Urban resilience in Finnish cities

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A city has many systems and sub systems which are interlinked and interconnected

A change in one place will affect on the whole system

→System dynamic model for a city

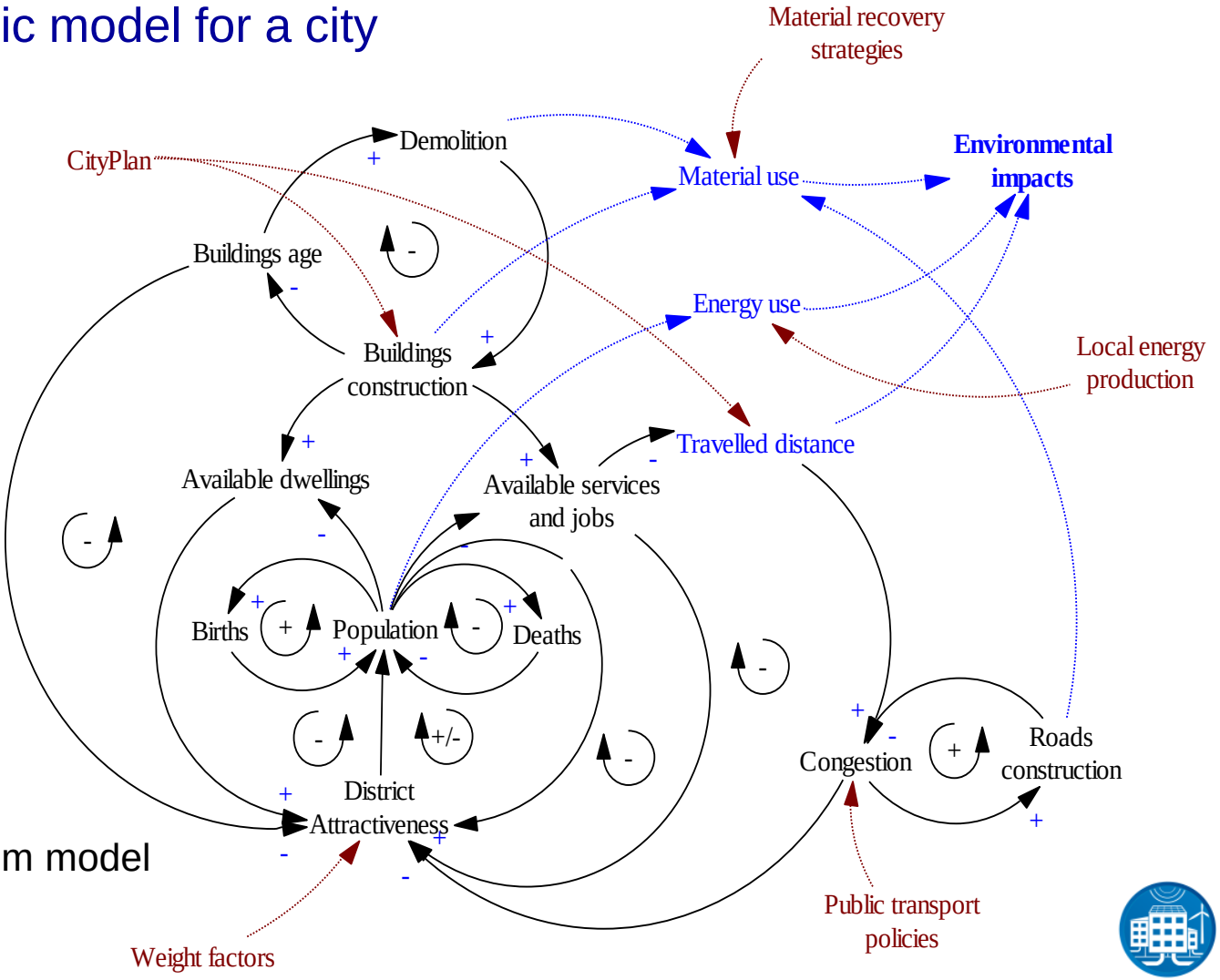


Fig. VTT city system model

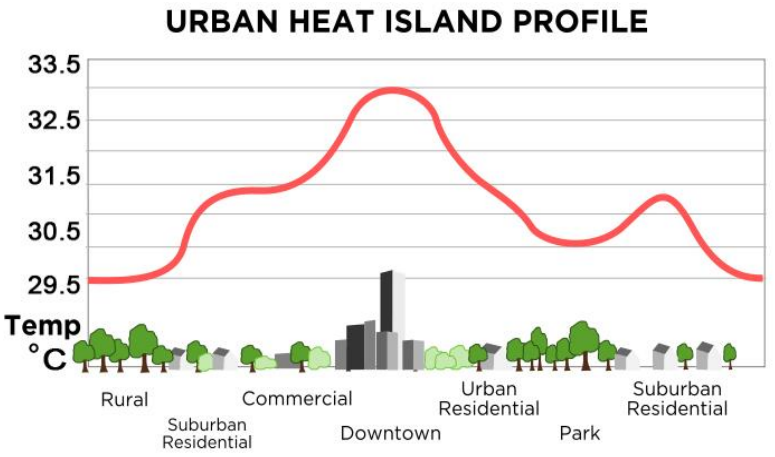
Climate & Water Resilience

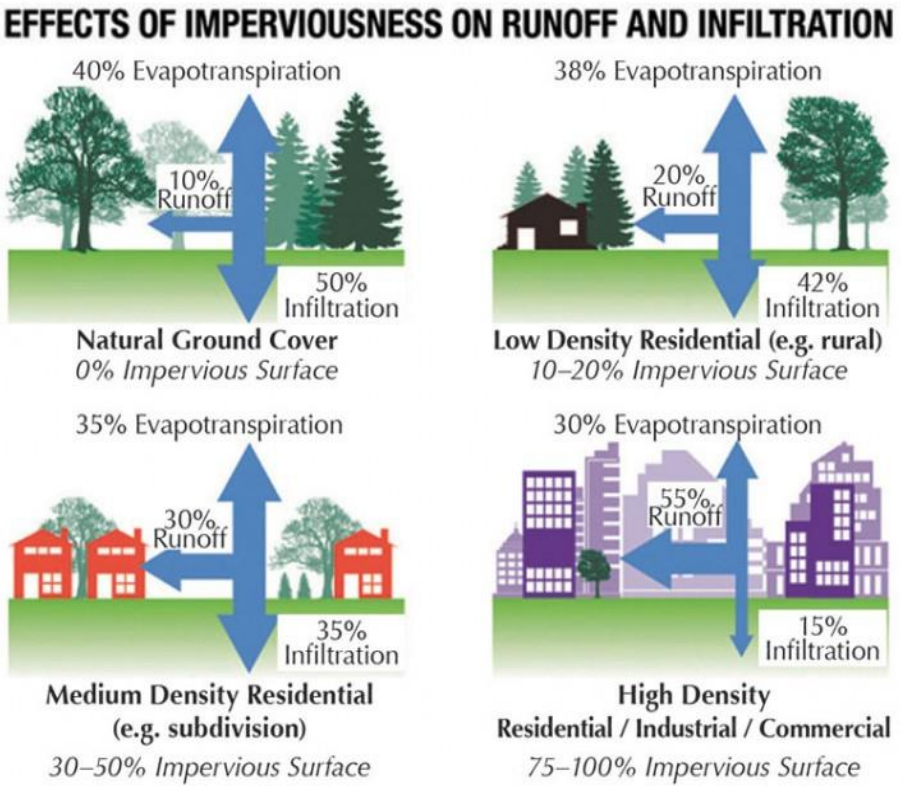
Cities face significant challenges of urban densification & extreme weather conditions due to climate change

Need integration of innovative, smart technologies & decision-making processes with in-depth understanding of social fabric of cities

Role of RTOs:

- develop & optimise applicable technologies & systems
- provide quantitative evidence of integrated, smart technologies' efficacy, applicability, & cost-effectiveness
- leveraging industry partnerships to commericalise technology & support new economic opportunities (jobs, products, services)

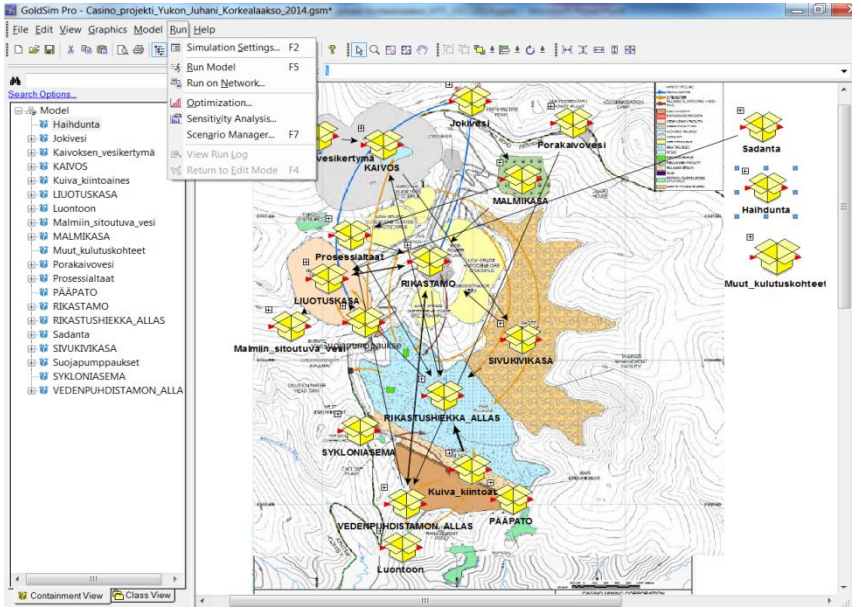


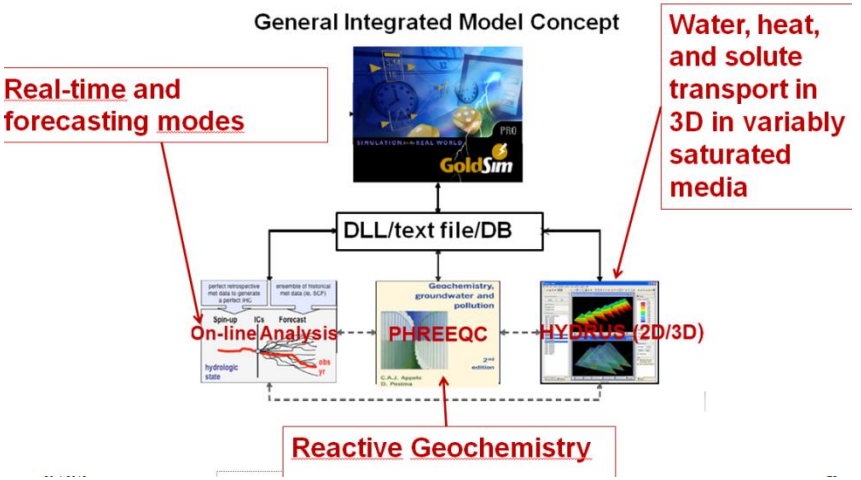


Climate & Water Resilience

Adaptation & mitigation technologies:

- Improved flood prediction & risk analysis – linking downscaled climate models with detailed catchment-scale hydrological models
- Increased flood buffering capacity – blue-green-grey infrastructure solutions to manage excess floodwaters
- Real-time monitoring & response – advanced sensors and integrated networks to enable real-time monitoring and decision-making

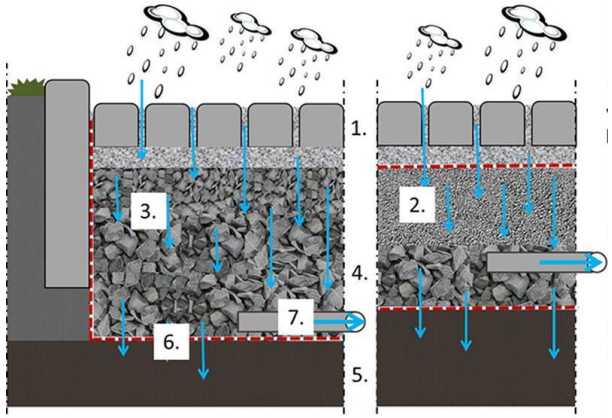




Climate & Water Resilience

Adaptation & mitigation technologies:

- Improved flood prediction & risk analysis – linking downscaled climate models with detailed catchment-scale hydrological models
- Increased flood buffering capacity – integrated blue-green-grey infrastructure solutions to control flooding, purify stormwater runoff, & reduce heat island effect
- Real-time monitoring & response – advanced sensors and integrated networks to enable real-time monitoring and decision-making



Climate & Water Resilience

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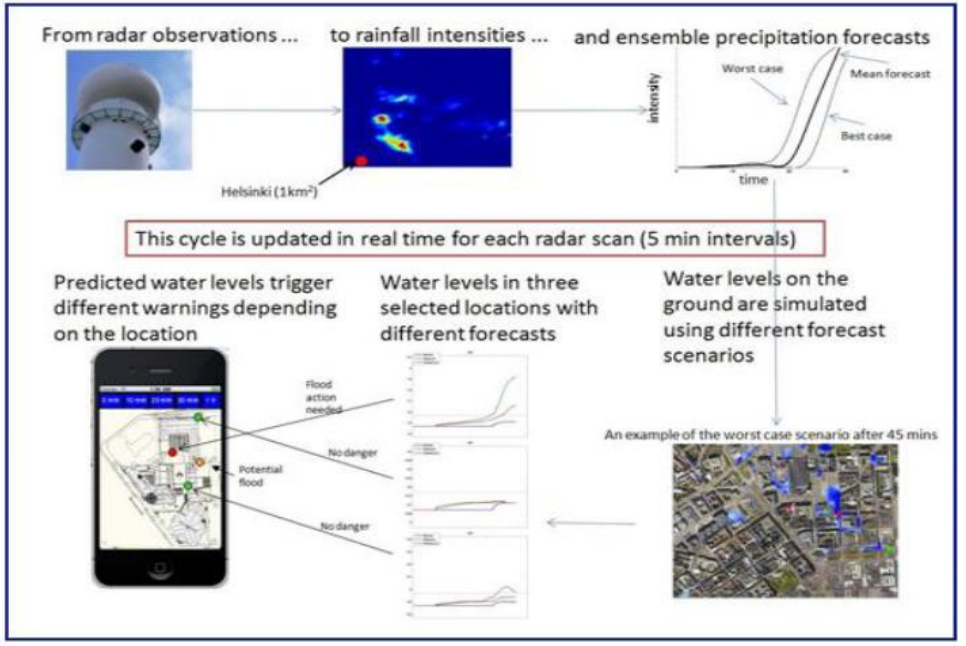
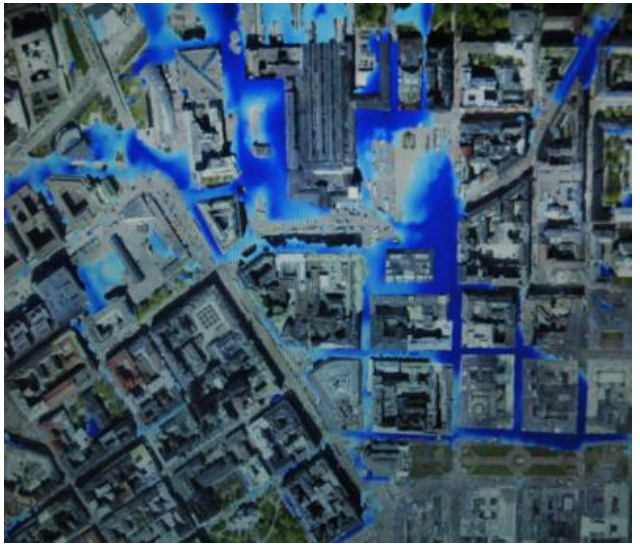


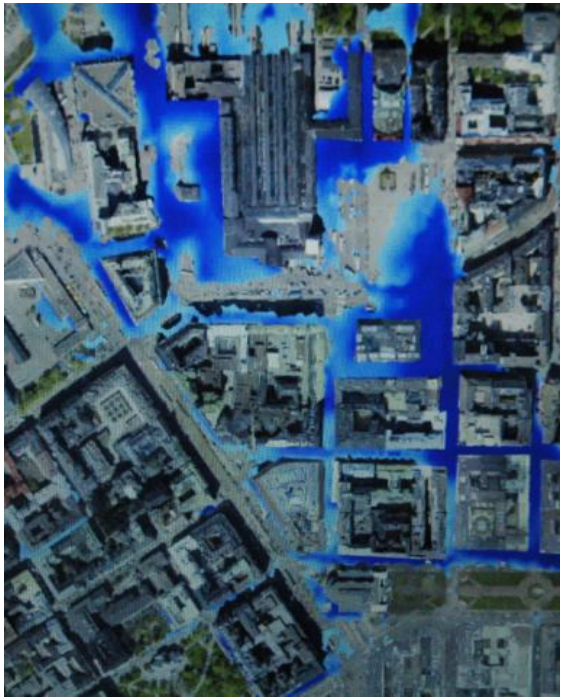


Flood forecast simulations (10 min, 20 min, 30 min, 1 h, etc.)

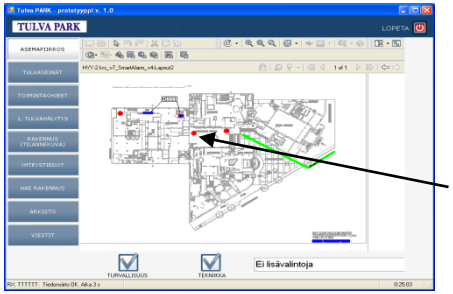
Heavy rain, flooding, security and safety

Local warning system: SmartAlarm

1. Rain measurements and predictions



2. Flooding prediction by simulations (10 min, 20 min, 30 min, 1 h, jne.)

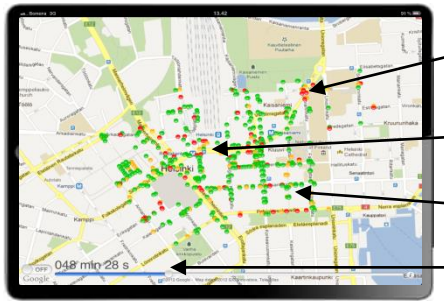


Asema-piirros

Kerroskuvat

Tulva-hälytys

3a. Building-level situation, flood prediction, alarms and operational instructions



Tulva-hälytys

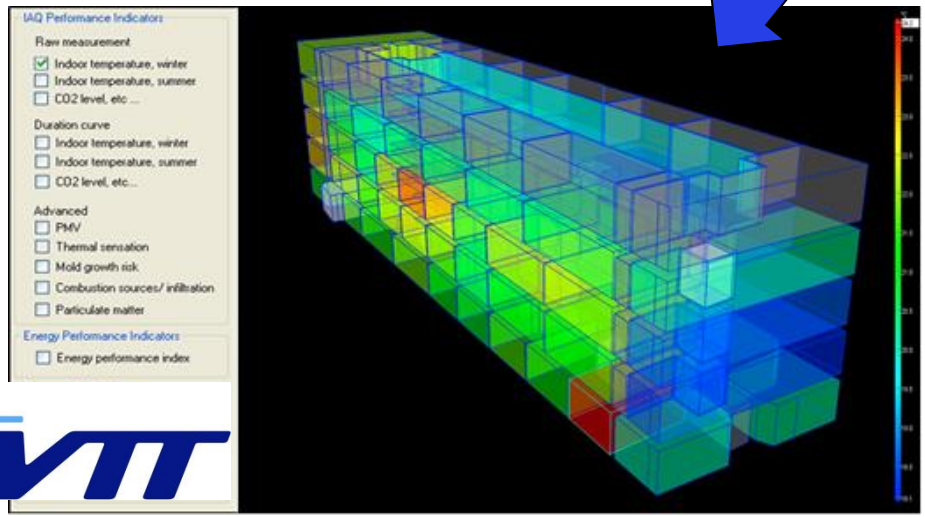
Mahdollinen tulvatilanne

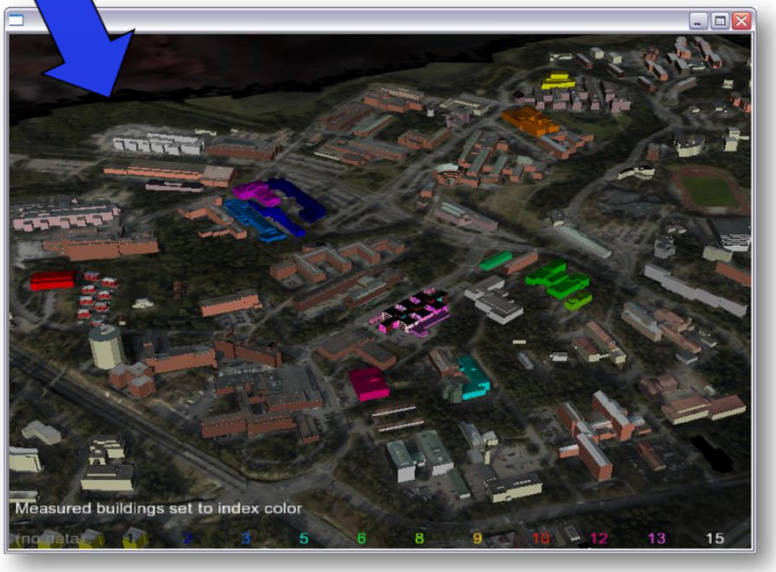
Ei vaaraa

Tulvaennuste (10 min, jne)

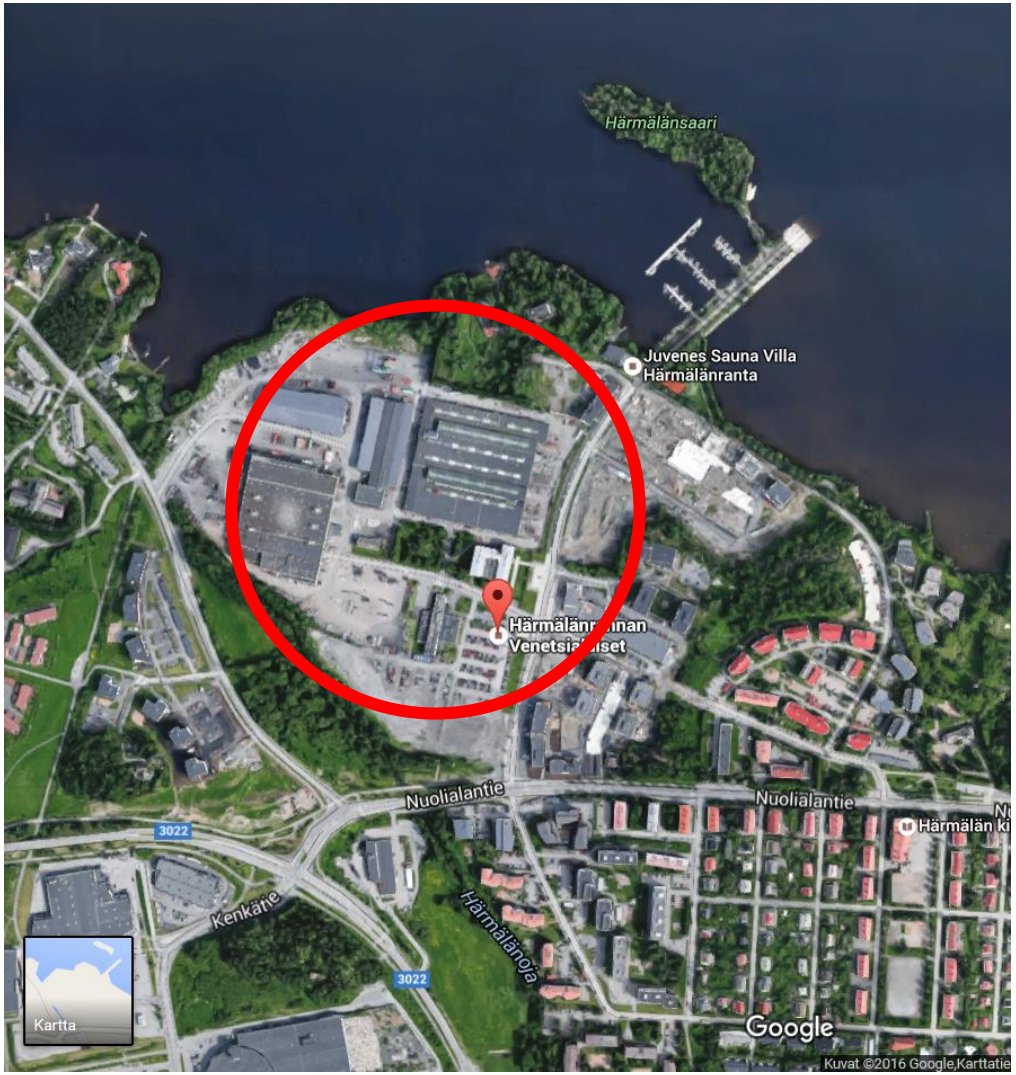
3b. City-level situation, flood prediction and operational instructions

Energy resilience, real time monitoring and control





District development, Co-ZED



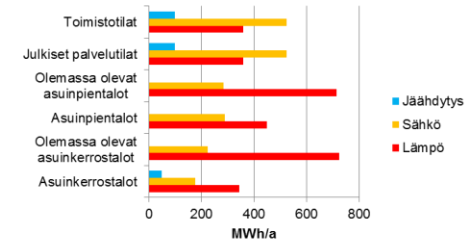
Kuva Googlemaps

Optimization of an area-level solution:

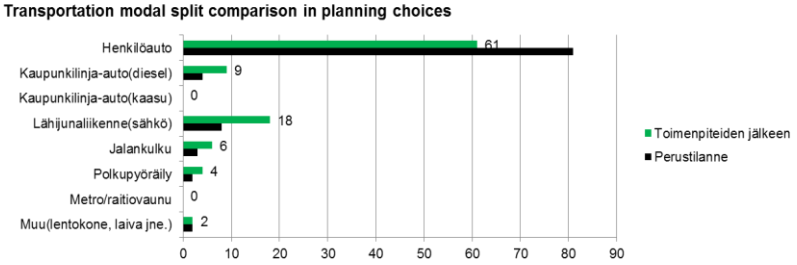
- Buildings
- Energy system

VTT KEKO Results: easy and quick visualisation of energy efficiency and emissions for urban planning

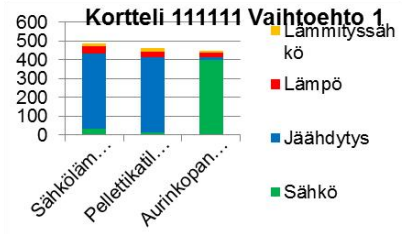
Energy demands in the area

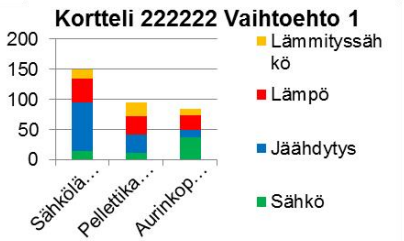


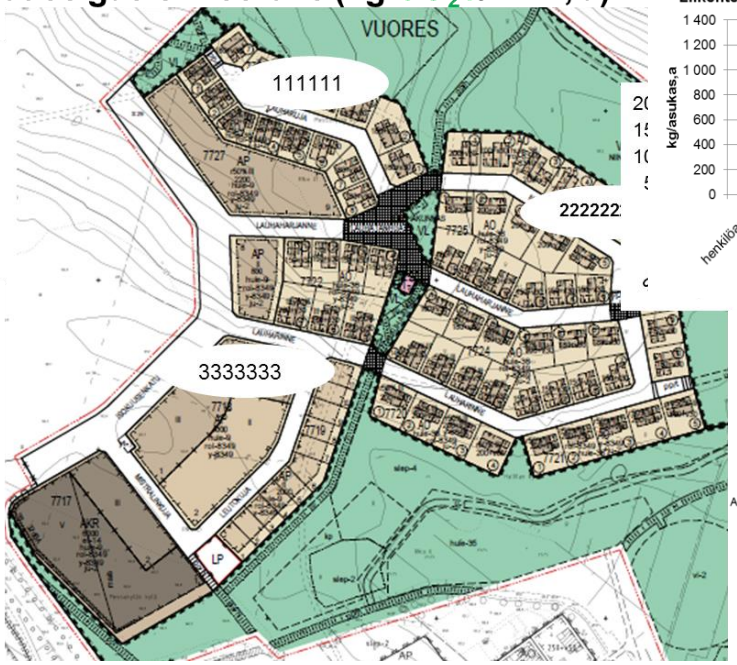
Transportation planning and emissions

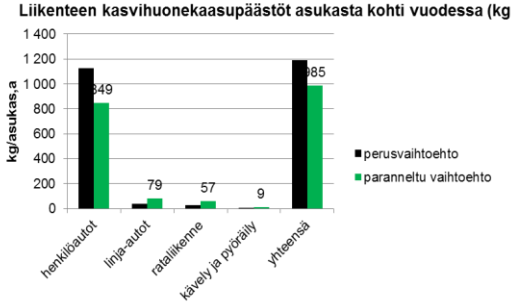


Greenhouse gas emissions (kg CO_2e/k-m^2, a)

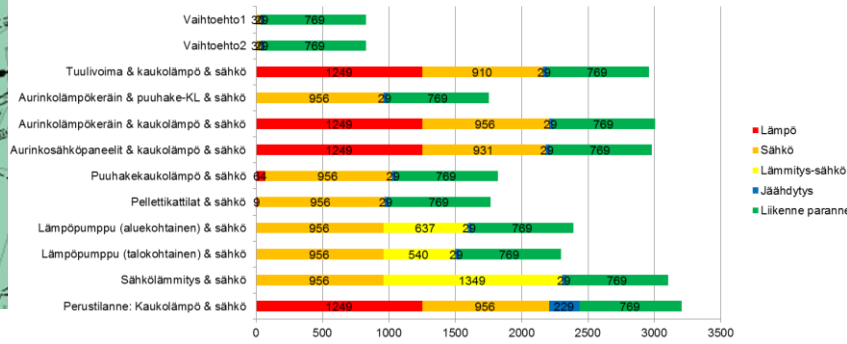








Energy supply: CO_2 emission comparison



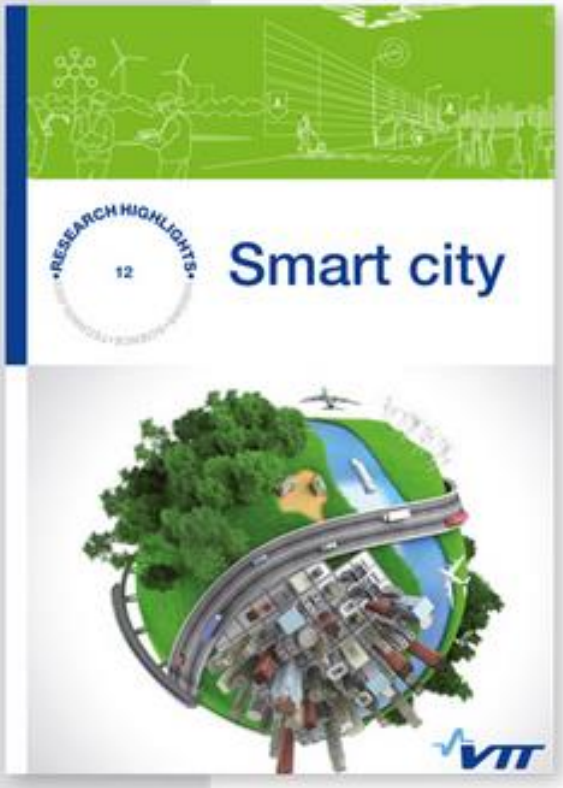
29/11/2016

(kuva muokattu: Vuoreksen asemakaava, Tampereen kaupunki)

Smart city

The publication presents a compilation of extended abstracts of VTT's recent research on smart cities.

DOWNLOAD THE FREE PUBLICATION



http://www.vtt.fi/inf/pdf/researchhighlights/2015/R12.pdf

The CITYZER Project

- Time schedule: 2016-2018
- Total budget: 5.5 M€
- Cityzer creates foundation for new **digital services to support urban decision making related to severe weather and air quality phenomena**
- Cityzer project develops an integrated ecosystem to **provide localized and accurate fore- and nowcasts for urban weather and air quality**
- Cityzer project connects research and commercial partners in Finland, Brazil and China
- More information: http://cityzer.fmi.fi