Future Cities Dialogue

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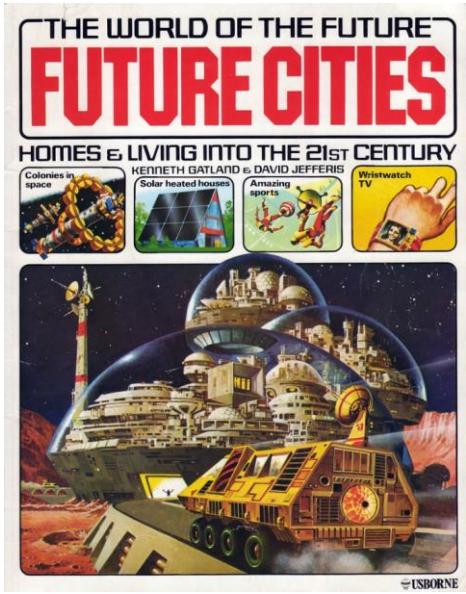
The market for integration services is very large, but what does it practically look like?

- Which systems can be integrated?
- Where does integration lead to resilience, and where instability?
- What do citizens want from integrated systems?
- How do we ensure that the competitions we run and the projects we back are heading towards the integrated urban future that people want?

. . . . so that we can improve urban resilience & UK business success



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COMPUTERS IN THE HOME

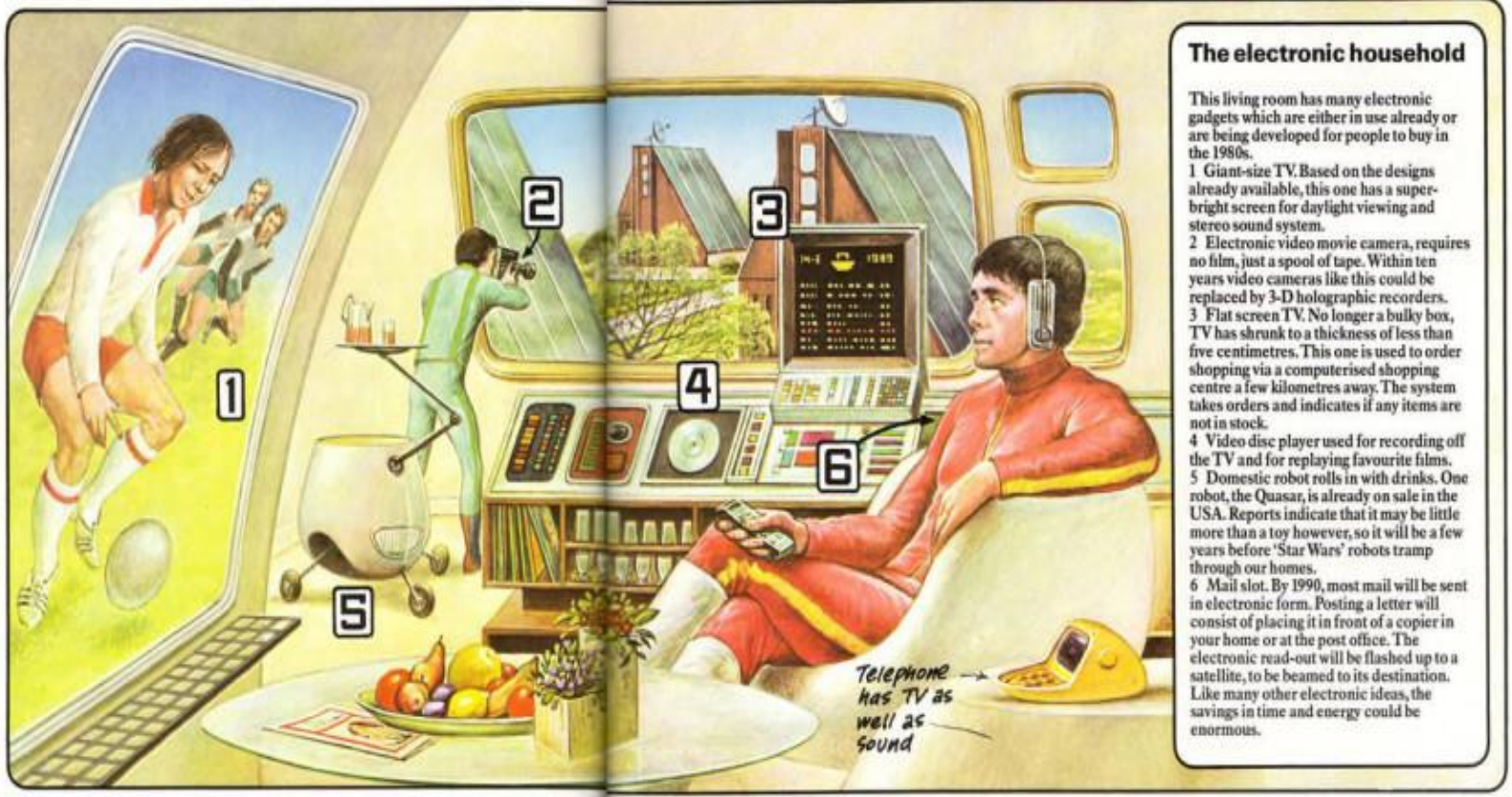
The picture on the right takes you into the living room of a house of the future. The basics will probably be similar – windows, furniture, carpet and TV. There will be one big change though – the number of electronic gadgets in use.

The same computer revolution which has resulted in calculators and digital watches could, through the 1980s and '90s, revolutionise people's living habits.

Television is changing from a box to stare at into a useful two-way tool. Electronic newspapers are already available – pushing the button on a handset lets you read 'pages' of news, weather, puzzles and quizzes.

TV-telephones should be a practical reality by the mid 1980s. Xerox copying over the telephone already exists. Combining the two could result in millions of office workers being able to work at home if they wish. There is little need to work in a central office if a computer can store records, copiers can send information from place to place and people can talk on TV-telephones.

Many people may prefer to carry on working in an office with others, but for those who are happy at home, the savings in travelling time would be useful. Even better would be the money saved on transport costs to and from work.



The electronic household

This living room has many electronic gadgets which are either in use already or are being developed for people to buy in the 1980s.

1 Giant-size TV. Based on the designs already available, this one has a super-bright screen for daylight viewing and stereo sound system.

2 Electronic video movie camera, requires no film, just a spool of tape. Within ten years video cameras like this could be replaced by 3-D holographic recorders.

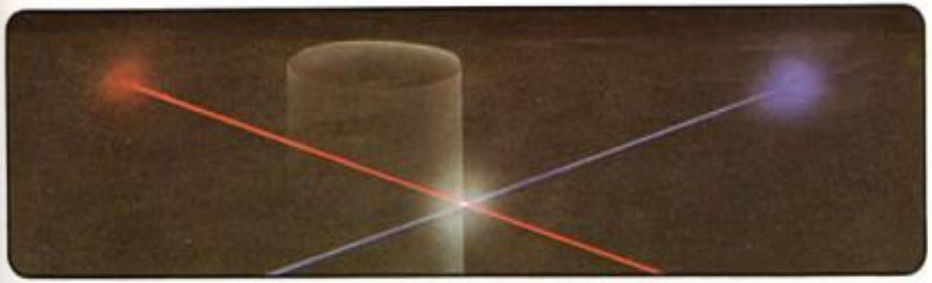
3 Flat screen TV. No longer a bulky box, TV has shrunk to a thickness of less than five centimetres. This one is used to order shopping via a computerised shopping centre a few kilometres away. The system takes orders and indicates if any items are not in stock.

4 Video disc player used for recording off the TV and for replaying favourite films.

5 Domestic robot rolls in with drinks. One robot, the Quasar, is already on sale in the USA. Reports indicate that it may be little more than a toy however, so it will be a few years before 'Star Wars' robots tramp through our homes.

6 Mail slot. By 1990, most mail will be sent in electronic form. Posting a letter will consist of placing it in front of a copier in your home or at the post office. The electronic read-out will be flashed up to a satellite, to be beamed to its destination. Like many other electronic ideas, the savings in time and energy could be enormous.

▲ The magic of laser-holography, a new technique which creates 3-D pictures apparently out of thin air, could result in business conferences like the one shown above. On the left the heads of a branch office have just come in to their boardroom, first thing in the morning. Across the table is their boss. He is in the head office of the company in the centre of a major city thousands of miles away. It is night-time there and is the end of his day. 3-D cameras hanging from the ceilings of each room create the illusion of a compete room with the two sides present (this picture has been split down the middle to avoid confusion). Electronic conferences like this would save enormous amounts of time, money and energy.



▲ Today it is possible to copy a photograph or document in a Xerox copier. In the future, it should be as simple to copy a three-dimensional object. Such a 3-D copier already exists in prototype form. It works like this: a transparent tank is filled with special liquid which solidifies in the presence of light of a particular colour, just as photographic paper darkens when exposed to light. Two different coloured laser beams criss-cross the tank. Where they cross, their light mixes and changes colour. At that point the liquid solidifies. By following pre-set instructions the lasers can 'carve-out' any shape in the tank. By varying the lasers' colour and by varying the ingredients of the liquid, it may be possible to create virtually anything.

DEMAND FOR TRANSPARENCY

- Across the world, civil society is encouraging higher standards of transparency, monitoring, accountability and representation, and

INEQUALITY

LEVELS OF DISPOSABLE INCOME

Money is one aspect in achieving higher living standards and thus greater well-being. Higher economic wealth may also improve access to quality education, health care and housing. Over the most recent years, in many OECD countries households have enjoyed

- The global middle class is expanding rapidly thanks to rising disposable incomes in growing emerging market economies. By 2020, over 1.5 billion households globally will have an annual disposable income over US$10,000 measured at PPP, up from 1.2 billion households in 2012.
- This rising middle class will spur consumer demand with middle class households wanting more and more goods and services.
- The most recent regional gross disposable household income (GDHI) estimates for 2013 show that regional GDHI per person increased in all regions of the UK between 2012 and 2013.

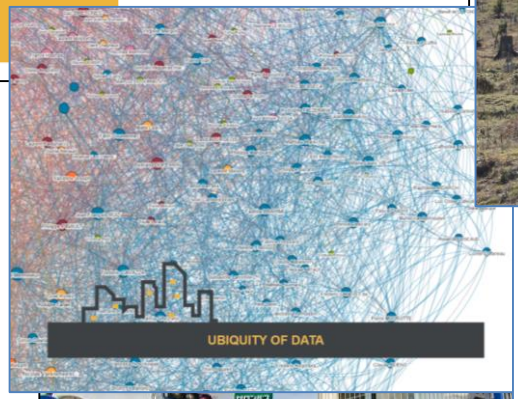
DIET-RELATED REGULATION

Many governments are choosing stringent top-down regulations that promote certain dietary practices. In some cases, governments tax unhealthy products like sugar. In others, healthy eating and food education is promoted. These regulations are implemented on the city, state, and national level.

- Some countries, notably Korea and Denmark are promoting a traditional diet that is low in sugar and processed foods.
- Mexico, one of the most obese countries in the world, has instituted taxes on "junk food" and sugary drinks. One year after the 10% tax on soda was put into place, consumption decreased by 12%.
- In the US, $31 million was awarded to help beneficiaries of the Supplemental Nutritional Assistance Program (SNAP) access healthy foods with their benefits.

RESOURCE SCARCITY

CLIMATE CHANGE IMPACTS



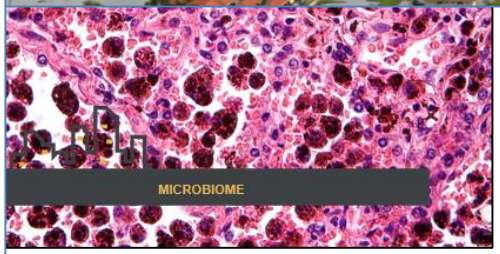
UBIQUITY OF DATA

POPULATION GROWTH

The world population is projected to continue increasing over the next few decades. The majority of this growth will occur in the developing world, but the developed world faces numerous challenges in relation to population growth, including declining and ageing populations and implications for migration patterns. Population growth compounds the competition for land and the many challenges of achieving sustainable economic welfare on a finite planet.

- In 1950 there were 2.6bn people in the world, in 2015 there are 7.3bn.
- There is an 80% chance that the world's population will continue to grow throughout the twenty-first century, reaching between 9.6 billion and 12.3 billion by 2100.
- In Pakistan 185 million people live on the equivalent of 8% of the US land area, a figure that is expected to increase to 271 million by 2050 – which is nearly equal to the total US population today.
- The population in UK grew by almost half a million people in 2014 to 64.5 million people.

LINKS:
United Nations Population Division (2015). World population prospects: the 2015 revision
United Nations researchers, as published inn Science (2014, Sep). World population stabilization unlikely this century
Earth Policy Institute (2014). Population Fact Sheet.
http://www.ons.gov.uk/ons/dcp171778_406922.pdf

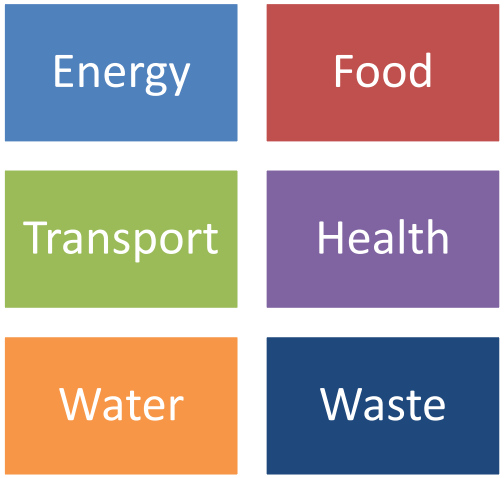


MICROBIOME

MENTAL HEALTH IN CITIES

Phase 1: system outcomes

Six Urban Systems



Weak signals
Futures research
Expert workshops
Futures centre trends

Plausible future system outcomes

Energy 1	Energy 2	Energy 3	Energy 4
Food 1	Food 2	Food 3	Food 4
Transport 1	Transport 2	Transport 3	Transport 4
Health 1	Health 2	Health 3	Health 4
Water 1	Water 2	Water 3	Water 4
Waste 1	Waste 2	Waste 3	Waste 4

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Name		WHAT DOES THIS FUTURE LOOK LIKE?	HOW DO WE PAY FOR IT?
# 1: Government keeps me healthy 	*The government has taken charge to grow our food more efficiently in a centralized system as the world has been rocked by climate change.*	• Because of climate change the government has taken control to keep our economy going and keep us all fed. • We mass-produce nutritionally-fortified foods that ensure we all get a basic level of nutrition. • All land that can be used to produce food is, both in the countryside and around cities – urban green space have gone as housing is prioritised • We genetically modify plants and animals to get the right production levels.	High taxes. People complained initially, but given the effects of climate change we don't have much choice. Prices for staple foods are kept down. We are charged for food waste, incentivising us to use everything
# 2: Pulling together locally 	*I collaborate with my community to grow much of our own food close to home.*	• There are global economic, security and climate challenges, but community spirit is high. • We grow sustainable traditional crops and eat organic, local, climate resistant and seasonal crops and livestock, importing much less than before • High-tech tools like wireless sensors and drones remotely monitor water and fertiliser and how the crops are growing to help farm efficiently • Community dining halls, recipe libraries and family growing plots are popular • Sometimes food is rationed if the harvest is poor.	Ourselves – there are few central government subsidies. Food prices are extremely volatile, so sometimes we can't afford the nutrition we'd like. Some communities barter food for energy.
# 3: High tech globalised supply 	*Food is mostly high tech, sold and distributed globally. I want good quality and authentic food, which I buy from around the world to get it.*	• Heritage foods like Swiss chocolate, Scotch whisky, French cheeses are a massive global market. Small urban farms give us a taste of 'real food' and are a cool tourist attraction. • Most food is produced intensively, focused on high yields from animals and crops. This can be environmentally damaging • Big multinational businesses are important – the most successful ones have managed to develop strong, authentic local brands. • Electric vehicles and dual-fuel ships bring us food from all around the world	Ourselves. Food is not cheap, but large intensive global manufacturing keeps prices down.
# 4: High-tech & functional - 	*I want ready-made, speedy food, with good nutrition, and I have to pay a lot more for it. I 3D print my own food or have it delivered by drones.*	• Large scale rural farmland is run using very precise agriculture techniques (e.g. wireless sensors and GM interventions that influence nutrient levels). • Urban farming grows high value products on building roofs e.g. superfood greens, honey. • Delivery drones bring our food, or we 3D print food using ingredients, flavoring mixes and recipes which means less waste. • Supermarkets no longer exist…some people don't even have kitchens. • A carbon tax increases the cost of e.g. beef and dairy, so scientists to have developed new alternatives (e.g. insects, soy).	There's enough food around – but it's a lot more expensive than it was. High-priced businesses give us the right kinds of healthy foods, even if they are heavily processed.

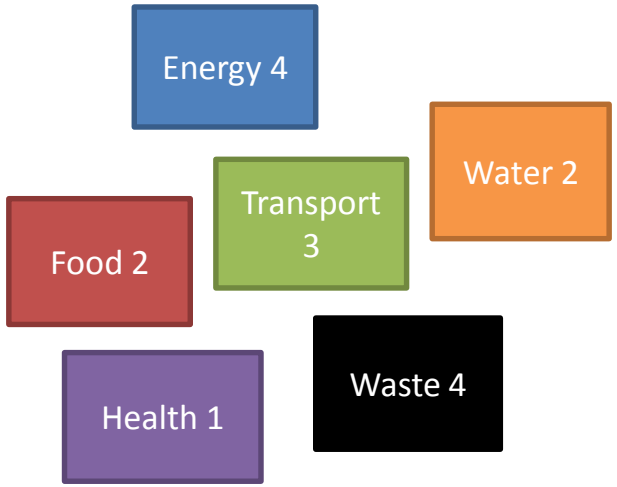
Phase 2: citizen engagement

Plausible future system outcomes

Energy 1	Energy 2	Energy 3	Energy 4
Food 1	Food 2	Food 3	Food 4
Transport 1	Transport 2	Transport 3	Transport 4
Health 1	Health 2	Health 3	Health 4
Water 1	Water 2	Water 3	Water 4
Waste 1	Waste 2	Waste 3	Waste 4

Online citizen engagement
3 citizen workshops

Desirable system outcomes



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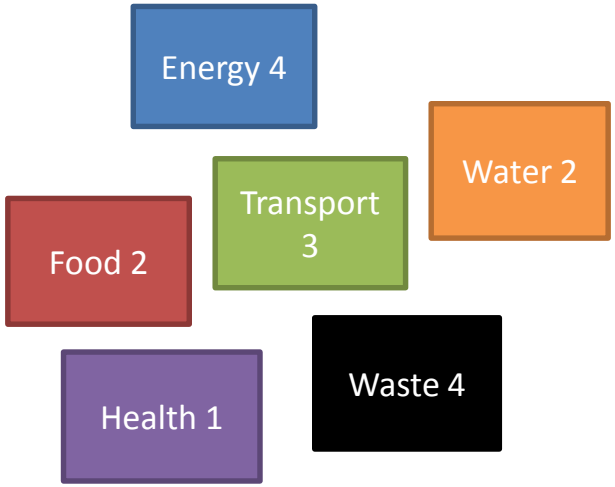
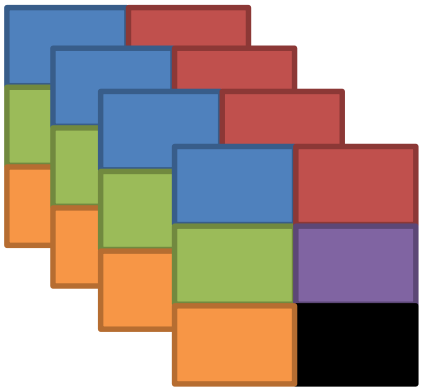
Phase 3: scenarios for system integration

Desirable system outcomes



Analysis
Expert workshops

System integration scenarios



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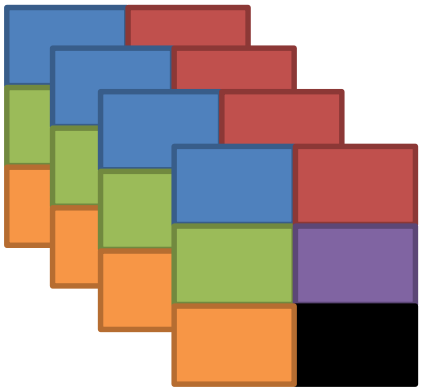
Phase 4: citizen validation and refinement

System integration scenarios



Citizen summit

Finalised scenarios

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8 design principles for urban integrated systems:

- Resilient and evolutionary
  - Redundancy built in
  - Multiple solutions
- Tech-enabled, but not tech-centered
  - Not everything has to be ‘smart’
  - Encourage social interaction and build skills
- Well-governed
  - Governance comes from many quarters
- Sustainable
  - Enable urban natural capital
  - Build social fabric

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8 design principles for urban integrated systems:

- **Human centered**
  - Integrating systems = integrating people
  - Stimulate participation
- **Globally linked**
  - Learn from others
  - Create communities of interest
- **Value networked**
  - Costs and benefits of system change fall on many
  - Convene the unusual suspects
- **Transparent**
  - Respect for privacy & data ownership

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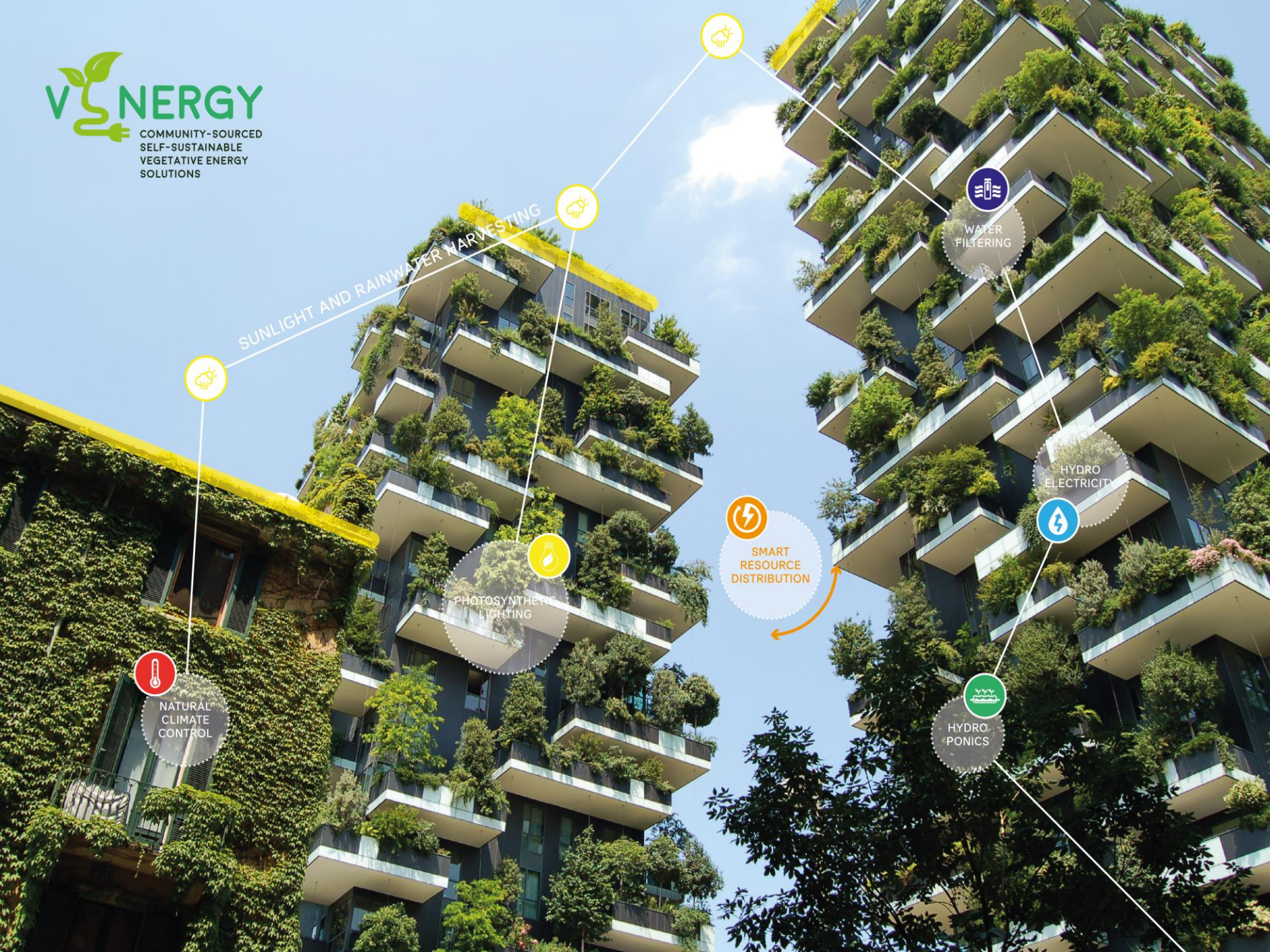
VENERGY
COMMUNITY-SOURCED
SELF-SUSTAINABLE
VEGETATIVE ENERGY
SOLUTIONS
SUNLIGHT AND RAINWATER HARVESTING
WATER FILTERING
HYDRO ELECTRICITY
SMART RESOURCE DISTRIBUTION
PHOTOSYNTHETIC LIGHTING
NATURAL CLIMATE CONTROL
HYDRO PONICS

Thank you

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