International Council for Research and Innovation in Building and Construction

SPARCS

CIB and SPARCS webinar, June 29th

Welcome, **Don Ward**, CEO, CIB

What is a smart city, Dr. **Miimu Airaksinen**, CIB TG88, CEO, RIL

Designing and implementing Positive Energy Districts, Dr. **Francesco Reda**, SPARCS coordinator VTT

Intelligent and Responsive Buildings, Prof. **Derek Clements-Croome**, Reading UK

Smart Construction Process, Prof **Geoffrey Shen**, Chair and Assoc. Dean, The Hong Kong Polytechnic University

What is a smart city?

Dr. Miimu Airaksinen, CEO at Finnish Association of Civil Engineers RIL

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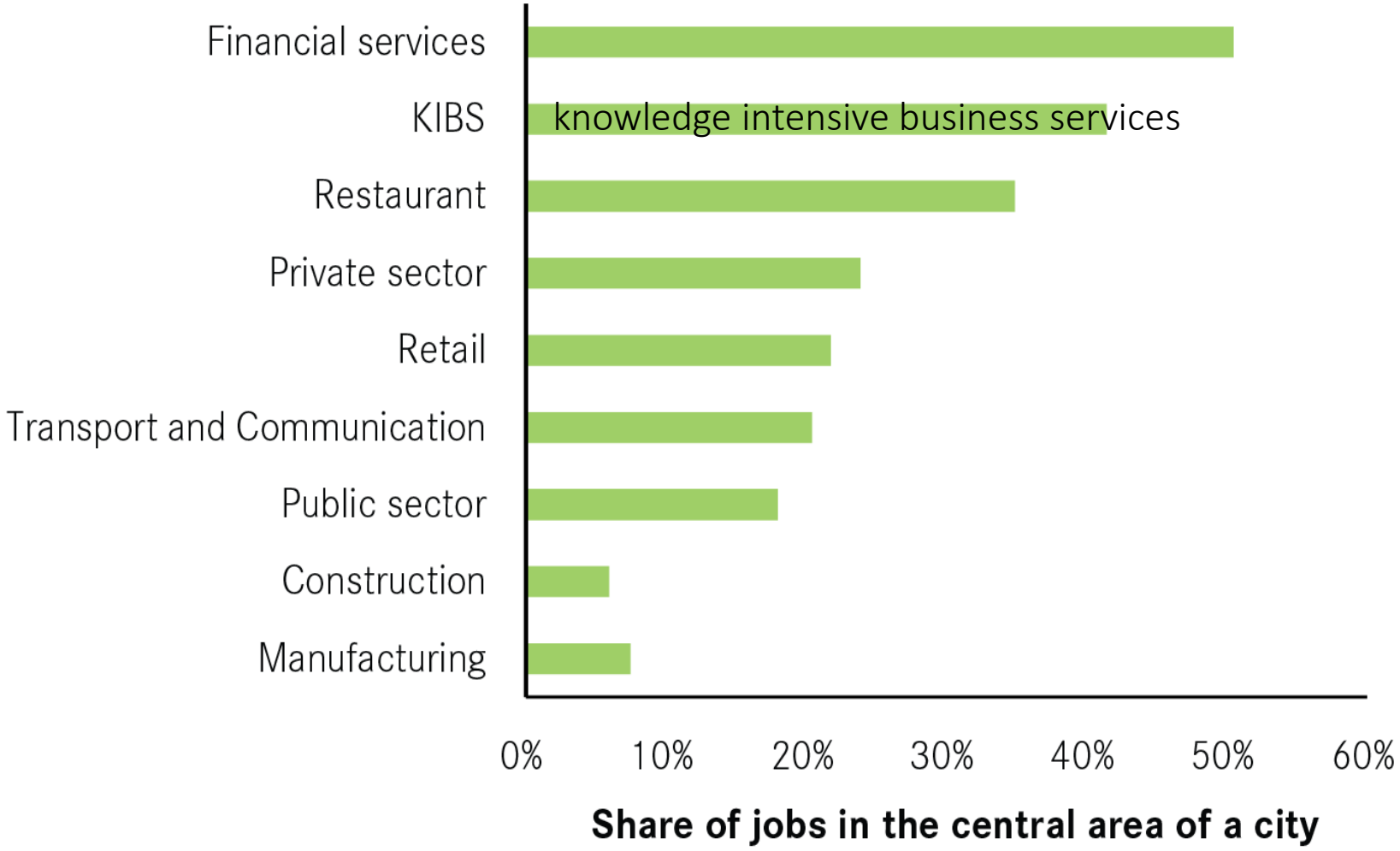
Urbanisation is a big megatrend

- 54% of the global citizens are living in cities and the trend is increasing (78% in Europe)
- 70% of the GDB is created in cities (85% in Europe)
- 90% of all innovations are created in cities
- At the same time over 70% of all CO_2 emissions are originated from cities
- Need for smart buildings and infrastructures to support sustainable and convenient living and working in cities

Cities and economy

Cities benefits:

- The ability to share inputs and infrastructure, such as roads, rail and street lights
- The ability to recruit from a deep pool of workers with relevant skills
- The ability to exchange ideas and information, known as ‘knowledge spillovers’



Source: ONS Business Demography Database

Why smart buildings and infrastructures are important ?

Because of resilience

The economic losses caused by weather- and climate-related extremes in the 33 European Environment Agency member countries between 1980–2016 was **over 450 billion euros**.

Main reasons were:

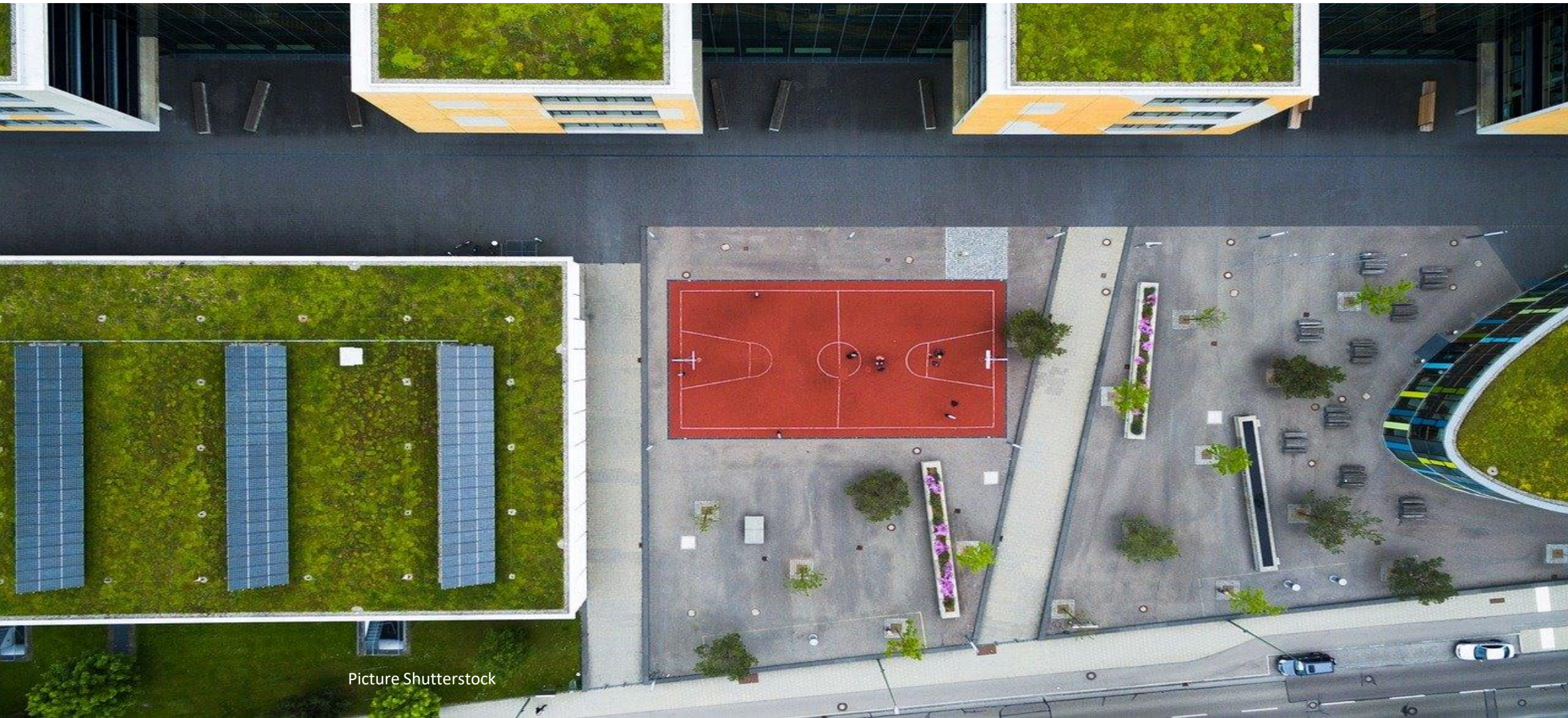
- floods ~40%
- storms 25%
- droughts ~10%
- heat waves ~5%

The insurance coverage is 35 %.

Regarding impacts on human health, heat waves are the deadliest.

Forecasting and preventing

sensors inside structures and monitoring outdoor conditions
early warnings based on evidence



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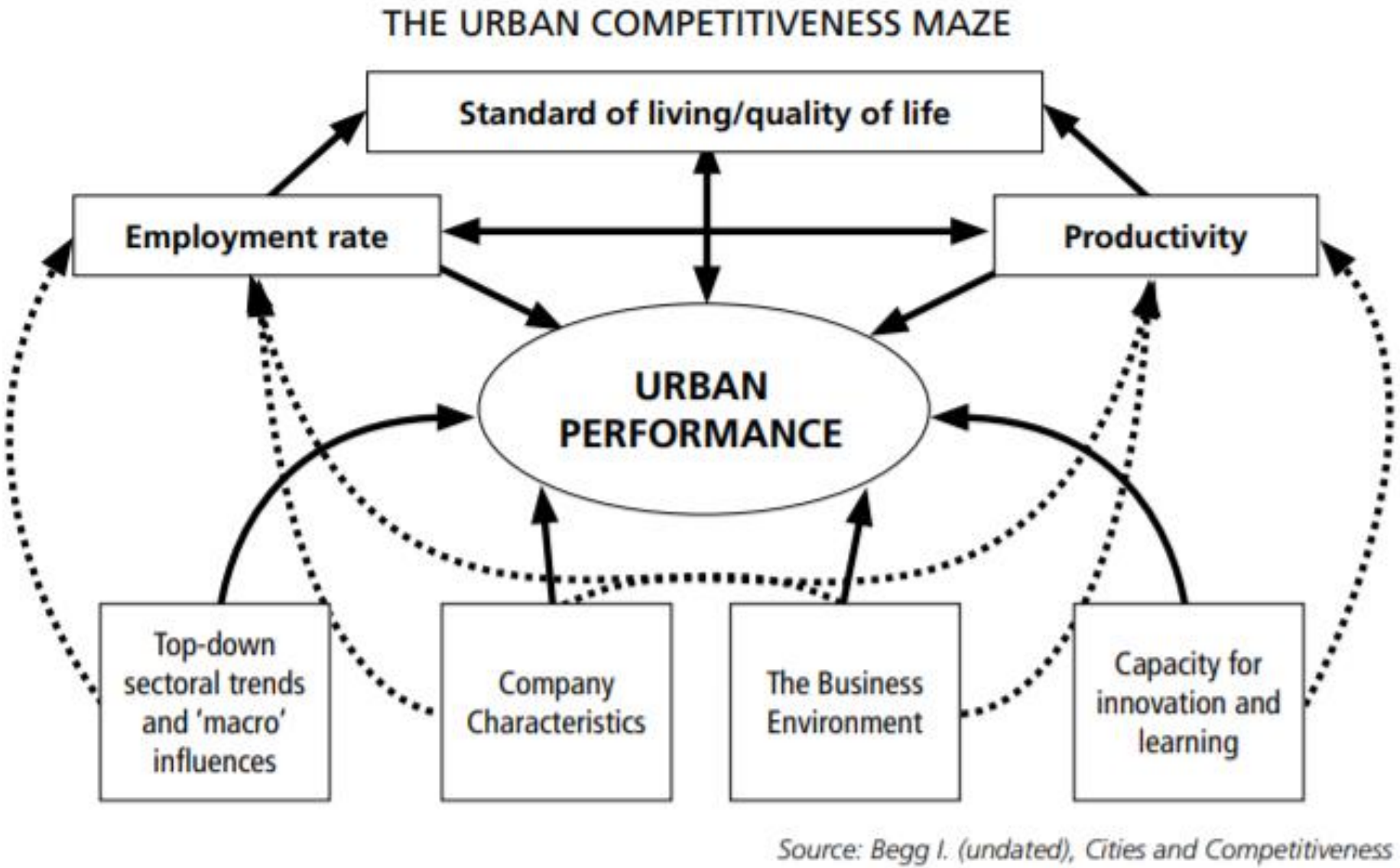

Source: Begg I. (undated), Cities and Competitiveness

$$\text{Efficiency} = \frac{\text{Quality of Life}}{\text{Environmental pressure} * \text{Use of Resources} * \text{Costs}}$$

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What citizens want?

People are adaptable

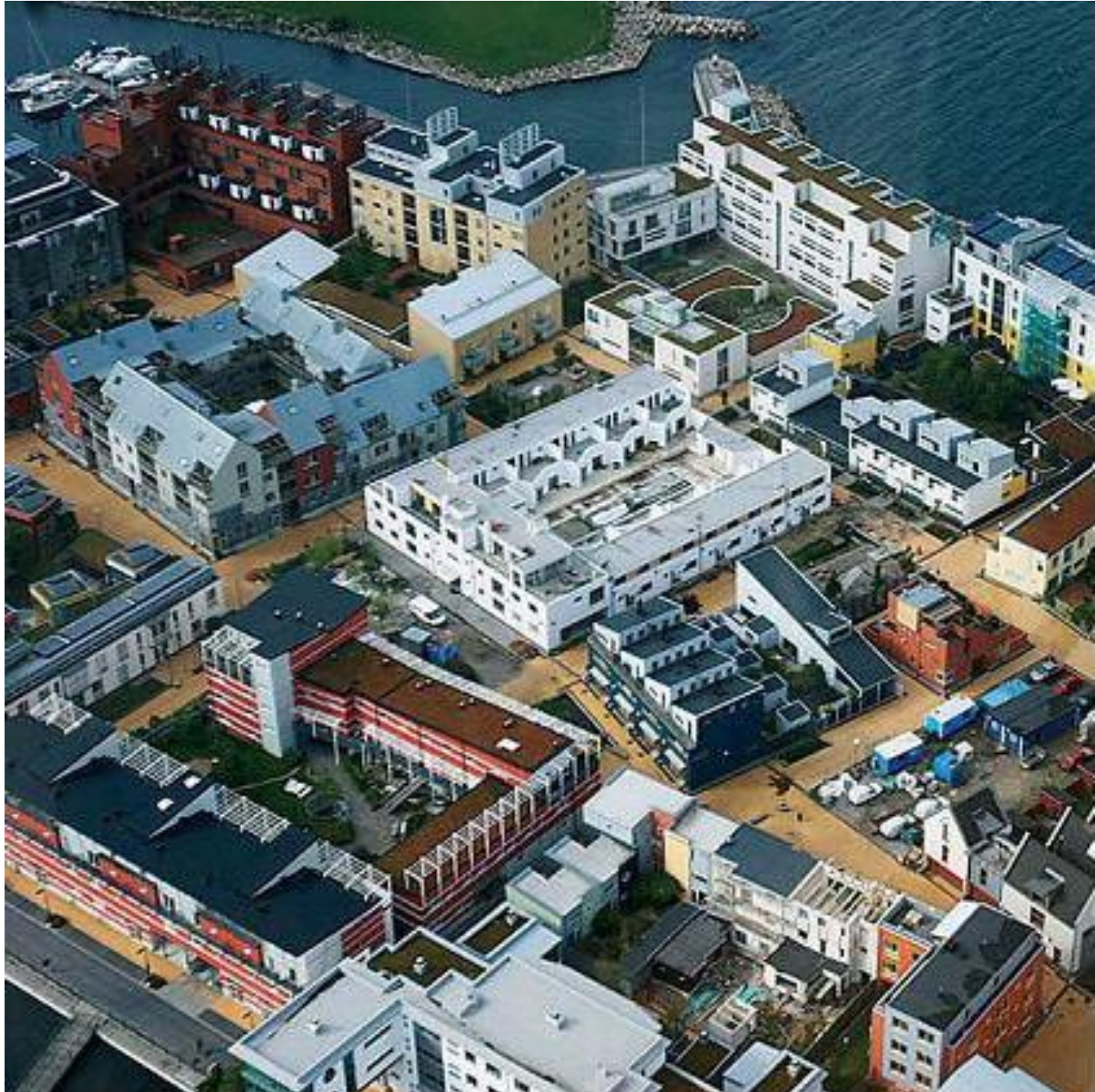
- Privacy
- Green, blue areas
- Services close
- No time-consuming commuting
- Affordability
- Open space

What kind of city and to whom?

- Existing buildings and infrastructures in cities
- Long life span of buildings and infrastructure
- We are designing city structures for inhabitants who are not even born yet !
- Adaptability of buildings and infrastructures

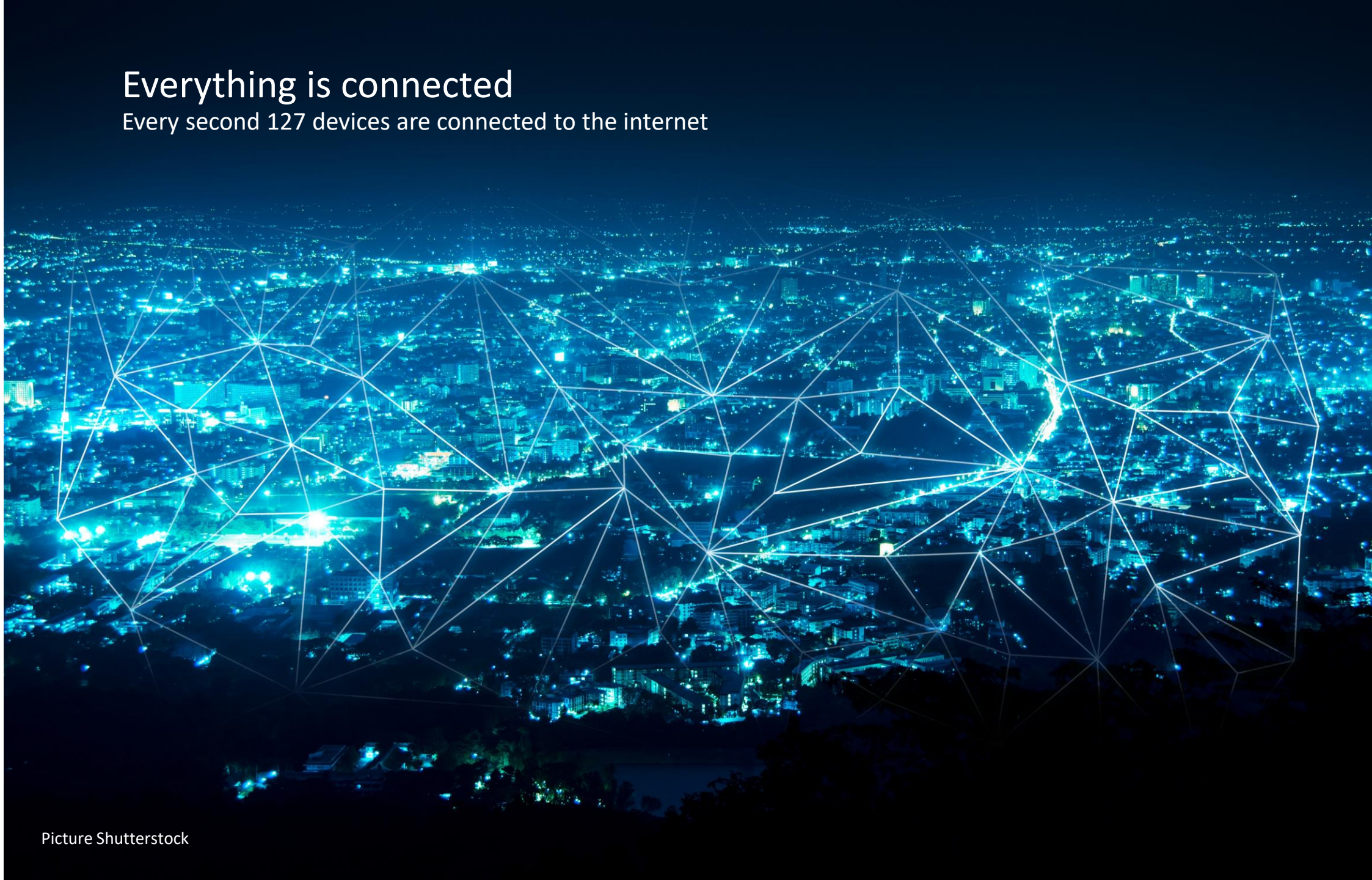
Picture M.Airaksinen

Adaptive
and
context aware
cities
are resilient



Everything is connected

Every second 127 devices are connected to the internet



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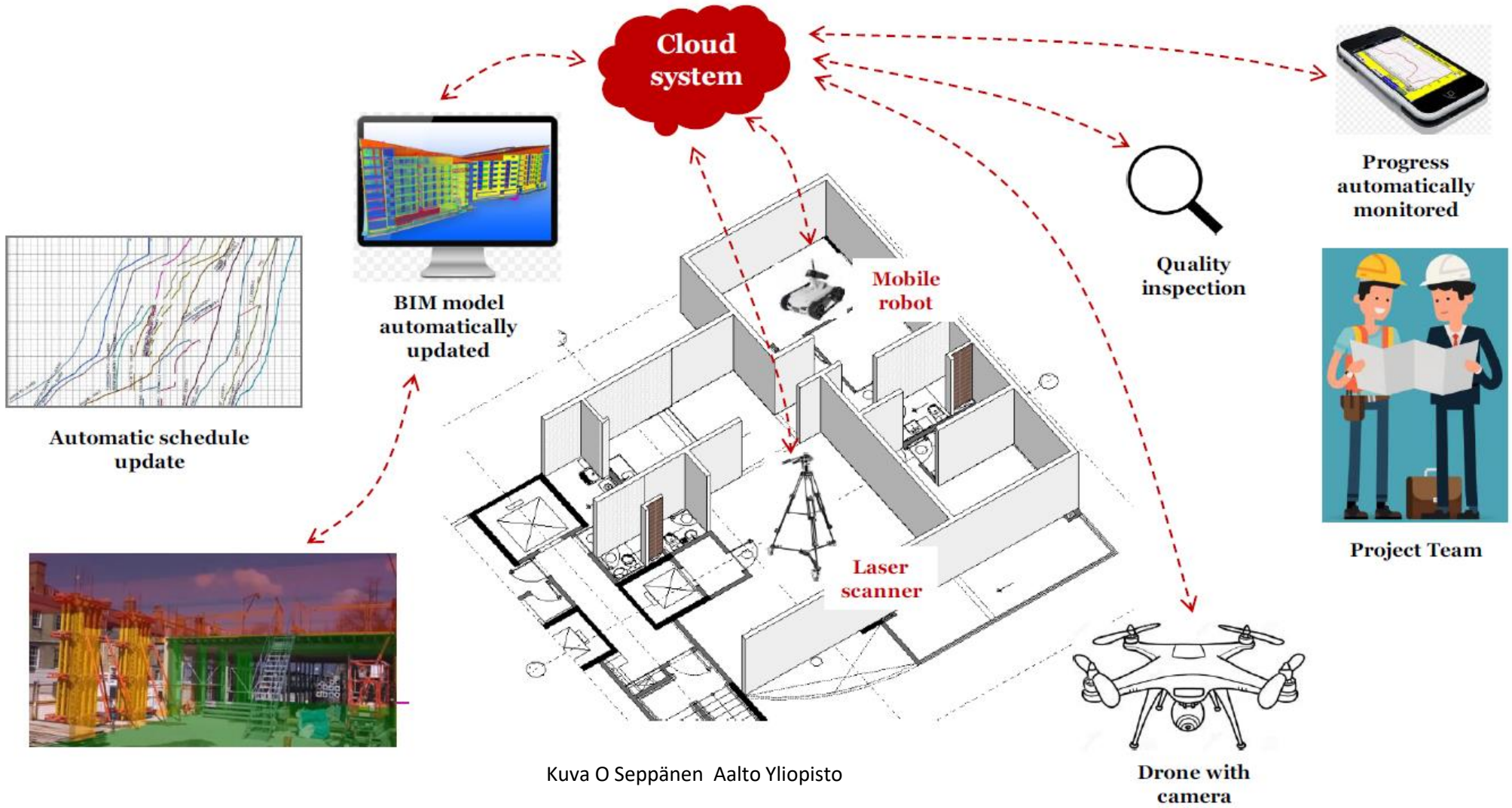
Real time construction site management and digital construction

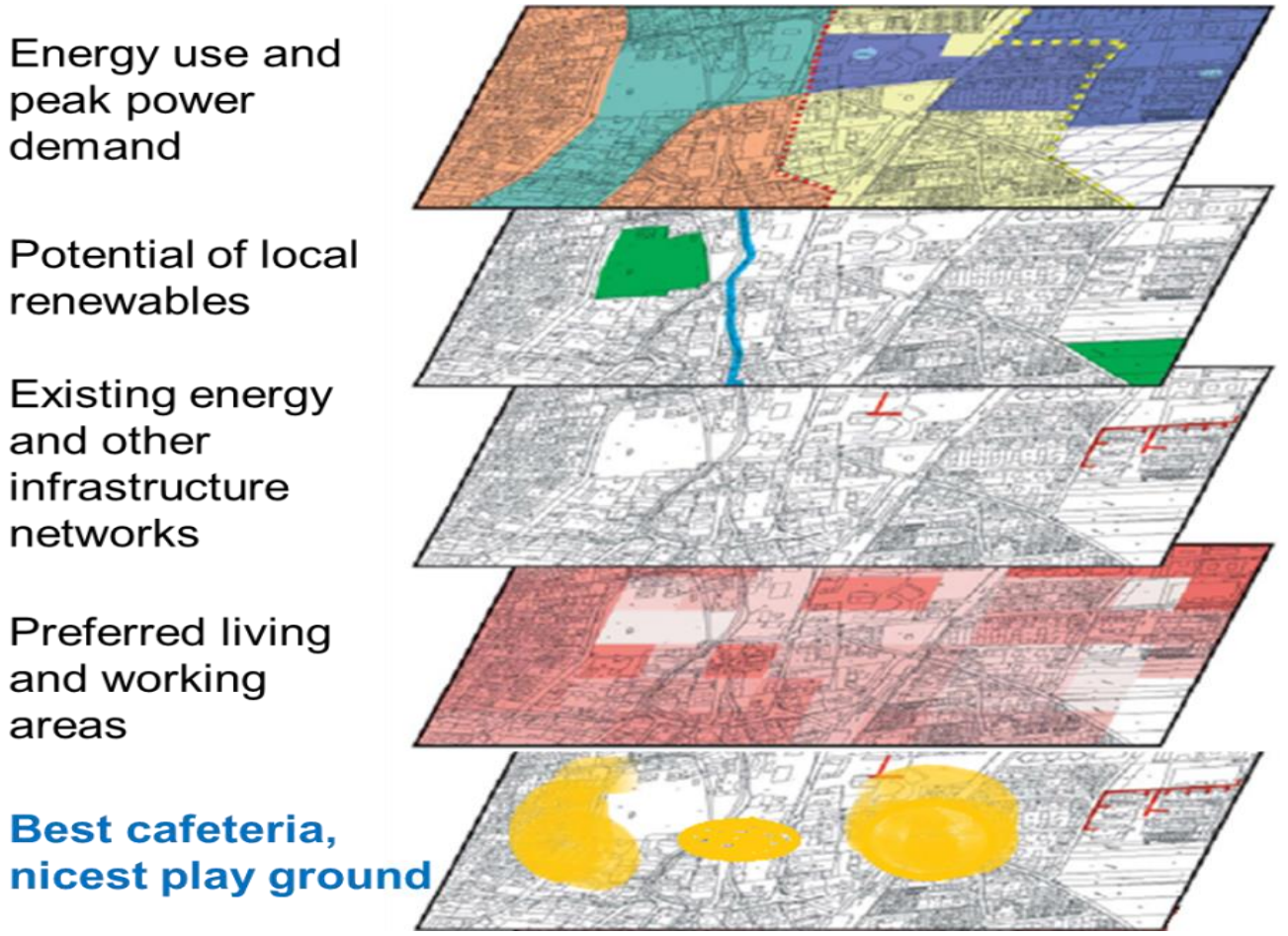


Kuva O Seppänen Aalto Yliopisto

City-wide data must generate real insights (resilience)
Combining data from different sources

Since many systems are connected the decision making and leadership processes need to change.

In addition, the business models are in transition (many stakeholders, new eco-systems)



Services

Future services like
Living as a service

Just like a garden, the services are changing their color and form and they are perceived differently by different persons. Need for evolution of services.

Picture M Airaksinen

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