resources available in Europe. Integral topics covered by the project are the techno-economic and environmental assessments as well as the development of business plans for subsequent commercialization of the individual product lines and the overall value chain.

The BIO4PRODUCTS consortium consists of 2 large industries and 4 SME's and 1 one non-profit organization covering the whole chain from biomass collection, primary and secondary conversion, and final use in end products. Additionally, specific expertise is included on environmental evaluation and the market introduction of sustainable products.



<b>KARMA2020</b>		<b>723268</b>
Title: <b>Industrial Feather Waste Valorisation for Sustainable KeRatin based MAterials.</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-03-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>1/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.679.744,39</b>	EU requested grant (€): <b>5.880.471,38</b>	

**Free keywords:** *Keratin, bioplastics, feathers*

### **Abstract:**

According to European Commission, 13.1 million tons of poultry meat was produced only in the European Union (EU-28) in 2014 with an estimated generation of 3.1 million tons feather waste. At present the majority of poultry feathers are converted into low nutritional value animal food or disposed in landfills, causing environmental and health hazards. In this context, the overall objective of KaRMA2020 is the industrial exploitation of such underutilized waste to obtain added value raw materials for the chemical sector: keratin, bioplastics, flame retardant coatings, non-woven and thermoset biobased resins. This will be accomplished through either: i) innovative and sustainable approaches (already patented by some of KaRMA2020 partners), or ii) conventional and economic techniques. The obtained raw materials will be manufactured at industrial scale and further used for the production of novel bio-based products such as: slow release fertilizers, biodegradable food packaging plastics, flame retardant coated textiles and flame retardant thermoset biobased composites. The sustainability of the new raw materials and end-products will be evaluated through LCA assessment. Additionally, an integrated waste management plan will be elaborated to minimize environmental impacts generated by wastes.

Communication and knowledge transfer as well as a detailed business plan will allow maximizing overall profitability of KaRMA2020 results.

The well balanced composition of the consortium including industry, RTD performers and academia give KaRMA2020 the maximum chance of success.

<b>REHAP</b>		<b>723670</b>
<b>Title: Systemic approach to Reduce Energy demand and CO2 emissions of processes that transform agroforestry waste into High Added value Products.</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-03-2016</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.224.644,99</b>	EU requested grant (€): <b>6.743.545,00</b>	

**Free keywords:** *lignocellulose waste, lignin, tannins, sugars, building blocks, up-scaling, process engineering, construction sector, bioresins, bioadhesives, bio-insulation foam, biosuperplasticant, revalorization*

### **Abstract:**

Europe's position in the production of biochemicals from biomass and by-products is limited to a few compounds, while their demand is among the largest in the world. However, Europe has a lot of world leader chemical companies. On the other hand, lignocellulosic waste constitutes one of the most abundant resources without competing with food chain.

REHAP's 16 partners aim at revalorizing agricultural (wheat straw) and forestry (bark) waste through its recovery, and primary (sugars, lignin, tannins) and secondary (sugar acids, carboxylic acids, aromatics and resins) processing to turn them into novel materials, and considering Green Building as business case. The project will provide reductions in utilization of fossil resources of 80-100%, and energy utilization and CO2 emissions above 30%. Specifically, building blocks (1,4 and 2,3-Butanediol, estherpolyols), materials (PUs, phenolic resins, modified hydrolysis lignin) and products (wooden boards, insulation foams, cement, adhesive) will be obtained:

- Isolation of tannins and carbohydrates from forestry waste to turn them into bio-phenolic resins for wooden panels and isocyanate-free polyurethanes (PU) for insulating foams, respectively.
- Isolation of lignin and carbohydrates from agricultural waste to turn them into bio-phenolic resins for wooden panels and biosuperplasticizers for cement, and estherpolyol PU for adhesives, respectively.
- Fire retardant lignin and sugar-based additives will be also developed.

Developed processing technologies (chemo/thermo/enzymatic and fermentation) will be optimized at pilot scale (TRL6-7) for further exploitation and replication of results. All products will be integrated in a prototype to demonstrate industrial applicability into the Green Construction sector. Throughout the project, Life Cycle and Cost Assessment, market analysis, business plan, waste management strategy and measures for future standardization will be implemented using a systemic perspective approach.

<b>DREAM</b>		<b>723641</b>
Title: <b>Design for Resource and Energy efficiency in cerAMic kilns</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2016</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.076.105,00</b>	EU requested grant (€): <b>5.076.105,00</b>	

**Free keywords:** *Ceramic Kilns, Refractory Materials, Simulation, Heat Pipes, Ceramic Tile Manufacturing*

### **Abstract:**

The DREAM project aims to design, develop and demonstrate a radically improved architecture for ceramic industrial furnaces, characterised by optimised energy consumption, reduced emissions, and lower operating costs compared to currently available technological solutions. This will be obtained by substantially enhancing specific furnace parts (control system, refractories, emissions abatement system) and by adding new modules and sub-systems (CHP unit, heat pipes) to the current furnace architecture.

DREAM Specific objectives will be:

O1 – To design innovative hardware furnace components improving energy efficiency (biofuel-fed CHP unit, heat pipes, emission abatement system)

O2 – To introduce substantial improvements on current hardware-software kiln parts (kiln control tool, refractory materials)

O3 – To test the DREAM solutions in a variety of industrial settings (retrofitting and pilot kiln demonstrators)

O4 – To pave the way for a full seizure of DREAM related market opportunities (dissemination, exploitation within the ceramic sector and market replication)

DREAM will develop and demonstrate technologies enabling a significant advancement in the sustainability of ceramics processes, implementing 5 synergic lines of research and 3 industrial demonstrators, which will act as technological showcases for market deployment. Such approach will enable to advance, in the five lines of research, from TRL4 to TRL6.

DREAM will strongly contribute to both the sustainability and competitiveness of the European ceramics and process industries. In particular, the DREAM technologies will earn an overall 20% OPEX and energy consumption reduction for industrial furnaces, with an average investment payback time for end users lower than 3 years.

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The DREAM coordinator and industrial partners are technology and market leaders in the ceramics equipment field, and this will streamline the translation of the DREAM research results into successful products and services.

<b>IMPROOF</b>		<b>723706</b>
Title: <b>INTEGRATED MODEL GUIDED PROCESS OPTIMIZATION OF STEAM CRACKING FURNACES</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.878.401,25</b>	EU requested grant (€): <b>6.878.401,25</b>	

**Free keywords:** *steam cracking furnace, light olefin production, high emissivity material, 3D reactor designs, renewable fuels, high performance computing, model based optimization*

### **Abstract:**

The objective of the project IMPROOF is to drastically improve the energy efficiency of steam cracking furnaces by at least 20%, in a cost effective way, while simultaneously reducing emissions of greenhouse gasses and NOx per ton ethylene produced by at least 25%. One important way to reduce the energy input in steam cracking furnaces is to reduce coke formation on the reactor wall. The use of either advanced coil materials, combined with 3D reactor designs, improved process control, and more uniform heat transfer will increase run lengths, reducing simultaneously CO2 emissions and the lifetime of the furnaces. Biogas and bio-oil will be used as alternative fuels because they are considered renewable, and hence, decrease net CO2 production.

Application of high emissivity coatings on the external surface of the radiant coils will further substantially improve the energy consumption. Less firing is required to reach the same process temperatures in the radiant coils. This will reduce fuel gas consumption and CO2 emissions by 10 to 15%.

IMPROOF will demonstrate the advantage of combining all these technological innovations with an anticipated increase of the time on stream with a factor 3.

To select the correct technologies for sustainable implementation in complex plant-wide and industrial data-intensive process systems, all the technology will be implanted in real-plant conditions at TRL6 in DOW.

The strongly industrial oriented consortium is composed of 7 industrial partners, including 2 SME completed by 2 RTO and 2 university. This partnership shows a clear and strong path to the industrial and economical world with the involvement of all actors of the furnaces business.

The financial resources mobilized by the partners represent a total grant of 6 878 401,25 € with a global effort of 538 person.month.

<b>VULKANO</b>		<b>723803</b>
Title: <b>Novel integrated refurbishment solution as a key path towards creating eco-efficient and competitive furnaces</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-04-2016</b>	Type of Action: <b>RIA</b>
Project start date: <b>7/1/2016</b>	Duration: <b>42 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.940.813,75</b>	EU requested grant (€): <b>6.940.813,75</b>	

**Free keywords:** *retrofitting, industrial furnace, refractory, PCM, control system, co-firing, energy efficiency, steel sector, ceramic sector*

### **Abstract:**

The main goal of VULKANO is the retrofitting of two types of industrial furnaces, namely preheating and melting, applied on three energy-intensive sectors (steel, ceramic and aluminium) with a huge number of potential users in Europe. Thus, this project aims to design, implement and validate an advanced retrofitting integrated solution to increase the energy and environmental efficiency in existing industrial furnaces fed with NG; through the combined implementation of new solutions based on high temperature phase change materials, new refractories, optimised co-firing of NG and syngas from biomass or process gas, an advanced monitoring and control system and an holistic in-house predictive tool. All together will achieve a 20% increase in the energy efficiency of furnaces.

On top of that, the realistic and powerful holistic tool will also be able to optimize the integration of the solution with upstream/downstream perspective, following a life cycle and cost thinking. This predictive tool will support plant operators and decision makers to select most suitable retrofitting strategy for their plants, fostering overall efficiency, increase in competitiveness and circular economy and reducing the environmental impact of the product value chain from an LCA and LCC perspective.

The retrofitting solutions will be tested at TRL 7 in two real facilities in Ceramic (Spain) and Steel (Slovenia) sector, validating the replicability of such solutions in a third sector (Aluminium-Turkey). VULKANO addresses the main challenge when facing furnaces retrofitting, which is tackling the problem from an overall and cost thinking perspective, which will enable overcoming the barriers for energy efficiency improvements. A well balanced consortium formed by end-users, technology solutions providers and research organizations ensures successful achievement of objectives, which will allow a wide spreading replication strategy towards furnaces retrofitting towards modern and efficient designs

<b>CarbonNext</b>		<b>723678</b>
Title: <b>The Next Generation of Carbon for the Process Industry</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-05-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>495.747,50</b>	EU requested grant (€): <b>495.747,50</b>	

**Free keywords:** *Carbon sources*

### **Abstract:**

The process industries and other crude oil consuming sectors are heavily dependent on fossil inputs for both carbon feedstock and energy, with the consequential CO<sub>2</sub> emission problems and import dependency as a result. To be prepared for a future with significantly reduced emissions they are seeking alternative carbon sources to replace traditional fossil fuels.

The objective of the CarbonNext project is to evaluate the potential use of CO<sub>2</sub>/CO and non-conventional fossil natural resources as feedstock for the process industry in Europe. The work will examine the existing and expected sources of CO<sub>2</sub> and CO as well as non-conventional fossil natural resources such as shale gas, tar sands, coal bed methane, gas to liquid, and coal to liquid technologies.

Results of the project will include the identification of value chains within processes and where industrial symbiosis can be valuable (chemistry, cement, steel, etc.). The CarbonNext project will inform, as a basis for decision-making, Europe's SME's, large industry and policymakers with an enhanced understanding of the impact and opportunities for new sources of carbon for the processing industry. CarbonNext will primarily focus on new sources of carbon as a feedstock and secondarily the impact on energy availability, price and emissions.

The CarbonNext consortium brings together three of the leading organisations in the field of carbon dioxide/carbon monoxide utilisation. The knowledge base that each member brings is as a leader in the field and is therefore exemplary. CarbonNext will build on the project team achievements in the FP7 project SCOT (Smart CO<sub>2</sub> Transformations), the BMBF funded coordination project CO<sub>2</sub>Net, the CO<sub>2</sub>Chem network and many climate and energy related projects in Europe and for the European Commission.

<b>INSPIRE</b>		<b>723748</b>
Title: <b>Towards growth for business by flexible processing in customer-driven value chains</b>		
Call Id: <b>H2020-SPIRE-2016</b>	Topic: <b>SPIRE-06-2016</b>	Type of Action: <b>CSA</b>
Project start date: <b>9/1/2016</b>	Duration: <b>24 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>495.065,00</b>	EU requested grant (€): <b>495.065,00</b>	

**Free keywords:** *Flexible processing; customer-driven value chains; innovative business models; manufacturing, Factories of the Future; SPIRE community; SMEs; scenarios & validation*

### **Abstract:**

INSPIRE aims at increasing the competitiveness of European manufacturing which depends on producing differentiated and high added value products in an efficient and sustainable manner, with reduced production costs, increased product quality, minimised time to market and optimized strategies towards resource efficiency. The main focus of this project is the development of innovative business models creating flexible networks through the use of intensified processing that would promote more local production in Europe within the 5 years after the end of this study. The project takes an interesting and valuable approach by bringing together the (downstream) manufacturing ("Factory of the Future") community with the (upstream) process industry (SPIRE) community, as well as regional industrial clusters (parks) to study required changes of business models in Europe, due to a.o. 1) further integration of these industries in the value chain leading to more flexible and demand driven business operation and 2) increased trends towards resource sharing and optimization across multiple process industries (e.g. through industrial symbiosis within regional contexts such as industrial parks). Special attention will also be given to how this approach would be responding to the needs of SMEs as partners in value chains. Expected outcome of this project would be the description of the current European landscape and link between intensified processing and flexibility, development of innovative business models for different sectors in general, and providing a guideline to measure the performance of such novel models under different scenarios.



<b>ENSUREAL</b>		<b>767533</b>
<b>Title: Integrated cross-sectorial approach for environmentally sustainable and resource-efficient alumina production</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.971.037,50</b>	EU requested grant (€): <b>7.251.488,89</b>	

**Free keywords:** *Pedersen, sustainable process industries, circular economy*

### **Abstract:**

Global alumina production capacity is forecast to grow by 30% over the next ten years. Unfortunately, Europe cannot keep the competition and is highly dependent on imported alumina and bauxite. ENSUREAL project's main objective is to decrease this dependence and characterise all the streams of the alumina industry in order to valorise them and make the European aluminium industry more competitive at a global scale.

In order to do so, ENSUREAL addresses the production of alumina of the aluminium production sector, through the introduction of a new technology (Pedersen process) that improves the process' yield and its energy and environmental performance. Moreover, ENSUREAL's consortium proposes a new value chain that takes into account all the streams as valorisable products across the aluminium supply chain and introduces the foundry and the agricultural sector. A call for transparency (no-more-black-boxes) and thus a deeply cross-sectorial initiative.

More specifically, ENSUREAL brings together the aluminium sector (Aluminium of Greece), the foundry sector (Odlownie Polskie S.A., Poland), the agricultural sector (Luvena S.A., Poland) and lime producers (CaO Hellas, Belgium), in order to demonstrate the new technologies and approaches proposed. The innovative character of the project is brought by major players in R&D, such as SINTEF, NTUA and NTNU. Outotec and SMS group bring outstanding engineering and process expertise. Furthermore, 3 SMEs will help define and optimise the bauxite scenario in Europe (AdMiRIS), develop ENSUREAL's business case (ITRB) and study the upscaling of the process for future commercial prospects (KON Chem). Last but not least, clustering with other EU initiatives, including other SPIRE projects, will be paid special attention in order to promote a transparent approach of development that show the aluminium producers in Europe all the benefits of implementing the ENSUREAL process once it is demonstrated.

<b>Morse</b>		<b>768652</b>
Title: <b>Model-based optimisation for efficient use of resources and energy</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.791.410,00</b>	EU requested grant (€): <b>4.700.692,50</b>	

**Free keywords:** *Trough process optimisation, process industry, software framework, process model, production coordination, process monitoring, resource and energy efficiency, process control, model predictive control*

### **Abstract:**

The process industry is continuously looking for new ways to improve resource efficiency due to high dependence on resources (energy, raw materials and utilities). In large scale production even small changes in using raw materials and in energy can significantly improve process efficiency. The MORSE approach is to adopt new software tools for model-based predictive control, multi-criterial through process optimisation and quality management with overall process coordination. The application of these new software tools will lead to process improvements - reducing the use of raw material and energy while increasing the high quality and production rates.

The Morse project aims to further develop and to integrate a set of software tools that have partly already been validated in different process steps in steel industries. These software prototype tools and models were developed and evaluated by six R&D partners of the consortium in collaboration with three process industry partners. With the enhanced Morse tools companies of the process industry will be enabled to optimise the use of raw materials and energy by coordinated prediction and control of resource input and product quality along the entire process route from raw material and energy intake to customer delivery.

The mission of the Morse project is to develop model-based, predictive raw material and energy optimisation tools for the whole process route. This approach will be demonstrated in steel industry, to increase yield and product quality in production of high-strength carbon steels, stainless steels and cast steels.

<b>SUPREME</b>		<b>768612</b>
<b>Title: Sustainable and flexible powder metallurgy processes optimization by a holistic reduction of raw material resources and energy consumption.</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-07-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>9.810.118,75</b>	EU requested grant (€): <b>7.959.642,89</b>	

**Free keywords:** *powder metallurgy, additive manufacturing, near-net shape, water atomization, gas atomization, ball milling, ferrous metal, non-ferrous metals, mineral concentration, process control*

### **Abstract:**

SUPREME aims at optimizing powder metallurgy processes throughout the supply chain. It will focus on a combination of fast-growing industrial production routes and advanced ferrous and non-ferrous metals. By offering more integrated, flexible and sustainable processes for powders manufacturing and metallic parts fabrication, SUPREME enables the reduction of the raw material resources (minerals, metal powder, gas and water) losses while improving energy efficiency, production rate and CO2 emissions, into sustainable processes and towards a circular economy. To achieve this goal, an ambitious cross-sectorial integration and optimization has been designed between several powder metallurgy processes: gas and water atomization as well as ball milling for metal powder production, additive manufacturing and near-net shape technologies for end-parts fabrication. Quality and process control will be developed to monitor KPI, based on eco-innovation approach, to demonstrate the optimization of material and energy use. 4 demonstrators will be proposed at each step of the value chain in real industrial setting and ready for business exploitation at TRL 7: mineral concentration, metal powder manufacturing, metal part manufacturing and end-product that will validate a global optimization of more than 25% on material yield losses, more than 10% on energy efficiency, more than 10% on production rate and beyond 30% of CO2 emissions. SUPREME has gathered an outstanding consortium of 17 partners from 8 countries, represented by 11 companies including 6 SMEs that will ensure a successful implementation towards market applications. 5 applications sectors are targeted: automotive, aeronautics, cutting tools, molding tools and medical. The process key differentiation advantages will bring modularity, flexibility and sustainability to powder metallurgy and will reduce the total cost breakdown of these technologies, boosting their adoption by industry.

<b>Carbon4PUR</b>		<b>768919</b>
<b>Title: Turning industrial waste gases (mixed CO/CO<sub>2</sub> streams) into intermediates for polyurethane plastics for rigid foams/building insulation and coatings</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-08-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.765.358,75</b>	EU requested grant (€): <b>7.765.358,75</b>	

**Free keywords:** *Flue gas mixture conversion, CO<sub>2</sub>/CO mixture, chemical building blocks, polyurethanes, lactones, cyclic carbonates, polymer intermediates, rigid foams, coatings, catalysis, decarbonisation, CCR, CCU*

### **Abstract:**

The EU process industry needs to become less dependent of fossils as source of carbon, and – at the same time - to reduce the greenhouse effect by decarbonizing the economy. Carbon4PUR will tackle the two challenges at the same time by transforming the CO<sub>2</sub>/CO containing flue gas streams of the energy-intensive industry into higher value intermediates for market-oriented consumer products. The industrially driven, multidisciplinary consortium will develop and demonstrate a novel process based on direct chemical flue gas mixture conversion, avoiding expensive physical separation, thus substantially reducing the carbon footprint, and also contributing to high monetary savings.

Both the consortium and the work are organized along the full value chain starting with the provision and conditioning of industrial emissions from a steel to a chemical company in line with the concept of industrial symbiosis, going through the transformation into chemical building blocks – lactones and cyclic carbonates – which both will be further transformed into polymer intermediates and flow into desired sustainable polyurethane applications of rigid foams and coatings. LCA and technology evaluation will be done and replication strategies to transfer the technology to other applications will be elaborated. The distinctive feature of the developed process is avoiding resource-intense separation of the gas components before the synthesis, and developing a chemo-catalytic process to deal directly with the gas mixture instead. The challenge and innovation is coming up with an adjustable process in terms of on-purpose and demand tailor-made production of required products, taking into account all variables at the same time: the available flue gases characteristic from the steel plant, material and process parameters, and the market requirements for the end product, thus flexibly involving the whole value chain with best results and possibly lower the prices.

<b>ICO2CHEM</b>		<b>768543</b>
Title: <b>From industrial CO2 streams to added value Fischer-Tropsch chemicals</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-08-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.948.588,75</b>	EU requested grant (€): <b>5.948.588,75</b>	

**Free keywords:** *Chemicals from CO2, Fischer-Tropsch, white oils, high molecular weight waxes, coatings sealants, greenhouse gas reduction, carbon capture and utilisation, heat exchanger reactor, RWGS, CVD*

### **Abstract:**

The overall aim of the project is to develop a new production concept for converting CO<sub>2</sub> to white oils and aliphatic high molecular weight waxes. The products are used for wax emulsions and white oils to be used in coatings and sealant materials. The properties of the raw materials will be tested against current fossil based materials. The main raw material for the process is CO<sub>2</sub> which is available from processes currently operating at a large industrial site with significant annual CO<sub>2</sub> emissions. H<sub>2</sub> is obtained as by product from a chlor-alkali plant on the site. Currently H<sub>2</sub> is produced in excess and it is used mainly for energy production. Currently at this chemical production site about 2 million tons/a of CO<sub>2</sub> is vented to the atmosphere, creating a huge GHG emission reduction potential. The core of this project is a combination of reverse water gas shift (RWGS) coupled with advanced, modular Fischer-Tropsch (FT) technology. The RWGS-step converts CO<sub>2</sub> with H<sub>2</sub> to carbon monoxide. The following FT-reaction step will be carried out in a novel intensified reactor recently developed and patented by Ineratec. Over 1500 kg of white oils and high-molecular weight wax will be manufactured using a container-sized microstructured reactor system. Techno-economic and environmental assessments will be carried out to demonstrate the potential of the new concept in different locations and integration sites. A business plan will be formulated in the project for a follow-up of a commercial industrial demonstration project.

<b>RECODE</b>		<b>768583</b>
<b>Title: Recycling carbon dioxide in the cement industry to produce added-value additives: a step towards a CO2 circular economy</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-08-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>8/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>7.904.415,00</b>	EU requested grant (€): <b>7.904.415,00</b>	

**Free keywords:** *Ionic liquids, calcium carbonate nanoparticles, carboxylic acids, cement industry, CO2 purification, CO2 utilization*

### **Abstract:**

CO<sub>2</sub> from the flue gases of a rotary kiln in a cement industry (CO<sub>2</sub>: 25 vol%) will be used for the production of value-added chemicals (acid additives for cement formulations) and materials (CaCO<sub>3</sub> nanoparticles to be used as concrete fillers). A circular-economy-approach is enabled: the CO<sub>2</sub> produced by cement manufacturing is re-used in a significant part within the plant itself to produce better cement-related products entailing less energy intensity and related CO<sub>2</sub> emissions by a quadratic effect.

Ionic liquids (bare or amine-functionalised) will be the key technological playground for the efficient and cost-effective (<30 €/ton) purification of CO<sub>2</sub> to a purity grade sufficient for the above mentioned utilisation paths. A dedicated pilot plant (flue gas flow rate: 50 Nm<sup>3</sup>/h) will be developed, based on the knowledge-based selection of the best ionic-liquids composition and operating conditions.

Within a final TRL 6 integrated system demo campaign, the thereby derived CO<sub>2</sub> will be utilised in parallel to:

-) promote the precipitation of nano-CaCO<sub>3</sub> powders which act as strength enhancer and accelerator of the hydration rate.

-) synthesize through electrocatalytic and catalytic pathways formic acid, oxalic acid and glycine to be used as hardening acceleration promoters, grinding aids or ionic liquids additives, respectively.

Distinctive features of the RECODE approach are the high process intensification and scale-up-ability; the use of low-grade heat sources; the meaningful reduction of CO<sub>2</sub> emissions (>20% accounting for direct and indirect means) and the good market potential of their products at a mass production scale.

The first two years of the project will be focused on the development of key functional materials and process units at TRL 4-5, the third year on the assembly of single-process lines certified at TRL 5-6, and the fourth year on the assembly and testing at a cement manufacturing site (TITAN) of the TRL 6 integrated CO<sub>2</sub> process.

<b>DEMETO</b>		<b>768573</b>
Title: <b>Modular, scalable and high-performance DE-polymerization by MicrowavE TechnOLogy</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-09-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>9.890.857,14</b>	EU requested grant (€): <b>7.808.937,50</b>	

**Free keywords:** *depolymerization, PET, recycling, circular economy, microwaves, plastics, polyester, waste2resource*

### **Abstract:**

Based on an internationally patented technology, the project foresees to bring at industrial level (through a completely functional pilot plant) the usage of microwaves as Process Intensification approach (through an electromagnetic catalytical effect) of the well-known alkaline hydrolysis depolymerization reaction. Such reaction was, up to know, economically unfeasible due to a certain number of technological constraints that DEMETO finally solves.

Coordinated by PROCESSI INNOVATIVI, R&D company of a large EPC (Engineering, Procurement and Construction) group, but supported by a large basis of SMEs that will bring the most innovative aspects of the project technology, DEMETO's Consortium is composed by highly skilled members, which can guarantee the appropriate exploitation of the project business case, also thanks to the involvement of all the major commercial stakeholders of the PET value chain, including the most relevant Customer Segments.

In fact, having followed all previous steps from lab-level testing (TRL3) to industrial demonstration of the core reactor (TRL6), we are now in the position to further move the technology towards its market deployment, by building a pilot plant (containing a full reactive unit) that would act as industrial demonstration of the performances of DEMETO's de-polymerization approach to the market.

One of the project major strengths is in fact that the market is ready to accept DEMETO's technology. The existing value chain of post-consumer recovery of PET plastic waste is perfectly apt to accept the introduction of a new "ring of the chain", that would close the loop into a circular economy model, acting either at the end of the chain (mechanical recyclers) or at its beginning (PET producers). This gives us a total addressable market of about 60 plants in Europe (270 worldwide), for a value of around €1.2bn (€5.4bn worldwide).

<b>ECCO</b>		<b>768692</b>
Title: <b>Energy Efficient Coil Coating Process</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-09-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>9.803.316,25</b>	EU requested grant (€): <b>7.850.029,38</b>	

**Free keywords:** *coil coating, radiant burners, solvents, high temperature ceramics, catalytic coating*

### **Abstract:**

Coil coating is an important industrial process applied in a major part of industrial steel and metal alloy production and associated with big facilities and large primary energy consumption. A major part of the overall plant size and the energy demand of coil coating facilities is associated with the drying/curing process that occur inside a curing oven, which is the bottleneck concerning the increase of the production capacity. In this drying/curing process, organic solvents are vaporized from the applied liquid coating film and since they are flammable, the usually applied curing ovens with convective air drying technology have to be operated far below the Low Explosive Limit (LEL), due to safety constraints. ECCO proposes a novel solution for the curing oven operation, which can not only drastically increase the compactness and energetic efficiency of the system, but leads to an increased production flexibility due to a fuel-flexible, modular and potentially energetically self-sustainable process. The main idea is to heat the metal strip by IR-radiation and operate the curing oven well above the Upper Explosive Limit (UEL), thus, performing the drying and curing process in an atmosphere mainly consisting of the solvent vapours, which are used as fuel in IR radiant porous burners. This solution leads to a size/ production capacity ratio reduction of 70% and a reduction of investment and operating costs of at least 40% each. Starting from previous activities at TRL 4, an interdisciplinary approach is foreseen, based on advanced-materials, combustion technology and prediction tools for system design/optimization, with active participation of key industrial stakeholders, to bring this technology to TRL 6 and realize a prototype furnace at industrially relevant size and environment.



<b>NOVUM</b>		<b>768604</b>
<b>Title: Pilot line based on novel manufacturing technologies for cellulose-based electrical insulation components</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-09-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>8.491.018,75</b>	EU requested grant (€): <b>6.480.353,13</b>	

**Free keywords:** *electrical insulation components, cellulose, thermoplastic, 3D printing, foam forming, thermoforming*

### **Abstract:**

Production of electrical insulation components is globally a B\$1.19 business. Cellulose is one commonly used raw material for insulation components. State-of-the-art production methods for high quality electrical insulation products are typically labour intensive and slow.

The main objective of NOVUM is to develop and demonstrate a compact and feasible pilot line concept based on novel processing technologies for rapid, design driven production of advanced cellulose-based electrical insulation components. This new pilot line will result in significant efficiency improvement and higher productivity and flexibility, while ensuring lower operational costs as compared with the state-of-the-art process. Manual production will be replaced by an automated manufacturing concept with increased resource efficiency, including 40% reduction in labour time and 60% reduction in waste generation, 20% lower energy consumption and 40% decrease in operating costs.

Processing technologies in the focus of NOVUM are 3D printing of cellulose-based materials having thermoplastic features as well as foam forming and thermoforming of cellulose fibres. These three technologies will be developed in parallel to each other, together with the cellulose materials, in order to reach optimal combination for the pilot line concept. Besides technical feasibility, the decision on the pilot line concept will be based on the end use requirements as well as on economic, social and environmental impacts including circular economy considerations.

The novel manufacturing concept will also enable exploitation of the full potential of design in generating form and thus novel functionalities to cellulose-based electrical insulation components. In addition, the concept will be based on multipliable technologies, enabling their transition and wide adoption for cellulose-based materials across the process industry and for applications beyond NOVUM for other industrial areas.

<b>PORTABLECRAC</b>		<b>768905</b>
Title: <b>PORTABLE SOLUTION FOR THE ELECTROCHEMICAL REGENERATION OF ACTIVATED CARBON</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-09-2017</b>	Type of Action: <b>IA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>2.883.012,50</b>	EU requested grant (€): <b>2.206.718,75</b>	

**Free keywords:** *Activated carbon, electrochemical regeneration, reactivation, portable technology, flexible maintenance, in situ, cost savings, CO2 reduction*

### **Abstract:**

Activated carbon is manufactured overseas (30% of production occurs in CHINA). As an example, in 2016, 12% of worldwide AC demand (0.23 million of tons) corresponded to Western Europe . A Europe import about 80% of their internal consumption of AC. PORTABLECRAC provides a successful business case to reduce overseas imports with negative competitive and environmental impacts in key industries in Europe. Furthermore, great exploitation and replication opportunities for circular-local economy development, at business and environmental perspectives, will be pursued and exploitation path assessed as key implementation task after feasibility analysis is completed. However, due to continuous use, EXHAUSTION of AC filters is a common issue with the consequent high cost in producing virgin filters again. Indeed, there is a side problem related to the manipulation and management of exhausted AC that has to be considered as highly contaminant waste and can vary at regional-national level. Accordingly, the viability of AC use at industrial level roots in the regeneration and reactivation of exhausted AC.

AC can be regenerated (large facilities i.e. do it at this moment), reducing costs by about 50%. Regeneration of spent AC is mainly done by thermal regeneration (as is the case of EMIVASA). However, it requires off-site service, high energy input and carbon losses with negative environmental impacts against the solution provide by PORTABLECRAC as the key value proposition (Table 1) shows.

PORTABLECRAC brings a sustainable and long term solution creating a direct and indirect employment in the “service-sector” from UE. PORTABLECRAC KEY VALUE PROPOSITION is to provide a solution to water treatment with 86% reduction in cost per kg/AC and 4 times reduction in CO2 emissions. Business model will be assessed and validated during the scope of the project, based on traditional key drivers for industry market penetration as cost reduction and legislation framework

<b>CO2EXIDE</b>		<b>768789</b>
Title: <b>CO2-based Electrosynthesis of ethylene oXIDE</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-10-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>1/1/2018</b>	Duration: <b>36 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.420.113,25</b>	EU requested grant (€): <b>5.420.113,25</b>	

**Free keywords:** *CO2 capture, PEM electrolyser, electrochemical CO2 reduction, electrochemical water oxidation, gas separation, ethylene, hydrogen peroxide, chemical catalysis, cascade reactor, ethylene oxide*

### **Abstract:**

The CO2EXIDE project aims at the development of a combined electrochemical-chemical technology for the simultaneous “200%” conversion of CO<sub>2</sub> to ethylene at the cathode, water oxidation to hydrogen peroxide at the anode and a subsequent chemical conversion of both intermediates to ethylene oxide and oligo-/polyethylene glycol in a cascade, boosting this technology from TRL4 to TRL6. The CO2EXIDE technology combines a modular nature for the feasibility of a decentralised application, a high energy and material efficiency/yield and the substitution of fossil based production of ethylene oxide. The CO2EXIDE technology will be combinable with renewables and allows for the direct creation of products, which can be integrated into the existing supply chain. The reactions will be operated at low temperatures and pressures and forecast significant improvements in energy and resource efficiency combined with an enormous reduction of GHG emissions. All improvements will be quantitated using Life Cycle Assessment.

The CO2EXIDE approach will bring together physicists, chemists, engineers and dissemination and exploitation experts from 5 universities/research institutions, 3 SMEs and 2 industries, innovatively joining their key technologies to develop and exploit an unprecedented process based on CO<sub>2</sub>, renewable energy and water to combine the chemical and energy sector.

Within 36 months project duration, the CO2EXIDE technology will undergo a thorough material and component R&D programme. A 1kW PEM electrolyser for CO<sub>2</sub>-reduction and water oxidation in combination with an ethylene enrichment unit and subsequent chemical conversion cascade reactor will be manufactured to produce ethylene oxide as intermediate for oligo-/polyethylene glycol synthesis. This will prove the achievement of the quantified techno-economic targets of CO2EXIDE.

<b>OCEAN</b>		<b>767798</b>
Title: <b>Oxalic acid from CO<sub>2</sub> using Electrochemistry At demonstration scale</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-10-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>48 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>5.523.650,00</b>	EU requested grant (€): <b>5.523.650,00</b>	

**Free keywords:** *electrochemistry, CO<sub>2</sub>, oxalic acid, polymers, glycolic acid*

### **Abstract:**

The OCEAN project aims to develop an integrated process for the production of high-value C<sub>2</sub> chemicals from carbon dioxide using electrochemistry. This will be achieved by: 1) improving and optimizing a TRL5 technology that can convert carbon dioxide to formate, to TRL6. OCEAN will bring this technology just one-step away from commercialization, by demonstrating this technology at the site of an industrial electricity provider, converting 250 g of CO<sub>2</sub> per hour at 1.5 kA/m<sup>2</sup>. The energy efficiency will be improved by coupling the cathodic reaction to the oxidation of glucose at the anode, using a novel technology to match the kinetics of the reactions at both electrodes. The obtained formate can be converted to oxalate. 2) Developing new electrochemical methodologies to further convert formate and oxalate to formic acid and oxalic acid, respectively. Novel salt-splitting will be investigated using bipolar membranes. Again, this allows for direct coupling with an electrosynthesis step at the anode and/or cathode. 3) Developing new electrochemical methodologies by converting oxalic acid to glycolic acid and other high-value C<sub>2</sub>-products, these will be benchmarked with conventional hydrogenation. 4) Integrating the TRL6 and new (TRL4-5) electrochemical technologies in an industrial process, aimed at the production of high-value C<sub>2</sub> products and polymers thereof by developing the process steps needed to produce oxalate, C<sub>2</sub> products and polymers. 5) Demonstrating the economic feasibility by performing a market analysis and making a business case and exploitation strategy. Overall, OCEAN aims at addressing the critical elements that are currently hindering new electrochemical processes by targeting high value products that have the corresponding production margin to introduce this technology on the market, lower the power costs by combining oxidation and reduction, and a trans-disciplinary approach that is needed for the introduction of these advanced technologies.

<b>SIDERWIN</b>		<b>768788</b>
Title: <b>Development of new methodologies for industrial CO2-free steel production by electrowinning</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-10-2017</b>	Type of Action: <b>RIA</b>
Project start date: <b>10/1/2017</b>	Duration: <b>60 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>6.824.336,25</b>	EU requested grant (€): <b>6.824.336,25</b>	

**Free keywords:** *Electrowinning, Steelmaking, Electrolysis, Renewable energies, By-products valorisation,*

### **Abstract:**

For the time being, there are no economically feasible steelmaking technologies available having the potential to meet the EU's climate and energy targets for 2030. At best, a 15% decrease in the overall CO2 intensity of the sector could be achieved throughout the widespread dissemination of technologies that could reasonably become cost-effective in the future. Therefore, breakthrough technologies are urgent and indispensable.

ΣIDERWIN project proposes to develop a breakthrough innovation compared to the actual steel production process bringing together steel making with electrochemical process. The electrolysis process using renewable energies will transform any iron oxide, including those inside the by-products from other metallurgies, into steel plate with a significant reduction of energy use. This process decomposes under mild conditions but at intense reaction rate naturally occurring iron oxides such as hematite into iron metal and oxygen gas. By offering a CO2-free steel production process, the project will contribute to the reduction of the total greenhouse gas emissions.

Compared to traditional steelmaking plants, this innovative technology has several positive impacts such as: a reduction by 87% of the direct CO2 emissions; a reduction by 31% of the direct energy use; the ability to produce steel from by-products rich in iron oxides from non-ferrous metallurgy residues; an increased integration with renewable energies with a more flexible process.

The project is led by ArcelorMittal the world's leading steel and mining company. The company has been working for 12 years on the development of the technology to bring it from the TRL 0 to TRL 4 through the manufacturing of 5 different pilots, proving the potential of the technology. With this solid background, ArcelorMittal surrounded by 11 additional innovative European partners, aims at developing a 3 metre-long new experimental pilot to validate the technology at TRL 6.

<b>SPRING</b>		<b>767412</b>
Title: <b>Setting the framework for the enhanced impact of SPIRE projects</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-11-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>24 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>499.368,75</b>	EU requested grant (€): <b>499.368,75</b>	

**Free keywords:** *Enhancing impact of SPIRE projects*

### **Abstract:**

Increasing industrial uptake of project findings is at the heart of project SPRING. It is the essential building block for ensuring greater impact of SPIRE projects and therefore progress towards the SPIRE roadmap goals of increased resource and energy efficiency in the EU process industries.

Instead of focusing on a small cluster of projects, SPRING has been developed to provide the mechanism to enhance the impact of all SPIRE projects.

Project SPRING's objective is to increase progress towards the SPIRE goals and enhance return on investment in projects by addressing the needs of those who make the decisions to adopt process innovations in industry and barriers to their adoption. It will do this by providing guidance to project participants, decision makers in industry and broader SPIRE stakeholders, enabling them collectively to:

1. Improve the articulation of the value of project exploitable outputs
2. Improve the articulation of industry needs and barriers-to-uptake of exploitable outputs
3. Improve the mapping of project value to industry needs
4. Identify policy gaps and recommendations to improve project impact

To address these objectives, the project will deliver six sets of exploitable outputs:

A – Guidance on best practice of how to measure progress, impact and success of SPIRE projects.

B – Frameworks for getting different levels of project results to the right audience through the spire2030.eu portal

C – A model for mapping project outputs to industry needs, through thematic, interactive industry workshops, expert input and technology scanning methods.

D – Guidance for understanding business barriers to uptake, including best practice for enabling good decision making when evaluating project outputs.

E – A package of training and network groups to upskill SPIRE project participants

F – Identification of policy gaps and future SPIRE needs

<b>HARMONI</b>		<b>768755</b>
Title: <b>Harmonised assessment of regulatory bottlenecks and standardisation needs for the process industry</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-12-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>8/1/2017</b>	Duration: <b>27 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>999.613,75</b>	EU requested grant (€): <b>999.613,75</b>	

**Free keywords:** *Regulation, Standards, Innovation, Technology transfer, Process Industry, Cross-Sector, SPIRE*

### **Abstract:**

HARMONI aims at bringing together all the relevant stakeholders of the process industry to jointly identify, analyse and propose solutions to the regulatory bottlenecks and standardization needs that hamper their innovation processes and the market uptake of their results, necessary to move towards a more sustainable and competitive European process industry. In order to achieve HARMONI's overarching goal, the consortium will develop and apply a methodology for ensuring an effective collaboration of the 8 sectors involved in SPIRE PPP to elaborate the solutions to the common challenges they face due to non-technological barriers, such as regulatory issues or the lack of European Standards when trying to improve their resource efficiency. In addition, HARMONI will analyse, compare and propose recommendations to trigger the transferability of technical solutions among and beyond the SPIRE sectors. The methodology will include the utilisation of the existing SPIRE Knowledge platform and the creation of another platform to be linked with CEN/CENELEC STAIR WG for the coordination of the project's standardization activities. The project activities will result in an optimized EU regulatory and standardization framework that facilitates and supports innovation in the process industry; a better participation of the SPIRE community in the EU regulatory and procedures, thus providing the most adequate input to the regulatory authorities; an earlier and more active involvement of the SPIRE community in the EU standardization process; and an overall better environment to maximize transferability rates of technologies across SPIRE sectors. HARMONI consortium includes 3 SPIRE sectorial associations (chemicals, cement and equipment), A.SPIRE, 2 RTDs coming from two SPIRE sectors (steel, ceramic), 1 National Standardization body (DIN) and an experienced RTO to coordinate them (CIRCE). In addition, an Advisory Board will involve the other 5 SPIRE sectorial associations and CEN/CENELEC



<b>SCALER</b>		<b>768748</b>
Title: <b>Scaling European Resources with Industrial Symbiosis</b>		
Call Id: <b>H2020-SPIRE-2017</b>	Topic: <b>SPIRE-13-2017</b>	Type of Action: <b>CSA</b>
Project start date: <b>11/1/2017</b>	Duration: <b>30 months</b>	Unit: <b>RTD/D/02</b>
Total costs (€): <b>1.049.481,25</b>	EU requested grant (€): <b>1.049.481,25</b>	

**Free keywords:** *Industrial Symbiosis, Circular Economy, Process Industries, European Resources, Eco-efficiency*

### **Abstract:**

Industrial symbiosis promotes sharing of physical resources (energy, water, residues and recycled materials, etc.) between different industrial processes, increasing business opportunities and creating new jobs while reducing environmental impacts. Neither self-organization nor the few government co-ordinated mechanisms have delivered mass implementation of Industrial Symbiosis. Given the great potential for triple-bottom line benefits this failure must be understood and addressed. SCALER aims to massively increase the implementation of industrial symbiosis, by developing mechanisms to retain the embedded value of European resources, thus, enabling the circular economy to achieve higher resource efficiency through systemic innovations led by intensified industrial symbiosis initiatives and enhanced by cross-sectorial collaboration and, to support the development of a roadmap to improve the adoption of industrial symbiosis in the European process industry at regional / national / European level. SCALER will use new and advanced practices in identifying value opportunities, use new methods to create a larger market for available resources, and use new methods to measure and manage the implementation and sustaining of new relationships. SCALER brings together qualitative and quantitative tools and methods to support self-organised initiatives on industrial symbiosis and to enhance facilitation processes and coordination actions. The creation of new spaces for interaction, collaboration and cooperation and the engagement of a broader set of stakeholders are crucial elements of the multiplier effect in industrial symbiosis implementation. SCALER provides a comprehensive solution for understanding, assessing and intensifying the potential of industrial symbiosis in Europe.

<b>EUCALIVA</b>		<b>745789</b>
Title: <b>EUCALyptus Lignin VALorisation for Advanced Materials and Carbon Fibres</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-D03</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>9/1/2017</b>	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>2.419.871,25</b>	EU requested grant (€): <b>1.795.009,88</b>	

**Free keywords:** *Lignin, carbon fibres, elctrospinning*

### **Abstract:**

Natural resources are being exhausted due to the great demand of their services and the insufficient actions taken for their preservation. Against this background, the use of waste components from industrial activities as raw materials to obtain high value-added products is of great relevance.

Lignin from pulping process is present all over Europe and represents a big source of underexploited material. There is an estimated 70 million tonnes of lignin available from pulping processes worldwide, but much of this is not isolated but burned onsite to provide steam for heat and power production. Until now only about 2% of the lignins available in the pulp and paper industry is commercially used comprising of about 1,000,000 tons/year lignosulphonates originating from sulphite pulping and 104,000 tons/year of kraft lignins produced in the kraft process

<b>BIOMOTIVE</b>		<b>745766</b>
<b>Title: Advanced BIObased polyurethanes and fibres for the autoMOTIVE industry with increased environmental sustainability</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-D05</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>15.186.325,05</b>	EU requested grant (€): <b>10.659.352,50</b>	

**Free keywords:** *automotive, regenerated fibres, thermoplastic polyurethane, polyurethane foam, 1,4 butanediol, azelaic acid, furan di-carboxylic acid, biocomposite*

### **Abstract:**

Vehicles are composed by different materials and a noticeable and fundamental fraction of them (20% w/w) is constituted by plastic material, among which polyurethanes. PU is fundamental since, thanks to its properties, it enables to reduce the overall weight of the car, resulting also in a lower fuel consumption. More and more vehicles' manufacturers and suppliers are betting on biobased alternatives derived from renewable raw materials, but a biobased plastic able to mimic technical properties of PUs as well as to provide the required aesthetics and haptics has not been developed yet. The BIOMOTIVE project will pave the ground towards the production and subsequent market penetration of biobased automotive interior parts with enhanced technical performance, improved environmental profile and economic competitiveness, with the aim of replacing the fossil-based, non-biodegradable counterparts. Within the project, innovative and advanced biobased materials with an increased biobased content (60-80%), i.e. thermoplastic polyurethanes, 2-components thermoset polyurethane foams and regenerated natural fibres, will be produced starting from renewable biomass feedstock not in competition with food and feed, leveraging innovative production techniques. Such materials will be validated into cars' interior parts (door handles and automotive seats) demonstrating advanced properties in terms of resistance to fire, mechanical strength and flexibility as well as improved recyclability of the end-of-life products. The project will also aim at demonstrating an innovative process for the production of 100% biobased NIPUs, with moisture-repellant properties. The involvement of external industrial players thorough targeted dissemination events will pave the ground to the widening of the market applications of the developed biomaterials: regenerated fibres from paper-grade wood pulp into textile production and biobased TPUs in nature based solutions within the construction sector.

<b>EMBRACED</b>		<b>745746</b>
<b>Title: Establishing a Multi-purpose Biorefinery for the Recycling of the organic content of AHP waste in a Circular Economy Domain</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-D06</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>6/1/2017</b>	Duration: <b>60 months</b>	Unit:
Total costs (€): <b>17.334.553,75</b>	EU requested grant (€): <b>10.695.211,13</b>	

**Free keywords:** *Multi-purpose Biorefinery, Circular Economy, Post-Consumer Absorbent Hygiene Products Waste*

### **Abstract:**

A sizeable category in terms of organic content within MSW is represented by Absorbent Hygiene Products (AHPs; e.g. nappies, adult incontinence products, feminine hygiene items, wipes, etc.) waste, which is currently considered as non-recyclable fraction of MSW and finds its way to landfills or incineration, leading to important environmental concerns. Indeed, each year 8,500,000 tons of such waste are incinerated or landfilled in Europe (the equivalent of almost 30 landfills every year), and over 30,000,000 tons in the world. AHP are mainly composed of a mix of natural fibres (cellulose) and polymers (PP/PE and superabsorbent polymer), valuable materials that currently don't find a proper valorization. Within EMBRACED project, a first-of-its-kind multi-purpose integrated biorefinery will be established in order to valorize in a relevant environment scenario the cellulosic fractions obtained from AHP waste towards the production of bio-products of significant commercial interest, and – concurrently – high added-value co-products, such polyolefinic plastics and SAP (superabsorbent polymers).

This innovative biorefinery model will involve all the main actors of the whole value chain, from AHP consumers and local population to waste management and logistic companies, leading AHP producers and bioprocess developers, as well as final products developers. In a view of circular economy, all the fractions obtained from the processed AHP waste will be reused through valorization into final products, and in particular the high-quality cellulosic fraction of AHP (ca. 1,275,000 ton/y in Europe), which has significant advantages vs. traditional 2nd generation lignocellulosic feedstocks in terms of homogeneity and downstream bioprocessing costs, will be converted and valorized in two parallel value chains, leading to the production of biobased building blocks, polymers and fertilizers.

<b>OPTISOCEM</b>		<b>744330</b>
Title: <b>OPTimized conversion of residual wheat straw to bio-ISObutene for bio based CHEMicals</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-D07</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>16.376.816,83</b>	EU requested grant (€): <b>9.755.493,63</b>	

**Free keywords:****Abstract:**

OPTISOCEM goal is to demonstrate the performances, reliability as well as environmental and socio-economic sustainability of the entire value chains, for the transformation of excess wheat straw into bio-Isobutene (bio-IBN) derivatives. To achieve these goals a team of 6 partners, leaders in their field, originating from 4 EU-member states, will join efforts. OPTISOCEM consists in showcasing the technical accessibility and economical sustainability of the value chains, from wheat straw to 2 different families of chemicals derived from bio-based IBN.

These compounds, oligomers (DIB, TIB, TeIB) and polyisobutylenes (PIBs) are currently used in a wide range of applications such as lubricants, adhesives, sealants, flavors & fragrances and substituted phenols. This large market is today supplied entirely by products derived from fossil-based isobutene. Products derived from bio-based IBN, using the same process as fossil-based IBN, and with at least as good performances, would provide a renewable supply.

OPTISOCEM includes the development & up-scaling of bio-IBN production from wheat straw, followed by the production and validation at relevant scale -representative of commercial, established processes- of the bio-based derivatives. To this end, four ambitious objectives were defined:

- Demonstrate the production of wheat straw hydrolysate (WSH) and establish a quality standard to feed the IBN fermentation unit,
- Demonstrate the production of bio-IBN from WSH at pre-commercial scale,
- Demonstrate the quality of end products obtained with bio-IBN as a feedstock and using traditional commercial processes designed for fossil based IBN,
- Determine and validate the targeted technical, economic as well as environmental/social sustainability performances to be achieved for a commercial plant project.

Related Work packages, tasks, milestones and risks are considered in order to achieve these objectives. OPTISOCEM project is fully aligned with the call topic.

<b>SYLFEED</b>		<b>745591</b>
Title: <b>From forest to feed: enable the wood industry to bridge the protein gap</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-D08</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>9/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>15.579.450,58</b>	EU requested grant (€): <b>10.892.598,89</b>	

**Free keywords:** *Wood, Lignocellulose, Demonstration Plant, Biorefinery, Pre-treatment, Hydrolysis, Enzyme, 2G Sugars, Single-Cell Protein, Fish Feed, Sustainable, Cross-sectorial Technology, Competitive Value Chain*

### **Abstract:**

For decades, Europe has been facing a huge protein deficit (more than 70% is imported). Today, the objective is to initiate ways to sustainably produce proteins in Europe, by creating new cross-sectorial businesses.

Partners within the consortium have been developing a bio-refinery concept allowing transformation of woody biomass into high-value Single Cell Protein (SCP) to be used as animal feed.

The SYLFEED project consists in upscaling the bio-refinery process to a demonstration plant with a capacity to process up to 5t/day of lignocellulose into SCP for use in aquaculture. SYLFEED will demonstrate the synergies between forestry industry and protein fish feed market, creating new high value opportunities for the former and an alternative, sustainable, protein source for the latter. Wood residues are abundant and highly sustainable and SCP present an amino-acid profile close to that of the fishes, making them an excellent raw material in fish feed formulation (there is room for more than 50 lignocellulose bio-refineries in Europe, leading to the production of at least 1.4 Mt of proteins and a significant reduction of the protein gap).

SYLFEED spans across the full value chain: from biomass stakeholder to fish feed sellers (future buyers of SYLFEED proteins), including biomass-to-SCP technology developer/ experts.

SYLFEED's ambition is threefold:

- To respond to strategic needs of protein production in Europe to increase self-sufficiency.
- To improve the local economy (forest industry), save jobs in important industrial sectors and create new ones in the bio-economy.
- To produce proteins for fish feed in a way that addresses local and global environmental issues (oceans over-exploitation and negative effects of plant's culture – soybean, corn...).

To do so, the grand challenge of the SYLFEED demonstration project is to upscale from pilot scale and validate the bio-refinery process that converts lignocellulose into SCP suitable to formulate fish feed.

<b>AgriChemWhey</b>		<b>744310</b>
<b>Title: An integrated biorefinery for the conversion of dairy side streams to high value bio-based chemicals</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-F01</b>	Type of Action: <b>BBI-IA-FLAG</b>
Project start date: <b>1/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>29.949.323,00</b>	EU requested grant (€): <b>22.007.931,38</b>	

**Free keywords:** *BioEconomy, Milk, Circular Economy, Industrial Symbiosis*

### **Abstract:**

Whey Permeate (WP) and De-lactosed Whey Permeate (DLP) are major side-streams of dairy processing and represent a key challenge for the dairy industry due to a lack of reliability in current disposal routes and represent a sustainability bottleneck for the expansion of milk production in Europe in the “post-milk-quota era”. AgriChemWhey will build a first-of-a-kind, industrial-scale biorefinery with integrated symbiotic industrial and agricultural value chains that will valorise over 25,000 tonnes (100% dry matter) per annum of excess WP and DLP to several added value products for growing global markets including lactic acid, polylactic acid, minerals for human nutrition and bio-based fertilisers. This will be achieved through a coordinated investment process and development path to realise the Flagship plant, representing the first major industrial venture to convert residues from food processing, as second generation feedstocks, to value added bio-based products. The Flagship will prove the techno-economic viability of the innovative WP/DLP-to-lactic acid biorefinery technology and will establish a new value chain for industrial symbiosis with other local actors for the production of high value sustainable food and feed (including high quality mushrooms) products from other side streams, as an enhanced circular bioeconomy approach to agriculture and agri-food waste. This offers society and industry the opportunity for greater resource efficiency - less food waste, more products from the same starting material (milk), and integration of food and non-food material production. AgriChemWhey will also develop a blueprint of an economic sustainability concept and replication plans for other regions across Europe, thus maximising both short and long term impacts, contributing towards the development of the European bioeconomy to promote rural growth, competitiveness and job creation, and aligning with European sustainability targets.

<b>AFTERLIFE</b>		<b>745737</b>
Title: <b>Advanced Filtration TEchnologies for the Recovery and Later converslon of relevant Fractions from wastEwater</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R01</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>9/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>4.180.166,38</b>	EU requested grant (€): <b>3.890.593,13</b>	

**Free keywords:** *Membrane filtration, polyhydroxyalkanoates, food industry*

### **Abstract:**

AFTERLIFE proposes a flexible, cost- and resource-efficient process framed in the zero-waste and circular economy approach for the recovery and valorisation of the relevant fractions from wastewater. The first step of such process is an initial step consisting of a cascade of membrane filtration units for the separation of the totally of solids in wastewater. Then, the concentrates recovered in each unit will be treated to obtain high-pure extracts and metabolites or, alternatively, to be converted into value-added biopolymers (polyhydroxyalkanoates). Moreover, the outflow of the process is an ultra-pure water stream that can be directly reused.

The outcomes of the project will be focused on:

- Demonstration of an integrated pilot using real wastewater from three water intensive food processing industries (fruit processing, cheese and sweets manufacturing)
- Demonstration of the applicability of the recovered compounds and the value added bioproducts in manufacturing environments

The design and optimisation of the AFTERLIFE process following a holistic approach will contribute to improve performance and reduce the costs associated to wastewater treatment by maximising the value recovery.



<b>BioBarr</b>		<b>745586</b>
Title: <b>New bio-based food packaging materials with enhanced barrier properties – BioBarrier</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R05</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>3.784.375,00</b>	EU requested grant (€): <b>3.253.437,50</b>	

**Free keywords:** *Functional properties, gas barrier, moisture barrier, surface treatments, polyhydroxyalkanoates, biodegradable, compostable, new materials*

### **Abstract:**

BioBarr concerns the development of new bio-based and biodegradable food packaging materials by enhancing barrier functionalities to the biopolymer PHAs (polyhydroxyalkanoates) and by validating the new material in the food industry environment.

PHAs is potential substitute for conventional polymers, since they possess similar properties; respect to polylactic acid (the most widespread biobased/biodegradable material), PHAs show higher biodegradability and better functional properties and mechanical strength.

However, applications of PHAs as food packaging materials are subjected to some limitations. PHA shows medium values of O<sub>2</sub> and H<sub>2</sub>O transmittance while many the most critical factors for some foods (such dry products as bakeries) in relation to packaging are moisture uptake leading to loss of crispiness and oxidation of fats.

For overcoming this limiting factor in PHA food applications, BioBarr aims to enhance PHA vapour and gas barrier properties through material functionalization.

In the first research line, the approach consists of the use of biodegradable materials with adequate properties to be compounded in multi-layer structures specific for the food product category to be packed, in order to optimize functional properties. The innovation consists of laminating PHA with PLA (polylactic acid).

The second challenging research line in BioBarr is surface treatments (nanofilm metallization with AlO<sub>x</sub> or SiO<sub>x</sub> or metallization Aluminum process) of PHA films.

New materials will be validated on a restricted number of food products in the sector of bakery, representative of different shelf-life requirements and duration, with the purpose to increase shelf-life at least by 10%.

Final impact will be the creation of a new biobased value chain. Proposal takes into account the needs and the growth opportunities of actors operating in each value chain step: bioplastic producer, extrusion and filming actors, converter, inks producers, food industries end-users

<b>BIOSMART</b>		<b>745762</b>
Title: <b>Bio-based smart packaging for enhanced preservation of food quality.</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R05</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>4.950.560,00</b>	EU requested grant (€): <b>3.610.866,25</b>	

**Free keywords:** *Texturing, sol-gel, barrier layers, UV protective, superhydrophobic surfaces, microencapsulated phase change materials, barrier coatings, sensing devices, bio-active antimicrobial, volatile amine s*

### **Abstract:**

The BIOSMART project proposal has the ambition to develop active and smart bio-based and compostable packages addressing the needs of fresh and pretreated food applications. Moreover, the novel packaging system will form the basis for tailoring performance and functionality to specific flexible and rigid food packages in diverse market segments. A holistic ecosystem approach is pursued by offering solutions that bring enhanced performance and acceptable economics to the value chain and facilitate implementation and large-scale commercialization. Critical issues that differentiate the present packages from the future all-bio-based and compostable ones are enhanced active and smart functionalities that make possible: light weighting, reduced food residues, shelf life monitoring and longer shelf life, easier consumer waste handling, and all this at a competitive cost to the incumbent. The BIOSMART project proposal develops thus encompasses an approach for selectively integrating superhydrophobic surfaces, microencapsulated phase change materials, barrier coatings, sensing devices, and new bio-active antimicrobial and antioxidants, into all-bio-based multilayer flexible plastic packages. Three generic packaging systems are selected with specific performance needs as defined by current multi-material (eg. pouches, terrines and cardboard/thin film tray). The associate life cycle assessments for the different possible scenarios include the economic feasibility. Ultimately, this consolidated knowledge is captured in a material selection and packaging performance simulation App. through optimization of all possible variables to meet selected key performance indicators (KPI).

<b>REFUCOAT</b>		<b>745791</b>
<b>Title: Full recyclable food package with enhanced gas barrier properties and new functionalities by the use of high performance coatings</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R05</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>3.234.338,50</b>	EU requested grant (€): <b>2.300.735,30</b>	

**Free keywords:** *Bio-based, food packaging, hybrid, barrier and active coatings, mcl-polyhydroxyalkanoates, polyglycolic acid*

### **Abstract:**

RefuCoat project aims to develop hybrid bio-based high oxygen/water barrier and active coatings to be used in a monolayer bio-based food packages (films and trays) as alternative to current metallised and modified atmosphere (MAP) packages to avoid the use of non-renewable materials in multilayer structures that currently lead to complex and expensive recycling steps.

Hybrid coating formulations will combine cost-efficiently produced polyglycolic acid (PGA) and modified silica oxide. Fully biodegradable packages for fresh food products will be obtained with middle chain modified PHAs. PGA and PHA based hybrid coatings with high gas barrier properties will be further improved with active substances for improved shelf-life. Furthermore, new packages based on bio-PET and bio-PE combined with hybrid and active

coatings will be developed. The generated products will be validated and compared to current metallised, non bio-based alternatives in industrial products, in performance, shelf-life and biodegradability. Safety and regulatory compliance, environmental and economic sustainability will be specifically addressed. RefuCoat consortium is formed by 12 synergistic partners, 7 of them BIC members, reunites all actors in the value chain, SME partners (MIPLAST and IRIS), industrial partners (UNILEVER, MANOR, DACSA and

BIOPOLIS), and RTO Partners (THUNEN, CIB, AIMPLAS, EUFIC, Fraunhofer and AINIA). The project maximizes exploitation within the Consortium, promoting a circular economy concept, but also considers dissemination and communication in order to maximize the value of the project outcomes. maximizes exploitation within the consortium, promoting a circular economy concept, but also considers dissemination and communication in order to maximize the value of the project outcomes. Refucoat main impacts are expected in the improved performance of food packages, reduction of landfilling waste, cost-and environmental effectiveness in processing by Life Cycle and Techno-Economic Assessment, improved preservation of food products, new markets and contribution to KPI of BBI-JI. RefuCoat aims at a significant contribution in more than 880 jobs.

<b>BARBARA</b>		<b>745578</b>
<b>Title: Biopolymers with advanced functionalities for building and automotive parts processed through additive manufacturing</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R07</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>5/1/2017</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>2.711.375,00</b>	EU requested grant (€): <b>2.603.861,25</b>	

**Free keywords:** *Additive Manufacturing, Fused Filament Fabrication, agrowaste revalorization, polysaccharides, natural dyes, functional additives, automotive, building, hybrid manufacturing, RTM mould*

### **Abstract:**

The project aims at the valorisation of side-stream fractions and residues from agro-food production into novel polysaccharides and functional additives. These raw materials have been selected based on the advanced functionalities that provides to the polymeric matrixes. The extracted polysaccharides will be compatibilised with polyesters and polyamides and reinforced with extracted, modified and functionalised additives to obtain engineering bioplastic formulations adapted to current Fused Filament Fabrication (FFF) processes. The target of BARBARA project is the development of novel bio-based engineering bioplastic materials to validate in functional prototypes with advanced properties for building and automotive sectors.

The main functionalities developed under the BARBARA approach will permit the improvement of mechanical, thermal, aesthetical and well-being properties of novel biobased engineering polymers. Selected demonstrators of direct final parts for the automotive sector and moulds and tools for hybrid manufacturing for advanced building applications. Innovations in FFF will be validated during the project in order to enhance the performance of BARBARA biobased materials through this technology and fulfil the high-requirements of the industrial sectors.

BARBARA project will directly contribute to achieve SIRA's objective in KPI 5 (4 new advanced biobased materials) and KPI 6 (3 validated consumer products through 2 novel value chains for FFF).

The BARBARA consortium involves 11 partners (5 RTD, 3 SME and 3 Large Companies) accounting to 1 BIC full member, 1 in process of engaged and 3 associated, in 36-months project with a budget of 2,770,750€.

<b>ECOXY</b>		<b>744311</b>
<b>Title: Bio-based recyclable, reshapable and repairable (3R) fibre-reinforced EpOXY composites for automotive and construction sectors.</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R07</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>4.850.960,00</b>	EU requested grant (€): <b>4.850.960,00</b>	

**Free keywords:** *Bio-based resins; Bio-based fibres; Reprocessability; Repairability; Recyclability; Fiber-reinforced composites; Biorefinery; Flame-retardancy; Self-healing; LCA; Automotive; Construction.*

### **Abstract:**

Fibre reinforced thermoset composites (FRTCs) are attractive materials for high demanding sectors, such as automotive or construction, due to their lightweight and excellent mechanical properties. However, the lack of reprocessability and difficulty for repairing and recycling significantly increases the overall material cost and causes grave environmental concerns. Additionally, the vast majority of polymer matrices and fibres used in their manufacturing are non-renewable fossil-derived materials or require high amounts of energy for their production.

Aiming at addressing those limitations by involving the European bio-based industry, ECOXY will develop innovative bio-based epoxy resins and fibre reinforcements to produce new sustainable and techno-economically competitive FRTCs by targeting advanced functionalities: reparability, reprocessability and recyclability (3R). The 3R functionalities will be achieved by using new resin formulations replacing commonly used curing agents by dynamic hardeners, which under certain operational makes possible to: 1) repair fibre/matrix delamination and matrix micro-cracks, 2) reprocess cured laminates could be reprocessed to create new 3D parts (impossible with traditional FRTCs), 3) mechanical and chemical recycling.

Thus, ECOXY will develop: 1) tailor-made bio-based epoxy monomers (including biorefinery products), 2) upgraded and functional bio-based fibres (natural and PLA), 3) specific formulations for FRTCs manufacturing processes (RTM, wet compression moulding and pultrusion) and 4) additional functionalities such as flame-retardancy for 3R resin and self healing for fibres.

The selected prototypes will be validated for automotive and construction sectors using relevant standards and applicable certifications. Besides, an environmental (LCA) and socio-economic assessment of the results will be carried out.

The well balanced composition of the consortium, 6 SME, 6 RTO and 1 academia gives ECOXY the maximum chance of succ

<b>POLYBIOSKIN</b>		<b>745839</b>
Title: <b>High performance functional bio-based polymers for skin-contact products in biomedical, cosmetic and sanitary industry</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R07</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2017</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>4.058.359,38</b>	EU requested grant (€): <b>3.438.047,50</b>	

**Free keywords:** *biopolymers, biopolyesters, biopolysaccharides, bio-based, skin, diapers, wound dressing, anti-microbial, functionalities, anti-oxidant, personal care, sanitary, cosmetics, biomedical*

### **Abstract:**

Personal care, Cosmetic and biomedical industries deal with high-value and/or large volume consumption of polymer-based products which are often derived from fossil sources. Although a number of alternative bio-based polymers is the subject of recent research, more effort is still needed to increase their specific functionalities and performances in order to proceed with their true translation into market. PolyBioSkin aims at developing skin-contact biopolymer-based product parts with increased performance and functionality, such as parts of diapers, cosmetic pads and wound dressings. Indeed, PolyBioSkin will focus on two main classes of bio-based polymers relevant for next generation bio-based industry: biopolyesters (polylactic acid and polyhydroxyalkanoates) because fully renewable, biocompatible and biodegradable and available at an industrial scale, and natural polysaccharides (cellulose/starch and chitin/chitosan), derived from biomass and food waste, for their peculiar properties, such as absorbency and anti-infectivity.

Films and textiles will be produced starting from these polymers and their combinations to prove that key products and/or product parts in sanitary, cosmetic and biomedical industry can be effectively translated from a fossil-derived to bio-based polymer production. PolyBioSkin will provide to skin-contact products a much more environmentally friendly end of life than the current accumulation in landfills or incineration, thanks to their biodegradability allowing the organic recycling.

<b>PERCAL</b>		<b>745828</b>
Title: <b>Chemical building blocks from versatile MSW biorefinery</b>		
Call Id: <b>H2020-BBI-JTI-2016</b>	Topic: <b>BBI-2016-R08</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>7/1/2017</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>3.394.181,26</b>	EU requested grant (€): <b>2.518.517,64</b>	

**Free keywords:** *Bioethanol, Municipal Solid Waste, Succinic acid, Lactic acid, surfactants, adhesives, solvents, polyester polyols, fermentation, membrane electrolysis, enzymatic hydrolysis*

### **Abstract:**

PERCAL will exploit Municipal Solid Waste (MSW) as feedstock to develop intermediate chemical products at high yield and low impurity level with huge industrial interest. These will be complementary to the bioethanol (current PERSEO technology), to achieve a cascade valorisation of the MSW components, i.e.:

- Lactic acid (LA) to produce: 1) Eco-friendly ethyl lactate solvents by reactive distillation from lactic acid & bio-ethanol to be used in cleaning products and inks and 2) hot-melt adhesives for cardboard and other non-food applications in combination with maleic anhydride by reactive extrusion.
- Succinic acid (SA) as an intermediate building blocks to production of polyols for the polyurethane industry.
- Biosurfactants by chemical and/or microbiological modification of protein and lipid fraction from remaining fraction of MSW fermentation.

In order to minimize the MSW heterogeneous composition (due to seasonal and origin variability driven by local economic, social and climate conditions) limitations as a fermentation feedstock, four main innovations will be proposed: i) New enzymatic cocktails to maximize hydrolysis of fermentable organic matter with low inhibitors production, ii) the use of high yield, specific and robust strains for each selected acid, iii) the extraction of fermentation by-products acting as inhibitors to succinic acid production via novel membrane electrolysis employing an integrated continuous fermentation coupled with simultaneous organic acid removal in comparison with SA sequential fermentation followed by its separation using an electro dialysis-based and iv) optimize simultaneous saccharification and fermentation for lactic acid production followed by a downstream separation process based on membrane electro dialysis. To maximize the yield and purity of target organic acids, continuous and single step fermentation process will be prioritized in order to allow their integration in the PERSEO plant.

<b>SUSFERT</b>		<b>792021</b>
<b>Title: Sustainable multifunctional fertilizer – combining bio-coatings, probiotics and struvite for phosphorus and iron supply</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.D4</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>5/1/2018</b>	Duration: <b>60 months</b>	Unit:
Total costs (€): <b>9.364.590,27</b>	EU requested grant (€): <b>6.554.978,57</b>	

**Free keywords:** *Probiotics, iron fertilizer, phosphorus fertilizer, struvite, lignin coatings, sustainable*

### **Abstract:**

SUSFERT addresses the massive usage of mineral fertilisers in EU agriculture, which are largely based on non-renewable resources, but are required in intensive crop production for meeting demands for food and feed. SUSFERT will develop multifunctional fertilisers for phosphorus (P) and iron (Fe) supply, which will fit into existing production processes and common EU agricultural practice.

The SUSFERT innovation combines bio-based and biodegradable coatings, probiotics, and the renewable P-source struvite in at least four novel sustainable P and Fe fertiliser products, which may partly or fully replace unsustainable and resource-intense conventional ones. SUSFERT will test novel organic formulations, microgranules, granules, and liquid fertilizer products in field trials, evaluate them regarding economic potential and environmental sustainability, ensure regulatory compliance and establish industry-scale production processes (TRL 7-8). Technological concepts include 1) probiotics based on P and Fe solubilizing Bacilli and Actinobacteria; 2) microbial siderophore (Fe chelator) produced in a demonstration plant; 3) enzymatic modification of the by-product lignin for cost effective, biodegradable controlled release coatings and product stabilization and 4) demonstration of struvite, a renewable P-source from wastewater, as a partial substitute of mineral P. Five industrial, three SME and three academic partners will contribute expertise along the whole value chain in biotechnology, microbiology, large-scale fermentation, fertilizer production and sales. We will fit the SUSFERT products into the regulatory and policy context for conventional and organic agriculture in various pedo-climatic conditions in Europe and prepare rapid market entry post-project.



<b>EFFECTIVE</b>		<b>792195</b>
<b>Title: Advanced Eco-designed Fibres and Films for large consumer products from biobased polyamides and polyesters in a circular Economy perspective</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.D5</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>11.869.647,57</b>	EU requested grant (€): <b>7.171.906,64</b>	

**Free keywords:** *Biobased caprolactam, azelaic acid, long chain dicarboxylic acids, polyamides, polyesters, eco-design, large consumer products, regeneration, recycling, composting, biobased economy, circular economy*

### **Abstract:**

The EFFECTIVE project intends to demonstrate first of its kind and economically viable routes for the production of biobased polyamides and polyesters from sustainable renewable feedstock for the obtaining of fibres and films with enhanced properties, market competitiveness and increased sustainability. Such materials will be applied into eco-designed large consumer products targeting different markets, i.e. construction, automotive, primary and secondary packaging and textile and with the potential of being applied into many other markets (fishing, engineering plastics, agriculture, hygiene and personal care).

Following a circular economy approach, the sustainability of the value chains will be further enhanced by the demonstration of an improved end-of-life of the developed eco-designed biobased solutions through the application of monomer regeneration, recycling (for polyamides based fibres and films) and composting/anaerobic digestion (for polyesters based films) processes. The idea that “the end is a new beginning” will indeed drive the products design and realization.

The project covers the whole value chain: feedstock production, conversion into innovative biobased building blocks through biotechnological and chemical processes, formulation of innovative biobased polymers (polyesters and polyamides), final products development, end-of-life products management and processing.

The project intends to represent a key milestone towards the future industrialization of biobased fibres and films production in Europe foreseeing the mobilization of relevant investments by involved industry partners and fostering the adoption of multi-stakeholders collaboration models to demonstrate effective ways to develop new cases of biobased economy interconnected with circular regenerative economy joining environmental sustainability and economic profitability.

<b>ReInvent</b>		<b>792049</b>
<b>Title: Novel Products for Construction and Automotive Industries Based on Bio Materials and Natural Fibres</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.D5</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>9.592.782,49</b>	EU requested grant (€): <b>6.525.275,00</b>	

**Free keywords:** *bio-materials; natural fibres; foams*

### **Abstract:**

In view of moving towards a post-petroleum society, the communication of the European Commission on 13 February 2012 entitled "Innovating for Sustainable Growth: A Bioeconomy for Europe", and in particular its Action Plan, aims to integrate better biomass producing and processing sectors in order to reconcile food security, natural resource scarcity and environmental objectives with the use of biomass for industrial and energy purposes. Among others, construction and automotive industries have high potential for effective implementation of the strategy of European Bioeconomy in terms of more efficient use of biomass and industrial by products for development of bio-based value added products.

Reinvent project will answer these needs by developing and combining bio based materials and fibres for replacing the petroleum based polyurethane (PUR) insulation products used in buildings and soft foams for vehicles interior products. Polyols, natural cellulose fibres and nanocrystals, and biomass derived nanoparticles (NPs) will be derived by advanced technologies from sustainable wood-based and agro-based sources to develop and validate:

- i) Novel bio based rigid moulded and spraying insulation foam systems for the construction industry, e.g. composite bridge decks, spraying building insulations and insulating sandwich structures, and
- ii) Novel bio based soft and semi-rigid foams for the automotive industry, e.g. sub-layers for car ceilings, dashboards and seat covers.

These customer products will be validated for their enhanced properties, sustainability and low cost, and compared to currently available petroleum- and bio-based counterparts used in the construction and automotive industries, respectively. To enhance the sustainability of these products and materials, new energy and cost-efficient recycling technologies for the bio-based products will be developed.

<b>UNRAVEL</b>		<b>792004</b>
Title: <b>UNique Refinery Approach to Valorise European Lignocellulosics</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R2</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>3.995.800,75</b>	EU requested grant (€): <b>3.603.545,00</b>	

**Free keywords:** *pre-treatment, fractionation, lignocellulosic, lignin, polyurethane, bitumen, enzymatic hydrolysis, scale up, pilot plant*

### **Abstract:**

UNRAVEL aims to develop advanced pre-treatment, separation and conversion technologies for complex lignocellulosic biomass to produce usable lignin fragments, and monomeric sugars from the cellulose and hemicellulose fraction suitable for biochemical conversions. The technologies will be scaled up from lab (TRL 3) to pilot plant (TRL 5). UNRAVEL will achieve a breakthrough in the valorisation of lignocellulosic biomass by:

- Utilizing complex lignocellulosic biomass sources such as forest residues, bark, straw, and nut shells
- Recovering valuable components by feedstock pre-extraction prior to fractionation
- Achieving at least 80% lignin yield, 90% glucan recovery from the cellulose and 80% yield of monomeric hemicellulose sugars by utilizing the ECN FABIOLATM low temperature, energy-efficient acetone based fractionation process
- Purifying the hemicellulose hydrolysate and qualifying it for fermentation into chemical building blocks
- Developing lignin depolymerisation technologies
- Establishing high-value lignin applications through the production of lignin-based PUR & PIR foams and lignin-based additives in bitumen for roofing applications
- Demonstrating a 30% OPEX and 15 % carbon footprint reduction of the pre-treatment

UNRAVEL will develop an integrated cross-sector value chain by bringing together specialists with expertise on feedstock composition, chemical pulping and pre-treatment, enzymes production, polymer chemistry, separation and reactor engineering, techno-economic and sustainability assessments and knowledge dissemination and exploitation and communication. The active involvement of three SME's and two large enterprises, active in wood pulping and the production of lignin-based building materials, strengthens a market-driven approach and commercial exploitation and implementation of the results generated in the UNRAVEL project.

<b>AQUABIOPROFIT</b>		<b>790956</b>
Title: <b>AQUAculture and Agriculture BIOMass side stream PROteins and bioactives for Feed, FITness and health promoting nutritional supplements</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R4</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>4/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>4.163.240,00</b>	EU requested grant (€): <b>3.349.527,00</b>	

**Free keywords:** *aquaculture, fisheries, agriculture, nutrition, side streams, residues, valuable ingredients*

### **Abstract:**

The AQUABIOPRO-FIT main objective is to promote efficient utilisation of European aquaculture, fisheries and agriculture side streams in feeds and nutritional supplement products promoting fitness and health. To this end, we will develop side stream biomass processing technologies to up-concentrate nutrients and bioactives maintaining product quality and minimising waste. The safety, bioactivity and acceptance of the developed ingredients and products will be documented through cell, animal, taste panel and intervention studies with humans, namely athletes and patient groups. Technical, marketing, economic and environmental studies will complement the documentation portfolio of the AQUABIOPRO-FIT concepts and products. The developed knowledge and principles will be further systematised in net-based training modules, which will follow the intellectual property rights of the developed methods and products. Information material will be created for educating the public and raise awareness of the importance of circular economy and promote acceptance for side stream bio-based products in end markets.

<b>EXCornsEED</b>		<b>792054</b>
Title: <b>Separation, fractionation and isolation of biologically active natural substances from corn oil and other side streams</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R4</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>7.215.843,75</b>	EU requested grant (€): <b>4.259.297,00</b>	

**Free keywords:** *valorization; corn oil; thin stillage; rapeseed meal; proteins; bioactives; characterization; upscale; cosmetics; food; specialty chemicals; market validation*

### **Abstract:**

The EXCornsEED project aims to exploit the convergence between science, chemistry, biology, engineering and biotechnology tools for the creation of new knowledge and innovative applications, with the main goal to develop and validate an integrated process of innovative and highly sustainable extraction/purification/concentration technologies to be applied to bio-refineries side streams (i.e. corn oil, thin stillage from bio-ethanol and rapeseed meal from biodiesel production) for the recovery of proteins and several other bio-active compounds (i.e. polyphenols, amino acids, fibers, lipid compounds, alkaloids and tannins, etc.) and characterization/preparation of these as ingredients for food, specialty chemicals, and cosmetics markets. A three-step approach will upscale the EXCornsEED process from lab level (few grams, TRL3) up to industrial pilot in ENV premises (1t/d capacity, TRL5).

The project stems from a sound industrial vision set by ENV and other industrial partners to transform traditional bioethanol production in future biorefinery concept, fully in line with EU strategies for a bio-based economy. The concurrent presence of biotech producer ENV (project initiator) technology experts SAP, CEL and ICE, and product companies SIAL, NUT, BZN and DRL will guarantee the commitment towards a real market-driven project. A synergistic approach will be used with the collaboration of other partners CREA, CTA, INNEN, HC and TEC, in order to define a self-sustainable system and have an outcome that is in accordance with the principles of the circular economy.

<b>iFermenter</b>		<b>790507</b>
<b>Title: iFERMENTER - CONVERSION OF FORESTRY SUGAR RESIDUAL STREAMS TO ANTIMICROBIAL PROTEINS BY INTELLIGENT FERMENTATION</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R4</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>5.360.381,25</b>	EU requested grant (€): <b>3.997.825,00</b>	

**Free keywords:** *Synthetic biology; biorefinery residual stream; sugar conversion; sugar recovery; antimicrobial proteins*

### **Abstract:**

Plant dry matter, so-called lignocellulosic biomass, is the largest renewable biomass feedstock on Earth. Europe has over 14 mill tons of sugar residuals from biorefineries, which could be converted to profitable products and contribute to a sustainable bioeconomy. Unfortunately, existing biorefineries struggle with technical issues and low profitability due to the lack of adequate fermentation processes. Therefore, these sugars are either incinerated to generate energy or at best converted to ethanol (€0.6 /kg) but not to higher value chemicals.

Current concepts that aim to establish fermentation processes to convert residual sugar streams to high value products face challenges including inefficient sugar utilization by microorganisms and inhibitors in the residual streams, leading to low productivity and yields.

Our project aims to recover high value compounds from sugar residuals, and to turn fermentation processes converting these residual to antimicrobials cost effective. We will recover the high value sugar galactose (€40-200 /kg) from residual streams as part of their treatment process. By genome editing technique, we will design cell factories that consume the remaining residuals and produce nisin (€50-150 /kg), an industrially important commercial food/feed preservative. Additionally, we will develop an affordable, online feedback add-on system that will allow to intelligently change residual mixture during fermentation of these cell factories to optimize production online during the process. In a 150 L industrial bioreactor, we will demonstrate that our add-on invention iFermenter

- increases the yields of nisin by over 2 fold
- increases the nisin production by over 50% compared to what is possible today,
- and reduce at least 20% in CO2 footprint with this process compared to existing solutions.

Thus, iFermenter will render production of high value products with residual sugar stream highly efficient and cost-effective contributing to circular economy.

<b>Pro-Enrich</b>		<b>792050</b>
Title: <b>Development of novel functional proteins and bioactive ingredients from rapeseed, olive, tomato and citrus fruit side streams for applications in food, cosmetics, pet food and adhesives</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R4</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>3.956.640,86</b>	EU requested grant (€): <b>3.312.890,86</b>	

**Free keywords:** *Proteins, bioactives, food ingredients, polyphenols, carbohydrates, fractionation, downstream purification, antioxidants, pilot scale, biorefinery system, prebiotics, side-streams, adhesives*

### **Abstract:**

Pro-Enrich will develop a flexible biorefinery approach capable of processing a range of agricultural residues (rapeseed meal, olives, tomatoes and citrus fruits) in response to the increasing global demand for alternative sources of protein and phenolic product streams, tailored to the cross sectoral requirements of industry. Pro-Enrich will optimise existing biomass fractionation technologies and validate novel extraction approaches beyond the current state of the art (from TRL2 through to TRL 4/5) to isolate and purify proteins, polyphenols, dietary fibres and pigments. The products being targeted are food ingredients, pet food, cosmetics and adhesives. These will be developed through an iterative process of feedstock mapping, laboratory process development, functionality/performance testing of samples by industry and pilot upscaling.

Pro-Enrich gathers the expertise of 16 partners from 7 countries, covering the entire biorefinery value chain and consisting of 8 SMEs, 5 large enterprises, 2 RTOs and 1 university.

The project facilitates supply chain building across different sectors, including biomass production and logistics; materials handling and processing, through to end-users. The project will engage and collaborate with key industry stakeholders from farming and biomass supply, processors and brand name owners.

Pro-Enrich produces detailed life-cycle, socio-economic and safety assessments to facilitate policy and decision-making by industry and the EU, inform and guide consumer acceptance and assist with regulatory compliance. The outcome of Pro-Enrich will have a huge economical impact on the involved partners especially the industries and generate a large number of new job positions. However, the impact goes beyond the consortium by contributing to the BBI's strategy for zero-waste processing in the biobased products sector, by addressing technical, commercial and environmental impact across the whole supply chain.

<b>Prolific</b>		<b>790157</b>
Title: <b>Integrated cascades of PROcesses for the extraction and valorisation of proteins and bioactive molecules from Legumes, Fungi and Coffee agro-industrial side streams</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R4</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>9/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>5.342.470,45</b>	EU requested grant (€): <b>4.672.382,75</b>	

**Free keywords:** *Legumes, fungi, coffee, prototypes, extraction, enzymatic hydrolysis, bio-active, ingredients*

### **Abstract:**

Agro-industrial residual biomass, side streams and food production by-products like legumes, fungi and coffee are potential sources of valuable ingredients even though the routes for their exploitation are still at an early stage.

Pursuing the ambition of achieving prolific valorization of untapped biomass streams, the project R%D&I activities and partners of Prolific have been positioned around a central innovation cycle that is mainly driven by industrial end-users who exactly know the needs of their customers and the technical constraints and industrial environment in their respective sector.

The PROLIFIC project will apply a range of processing technologies to recover significant amounts of proteins/peptides and other value added compounds (e.g. carotenoids, phenols, caffeine and fibers) from industrial processing residues of legumes (seeds of peas, beans and chickpea), fungi (cuttings and mycelia of different species) and coffee (silver skin residue and not compliant roasted seeds). The economically and environmentally sustainable extraction, enzymatic modification, and conditioning techniques will be upscaled in industrially relevant environment. This will enable the production of consequent amounts of compounds and fractions necessary for the production of 16 product prototypes for the food, feed, packaging and cosmetic sectors.

The Prolific project will assess the environmental, societal, ethical, safety, and regulatory issues at each step of the targeted value chains. SME and large companies strive at achieving competitive biomass exploitation and attracting when needed additional investors. The industrial partners business strategies for the future market penetration starts with the clear identification of the customer needs and goes up to the preparation of give-aways of food and cosmetics prototyped products as a reward for filling in questionnaires about the Prolific products along with intensive dissemination and communication.



<b>SusBind</b>		<b>792063</b>
Title: <b>Development and pilot production of SUsustainable bio BINDER systems for wood based panels</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R5</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>5/1/2018</b>	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>5.480.220,00</b>	EU requested grant (€): <b>4.414.418,75</b>	

**Free keywords:** *Bio precursor, Bio based resins and binders, wood based panel boards, furniture*

### **Abstract:**

The overall objective of the SusBind project is to produce and test, in an industrially relevant environment (TRL5), bio-based binders as alternative to formaldehyde based binder currently used in the production of wood-based panel board (abbreviated as wood board). A lot has been done on this subject, but so far a bio-based binder able to compete at industrial scale with incumbent chemicals, does not exist. The reason to believe on the success of this project is backed: on the selection of the partners, which involves actors across the whole supply chain, and their extensive technological background developed during the last years.

The SusBind project intends to build on these success factors by:

- i. Selecting more adequate feedstocks from existing European Bio-refineries;
- ii. Applying new and greener conversion technologies for the production of binders and intermediates, including novel epoxidizing enzymes (peroxygenases) developed in the project IndOx (FP7-KBBE; [www.indoxproject.eu](http://www.indoxproject.eu));
- iii. Producing and validating these new bio-based binders with leading wood board manufacturers for two product types: P2 Particle Board (PB) and Medium Density Fibreboard (MDF) and;
- iv. Involving the world leading brand owner, producer and retailer of mass market furniture.

The SusBind resulting binder system will prove better performance in PB and MDF in terms of 50 - 75% reduction of formaldehyde emissions than current fossil- and formaldehyde-based wood boards. The active participation of industry and a consumer brand owner secures post-project scale up into existing plants. On the basis of cost analyses performed, an economically viable and better performing precursor will increase the marketability of bio-based furniture products concerned. The results of SusBind will not only benefit consumer health and help mitigate climate change, but also strengthen the European furniture industry by providing a cost efficient, bio-based alternative to formaldehyde-based binders.

<b>NEWPACK</b>		<b>792261</b>
Title: <b>Development of new Competitive and Sustainable Bio-Based Plastics</b>		
Call Id: <b>H2020-BBI-JTI-2017</b>	Topic: <b>BBI.2017.R6</b>	Type of Action: <b>BBI-RIA</b>
Project start date: <b>6/1/2018</b>	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>5.324.525,00</b>	EU requested grant (€): <b>4.274.587,00</b>	

**Free keywords:** *Circular economy, sustainable design, environment, resources, sustainability, technological innovation, bioplastic*

### **Abstract:**

The objective of NEWPACK is to validate in industrial setting the production of at least two new bioplastics based on PHB- PLA blends with improved sustainability performance, obtained by the addition of natural extracts with antioxidant/antibacterial properties and nanoadditives from cellulose and chitin. A new circular economy value chain will be generated from agro-food wastes that will be exploited for the production of PHB, while designing and validating the process up to pilot scale. Blending of PLA and PHB will be validated at pilot scale to achieve specific final product requirements based on targeted products. New bioplastic properties and functionalities will be achieved through incorporation of nanocellulose or nanochitin additives (to improve typical problems of processability and mechanical properties of PLA-PHB), antioxidant and antimicrobial additives. The ability to extend the functionalities will be validated in real industrial environments. NEWPACK activities are underpinned by the prior experience and results (already validated at TRL 3-4) of the partners in order to achieve advanced TRLs (5-6) for the developed technologies, including PHB production from potato peels/sweet corn residues; co-blending of PHB with PLA; nanocellulose extraction from wheat straw and incorporation into PHB-PLA blends and encapsulation of natural antioxidants/antimicrobials for addition to PHB-PLA. Great emphasis will be on assessing technical and economic feasibility of the processes; demonstrating the biodegradability of solutions; ensuring the compliance to the market and regulatory requirements; LCA evaluation; preparing for future scale-up of the processes to achieve a pre-industrial production and identification of stakeholders perceptions, attitudes and expectations towards bioplastics. The NEWPACK consortium has 13 partners with academic research organizations and small and large industries which cover the whole innovation, production and final use value chain.

<b>DEEP PURPLE</b>		<b>837998</b>
<b>Title: CONVERSION OF DILUTED MIXED URBAN BIO-WASTES INTO SUSTAINABLE MATERIALS AND PRODUCTS IN FLEXIBLE PURPLE PHOTOBIOREFINERIES</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO1.D2</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date:	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>9.527.581,25</b>	EU requested grant (€): <b>6.983.049,99</b>	

**Free keywords:** *Photobiorefinery, biopolymer, cellulose, chemical precursor, fertilizer, municipal solid waste, organic fraction, phosphorous, sewage, wastewater*

### **Abstract:**

DEEP PURPLE creates a holistic consortium to transform diluted urban bio-wastes, including mixed waste streams, organic fraction of municipal solid waste (OFMSW), wastewater (WW) and sewage sludge (SS), into feedstock for bio-industry to obtain sustainable bio-products. This revolutionary concept will be implemented in a novel Single-Site Multi-Platform Concept (Biomass, Cellulose and Biogas) to replace current polluting destructive practices with new value added concepts. The beneficial use of bio-waste is obtained by an innovative combination of optimized recovery technologies and novel solutions: the Purple Phototrophic Bacteria (PPB) PhotoBiorefinery. The use of PPB -the most versatile metabolism reported- ensures the adaption to fluctuating and diluted waste streams to support a stable profitable production chain. The first PPB PhotoBiorefinery in the EU (the biggest worldwide) will be validated in different environmental, economic, logistic, and social scenarios.

The concept will be implemented by end-users from four municipalities, namely Madrid (ES), Toledo (ES), Třinec (CZ) and Velká Polom (CZ) to transform bio-wastes (OFMSW: 422 t/y, mixed waste: 438,000 m<sup>3</sup>/y) into high-added value bio-products: fine chemicals (bio-cosmetics), fertilizers, bio-packaging and self-repairing construction materials. The market uptake of DEEP PURPLE is facilitated by optimal logistics of bio-wastes conversion (reduction of landfilled OFMSW: 60%, WWTP solids recovery: 71%), and bio-products quality to favor their commercialization (440 t/y). The integration of value chains is boosted by relevant stakeholders participation and innovative business models, minimizing waste and maximizing benefits (85 M€ benefits, GHG emissions savings: 11,300 tCO<sub>2</sub>eq/y in 2025). Key communities (social engagement strategies) will participate in the new value creation, calibrating the returns of the project like social innovation promotion and creation of new opportunities along the urban value cycle

<b>VAMOS</b>		<b>837771</b>
Title: <b>Value added materials from organic waste sugars</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO2.D3</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date:	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>12.787.844,00</b>	EU requested grant (€): <b>6.984.812,88</b>	

**Free keywords:** *Lignocellulose, cellulosic sugars, bio-products, biomass*

### **Abstract:**

This project aims to showcase, at demonstration scale, the feasibility of producing and valorising second generation sugars derived from municipal solid waste (MSW). This MSW is composed of either mixed domestic residual waste or waste rejected from sorting and recycling processes (MRF rejects) and contains significant quantities of paper/card (lignocellulosic) based materials. The sugar will be utilised in the production of three bio-based products; 1) a thermoset bioresin used in the binding of mineral-wool insulation; 2) purified lactic acid (LA) for the commodities market; and 3) poly-lactic acid (PLA) and PLA/Fibre composite materials to be used in non-food contact applications within the fast moving consumer goods (FMCG), packaging, furnishings and construction sectors.

The vision is to create a paradigm shift in industrial biotechnology products by establishing a novel approach based on the efficient use of low value mixed waste and the conversion of this material into value-added products. This project, titled 'Value Added Materials from Organic waste Sugars' (VAMOS) aims to produce competitive, sustainable, affordable and high-performance bio-based materials from low-value residual waste sugars.

<b>VEHICLE</b>		<b>837866</b>
Title: <b>Valorise Extensive quantities of Hemicellulosic and Cellulosic sugars from Lignocellulosic biomass into high-value End products</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO2.D3</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date:	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>9.643.390,00</b>	EU requested grant (€): <b>5.872.354,13</b>	

**Free keywords:** *Hemicellulose, oligosaccharides, mono-ethyleneglycol, mono-propyleneglycol, 1,4-butanediols, long chain di-acids, LCA,*

### **Abstract:**

VEHICLE will demonstrate novel biotechnological and non-biotechnological technologies for providing and valorising low value sugar streams, thereby enabling significant progress in holistic & sustainable utilisation of lignocellulosic biomass. The main goals for this project are to demonstrate valorisation of dilute hemicellulose-containing prehydrolysate streams from pulp mills, which are currently waste streams with little value. The demonstration will take place by Ecohelix at the Domsjö Fabriker dissolving pulp mill in Sweden. In addition to widen the business and market opportunities of existing biorefinery investments by demonstrating the applicability of their sugar streams in several downstream options. Sugar streams will be provided by Avantium and Graanul from their demonstration and flagship facilities that are currently under construction. Subsequently the use of hemicellulose polymers from prehydrolysis streams in different pulp and paper product applications will be demonstrated by Kemira as well as the conversion of hemicellulose and cellulose based sugars into intermediate and building block chemicals – glycols (MEG and MPG), butanediol and long chain diacids – as well as into specialty sugars (glucosone, fructose) by Metgen, Avantium and Novamont. VEHICLE project will give special attention to secure the market demand and marketability of the produced intermediate molecules by demonstrating their use in a minimum of 5 end applications. In all 3 business cases VEHICLE maximises the weighted % of valorised feedstock, by covering more than one component and more than one product. UVIC will utilize well established LCA methodologies to assess the environmental and economic impacts of the developed products and processes. VEHICLE is based on sound business cases and business plans of three very promising value chains demonstrated by Ecohelix/Kemira, Avantium and Novamont. Combined with the 3 feedstock sources, up to 9 new value chains can be created.

<b>GRETE</b>		<b>837527</b>
Title: <b>Green chemicals and technologies for the wood-to-textile value chain</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO2.R6</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>2.754.693,75</b>	EU requested grant (€): <b>2.555.243,75</b>	

**Free keywords:****Abstract:**

The GRETE project will tackle the challenges caused by increased global demand for sustainable textile fibres by offering new breakthroughs in the wood-to-textile value chain. The substitution of cotton by man-made cellulose fibres is also necessary because of sustainability issues. Currently the raw material base for the production of man-made cellulose fibres from wood is limited, as only highly processed dissolving grade pulps are used industrially. GRETE will introduce technologies by which paper grade pulps from softwood and hardwood sources can be used as raw material for man-made textile fibres. GRETE will also offer safe and sustainable solvent systems for the production of regenerated cellulose fibres, instead of the present ones which are based on toxic or explosive chemicals. The developed novel solvents are ionic liquids (IL's), which will be non-toxic, recyclable and synthesized from low-cost industrially available chemicals. GRETE will also develop innovative technologies for chemical modification and enzymatic pre-treatment of pulps prior to cellulose dissolution. Chemical modification carried out either before or after dissolution and regeneration of pulps will bring chemical functionalities to fibres. The modifications either directly improve fiber properties (e.g. decreased fibrillation, improved fire resistance) or offer an easy route to further fibre processing. Improved dye adsorption and chemical reactivity will offer new options for dyeing and finishing treatments of the fibres, enabling e.g. the creation of a water-scarce end to the textile manufacturing value chain as well as open up the possibility for other targeted and water-scarce finishing treatments.

<b>B-FERST</b>		<b>837583</b>
Title: <b>Bio-based FERTilising products as the best practice for agricultural management SusTainability</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.D4</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date: <b>5/1/2019</b>	Duration: <b>60 months</b>	Unit:
Total costs (€): <b>10.016.296,25</b>	EU requested grant (€): <b>6.509.357,00</b>	

**Free keywords:** *Bio-based fertilisers; Biostimulant; nutrients; soil conditioning; industrial upscaling; bio-based value chain; Sustainability; logistics; business plan*

### **Abstract:**

B-FERST's main objective is to integrate the valorisation of bio-wastes in agriculture management plans creating a new circular and bio-based value chains considering a bilateral interaction between farming and fertiliser sectors focused on a paradigm shift in the fertiliser value chain with 8 specialised fertilisers. Specialised nutrient mixes are required to achieve a more sustainable management of resources by tailor-made nutrient dosing adapted to farmer systems. The SUSTAINABILITY of B-FERST is based on the reuse of bio-waste to replace non-renewable, non-domestic and energy intensive raw materials:

1) Bio-based solid fertilisers including renewable sources of macronutrients (N,P,K) obtained from 3 by-products streams: i) ashes, as source of P & K from: Waste Water Treatment Plants (WWTP) (sewage sludges), & agri-food such as: slaughterhouse waste, olive & livestock wastes; ii) struvite as source of P & N from WWTP & agro waste (pig slurries), and; iii) compost as source of organic carbon compound, N, P & K from Organic Fraction of Municipal Solid Waste) OFMSW, WWTP & agro waste (manure -livestock-).

2) Biostimulants for soil nutrient improvement from two approaches: selected microbiological strains as Microbial Plant Biostimulant (MPB) or Non-Microbial Plant Biostimulant (NMPB) from cardoon oil meal processing (agricultural by-products) and compost extracts. Bio-degradable coatings based on biopolymers will be used when MPB is added to the fertiliser products to protect the beneficial microorganisms and guaranty their performance.

The VIABILITY is based on previous R&D from other RIA projects. The manufacturing process will be demonstrated at a demonstrative industrial scale. Then specialised fertilisers will be performed and validated in 5 crops tests (Spain, Italy, France, Poland and Ukraine) comparing their functionality to that of traditional fertilisers in terms of: sustainable sourcing, logistics, soil and growing conditions, reaching a TRL6

<b>INGREEN</b>		<b>838120</b>
<b>Title: Production of functional innovative ingredients from paper and agro-food side-streams through sustainable and efficient tailor-made biotechnological processes for food, feed, pharma and cosmetics</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.D5</b>	Type of Action: <b>BBI-IA-DEMO</b>
Project start date:	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>8.947.381,25</b>	EU requested grant (€): <b>6.352.980,25</b>	

**Free keywords:** *biobased ingredients food by-product food feed nutraceutical cosmetic prebiotics cheese bakery*

### **Abstract:**

Agro-food and Paper mill side streams and by-products are sources of unexploited organic fractions exploitable into safe microbial biomasses, functional ingredients and intermediates, e.g. prebiotics, pre-fermented ingredients, bioplastics and chemicals. The INGREEN bio-based ingredients/materials will be used to produce innovative functional products for food, feed, packaging, pharmaceutical, nutraceutical and cosmetic sectors. The INGREEN outcomes will be obtained by validated tailor made biotechnologies based on safe microorganisms or eco-friendly approaches. Logistics and storage conditions will be optimized to favor the flow from feedstock to the bio-based prototype producers. INGREEN aims to demonstrate in industrial environments the efficiency and sustainability of the target biotechnologies to produce i) lactobionic acid (LBA), galactooligosaccharides (GOS), microbial safe biomasses from whey; ii) polyhydroxyalkanoates (PHA) enriched biomasses and purified PHA, as prebiotics and bioplastics respectively, from paper mill wastewater; iii) functional pre-fermented ingredients from rye/wheat milling fractions. Safe and characterized INGREEN ingredients will be used for innovative functional cheeses, bakery products and nutritious feeds. Functional GOS, LBA and pre-fermented bran will be used to produce prebiotic immune-stimulating gel, nutraceutical supplement and cleanser for human health. INGREEN biodegradable material will be valorised into bag in box to boost INGREEN fluid prototype sustainability. Prototype safety, shelf-life, quality and functional performances will be compared to benchmarks. Also LCA/LCC, sound business cases and plans and compliance with REACH and any relevant EU safety legislation will be applied over the whole project to assess prototype benefits compared to benchmarks. INGREEN product specifications will contribute to define/standardize the regulatory requirements for outcome innovation deals, market uptake and societal acceptance.



<b>PLENITUDE</b>		<b>838104</b>
Title: <b>First-of-its-kind, large-scale, lowest-cost, zero-waste biorefinery for the production of proteins for food and feed application from low cost sustainable feedstocks.</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.F2</b>	Type of Action: <b>BBI-IA-FLAG</b>
Project start date:	Duration: <b>60 months</b>	Unit:
Total costs (€): <b>27.573.402,50</b>	EU requested grant (€): <b>16.937.464,50</b>	

**Free keywords:** *Mycoprotein; biorefinery; Sustainability; zero-waste*

### **Abstract:**

PLENITUDE will build a bio-based value chain based around a unique highly efficient zero-waste process that produces sustainable protein by integrating an aerobic fermentation plant with a conventional first generation biorefinery.

PLENITUDE will increase the availability of sustainable, safe, food-grade protein by building and operating a large-scale, first-of-its-kind bio-based value chain producing food-grade protein sourced from sustainable sources such as wheat using an integrated biorefinery setup.

PLENITUDE directly addresses the topic “BBI.2018.SO3.F2” through enabling food-grade mycoprotein production within an integrated bioethanol refinery. The output protein will contribute to meeting the rapidly growing global protein demand identified in the specific challenge of the topic.

PLENITUDE will create initial output capacity of 16k tonnes per annum and based on the predicted outputs, the consortium aim to extend this capacity post project to produce a cumulative 1M tonnes of protein by 2030, which as a like for like replacement for meat from livestock equates to a reduction of >5M tonnes of carbon emissions.

The consortium has a strong industrial base led by the Südzucker Group of companies, including Crop Energies and Beneo, with 3F BIO as the technology supplier, and supported by partners covering the entire value chain for the creation of both new bio-based food products and new value chains across both B2B and B2C markets.

<b>BIOntop</b>		<b>837761</b>
Title: <b>Novel packaging films and textiles with tailored end of life and performance based on bio-based copolymers and coatings</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.R10</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>48 months</b>	Unit:
Total costs (€): <b>5.524.430,00</b>	EU requested grant (€): <b>4.219.696,74</b>	

**Free keywords:** *Bioplastic, PLA, copolymers, coatings, barrier, biodegradation, home composting, recycling, waste management, end of life, packaging, textile, food, personal care, eco-design, circular bioeconomy*

### **Abstract:**

Only 31% of plastic is currently recycled and plastic packaging still have a deficient end of life. Thus, improvements are needed to provide cost effective solutions with high bio-based contents and suitable performances for demanding packaging applications, with a consumption of 19M ton/year, while still achieving compostability in mild conditions.

Using sustainably sourced comonomers, additives and fillers to formulate novel PLA copolymers and compounds, the BIOntop project will deliver recyclable-by-design cost competitive packaging solutions that can be mechanically recycled, industrially/home composted or even suitable for anaerobic digestion.

Moreover, the barrier properties of delivered bio-packaging trays, films and derived packaging, will be enhanced using removable protein-based coatings and a novel fatty acid grafting technology to decrease permeability and compete with fossil packaging.

In the field of textile packaging , most used coatings are not bio-based and of different nature from the coated fibres, making material or organic recycling extremely difficult. New PLA coatings or fatty grafting will allow reprocessing without significant loss of properties.

BIOntop packaging, based on >85% renewable resources, will be compatible with a broad range of packaging applications' requirements but also multiple end of Life options. Our materials will be biodegradable in home composting conditions but also recyclable for multiple use secondary packaging.

Based on new circular bioeconomy value chains, BIOntop will generate growth for EU bioplastics and end users' industries in the food and personal care sectors with potential in many fields: BIOntop production is estimated to reach close to 9.6 Mton per year by 2030, overall leading to €40 M turnover and 170 new jobs. All in all, reducing the environmental footprint of plastics, our new bio-based packaging will have a significant positive social and environmental impact.

<b>CelluWiz</b>		<b>838056</b>
<b>Title: Process developments for a recyclable and compostable all-cellulose multilayer material for packaging</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.R10</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>2.841.875,00</b>	EU requested grant (€): <b>1.945.375,00</b>	

**Free keywords:** *All-cellulose packaging material, MicroFibrillated Celluloses, Wet lamination process, Chromatogeny process, Small scale pilot development, Biodegradable, Recyclable, Clamshells Cups and Trays*

### **Abstract:**

Packaging is necessary to transport and protect food and goods and communicate with the end-user. The food packaging industry, agile to follow consumer expectations and societal changes, is nowadays taking the challenge to improve its sustainability and reduce its environmental impact. CelluWiz project will greatly participate to take the challenge by developing, from TRL 3 up to 5, two innovative processes able to produce all-cellulose, recyclable and compostable, multilayer materials for packaging.

A consortium of 5 partners, including 3 RTOs and 2 industrial groups from 4 European countries, has been set up to reach the following objectives:

-Develop the MFC wet lamination process. This process assembles, without glue, a board with a layer of MicroFibrillated Celluloses, creating a stratified cellulosic material. The MFC layer confers stiffness, lightweighting, barrier to air, grease, contaminants and oxygen.

-Develop a specific version of the chromatogeny coating and grafting process for MFC layers. This ultrafast and efficient solvent free chemical grafting process will be fully revised to create a micron size layer of pure cellulose ester which will bring liquid resistance and water vapour barrier.

-Produce 3 proofs of concept (Clamshell, Cup, and Tray) showing performances at least equivalent to market references.

-Demonstrate the environmental benefits of the innovative processes and materials and their easy integration into the value chain, by performing LCA and LCC and by submitting the project advances to an advisory group composed of stakeholders of the value chain.

At the end of the project, small pilot machines will be able to prove that the CelluWiz' materials can offer a competitive alternative to existing multi-layers plastic materials or multi-materials while being renewable, recyclable/recycled in the paper waste value chain and biodegradable.

<b>MANDALA</b>		<b>837715</b>
<b>Title: The transition of MultiLayer/multipolymer packagiNg into more sustainable multilayer/single polymer products for the food and phArma sectors through the develOpment of innovative functional Adhesives</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.R10</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>42 months</b>	Unit:
Total costs (€): <b>4.573.892,50</b>	EU requested grant (€): <b>3.650.921,75</b>	

**Free keywords:** *Biobased and biodegradable adhesives, multilayer, monolayer, single-polymer, circular economy, pharma packaging products, sustainability, recyclability, biodegradability, compostability*

### **Abstract:**

The MANDALA project presents a sustainable solution for the plastic packaging sector which tackles 3 pillars: eco-design, dual functionality & end-of-life; with the aim to find a final solution based on multilayer monomaterial packaging with functionalities compared to multimaterial ones and fully produced with biobased & recycled polymers in order to reach a full circularity of resources.

MANDALA will develop new adhesives with dual functionality (easy to split and barrier properties) by incorporating thermoreversible covalent bonds and radiation absorbing nanoparticles, which at the same time will generate a tortuous path enhancing barrier properties that are critical for end-user. In addition, new polymer blends with increased biobased and recycled content of film layers will be developed. Their combination in a multilayer product will set the basis for new food (meat, ready-to-eat) and pharma (pill blister) packaging products. MANDALA project will demonstrate that the delamination technology can be up-scaled and applied to reach intermediate solutions for multilayer/multimaterial packaging (being biobased or not) progressively helping to become the end-of-life more sustainable by recovering all fractions and providing clean streams for their biodegradation or recycling.

MANDALA project will directly contribute to achieve KPI 1, KPI 2, KPI 6, KPI 8 and demonstrate the solution decreasing the end-of-life costs and CO<sub>2</sub> emissions in more than a 30%. It will develop innovations in 3 KETS. MANDALA consortium involves 12 partners (4RTD, 5SME, 1SME cluster and 2 Large Companies) accounting 2 BIC full members and 2 associated. The 42-months project will comprise a total estimated budget of 4,573,892,5€ and requested funding of 3,650,921,75€. There is a strong engagement of the industry with 922,970,75€ in-kinds (20,2%) and 4,869,731€ in additional activities during the project (machine acquisition) and 3,820,000€ envisaged to upgrade TRL after the end of the project.

<b>USABLE PACKAGING</b>		<b>836884</b>
Title: <b>Unlocking the potential of Sustainable Biodegradable Packaging</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.R10</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>6.427.043,75</b>	EU requested grant (€): <b>4.813.045,00</b>	

**Free keywords:** *Biodegradable polymers; biopolymers; bioplastics; biobased materials*

### **Abstract:**

USABLE Packaging will develop high performance plastic packaging through a sustainable and fully circular value chain, where the biomass raw material sourcing derives from food processing side streams, to obtain, via a low footprint biochemical processing, a portfolio of bio-based biodegradable building block materials enabling the realisation of complex packaging structures, including laminates and multilayer films, to match key functional requirements of commercial petrochemical plastics, such as gas/ liquid barrier properties, mechanical resistance, cold temperature resistance, hot tack, among others, while enabling the realisation of a full set of packaging items from rigid to semi rigid and flexible by tuning the functionalisation of base resins through bio-synthesis and the compound processing. USABLE Packaging concept is designed to retrofit the existing state of the art packaging processing technology by controlling the chemical and physical properties of the base building blocks materials. With respect to petrochemical peers USABLE Packaging offers a sustainable end-of-life, since on one hand materials are biodegradable with no harm to the environment, on the other hand they have potential to deliver additional economic value through organic recycling for production of biogas, with the same consolidated disposal route as bio-waste, or through biotech recycling, to be used again as feedstock for the production of the same base resins for USABLE Packaging, basically closing again and again the same value chain to re-obtain virgin materials.

<b>ECOAT</b>		<b>837863</b>
<b>Title: ECO sustainable multifunctional biobased COATings with enhanced performance and end of life options</b>		
Call Id: <b>H2020-BBI-JTI-2018</b>	Topic: <b>BBI.2018.SO3.R9</b>	Type of Action: <b>BBI-RIA</b>
Project start date:	Duration: <b>36 months</b>	Unit:
Total costs (€): <b>5.567.436,25</b>	EU requested grant (€): <b>4.613.778,25</b>	

**Free keywords:** *Biomolecules, barrier properties, antimicrobial, hydrophobicity, sustainability*

### **Abstract:**

The overall objective of project ECOAT is to select, extract-functionalise molecules (proteins, polysaccharides, cutin) from highly available, low valorised biomass such as tomato, legumes, sunflower etc for the development of new bio-based coating materials to be applied on two different substrates (cellulosic and plastic based), with improved performances compared to currently available products and at the same time with more sustainable end of life options.

The products to be developed in the project are in particular:

- Antimicrobial-antioxidant coatings based on chitin nanofibrills, and/or chitosan, functionalised MC, for cellulose tissues (personal care), paper and cardboard (packaging for fresh products like pasta, tableware), woven and nonwoven (sanitary), plastic substrates (bio-polyesters) for active packaging.
- Cutin based formulations for coatings water repellent (paper cups, service paper etc.), water vapour barrier (packaging) and protective properties (non-food packaging).
- Protein- based barrier adhesive for multilayer food packaging (bio polyesters based), with sustainable end of life options (composting, recyclability).

<b>DIGESTAIR</b>		<b>832012</b>
Title: <b>A novel anaerobic DIGESTer solution in AIR transport for on-board safe and efficient waste management</b>		
Call Id: <b>H2020-CS2-CFP08-2018-01</b>	Topic: <b>JTI-CS2-2018-CFP08-AIR-03-04</b>	Type of Action: <b>CS2-RIA</b>
Project start date:	Duration: <b>24 months</b>	Unit:
Total costs (€): <b>392.407,50</b>	EU requested grant (€): <b>392.407,50</b>	

**Free keywords:** *anaerobic digestion, prototype, cabin waste management, environmental impact, membrane filtration, energy recovery*

### **Abstract:**

The DIGESTAIR project addresses the topic JTI-CS2-2018-CFP08-AIR-03-04 within The Clean Sky 2 programme and it can contribute to the Eco-design Transverse Activity in Airframe ITD. According to the International Air Transport Association, airlines produced 5.2 million tons of waste last year. Recent data from Eurostat revealed that up to 36% of the air passenger transport in Europe has extra EU destinations producing Category 1 ICW. The proportion of food waste and plastic packaging generated on board can account for up to 20% of the total amount of waste. Although some airlines are implementing standards to control and eventually reduce their environmental impact, new initiatives for a better waste management need to be committed. The DIGESTAIR approach seeks to promote a technological solution to improve waste management on board by taking advantage of the well-known anaerobic digestion (AD) process. However, the application of AD technology in an aircraft environment requires research and innovation efforts since no attempts are documented up-to-date in the aviation sector.

The DIGESTAIR project involves a methodology that will ensure the accomplishment of the specific objectives based on prior experiences by considering the technical, security and hygiene requirements for an aircraft environment. A flexible and adaptable anaerobic digestion prototype with two different configurations will be manufactured: (i) two stage anaerobic process, and (ii) an alternative with membrane filtration unit in order to minimize size and weight and maximize the energy production. The prototype will be eco-designed, light, safe, and cost-efficient in terms of energy recovery and ICW treatment efficiency. Apart from the prototype, a simulation tool will be developed, which will help to boost prototype design and will be a valuable tool for future analyses of different scenarios and upscaling.

<b>WASTE2WATTS</b>		<b>826234</b>
Title: <b>Unlocking unused bio-WASTE resources with loW cost cleAning and Thermal inTegration with Solid oxide fuel cells</b>		
Call Id: <b>H2020-JTI-FCH-2018-1</b>	Topic: <b>FCH-02-7-2018</b>	Type of Action: <b>FCH2-RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>24 months</b>	Unit:
Total costs (€): <b>1.681.602,50</b>	EU requested grant (€): <b>1.681.602,50</b>	

**Free keywords:** *Biogas, SOFC, biogas cleaning, sulphur, siloxane, techno-economic optimisation*

### **Abstract:**

WASTE2WATTS (W2W) will design and engineer an integrated biogas-Solid Oxide Fuel Cell combined heat and power system with minimal gas pre-processing, focusing on low-cost biogas pollutant removal and optimal thermal system integration. Eleven partners from 4 leading biogas countries join efforts to these objectives: 2 biogas cleaning SMEs, 3 SOFC manufacturing SMEs, a biogas expert SME and 5 leading research and education centres in SOFC characterisation and modelling, and in biogas use as a fuel. Two cleaning approaches and hardware will be developed: one for small scale units (5-50 kWe), where a huge unutilised biogas potential resides (millions of farms, bio-wastes from municipalities) - here sulphur compounds (H<sub>2</sub>S and organic S) are removed by an appropriate solid sorbent matrix; one for medium-to-large scale units (≥500 kWe), which is the existing scale of landfill biogas and large bio-waste collection schemes - here sulphur compounds and siloxanes are removed among others by a novel cooling approach. For both cases the hardware will be built and installed on real biogas-sites treating different wastes. Gas analytics will validate the approaches. A 6 kWe SOFC system from a partner will run on a real agro-biogas site connected to the small scale sorbents cleaning unit. Cost projections for high volume production for both the cleaning and SOFC systems will be conducted. A detailed full system model will be implemented, considering the biogas feedstock, composition fluctuations (and dilution) and pollutant signatures, and optimizing thermal integration with biogas-inherent CO<sub>2</sub> (for dry-dominant reforming) and digester heating, with the targets to maximise net electrical efficiency and minimise cost. An Advisory Board consisting of biogas producing SMEs will accompany the project to facilitate market access and support the post-project multiplication of the developed solutions.



<b>WASTE2GRIDS</b>		<b>826161</b>
Title: <b>Converting WASTE to offer flexible GRID balancing Services with highly-integrated, efficient solid-oxide plants</b>		
Call Id: <b>H2020-JTI-FCH-2018-1</b>	Topic: <b>FCH-02-8-2018</b>	Type of Action: <b>FCH2-RIA</b>
Project start date: <b>1/1/2019</b>	Duration: <b>18 months</b>	Unit:
Total costs (€): <b>528.750,00</b>	EU requested grant (€): <b>528.750,00</b>	

**Free keywords:** *Biowaste; waste identification; gasification; reversible solid-oxide cell; grid balancing; renewable-power accomodation*

### **Abstract:**

The overall objective of the Waste2GridS (W2G) project is to identify the most promising industrial pathways of waste gasification and solid-oxide cell (SOC) integrated power-balancing plants (W2G plants in short). The project aims are to perform a preliminary investigation on the long-term techno-economic feasibility of W2G plants to meet different grid-balancing needs and to identify several promising business cases with necessary preconditions. To achieve such goals, an interdisciplinary team is formed by gathering leading research bodies and companies in Europe in the fields of solid-oxide reversible cells (SORC), waste identification, gasification and syngas cleaning, grid operation, and energy/process systems engineering. The results of the project will further enhance the knowledge exchange and interaction among different key players (manufacturers, investors, and research institutions), provide useful guidelines for technology development/deployment and market positioning, increase long-term competitiveness and leadership of relevant industries, and provide knowledge for policy support on W2G plants for a circular economy and for the decarbonisation of European energy systems.

<b>Circular Bioeconomy Thematic Investment Platform</b>	
Risk-sharing financial instrument	
Indicative timetable: Second half 2018	Indicative budget: EUR 100 million from the 2018 budget

**Specific Challenge:** The bioeconomy could significantly contribute to meeting the EU priorities on growth and climate as well as some of the UN Sustainable Development Goals (SDGs), if innovative technologies, processes and business models in this domain are developed and deployed. One of the key success factors behind such development and deployment is access to finance.

An InnovFin Advisory study<sup>4</sup> has identified funding gaps in two key areas of the bioeconomy – the bio-based industries and the blue economy<sup>5</sup> –, when projects are about to enter the demonstration or commercial phases. These funding gaps stem from the innovative nature of projects in these sectors, which causes a high level of risks (such as technology risks, market risks, regulatory risks), as well as a high level of required capital expenditure for those projects reaching the higher development and deployment stages. The study recommends, amongst other, tackling these funding gaps by establishing a dedicated EU Thematic Investment Platform (a risk-sharing financial instrument). Other areas of the bioeconomy, such as the agriculture and food sectors, would also benefit from such instrument.

This instrument should not only fill the existing funding gaps in the bioeconomy sectors both on land and sea, but also contribute to the EU agenda for a circular economy. In a circular economy the value of products, materials and resources is maintained for as long as possible, and the generation of waste minimised<sup>6</sup>. The circular bioeconomy is about the application of this concept to biological resources, products and materials.

**Scope:** The Circular Bioeconomy Thematic Investment Platform aims at providing access to finance, in particular in the form of debt or quasi-equity, to innovative bioeconomy<sup>7</sup> projects and focusses in priority, but not exclusively, on innovative circular bioeconomy projects.

The Platform may include, amongst others, projects that use terrestrial or aquatic biomass (including waste, residues, discards and by-products from the agricultural, agro-food, forestry and aquatic sectors) for innovative bio-based products or processes, or to valorise it for other innovative purposes (amongst which food, feed, fertilisers or soil improvers).

Projects focussing exclusively or mainly on renewable energy generation (fuels, heat or power) are not in the scope of the action.

<sup>4</sup> InnovFin Advisory "Study on Access-to-Finance Conditions for Investments in Bio-Based Industries and the Blue Economy", June 2017.

<sup>5</sup> Sectors within bio-based industries and blue economy covered by the InnovFin Advisory "Study on Access-to-Finance Conditions for Investments in Bio-Based Industries and the Blue Economy" are detailed in this study.

<sup>6</sup> Closing the loop – An EU action plan for the Circular Economy. COM(2015)614.

<sup>7</sup> The bioeconomy encompasses the production of renewable biological resources [terrestrial or aquatic] and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products (where bio-based products are products that are wholly or partly derived from materials of biological origin, excluding materials embedded in geological formations and/or fossilised) and bioenergy (Innovating for Sustainable Growth: A Bioeconomy for Europe. COM(2012)60.

This Thematic Investment Platform will be set-up under the InnovFin Holding fund. The EU funds<sup>8</sup> for this Platform will be entrusted to a manager to be selected by the EC.

**Expected impact:** The InnovFin Circular Bioeconomy Thematic Investment Platform will help in:

- reducing perceived investment risks by investors of the projects financed under this financial instrument, and thereby crowding-in private capital that could help filling the funding gaps;
- de-risking innovative technologies, processes or business models (amongst others) by validating them from a technological or commercial viewpoint, thereby encouraging later investments in their further development or deployment;
- fostering industrial, rural, coastal and offshore development, and opening new avenues for the primary sector, hence creating jobs and growth in the EU;
- contributing to the EU priorities on climate as well as on some of the UN SDGs by supporting projects related to the transition to a circular bioeconomy;
- promoting highly circular paradigms in bioeconomy.

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<sup>8</sup> EUR 50.00 million from the Societal Challenge 2 budget 2018 (of which EUR 30.00 from SC2-RTD and EUR 20.00 from SC2-AGRI), complementing budget of EUR 50.00 million from Access to risk finance, which makes a total of EU contribution of EUR 100.00 million to this risk-sharing financial instrument.

