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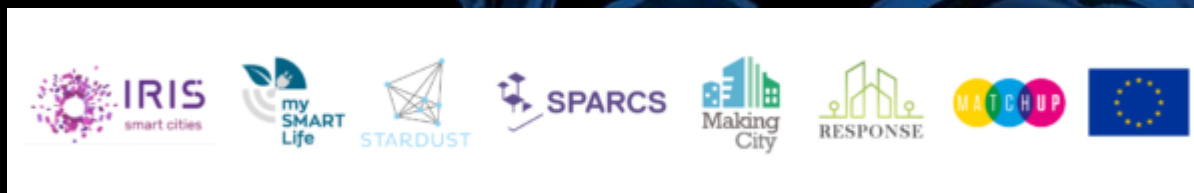
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EnergyWeek

Smart City Solutions From Finland

By: ENERGY VASA



23.3.2022

2022 MARCH 21-25
VAASA, FINLAND

Moderator



Mauritz Knuts

**Project Manager
Vaasa Region Development Company
VASEK**



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Welcome and introduction to European smart city projects



MAURITZ KNUTS

**Project Manager
Vaasa Region Development Company
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European smart city projects



IRIS
smart cities

Sustainable development of urban areas is a challenge of key importance. It requires **new, efficient, and user-friendly technologies and services**, in particular in the areas of **energy, transport and ICT**. However, these solutions need integrated approaches, both in terms of research and development of advanced technological solutions, as well as deployment.

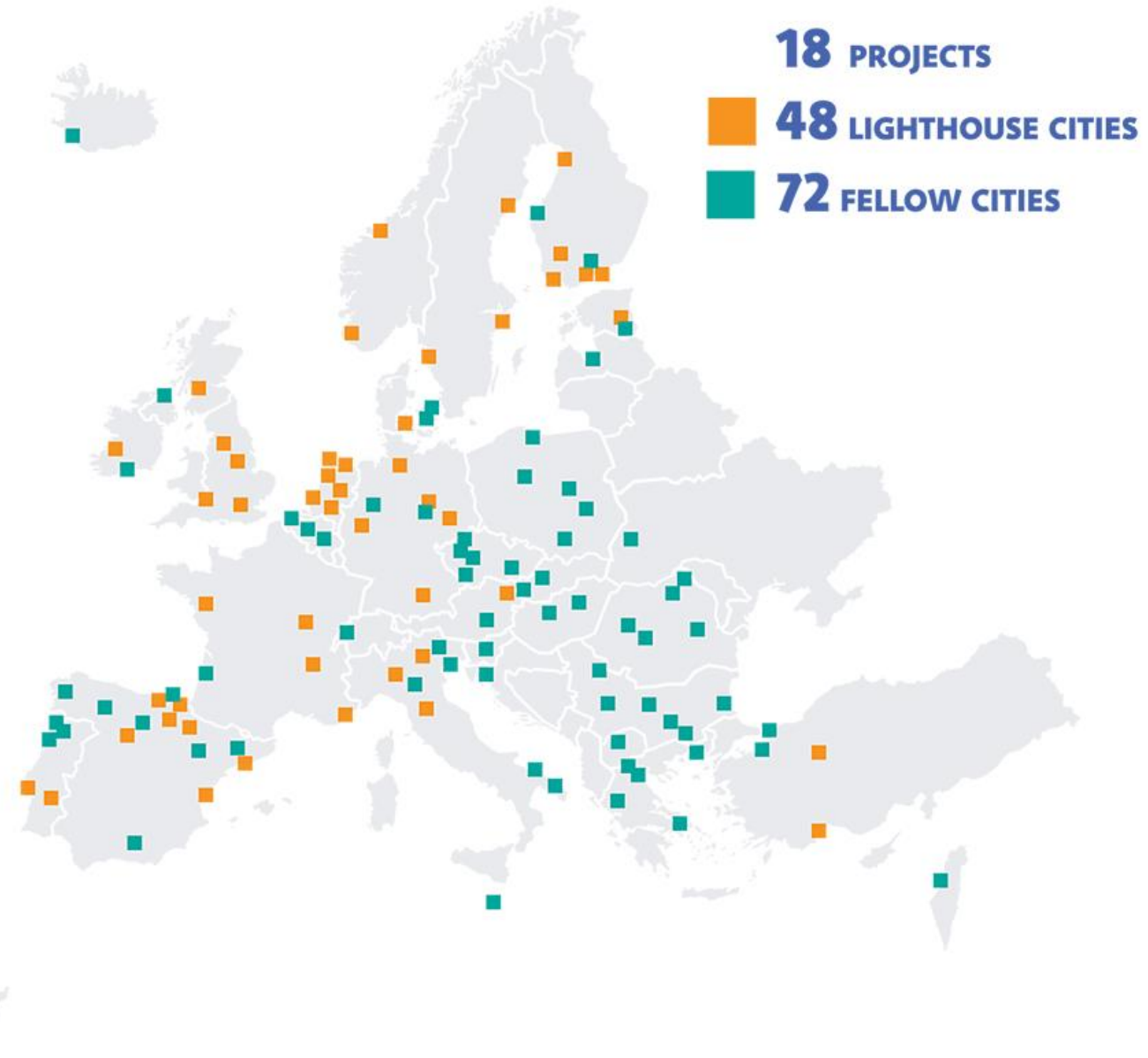
The focus on **Smart Cities Lighthouse** projects will result in integrated commercial-scale solutions with a high market potential, in the field of energy, transport and ICT.



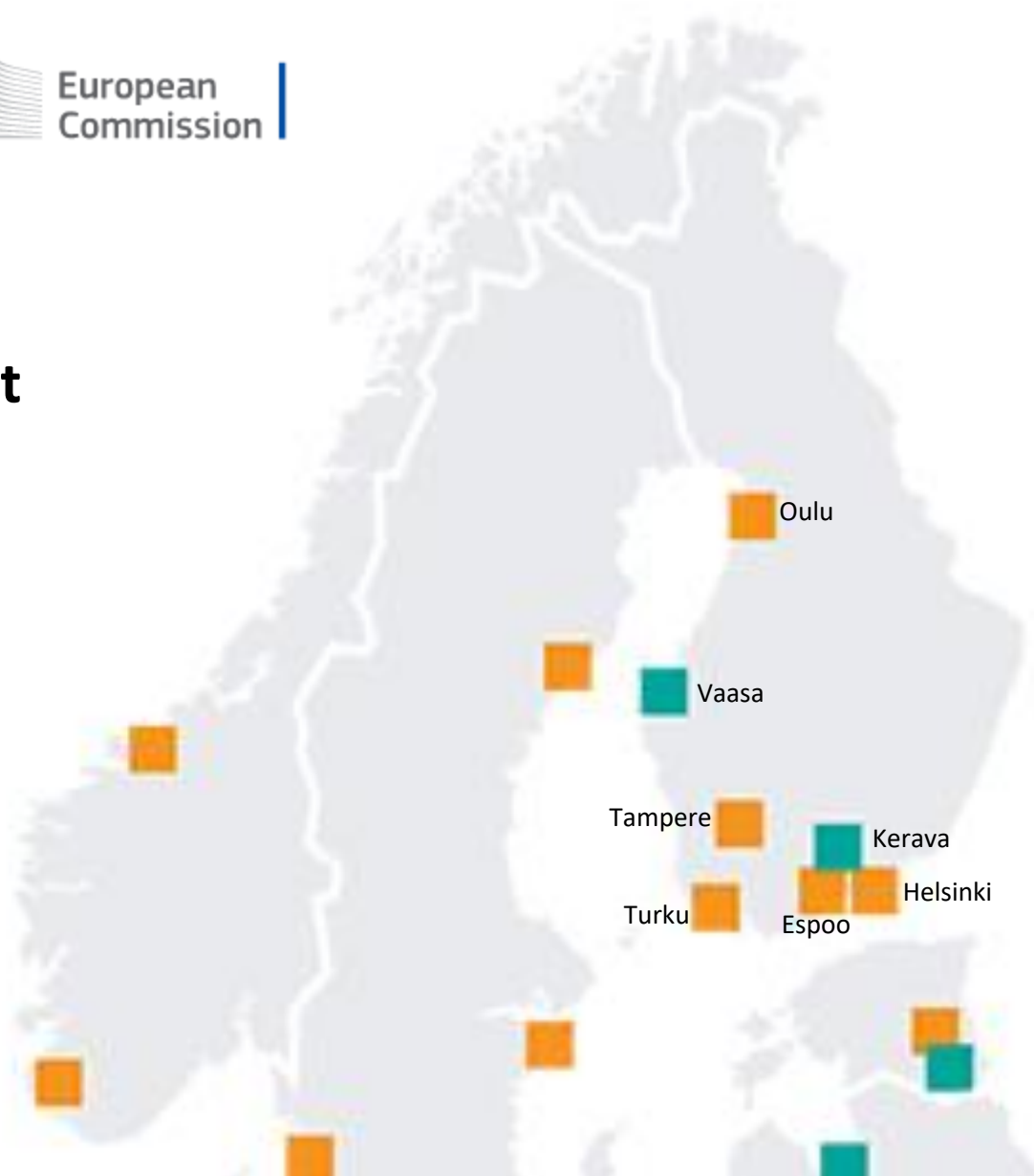
This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 774199.



The Smart Cities and Communities lighthouse projects are funded by the European Commission through the Horizon 2020 research and innovation programme, with the aim of bringing together cities, industry and citizens to demonstrate solutions and business models that can be scaled up and replicated, and that lead to measurable benefits in energy and resource efficiency, new markets and new jobs.



Energy
Transport
ICT



Smart City Solutions From Finland

Helsinki: *mySMARTLife*



Tampere: *Stardust*



Espoo: *Sparcs*



Oulu: *Making City*



Turku: *Response*



Vaasa: *IRIS Smart Cities*



Kerava: *Matchup*



Smart Cities Marketplace

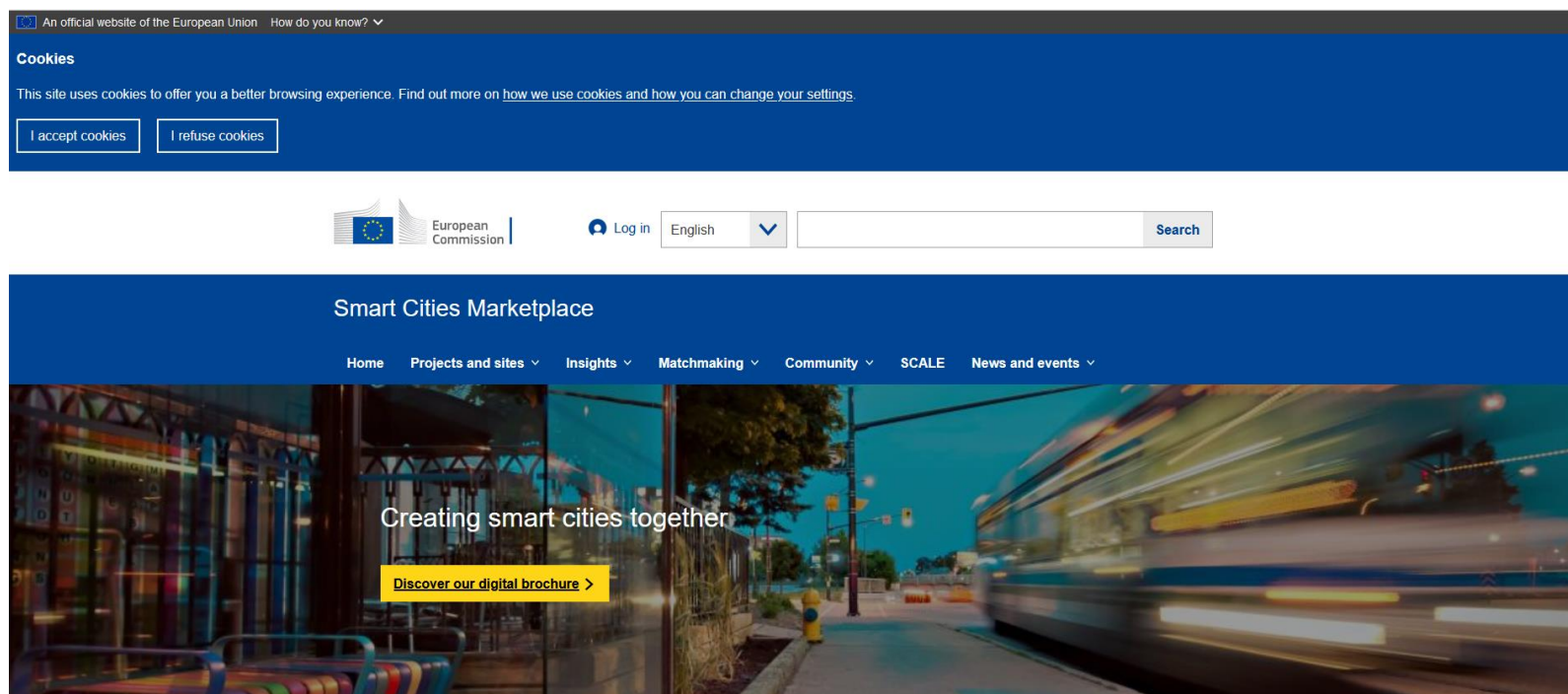


Creating smart cities together





What is the Smart Cities Marketplace?

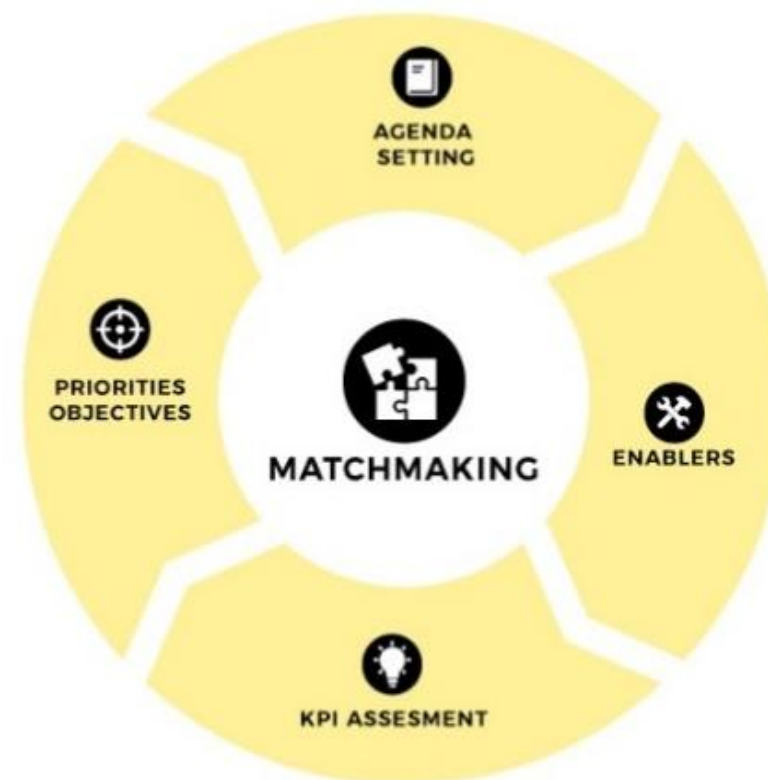


The Smart Cities Marketplace was created by merging the two former Commission projects
"Marketplace of the European Innovation Partnership on Smart Cities and Communities" (EIP-SCC)



What is the Smart Cities Marketplace?

- Smart Cities Marketplace + Smart Cities Information System knowledge repository of EU smart cities projects
- One-stop-shop for those who look to bring smart cities solutions/projects to the market.
- Action Clusters
- Matchmaking: events and platform





Our Instruments



EXPLORE

- Database of smart city solutions
- Quantitative and qualitative information
- Contacts



SHAPE

- Pan-European action cluster working groups and initiatives
- Regular workshops and webinars



DEAL

- Matchmaking events with investors
- Open calls for proposals ready to match
- Guidance on how to create bankable investment proposals

Smart Cities Marketplace



European
Commission



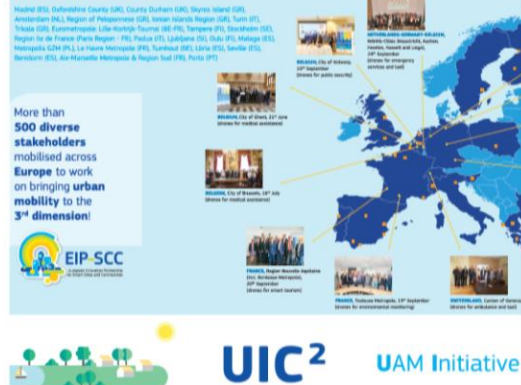
Examples of outcomes

Smart Cities Marketplace

EU Urban Air Mobility

A Community and the Voice of 42 cities / regions

FrontRunners (12 demonstrator projects (17 cities / regions, incl. 2 Cross-border)
Fellows (125 cities / regions)



CITIZEN ENGAGEMENT SOLUTION BOOKLET

EU Smart Cities Information System



Space for cities: from innovation to operation

A talk about concrete uses of satellite data and services to support cities' resilience and sustainability

Online workshop, 27 October 2020, 2 p.m. – 5:50 p.m.

Satellites offer reliable and objective information on soil, air, vegetation, and assets, which can be compared over time. This increases the amount and quality of data that city managers need to implement sustainable development strategies.

Eurisys organises an online workshop to present and discuss solutions to use satellite data and signals, which can make a real difference for public managers willing to increase cities' sustainability and resilience to climate change and critical events.

The solutions to be presented have been recently developed to improve services that already existed or to respond to emerging city challenges, such as climate change and the COVID-19 sanitary crisis.

Representatives from city authorities, SMEs, service providers and NGOs with an interest in satellite-based solutions for cities are invited to express their views on the relevance of the services presented with regard to their needs and to identify the operational use of such services in cities.

The workshop is organised by Eurisys as a contribution to the *Geospatial Cities* initiative of the European Innovation Partnership on Smart Cities and Communities (EIP-SCC).

Register [here](https://attendee.gotowebinar.com/register/9180076977286253580) <https://attendee.gotowebinar.com/register/9180076977286253580>

More info about the workshop: <http://bit.ly/FromInnovationToOperation>



Smart City Guidance Package

A Roadmap for Integrated Planning and Implementation of Smart City projects

J. Borsboom-van Beurden, J. Kallaios, B. Gindroz, S. Costa, J. Riegler



European Commission



How can I participate?

smart-cities-marketplace.ec.europa.eu/action-clusters-and-initiatives/action-clusters

European Commission Log in English

Smart Cities Marketplace

Home Projects and sites Insights Matchmaking **Community** SCALE News and events

Home > Community > Action clusters

Action clusters

An **Action Cluster** is an assembly of partners committing to work on specific issues related to smart cities, by sharing their **best practices**, giving added-value to their national and local experience and identifying gaps that need to be fulfilled at European level. The work of each Action Cluster is collected under thematic Initiatives. If you wish to indicate your interest in joining one or more Action Clusters, please fill in the [simple form](#).

Sustainable Urban Mobility

Initiatives	Active Members
4	213

Sustainable Built Environment

Initiatives	Active Members
3	206

Integrated Planning, Policy and Regulations

Initiatives	Active Members
4	187

Supported by **Smart Cities Marketplace** #EUSmartCities

☒ Save a backup on your local computer (disable if you are using a public/shared computer)

Join the community of the Action Clusters and Initiatives of the Smart Cities Marketplace

The community consists of many action clusters and initiatives with a variety of activities to help to shape the market for smart cities in Europe. These are assemblies of partners, committing to work on specific issues related to smart cities, by sharing the knowledge and expertise with their peers, providing added value with their national and local experience and identifying gaps that need to be filled at the European level. The work of each Action Cluster is collected under thematic initiatives.

The community is governed by its charter.

Fields marked with * are mandatory.

Disclaimer

The European Commission is not responsible for the content of questionnaires created using the EUSurvey service - it remains the sole responsibility of the form creator and manager. The use of EUSurvey service does not imply a recommendation or endorsement, by the European Commission, of the views expressed within them.

* Your name and surname:
The European Commission is committed to user privacy. Please read more about our Privacy Policy here.

Thank you! What is your **title / profession / job?**



1 - Call for projects

- The Smart Cities Marketplace is continuously looking for projects in need of finance to be matched with our Investors.



EIP-SCC
European Investment Partnership
for Smart Cities and Communities

Project Concept Note

The EIP-SCC Marketplace matchmaking support service is continuously looking for projects in need of finance to be matched with the requirements of members of our Investor Network.


So:

- Are you looking to make investments in the area of mobility, ICT or energy?
- Is your city ready to redevelop certain areas? Is your company working on a smart city project?

And you believe that you have a project concept that is mature enough to be pitched to an investor, do submit your idea using intake form below.

On behalf of the EIP-SCC matchmaking team, thank you in advance for your involvement!

Próxima
Página 1 de 5



Smart Cities Marketplace
European Investment Partnership
for Smart Cities and Communities


Expected Impacts		Impact	Other relevant information
<input type="checkbox"/>	Energy savings	<input type="checkbox"/> Renewable energy production	<input type="checkbox"/> Other impacts (please describe)
<input type="checkbox"/>	Reduced emissions	<input type="checkbox"/> Other impacts (please describe)	
<input type="checkbox"/>	Increased jobs created per year		
<input type="checkbox"/>	Decreased jobs created per year		
<input type="checkbox"/>	Other impacts (please describe)		

Investment sought	
INVESTMENT TYPE	<input type="checkbox"/> Loan
	<input type="checkbox"/> Equity
	<input type="checkbox"/> Debt
	<input type="checkbox"/> Other (please describe)
BUSINESS MODEL	
INVESTMENT SIZE (EUR)	
OTHER RELEVANT INFORMATION	

(*) Please select if you would be interested in sharing the project concept note and associated information with our action clusters to help you to shape and improve the maturity level in order to be eligible to receive an early-stage seed fund in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 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A masterclass for smart city project developers

**Smart Cities Marketplace**

The Smart City Roadmap

A two-day Smart Cities Marketplace Masterclass to help shape your smart city project

Introduction

The Smart Cities Marketplace is a major market-changing enterprise supported by the European Commission, bringing together cities, industries, SMEs, investors, researchers and other smart city actors. The Marketplace offers insight in European smart city good practice, allowing you to explore which research might fit your smart city project. What is more, the Marketplace represents a community of experts that can help you in shaping your smart city project so that you get your plan and business case ready for financing and can present it to investors. The Marketplace has a growing investor network that is instrumental in attracting investment while the matchmaking team of the Marketplace can support you in sealing a deal.

As part of its project shaping activities, the Marketplace is now offering a masterclass in developing a good smart city strategy which will sustain your work beyond the first experiments and pilots and form the resilient backbone of future projects. Special focus will be on integrating planning and implementation, the aspects of cross-domain collaboration with and buy in of a multitude of actors, the development of a long-term perspective on the built environment, and the early inclusion of financial aspects in your development of plans.

Who should attend?


The masterclass will be upon invitation and targeted to representatives of city administrations and smart city project developers. It will be highly interactive and each participant's smart city project portfolio will play a central role in group work. Participants will be requested to provide information on their project before the masterclass starts. This will ensure that participants can learn as much from each other as from the presenters.

The organisers of the masterclass will do an online intake of around 20 minutes with each participant prior to the masterclass to get a better understanding of their local situation, context of the plan and ambitions.

Explore
You will get access to knowledgeable experts giving you independent and high-quality advice on proven and tested solutions

Shape
We assist you in developing an investment proposal for your smart city roadmap

Deal
Match your ideas/plans with a network of solution providers and interested investors to support you in sealing the deal



- Practical, case-oriented
- Based on Smart City Guidance Package
- 2 days
- Ample time between days to work on project concept
- Constructive feedback from experts
- Register at: matchmaking@eu-smartcities.eu



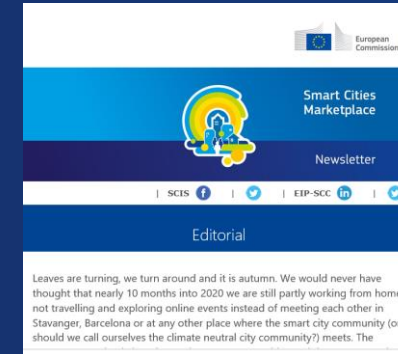
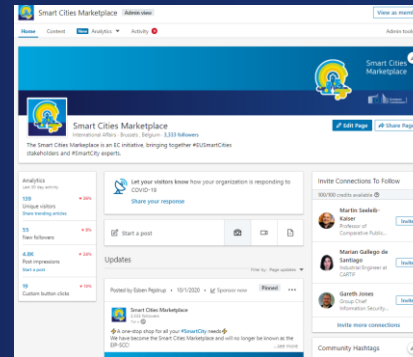


GET IN TOUCH!

Smart Cities Marketplace Forum - Towards a just and clean urban transition

Tuesday 26 – Wednesday 27 April 2022 On-site in Brussels

Smart Cities Marketplace



<https://smart-cities-marketplace.ec.europa.eu>

Sign up for our newsletter [here](https://bit.ly/34ReJEV): <https://bit.ly/34ReJEV>



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European
Commission

Carbon neutral energy production by 2030 in Kerava



TONI NEVALAINEN

**Technology Manager
Keravan Energia**



 **Hitachi Energy**

ABB

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Carbon neutral energy production by 2030 in Kerava

Keravan Energia Oy



Toni Nevalainen
Technology Manager

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+358 406 738 030

Keravan Energia Oy

Keravan Energia Oy is owned by its customers via its municipal owners (the City of Kerava 96.5% and the municipality of Sipoo 3.5%). Our mission statement is to maintain competitiveness and wellbeing in our region through favourable energy prices.

Our mission statement



Carbon neutral
energy production
by 2030 at the
latest

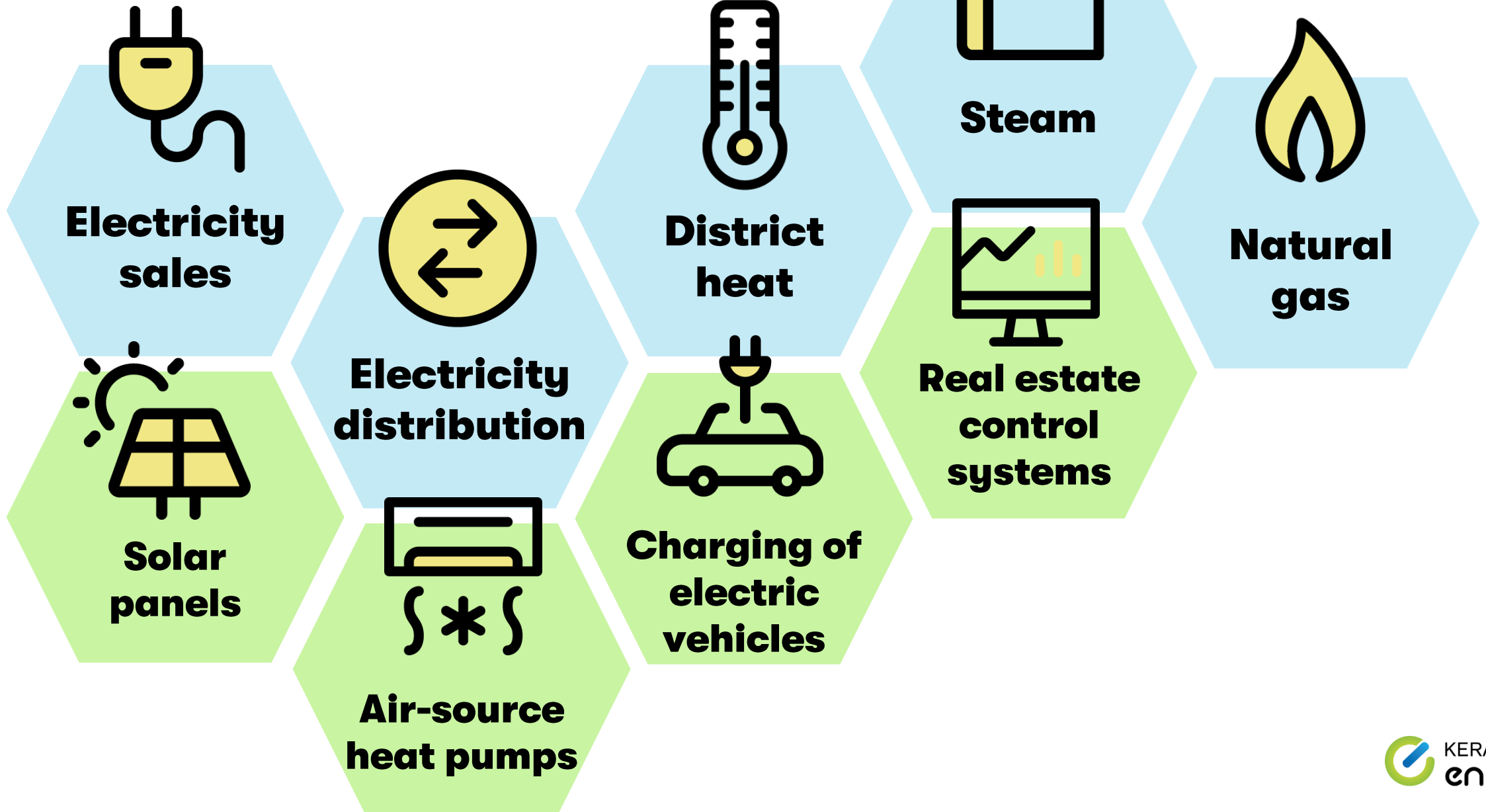


Favourable electricity
distribution prices
instead of paying
dividends



We create local
wellbeing in Kerava
and Sipoo

Our products





**For us, responsibility
means concrete
action**

Towards carbon-neutral energy production

90%

of the energy we
produce is already
generated with
renewable fuels.

-88%

of CO₂ emissions
from the 2010 level.

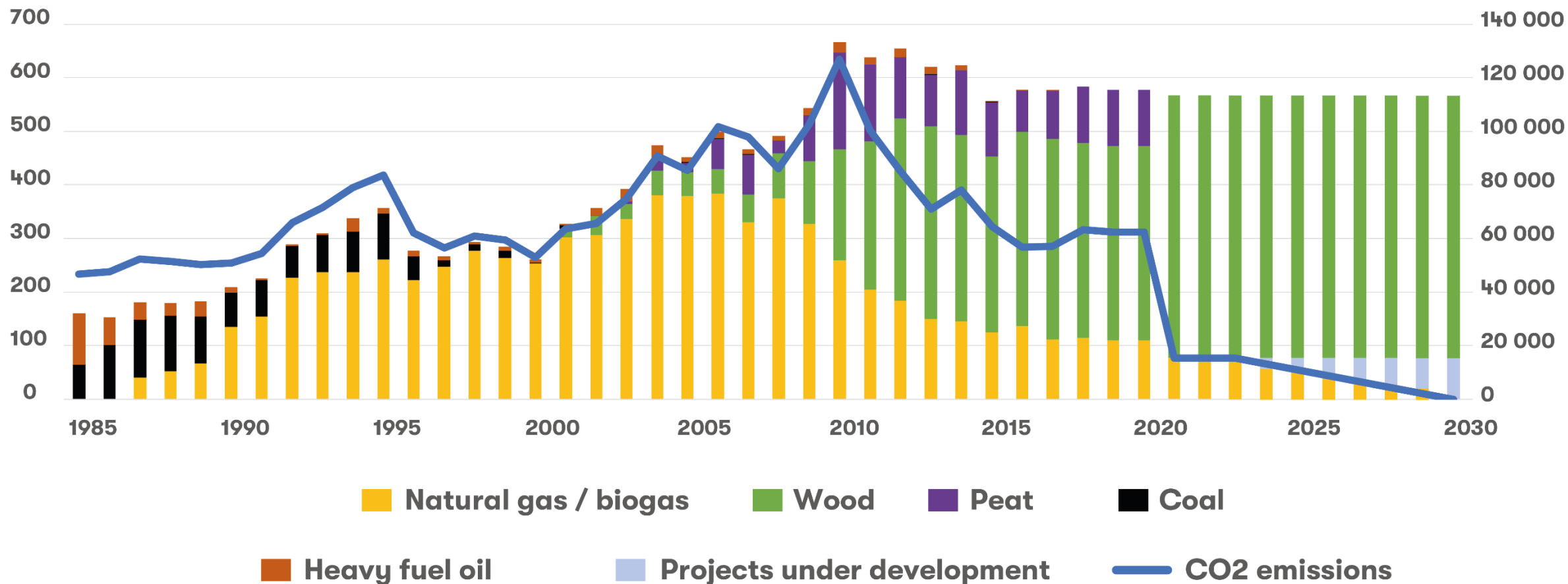
0g CO₂

by year 2030
at the latest.

Fuels and CO2 emissions

Use of fuels (GWh)

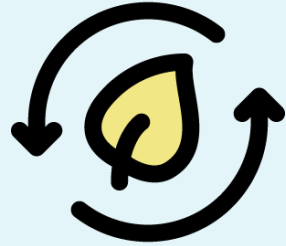
CO2 emissions (t CO2)



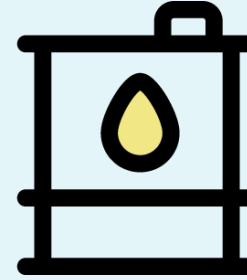
Concrete action instead of just plans



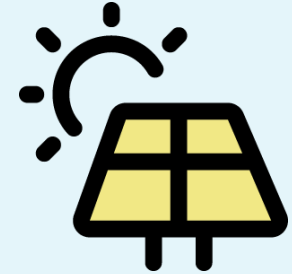
We phased out the use of coal in 2001



Renewable wood as the main fuel in 2009



We phased out the use of heavy fuel oil in 2014



Own solar power plant in Kerava in 2016



We phased out the use of peat in 2020



Waste heat of the bioprocess recovered in 2021



Wider utilisation of waste heat



Storage of heat

Case Sinebrychoff



We supply the heat required in the production process of the Sinebrychoff brewery in Kerava

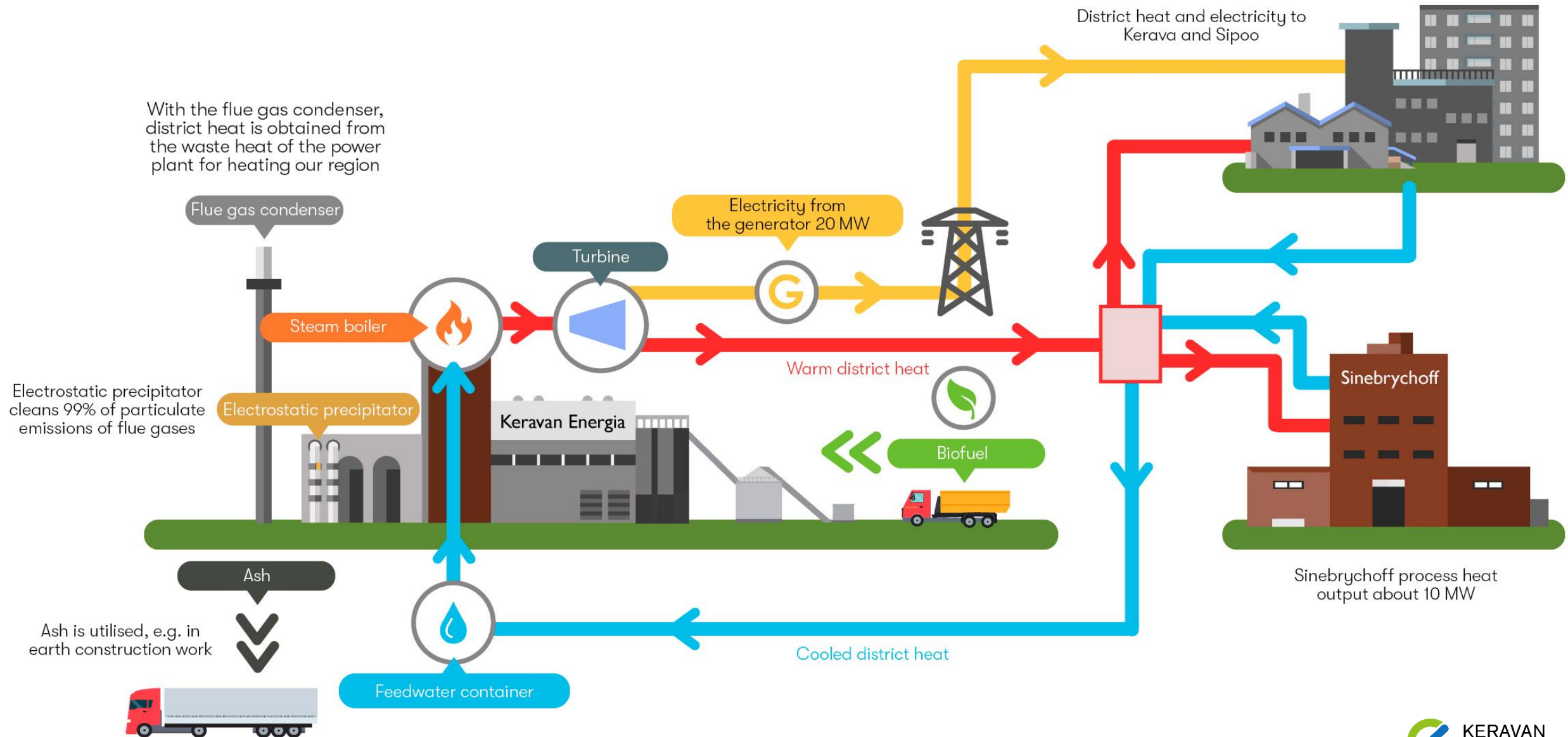
Need:

Sinebrychoff, Finland's oldest brewery, wanted to produce its drinks with 100% renewable energy.

Solution:

Our cooperation finally resulted in phasing out the use of peat in the Kerava bioplant. **Currently, the Sinebrychoff brewery in Kerava produces, e.g. Coca-Cola in a carbon-neutral way – uniquely in the world.**

How the cooperation brings benefits to the entire local area



Climate cooperation is beneficial for the whole region

The Kerava bioplant also provides heat for almost the whole of Kerava and Sipoo. As a result of phasing out the use of peat, the CO₂ emissions of the power plant fell by 45,000 tonnes at the annual level.

In its Kerava brewery, Sinebrychoff also recovers heat corresponding to the consumption by about 450 detached homes each year, which makes the use of district heating more efficient in our entire region!

Renewable transport fuel – Power-to-X

43%

According to the statistics of the City of Kerava, road traffic accounted for about 43 per cent of the carbon-dioxide emissions in Kerava in 2019.

-20,000 t/a

CO₂ emissions of the Kerava bioplant captured → renewable natural gas with methanation.
CO₂ emissions up to -20,000 t/a → energy production can become even carbon negative.

300 vehicles

Synthetic natural gas would be enough to meet the annual consumption of up to 300 heavy articulated vehicles.

How the methanation process works



Synthetic methane is produced with microbes discovered in bogland, turning the carbon dioxide and hydrogen of the bioplant into synthetic methane. The technology was enabled by Q Power Oy.

The planned plant would produce synthetic methane with an output of 11 MW, which would be enough for the annual need of about 300 heavy vehicles. It is also possible to process other fuels from methane.

The pilot implementation of methanation was successfully completed in January 2022. Next in line is the planning of implementation, after which the objective is to build a renewable methane production plant of about 11 MW in Kerava during 2024.



Thank you!

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Learnings from Heat Demand Response in EU mySMARTLife-project



HANNU PIKKARAINEN

**Business Development Manager
Helen Oy**



Hitachi Energy

ABB

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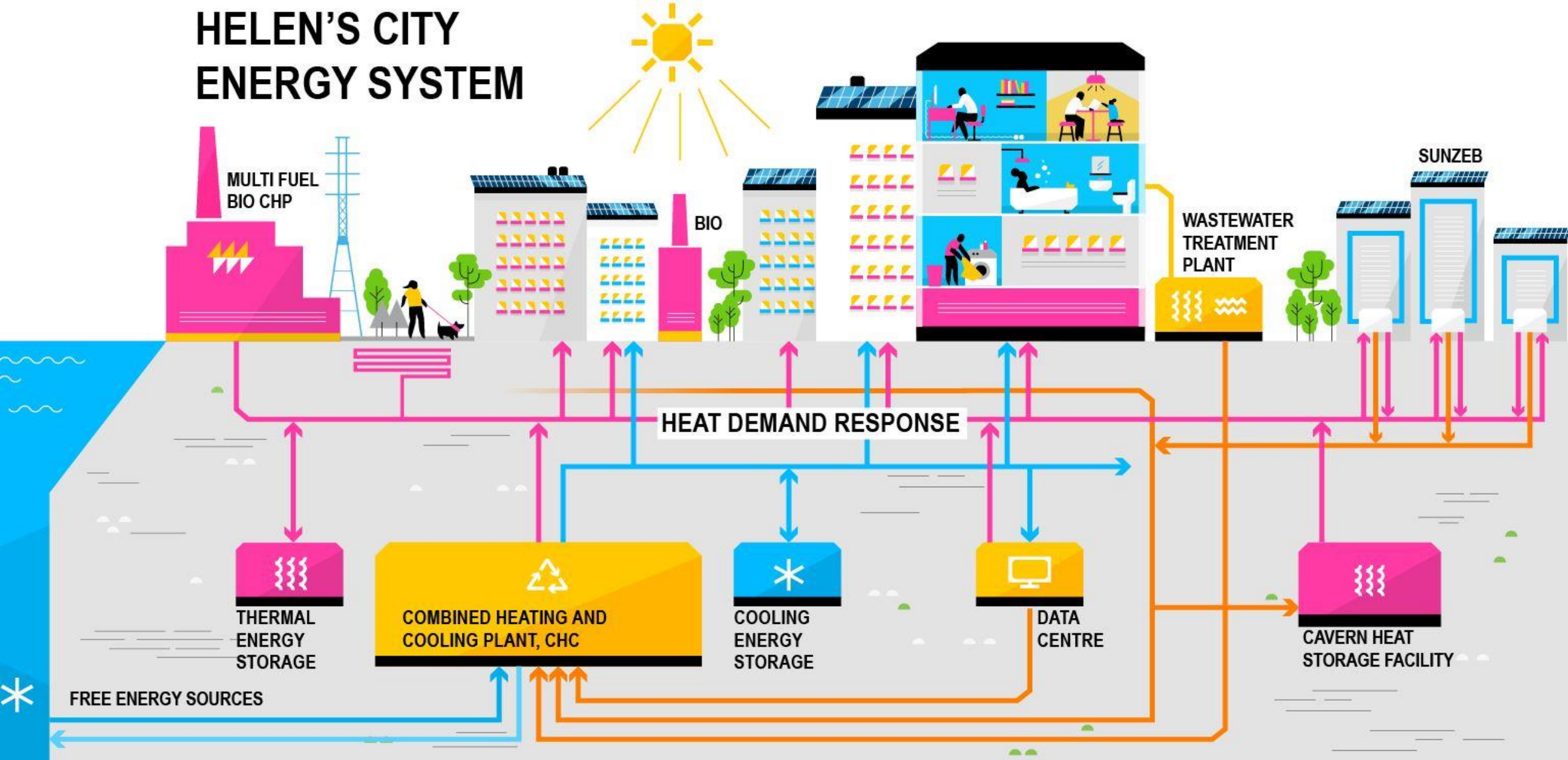


Heat Demand Response Service of Lighthouse City Helsinki

Hannu Pikkarainen
Business Development Manager
Helen



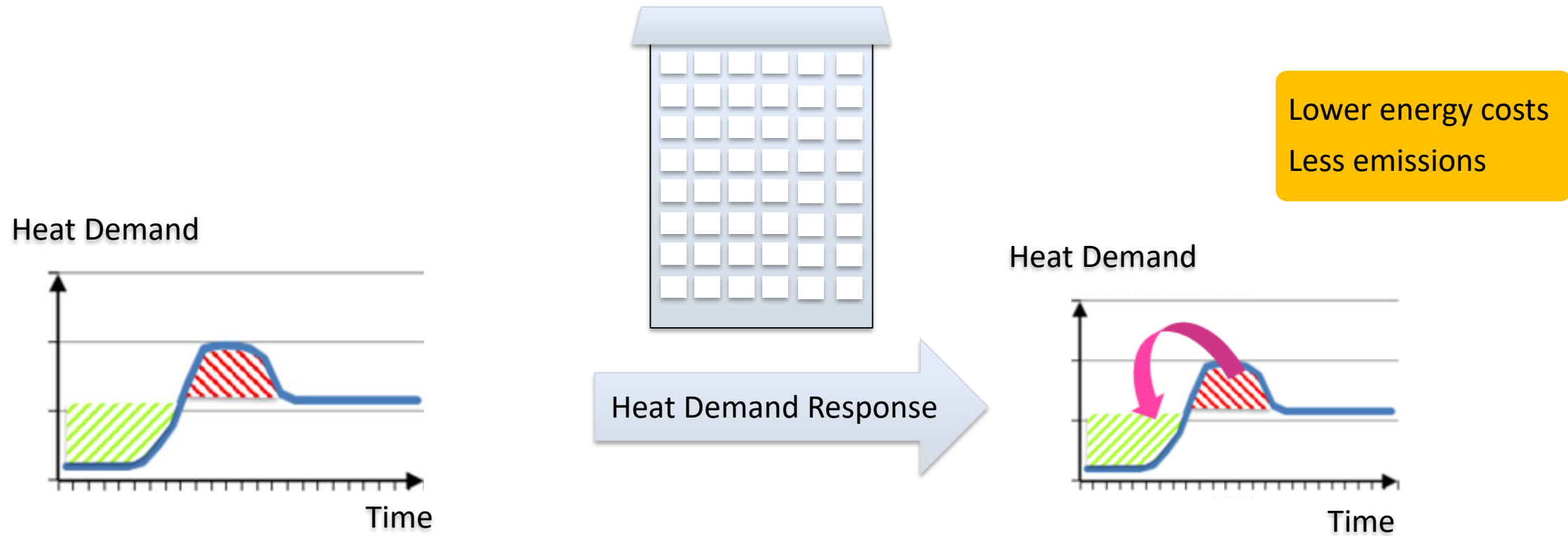
HELEN'S CITY ENERGY SYSTEM



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731297.



Building mass as heat storage to balance peak consumption



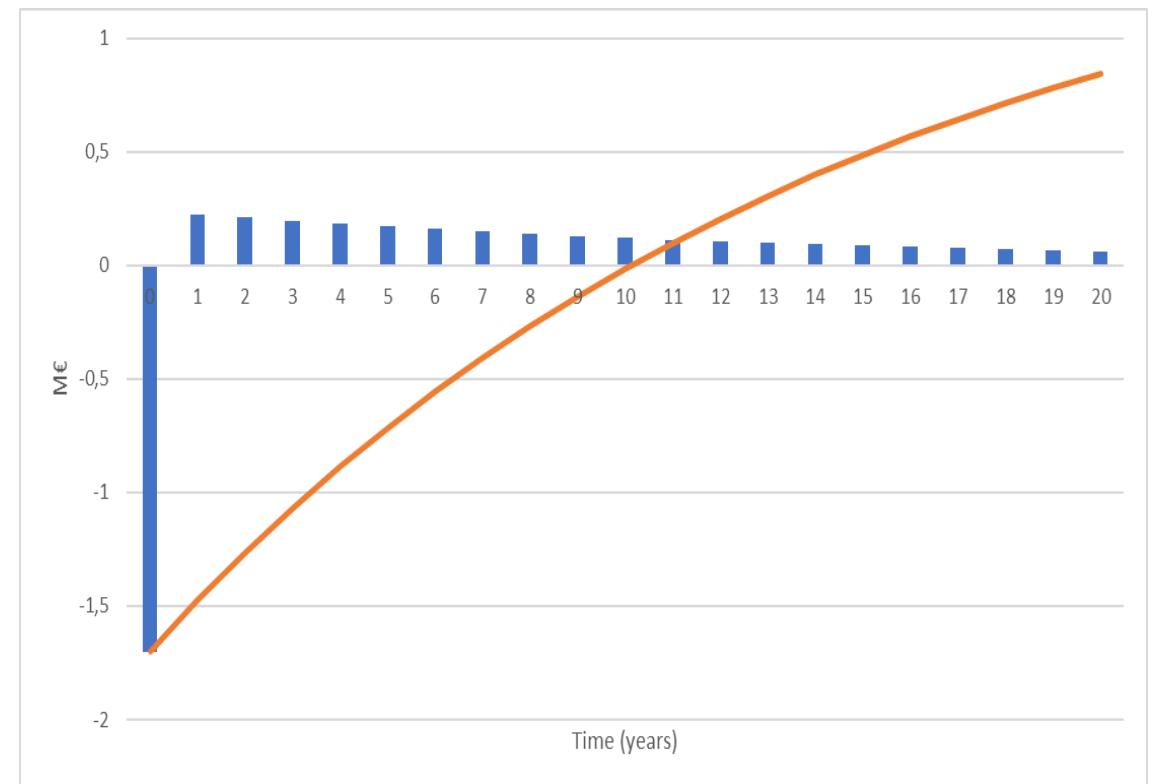
Heat demand response studies and pilots in Helsinki

- Business scenarios of heat demand response in Helsinki
- Residential building pilot
- Office building pilot

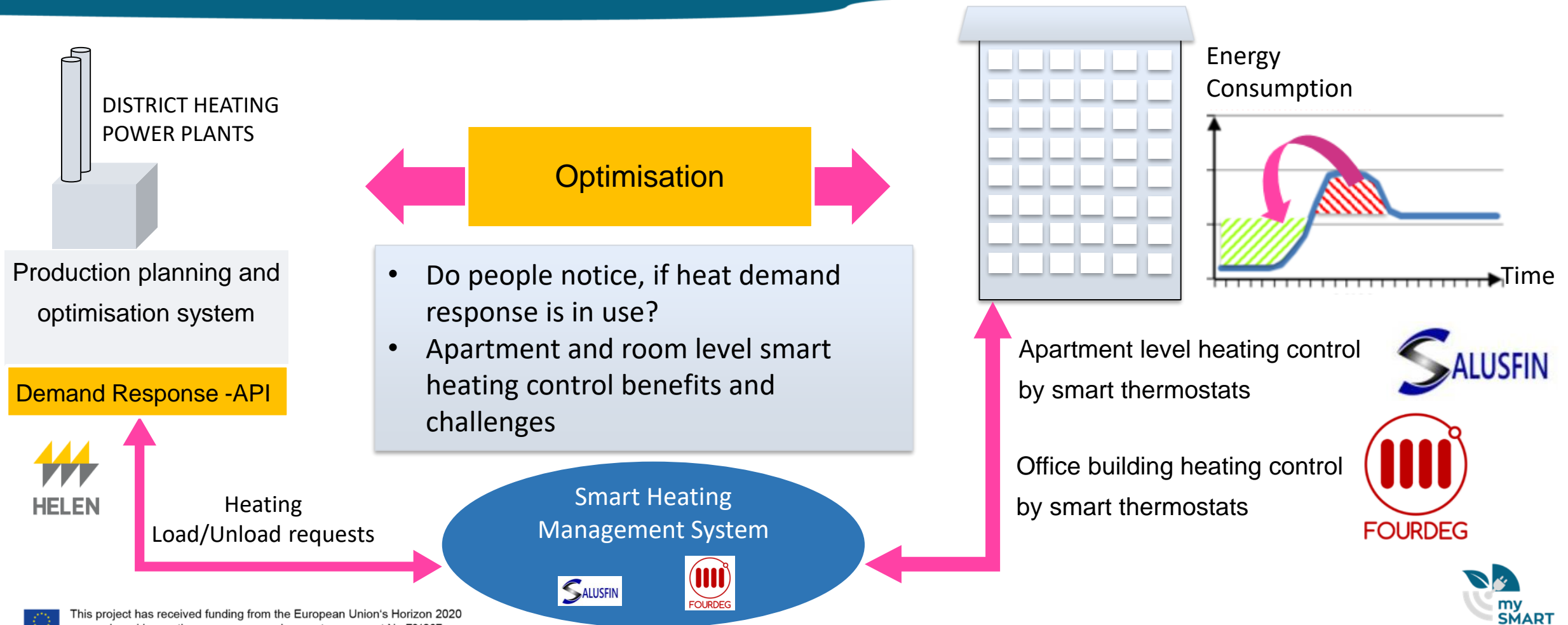


Heat demand response / Business as usual scenario

- **Business as usual scenario: selected buildings of Heka and the City of Helsinki**
 - **550 residential apartment buildings** of Heka
 - **50 other buildings** (business premises, offices, schools)
- Estimated max. power for heat demand response: **about 100 MW**
- **Estimated payback time** with optimal use of heat demand response: **about 10 years**
- **The solution would result in savings in energy procurement and district heat production.**
- Piloting capability exists, no commercial use currently

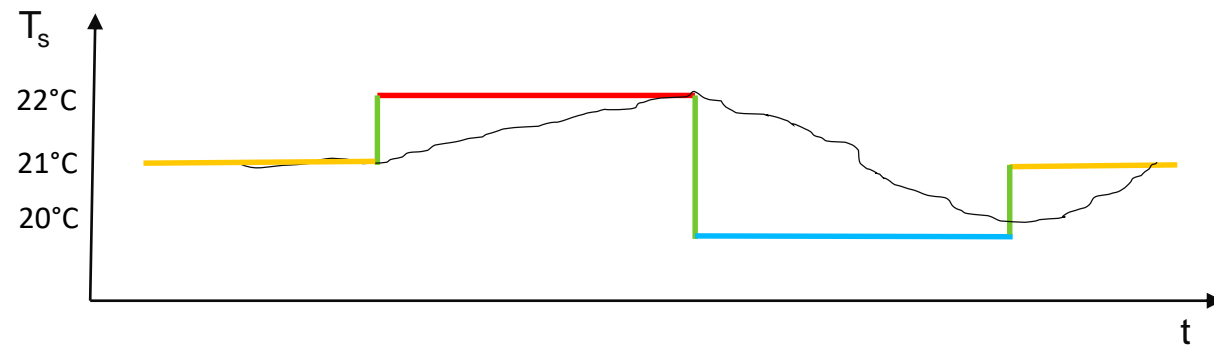


Residential and office building pilots

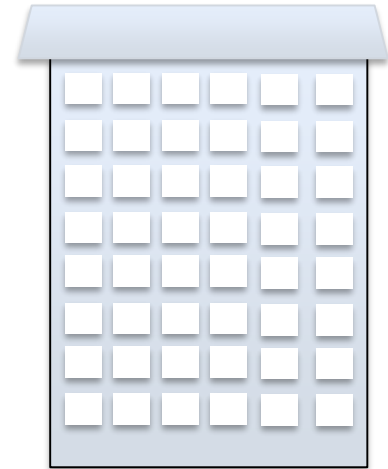


Energy loading and unloading in the building by changing temperature settings

TEMPERATURE
SETTING VALUE



- Normal setting value
- Load setting value
- Unload setting value
- Change in setting value
- Estimated indoor temperature



Residential building pilot with smart thermostats / Merihaka, Helsinki

- 167 apartments, built in 1975

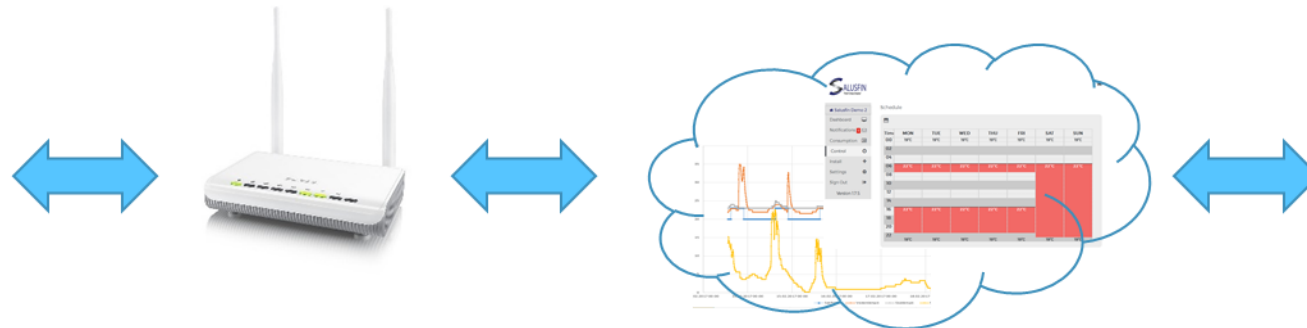


Smart Heating Benefits:

- Schedule and control to have better indoor climate
- Data and feedback on energy consumption patterns

Challenges

- Connectivity on apartment level
- Customer engagement, motivate inhabitants to take the full solution into use
- Support model, ensure that appropriate model is in place



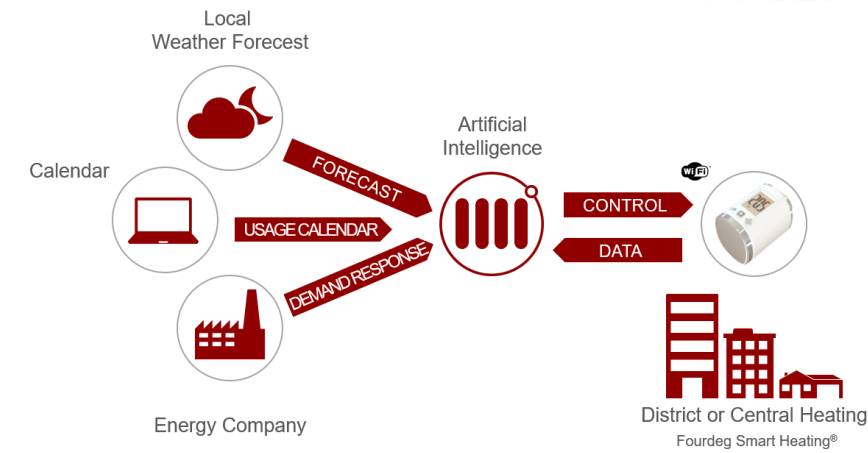
Office building pilot / Viikki office building



- Building control managed by Fourdeg
- Heat demand response impact to office personnel heating quality perception measured by VTT

Main result: demand response did not cause any noticeable perception impact for office personnel when the room temperature tolerance was limited $\pm 1^\circ\text{C}$

- **Room level control with thermostats is very efficient for heat demand response**
 - rooms can be heated over their normal temperature
 - all rooms will contribute with their own capability
- **Office buildings and other premises with known usage schedule are efficient for heat demand response**





Heat Demand Response Service of Lighthouse City Helsinki

Hannu Pikkarainen
Business Development Manager
Helen



Tampere Smart City IOT Solutions



MAARIT VEHVILÄINEN

**Project Manager
City of Tampere**



Hitachi Energy

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Smart City IOT Solutions

SMART CITY SOLUTIONS FROM FINLAND

VAASA ENERGY WEEK 23.3.2022

Maarit Vehviläinen, Project Manager,
STARDUST



- The objective is to pave the way towards the transformation of carbon supplied cities into smart, high energy efficient and citizen-oriented cities.
- This is to be achieved by developing new sustainable, technological solutions, and innovative business models related to them.
- Parties:
 - Coordinator: Cener (Spain)
 - Lighthouse cities: Pamplona, Tampere, Trento
 - Follower cities: Derry, Litomerice, Cluj-Napoca, Kozani
 - The consortium is composed of 30 organizations from 9 different countries: 7 cities, 4 research institutions, 6 SMEs and 13 industrial partners.
- Duration: 60 months (10/2017-9/2022)
- EU funding: € 18 million

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 774094

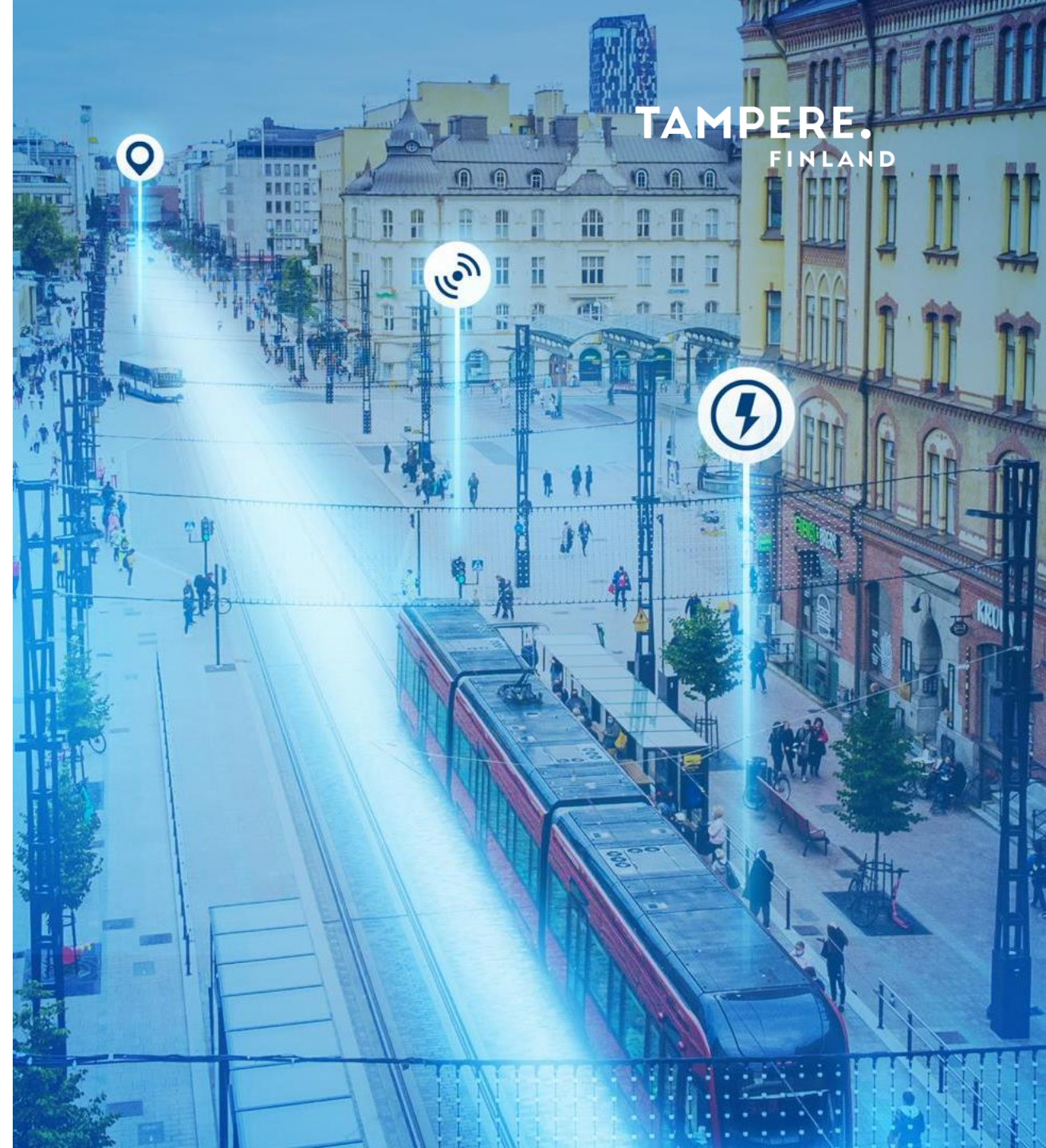


TAMPERE.
FINLAND

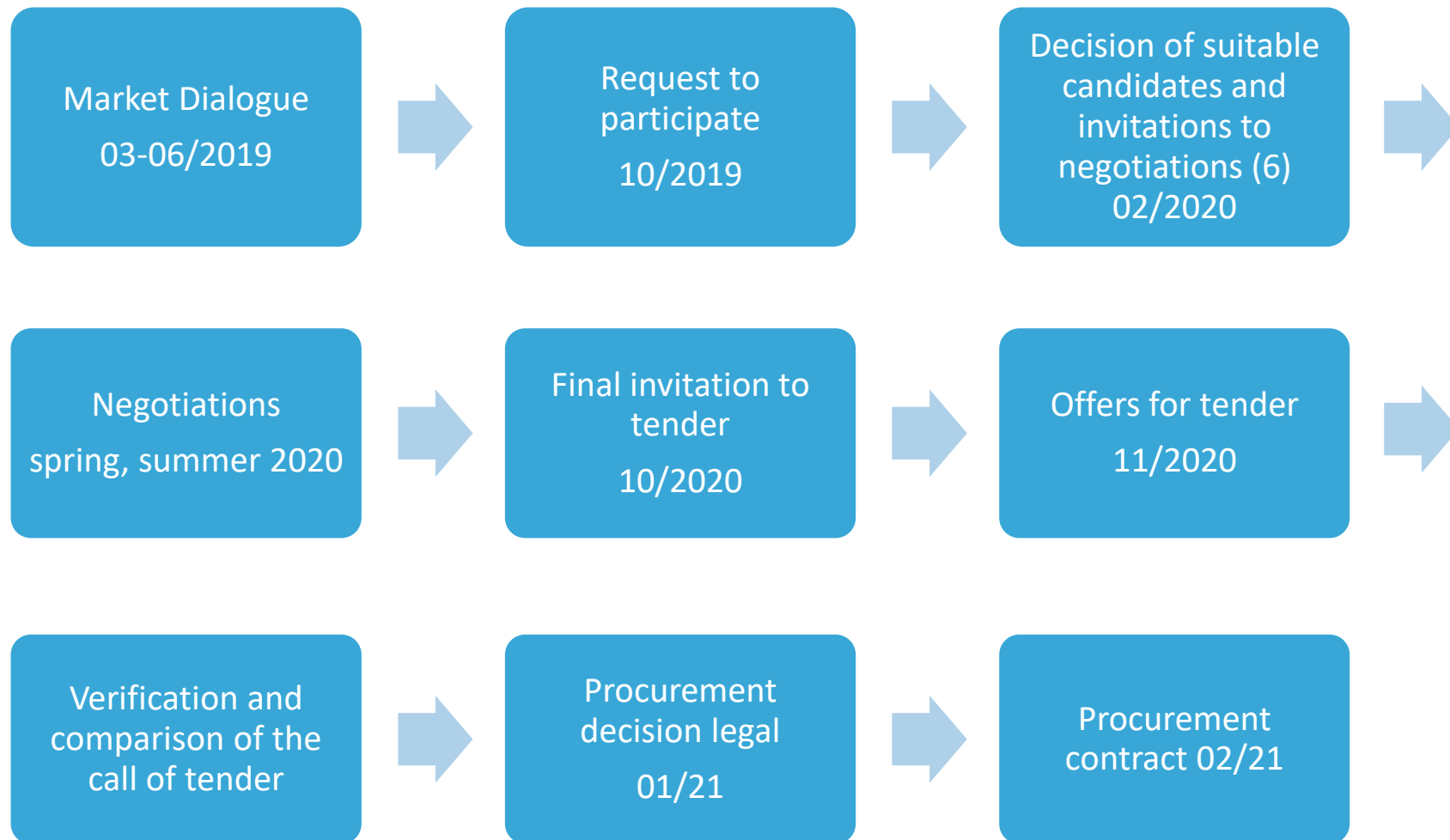
The outdoor lighting network itself forms a natural physical platform which can be utilized to build an extensive sensor network.

Objectives of the IoT platform procurement

- Energy savings
- Cost savings
- Reducing CO2 emissions
- More real-time information to support decision making
- Providing high quality services
- Partner
- Ecosystem



Competitive dialogue process



The platform aims to bring tangible benefits to the people of Tampere – a smarter and more sustainable everyday life for all of us.



IoT TAMPERE

Sign in to your account

Username or email

Password

Sign In

Or sign in with

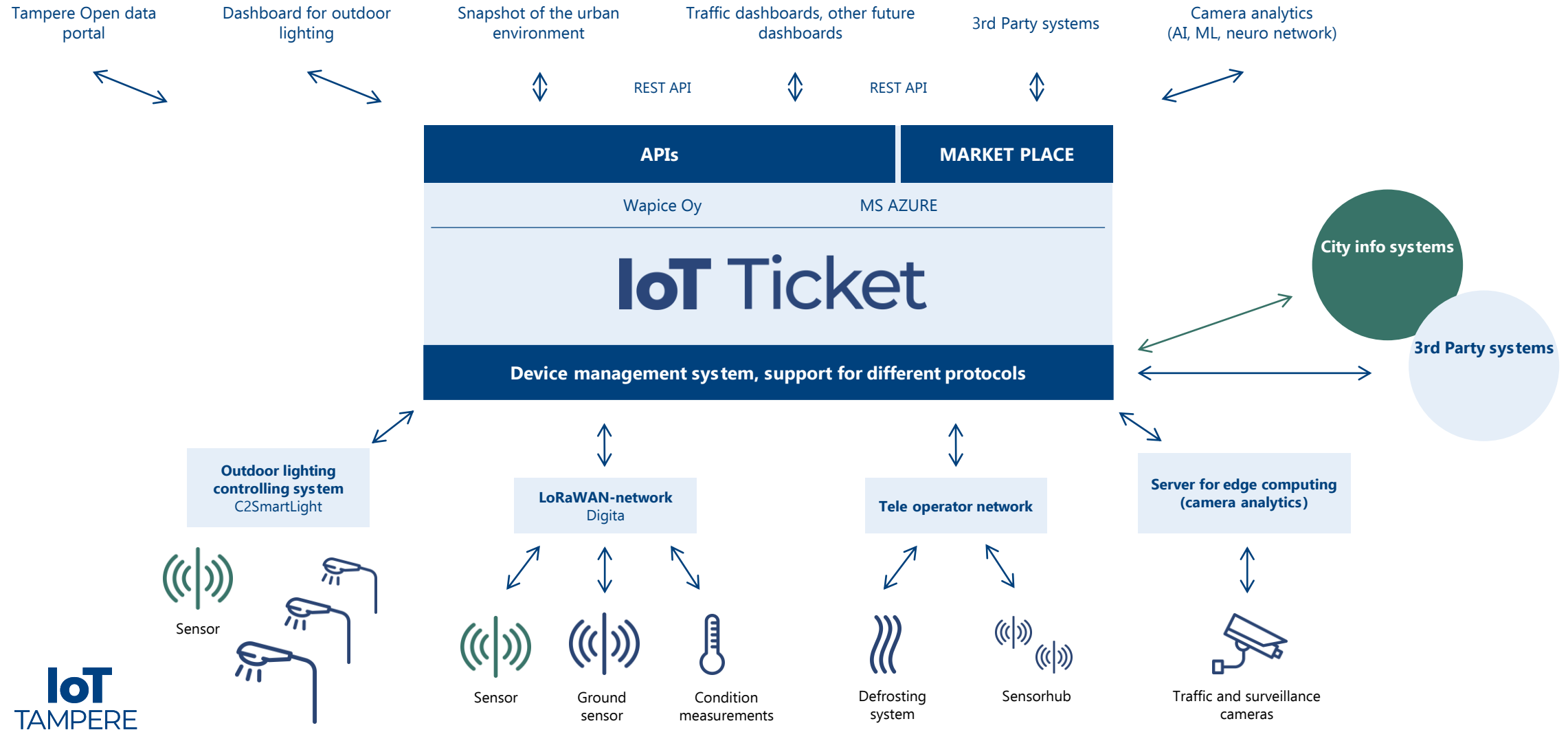
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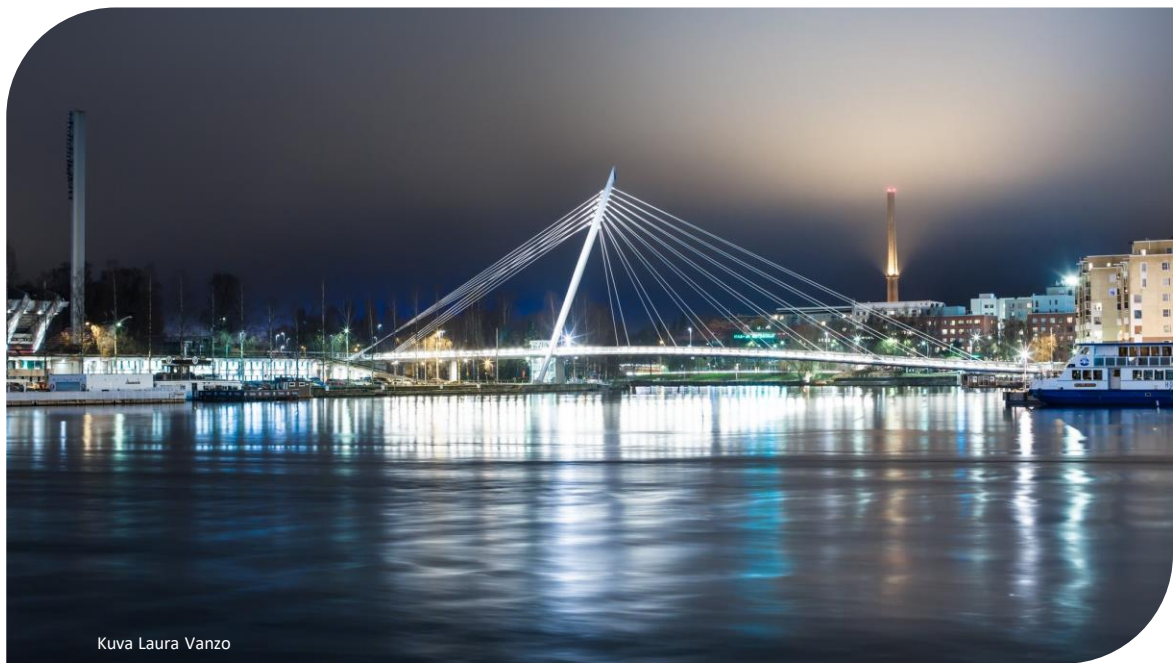


IoT-alusta on kehitetty osana STARDUST-projektia.
STARDUST on saanut rahoitusta Euroopan unionin
Horisontti 2020 -tutkimus- ja innovaatio-ohjelmasta (grant
agreement N° 774094).

IoT-platform architecture



Smart outdoor lighting



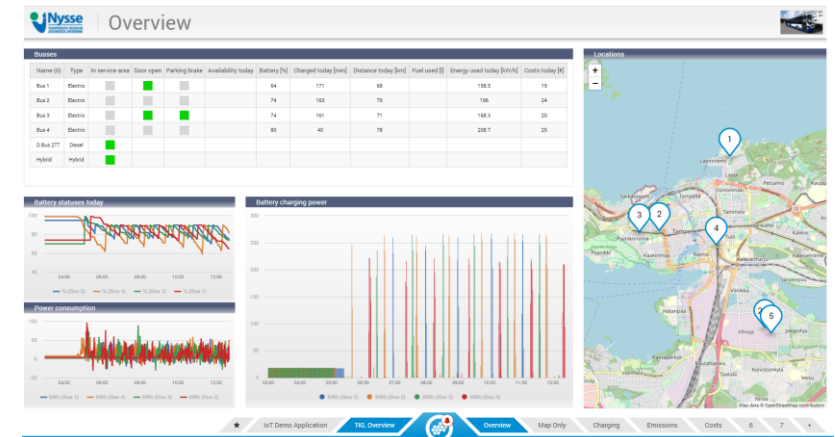
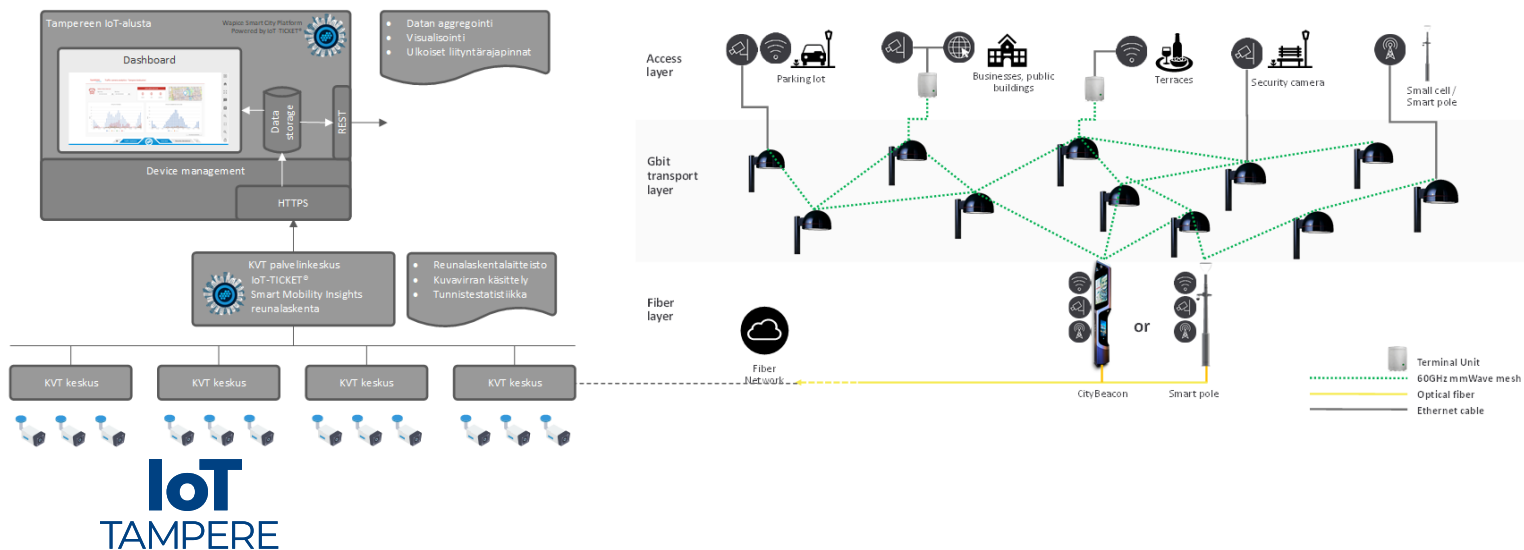
- control-influencing information from other systems can be imported into the control system
- control groups are defined (eg street-specific)
- the operation of the lighting can be monitored remotely
- local controlling
- lighting can be optimized according to the need for use
- Brings sensing capabilities that support other activities

Project Pilots

IoT Platform ready for development projects

Platform enables the pilots and tests for projects and make it easier for the city to scale and deploy successful experiments:

SURE, STARDUST, CityIoT2, Arena 5G –development project...

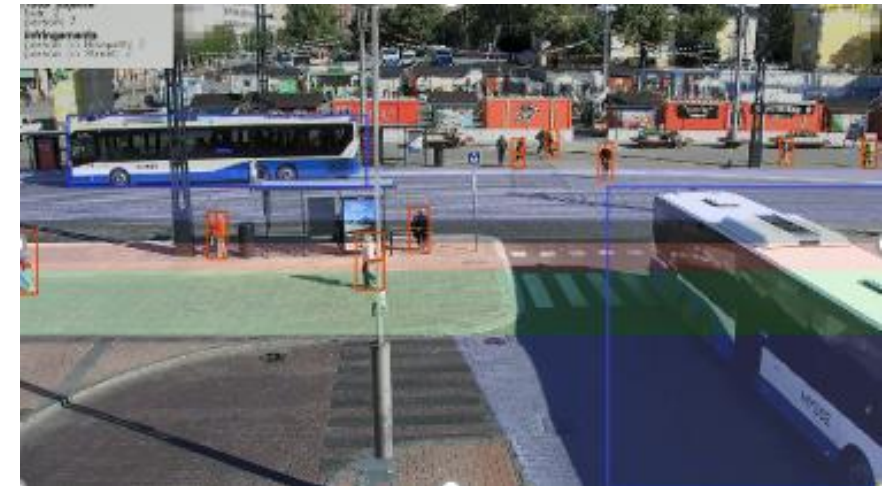
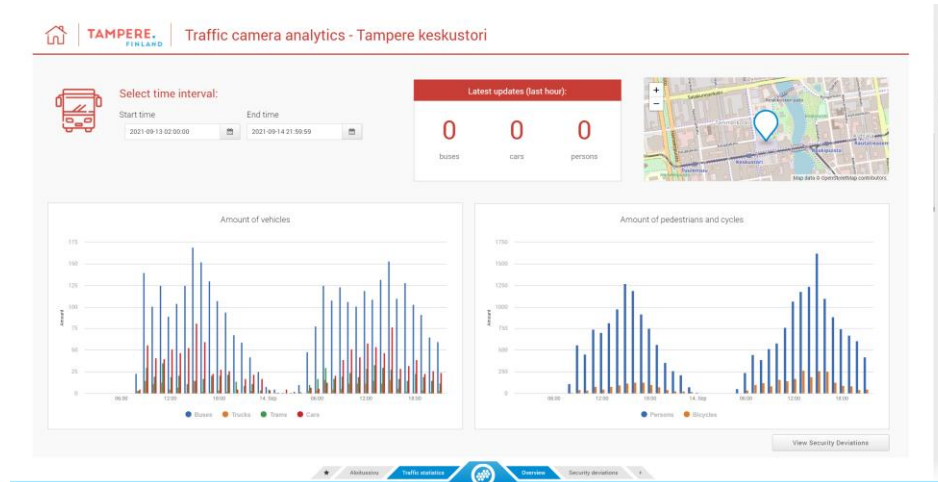


Example of future use cases



Traffic monitoring

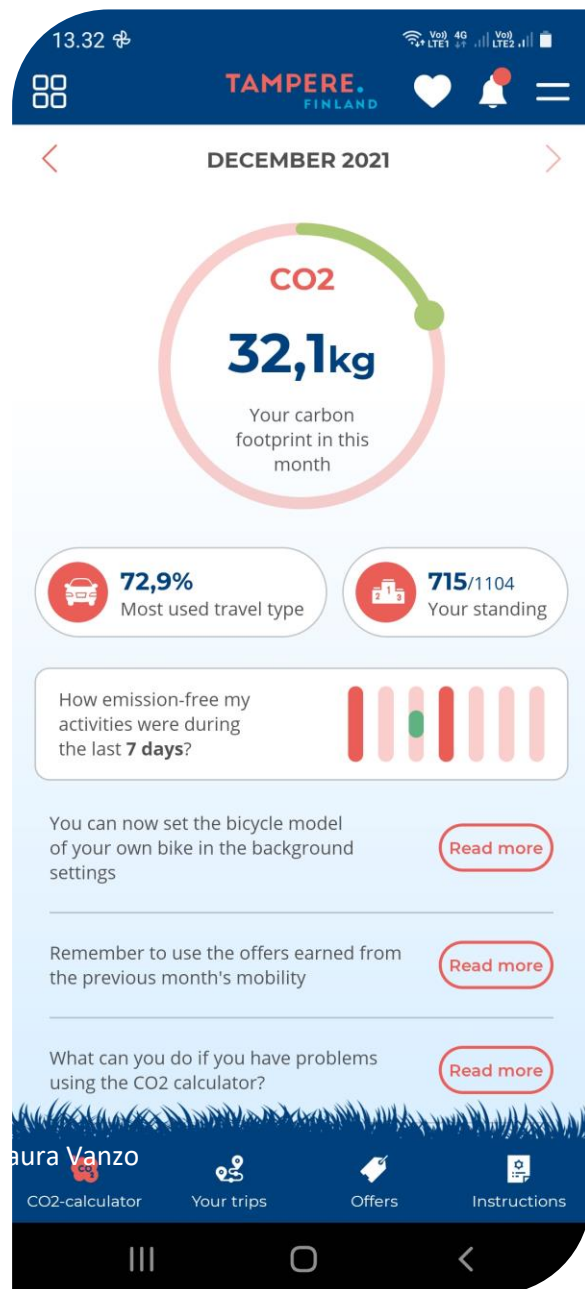
- Extensive traffic monitoring with the help of cameras.
- traffic counting (vehicles and light traffic), traffic offenses, crashes, near misses, etc.



Tampere.Finland app

- The Tampere.Finland application brings the user a diverse range of Tampere services. The application is aimed at the city's residents, but also at tourists and other customers in the Tampere area.
- Tampere.Finland application was developed as part of the innovative partnership of the Enlighten Tampere Hackathon process by Geniem Oy.
- Tampere.Finland application is using the open data and API:s available in the city of Tampere.
- Over 100 000 downloads

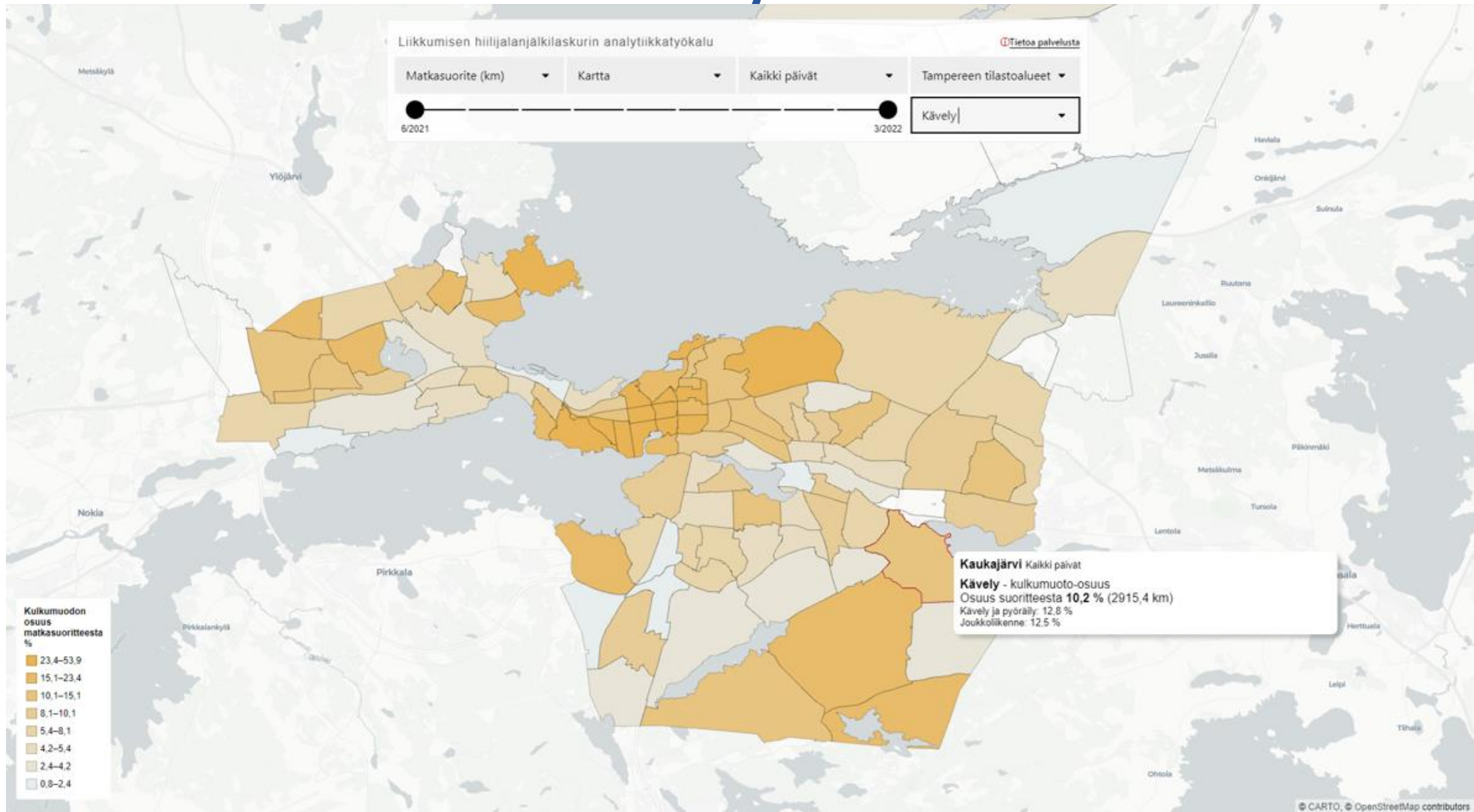




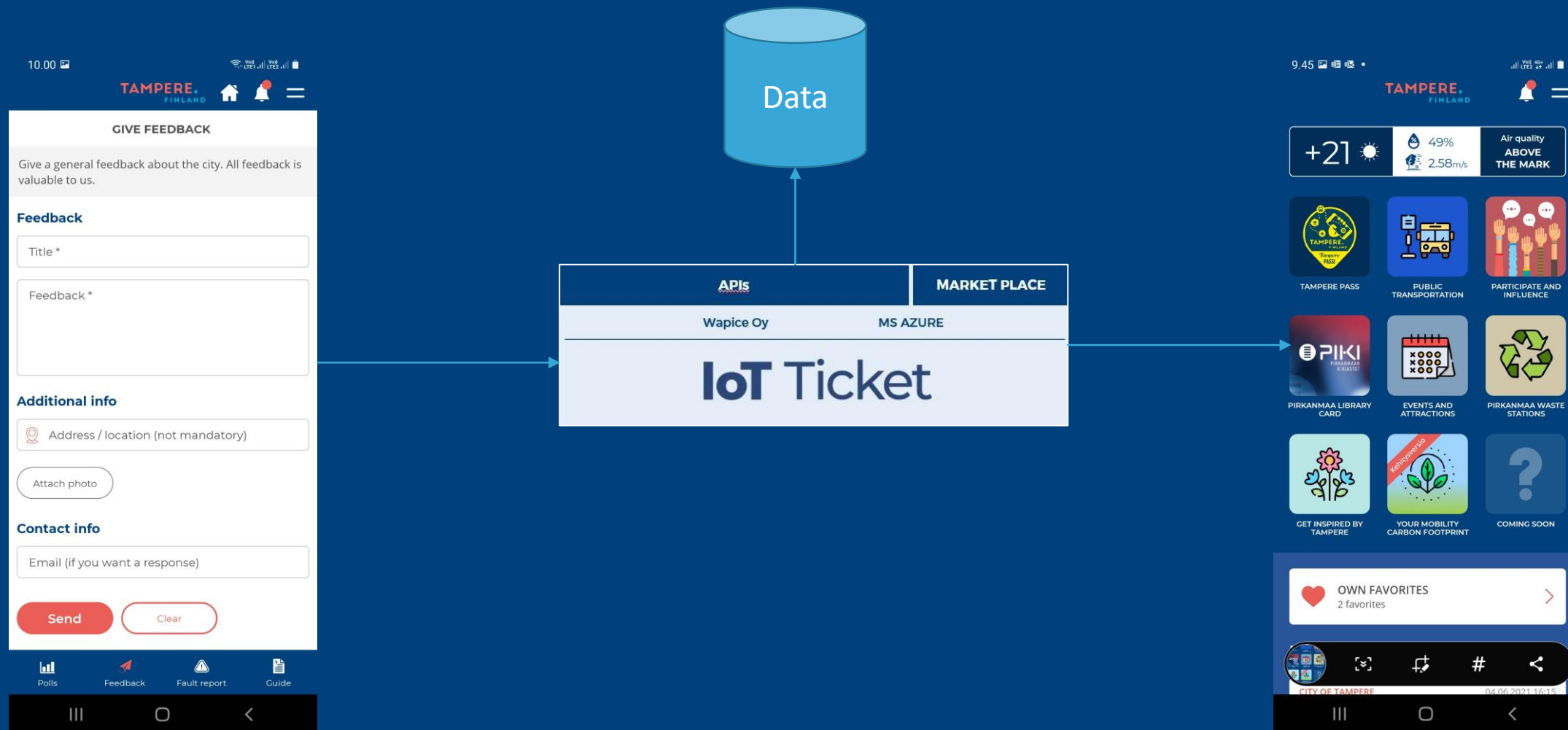
Mobility CO2 calculator

- The application provides a new kind of information about the movement of people, which facilitates the planning of better services.
- Sharing information about the carbon footprint of the mobility and influencing to choose more sustainable way of movement.

Data from mobility CO2 calculator



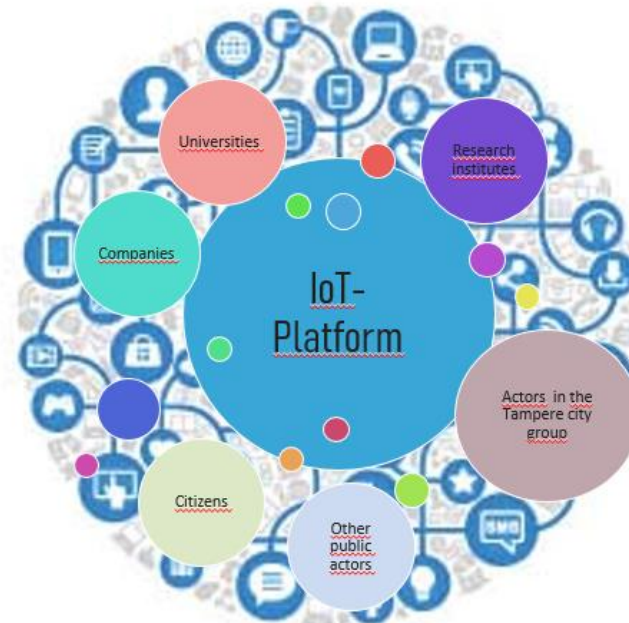
Combining IOT platform with Tampere.Finland



City as an Innovation Platform

With solutions targeting carbon neutrality, the city has and will open up its activities, development projects and challenges to businesses and communities in order to create new business opportunities.

Tampere is a smart user of data and an enabler of data-driven innovation. The entire city serves as an experimentation and development platform for new solutions.



Picture modified – Source Harri Lämsipuro, Tampere University



Transparent Collaboration Towards Carbon Neutral Tampere 2030

TAMPERE.
FINLAND

Citizens
*Engagement
Information
Service*

Business
*Climate
partnership*

Academia
*Strategic
partnership*

City
*Enabler
Platform
Roadmap*

Innovative
procurement

Circular
economy
partnership
model

Common
projects

IoT
platform

Sustainable
entrepreneur-
ship

Tampere
testbed

Ecosystems

Open
data

Climate
hero

Eco-
impact

Climate
budget

Energy
advice

Sustainability
in innovations
and
research

Transparent
communication

Education
co -
operation

Common
projects

Climate
watch

“Tampere will be carbon neutral in 2030. This objective will be achieved in cooperation with the city’s subsidiaries, stakeholders, businesses and residents. The objective of carbon neutrality will be taken into account in all of the city’s operations, procurement and investments. As a city of sustainable growth, Tampere values nature, conserves natural resources and reduces emissions.”

Tampere Strategy 2030

TAMPERE. FINLAND

iot.tampere.fi

Maarit Vehviläinen

Project Manager

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@maaritvehvilai1



TAMPEREEN KAUPUNKI

Interactive Break



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Oulu Smart City Energy Solutions



SAMULI RINNE

**Project Manager
City of Oulu**



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Oulu Smart City Energy Solutions

25.3.2022

Text and pictures:
Project manager, Making-City-project
Samuli Rinne
City of Oulu



**YHDYSKUNTA- JA
YMPÄRISTÖPALVELUT**

OULU



Making-City targets

- **PED = Positive Energy District in Kaukovainio**
 - Real data and model about energy consumption in buildings for assessment
- **Main target: CO₂ neutrality so that**
 - the emissions are not leaked elsewhere
 - it is socially sustainable
 - the cost is moderate
- **Other targets**
 - City Vision 2050 (energy issues)
 - Policy recommendations
 - Replicability assessment
 - Proving the low enough risk for investors (?)



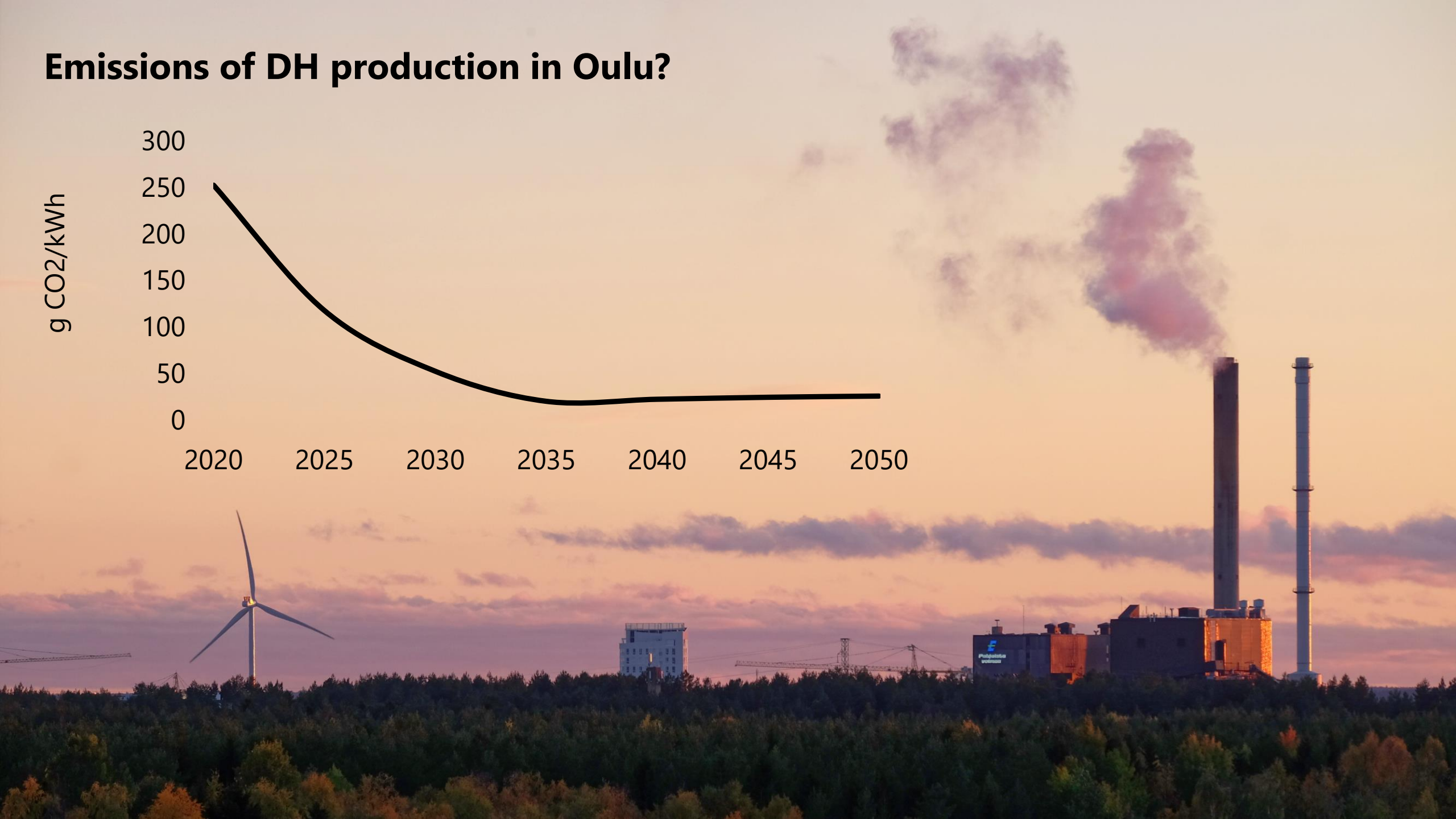
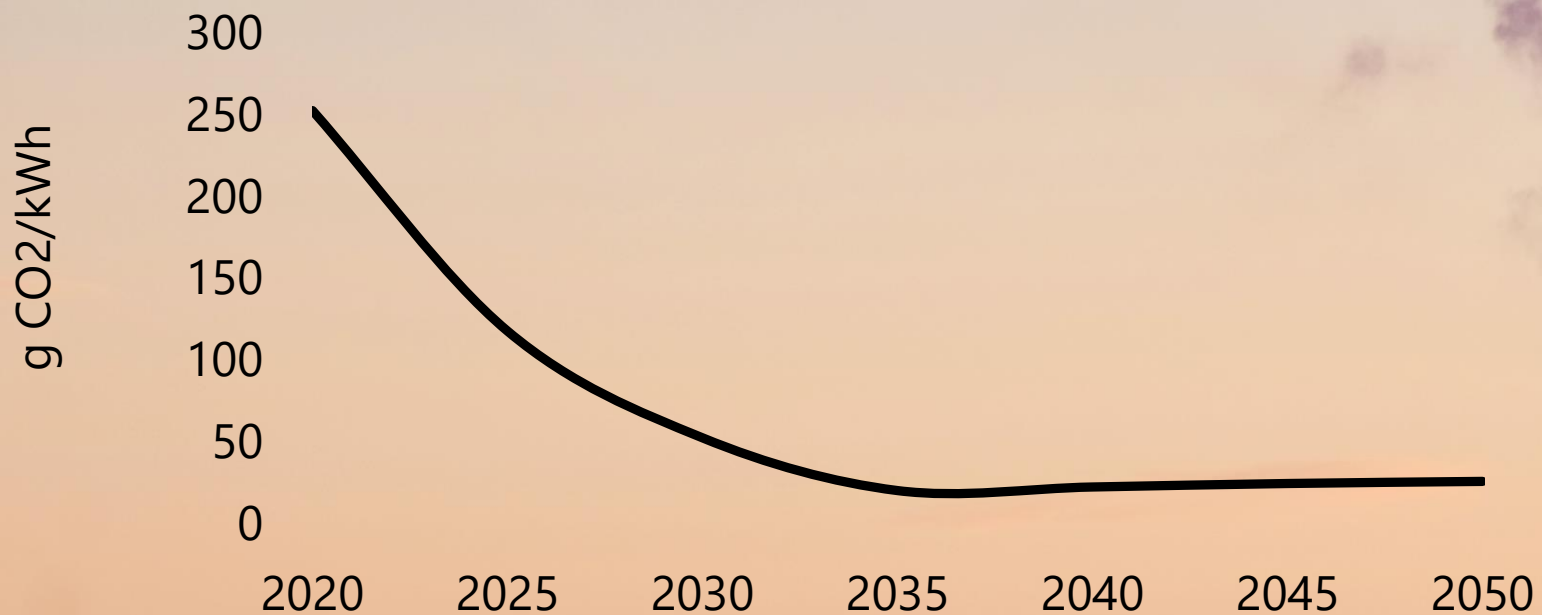
Euroopan unionin
Horisontti 2020 -ohjelman
rahoittama hanke



The MAKING-CITY project received
funding from the H2020 Programme
under grant agreement n°824418.



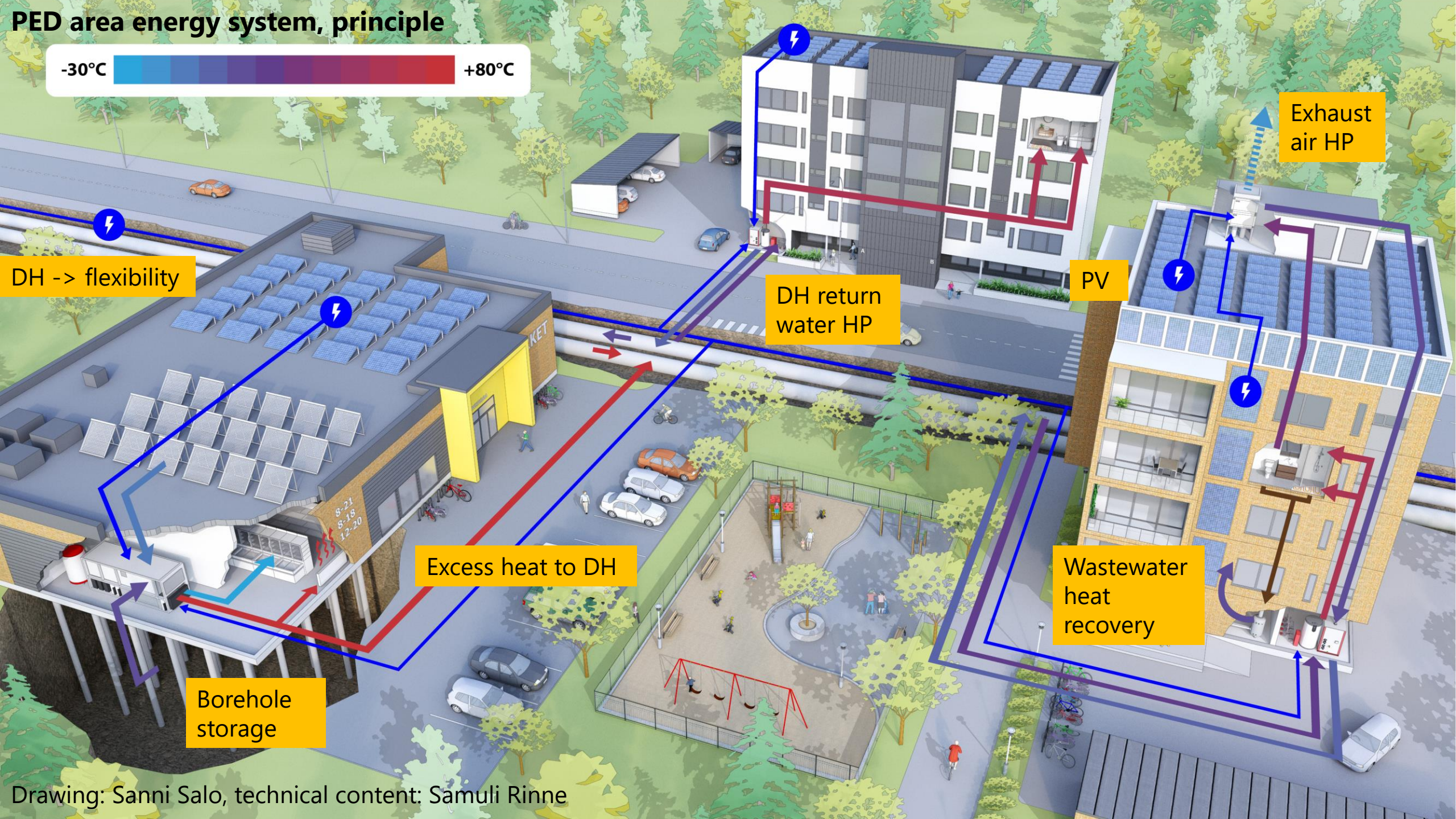
Emissions of DH production in Oulu?



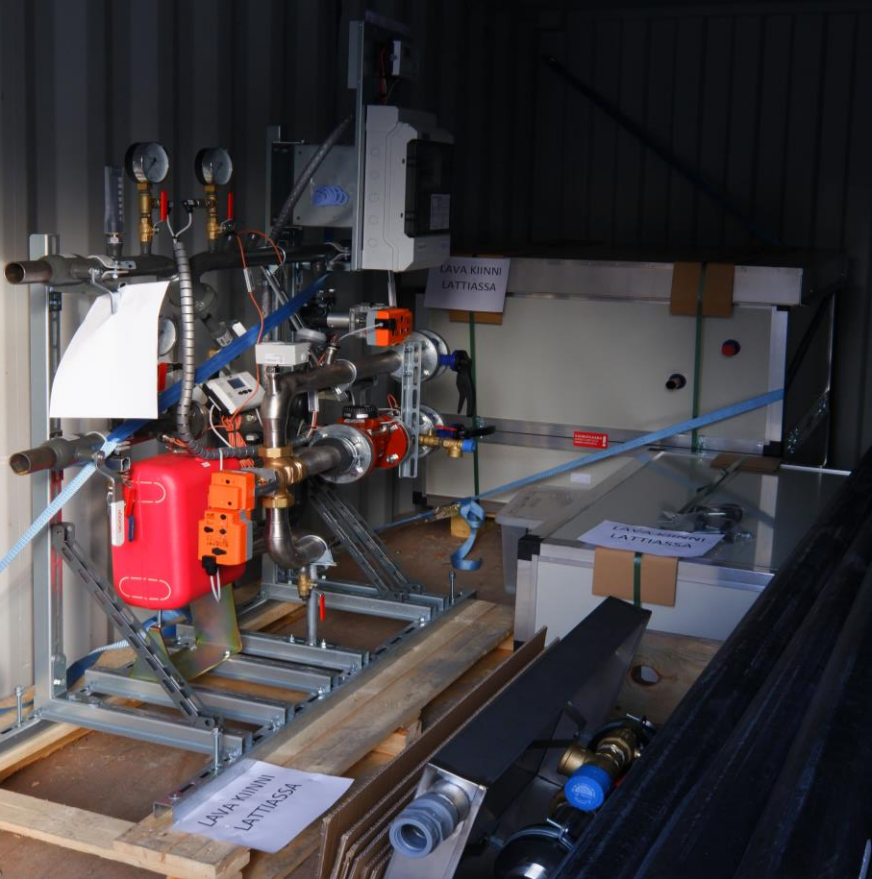
**DH in Oulu
2035-> ?
CO₂ free.**



PED area energy system, principle



Renovated rental house



New rental house

- $U\ 0,14\ \&\ 0,6\ \text{W/m}^2\text{K}$
- HR from exhaust air, DH return water, sewage water
- Pre-heating of air using free heat under building
- Demand-based ventilation control
- Water-saving guide light in taps
- PV 23 kW
- Total cost 2450 e/m²



PV on the roof of the rental house



Grocery store and apartment building

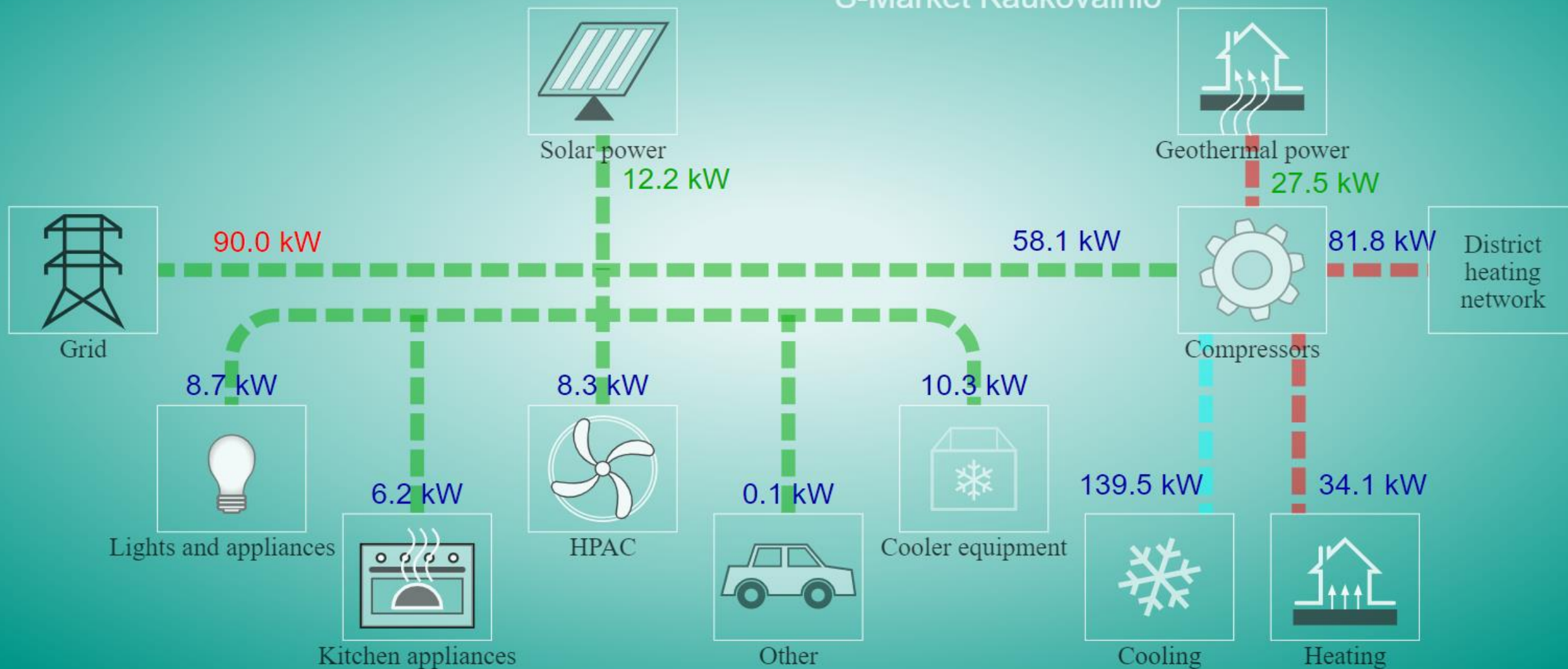


Grocery store energy flows 22.9.2021 9.55

makingcity.vtt.fi/authtest/auth/index.html

← Making City

S-Market Kaukovainio



Energy flows in the grocery store



**SINÄ TUULESTA
TEMPAAT ENERGIAA**

Asiakasmistajana olet yksi Pohjois-Suomen
suurimmista tuulivoiman tuottajista.

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RS - Toimitilat Oy

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Multipurpose building (school, library...)



Technical space after installation of heat pump





Smart
winter
maintenance
in Oulu



A night photograph of a snowy landscape. In the foreground, a small, snow-covered island or peninsula features a lighthouse with a warm, yellow light emanating from its top. Several bare trees stand on the island. In the background, across a body of water, a distant shoreline is visible with several tall, thin towers topped with red lights, and a line of smaller, yellow lights along the coast. The sky is a deep, dark blue.

A survey made in Oulu: energy and environment attitudes

- Relative importance: price 2, security of supply 1, environment 1
- 95% interested in environmental impact
- Openness asked for

Lessons learned

- **Solutions work well when adjusted properly and tailored in place**
- **Long sight is essential**
- **Everyday actions and wishes must be heard**
- **Maintaining price, functionability and telling about these -> acceptance**

Co-creating smart and climate-neutral positive-energy district (PED) – case Kera



ELINA WANNE

**Development Manager
City of Espoo**



 **Hitachi Energy**

ABB

Danfoss

 **Energiateollisuus**

 **VAAKAN
SÄHKÖ**



VED

 **WESTENERGY**

GAMBIT

 **Wapice**

VAMK
VAAKAN AMMATTI-
TUTKIJAKOULU
UNIVERSITY OF APPLIED SCIENCES

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Sustainable energy Positive & zero cARbon Communities

Co-creating smart and climate-neutral positive-energy district (PED) – case Kera

Project Manager Elina Wanne
Centre of Excellence for Sustainable Development
City of Espoo



Horizon 2020
European Union funding
for Research & Innovation

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 864242
Topic: LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities



Together towards a sustainable city

- Espoo aims to achieve the UN Agenda 2030 sustainable development goals by 2025 and carbon neutrality by 2030
- The working method is based on partnerships and collaboration for achieving goals - also in Kera
- The challenges of cities will be solved together - the new role of the city and neighbourhoods as a platform and enabler

Espoo city strategy

Sustainable Espoo programme

The most sustainable city in Europe

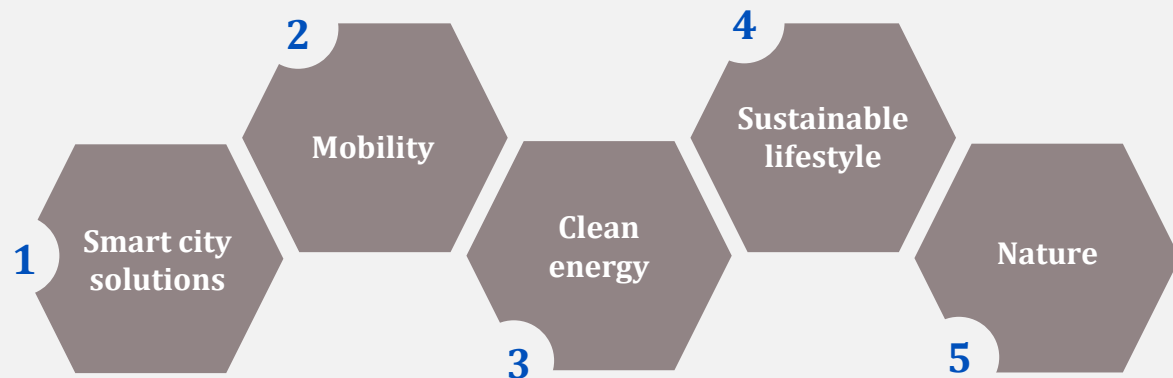
SDG City 2025

Carbon neutral 2030

Smart city

Climate action

Circular economy



Together...

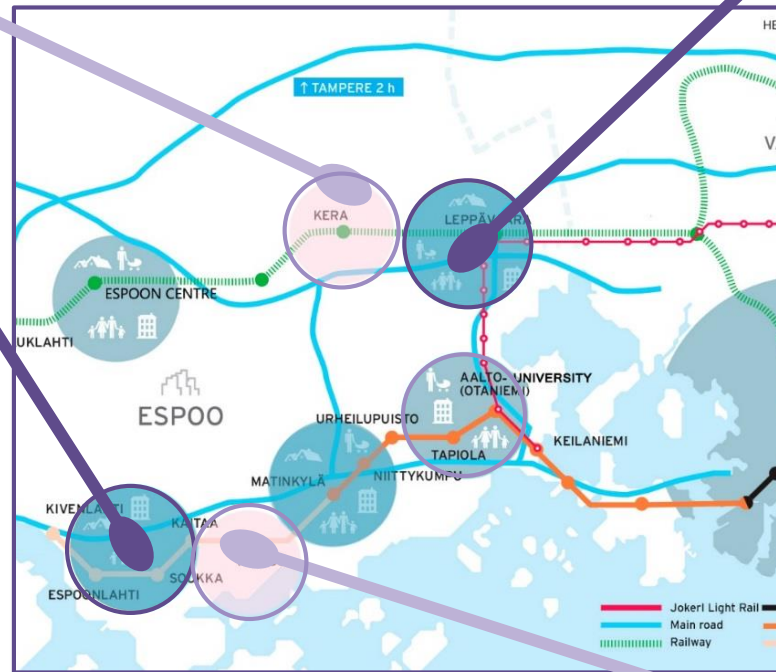
With residents, companies, research and education institutes, ngo's locally and globally

Demonstration areas

Kera / Leppävaara district
District planning demo area
 City Development
 Smart Technologies
 Co-creation
 Mobility solutions

Espoonlahti district:
Lippulaiva blocks

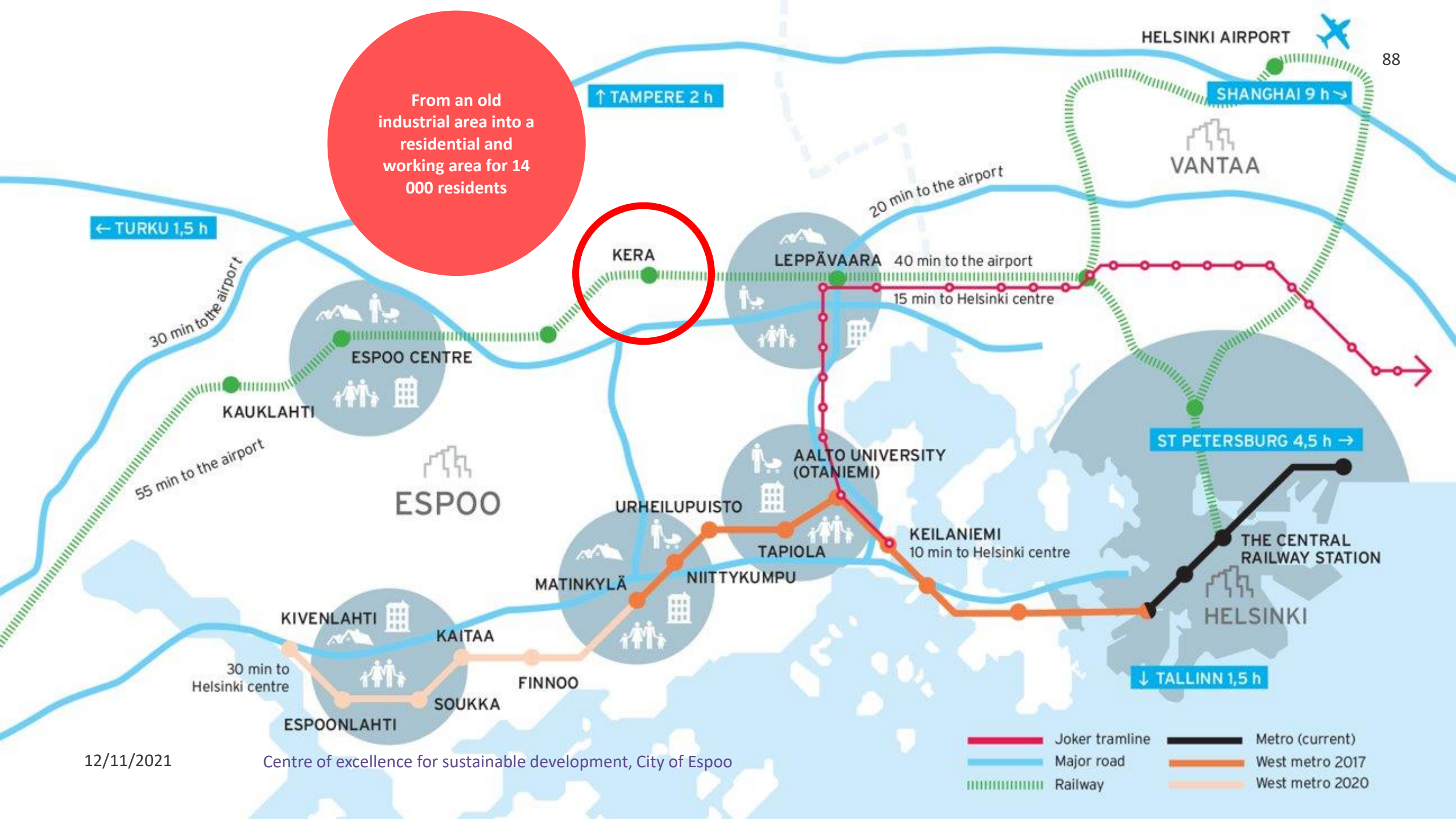
- RES
- Energy Storage
- Citizen engagement
- Multi-modal transport



Leppävaara
District:
Leppävaara Centre

- RES
- Energy Storage
- Smart Technologies
- E-mobility

Finnoo area
 Replication



An aerial photograph of a modern urban development. The scene is dominated by numerous white, rectangular buildings of varying heights, arranged in a grid-like pattern. These buildings are interspersed with lush green trees and grassy areas. A network of roads and pathways is visible, weaving through the urban landscape. The overall impression is one of a planned, sustainable community.

“The developing area of Kera will be an international example of a digital urban platform for circular economy, implemented in collaboration with the Smart & Clean foundation, Nokia and several other collaborators.”

**The Espoo
story**



**Kera now and in the
future – tools for
urban development?**



**The city plans districts,
makes land use
agreements, issues
building permits and
implements its own
infrastructure and
construction projects...**



**...but is also home, a
platform and a partner for
action, experimentation,
solutions, ideas, doing
things together and
common goals.**



Horizon 2020
European Union funding
for Research & Innovation

This project has received funding
from the European Union under the
Smart Cities and Communities

...under Grant Agreement No. 864242 Topic: LC-SC3-SCC-1-2018-2019-2020:

Kera development commitment

Challenge:

Turning an old industrial area into a sustainable circular neighbourhood

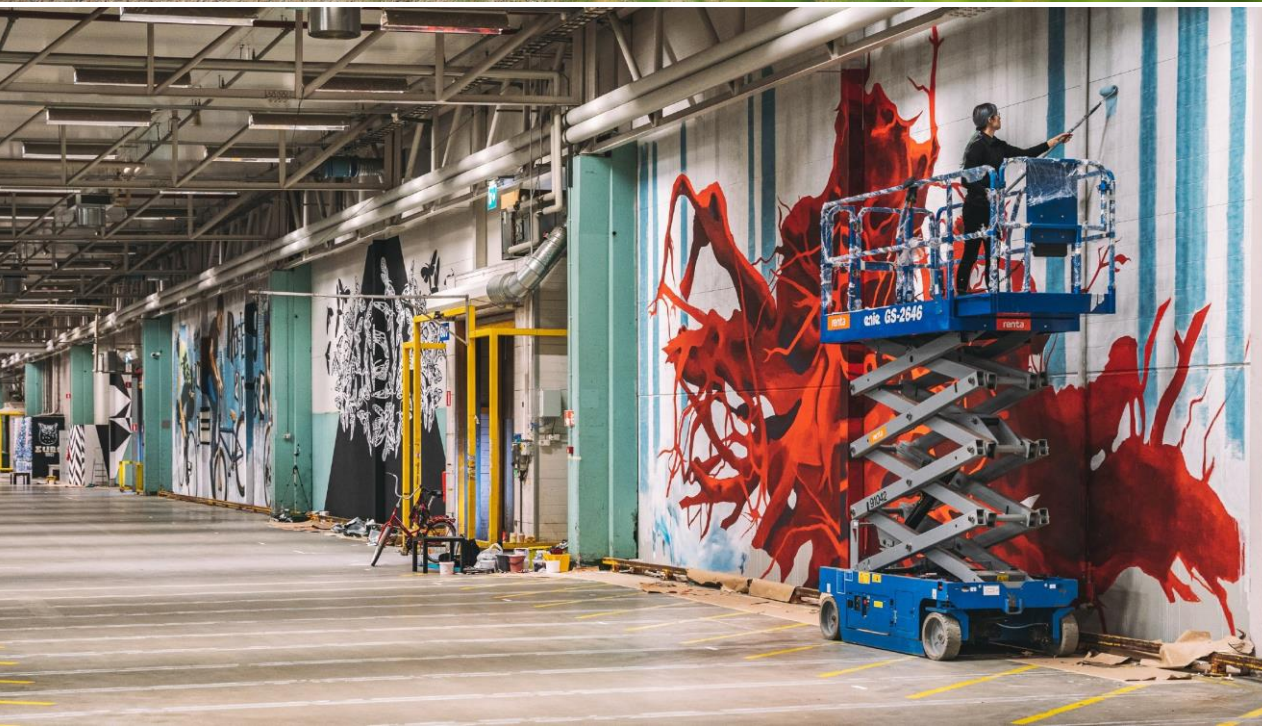
Gathering essential operators around the same table

Creating common goals and concrete steps to reach them

Committing together

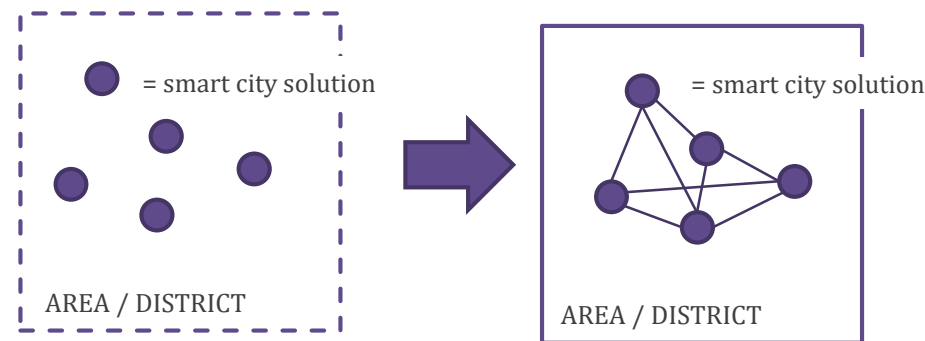
1. Close cooperation
2. Carbon neutrality by 2030
3. Significant circular economy solutions
4. Kera as a national and international reference site

12/11/2021

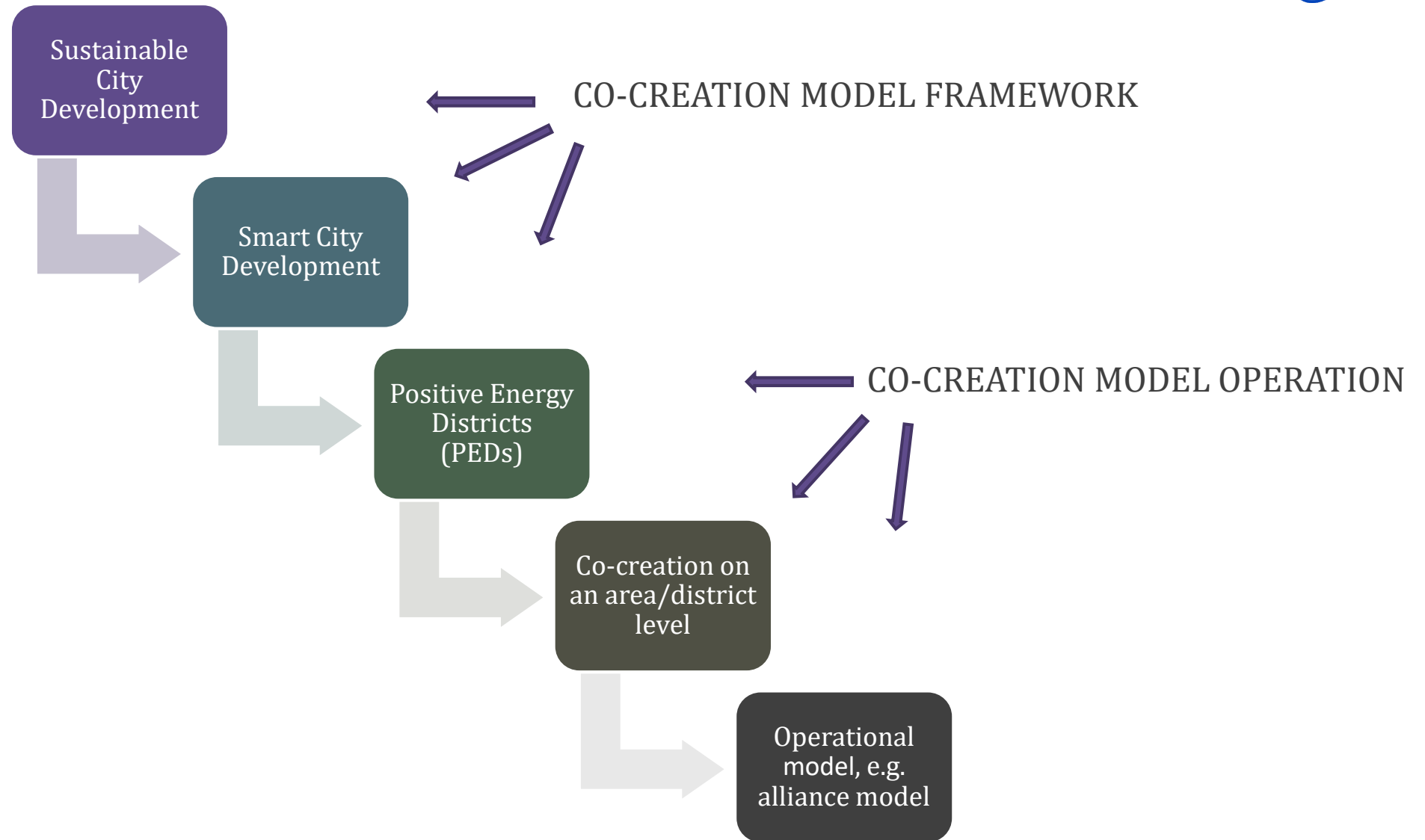


Aim

- ▶ How can we develop (new) urban districts as sustainable smart city areas together with different stakeholders?
 - ▶ Holistic integration of smart city solutions (not as separate solutions)



- ▶ Clarify district planning process and the possibilities for participation in the process
- ▶ Main themes: energy, mobility, land use



Co-creation process

- ▶ Co-creation with different stakeholders
 - ▶ SPARCS partners, organizations, citizens, city departments, companies, land owners
- ▶ Modes of working
 - ▶ Workshops (design sprints)
- ▶ Timeline: 11/2021-12/2022
 - ▶ Parts 1 & 2



Organisation & Participation



Project
steering group



Sprarring
group



Morning
coffee talks



Design Sprints



DS Result
coffee talks



Miro board as
working tool



Questionnaires
after the DS



Co-creation
internet page



Participation of
residents

Part 1: Creating the co-creation model for Kera

- ▶ Kera demo area as a case example
 - ▶ Preparation of the model framework
 - ▶ Benchmarking
 - ▶ Examination of previous Kera development processes
 - ▶ Co-creating the model for Kera with different stakeholders

- ▶ Timeline: 12/2021-06/2022



Part 2: Generalizing the model (Espoo and beyond)

- ▶ Expanding the model created for Kera for use in any (new) urban district development in Espoo
 - ▶ Different area typologies identified and examined
 - ▶ Generalizing the model together with stakeholders
 - ▶ Creation and launch of the model toolbox
- ▶ Timeline: 06-12/2022



<https://www.sparcs.info/>

  @SPARCSeu

VTT



Stadt Leipzig



CÂMARA MUNICIPAL DA MAIA



KLADNO



ΔΗΜΟΣ ΚΗΦΙΣΙΑΣ



ESPOO

KONE

SIEMENS



PLUGIT

CITYCON

ril

ADVEN

Fraunhofer

BABLE



Wohnen & Service Leipzig GmbH

**Leipziger
Stadtwerke**

CENERO

**seecon
Ingenieure**



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Energy



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We Deliver Intelligence



verd



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Thank you!

More information on SPARCS: <https://www.sparcs.info/>

Web site for co-creation model under coinstruction <https://co-creatingsparcs.fi/>

Vaasa Smart City Solutions



MIKA HAKOSALO

**Energy and Climate Specialist
City of Vaasa**



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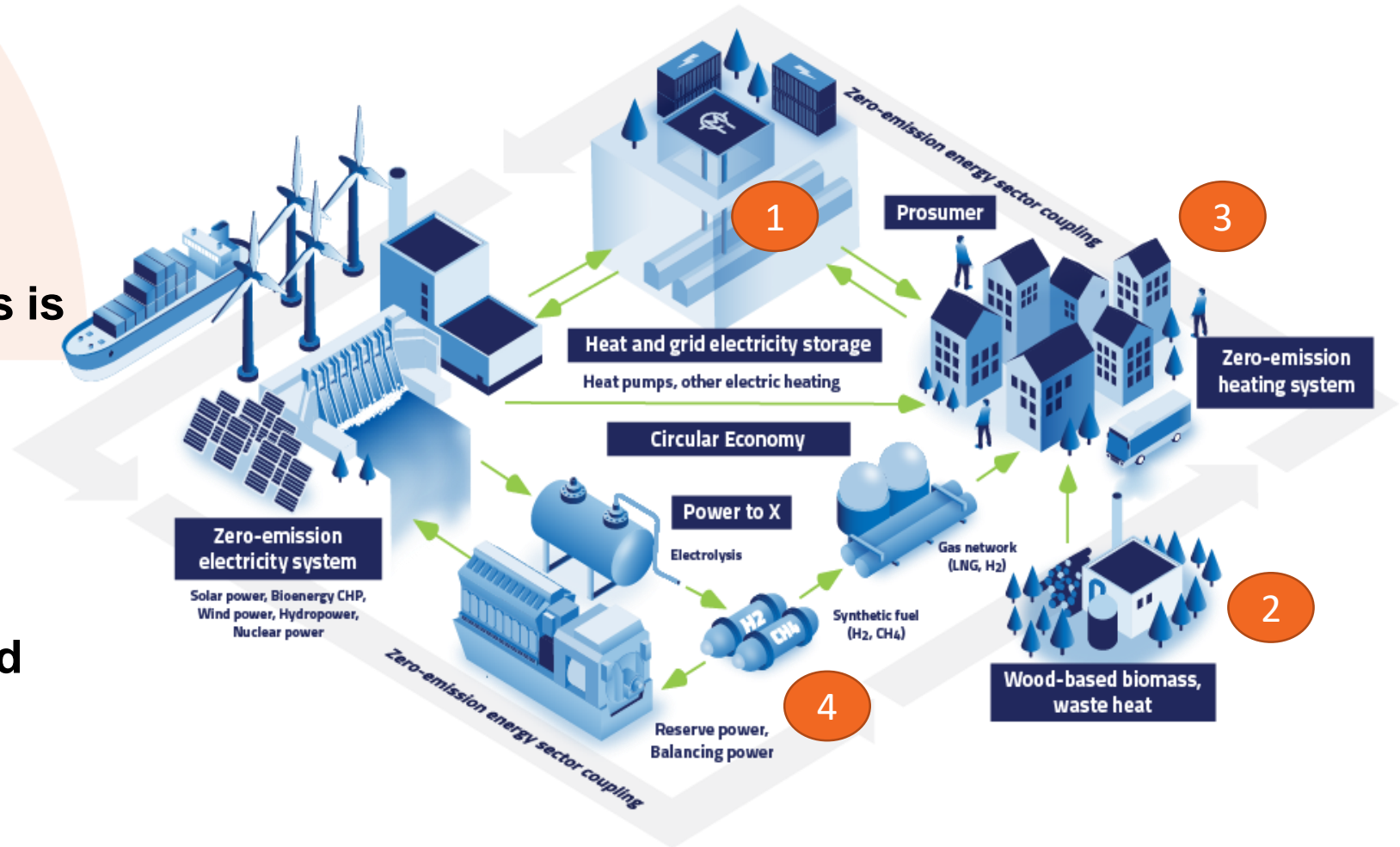
IRIS
smart cities

Positive Energy Districts as Innovation Ecosystems: Connections – Competence – Capital



Carbon Neutral Vaasa 202X – Innovation Ecosystem

- Vaasa is looking at carbon neutrality from an energy system perspective.
- Piloting innovative solutions is a way to build connections, competence and capital.
- The up-scaling of piloted innovations is done by world leading companies in the EnergyVaasa cluster.

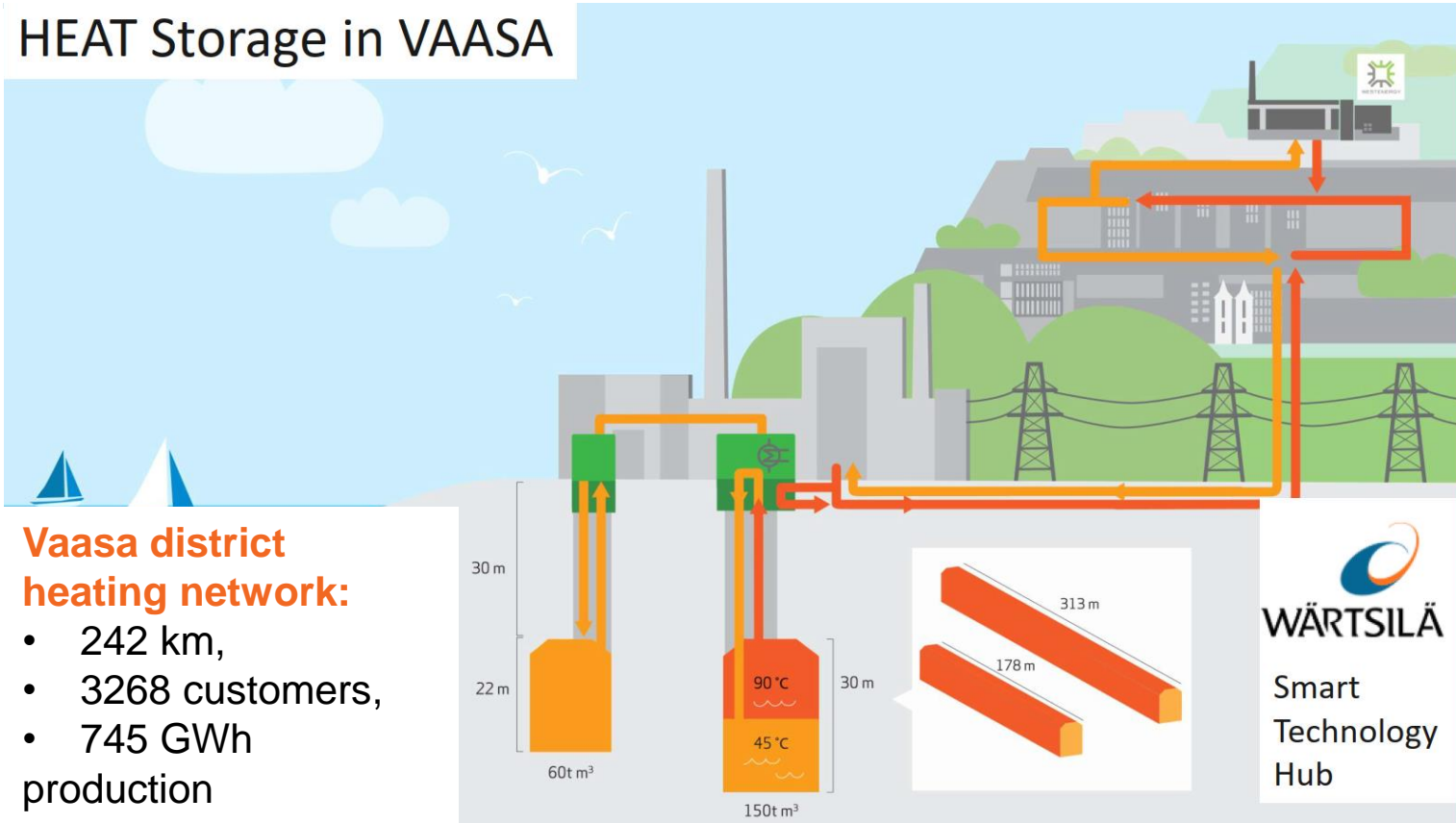


Symbiotic Waste heat Networks (TT#1) combined with smart multisourced low temperature district heating and innovative storage (TT#2)

VASKILUOTO

- District heating network – target to achieve carbon neutrality in heat production by 2025.
- Old fuel underground storage was prepared as heat storage.
- Use of waste heat from WestEnergy, Smart Technology Hub and other sources.
- Vaasan Sähkö (Energy company) implemented the storage in fall 2020.
- 10% reduction in emissions in first winter.
- **Study case:** Gothenburg, Utrecht

HEAT Storage in VAASA



Implementing Projects with National Funding

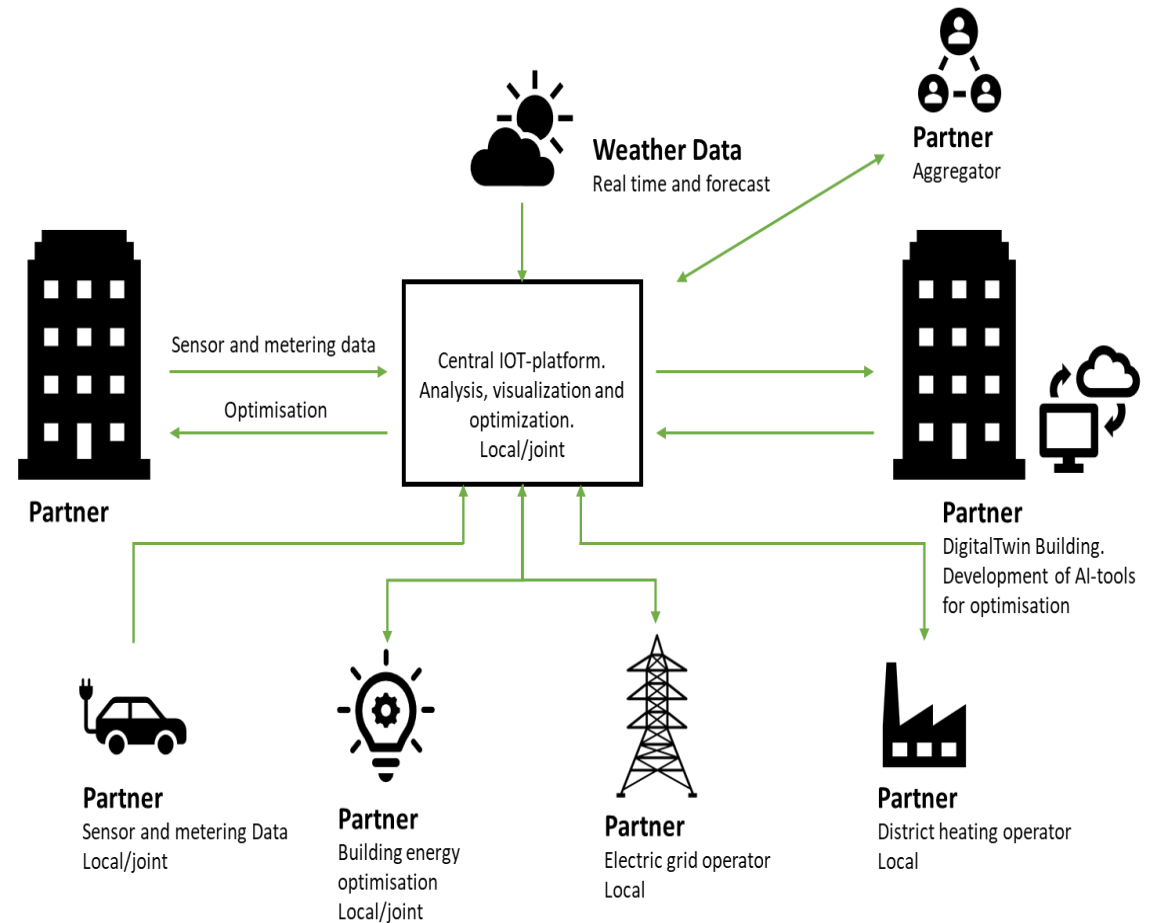
- Vaasan Sähkö is implementing several projects, funded by Ministry of Affairs, which can use the heat storage and make the energy production carbon neutral by 2025:
 - Pätt waste water treatment plant: 8 MW heat pump installation to recover waste heat into the heat storage. Replace 49 GWh coal/a.
 - Wärtsilä Smart Technology Hub: 3 MW heat pump installation to recover waste heat into the heat storage. Replace 18 GWh coal/a.
 - Bio-CHP –plant: The plant can produce 85 MW heat and 23 MW electricity from biomass. This will replace 806 GWh coal/a.



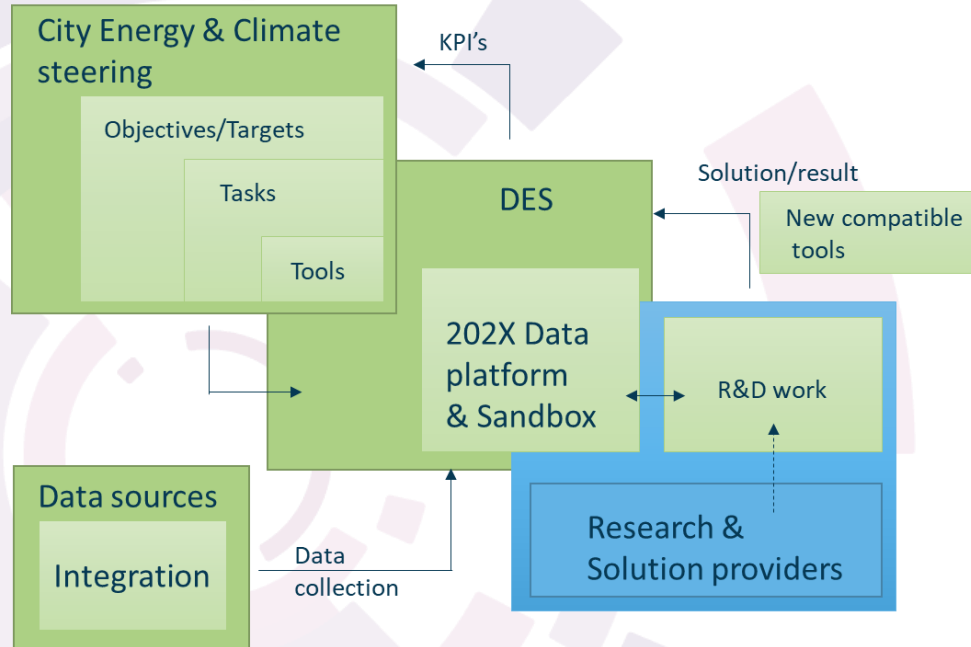
A City Innovation Platform (TT#4) for Energy optimisation (TT#2) and smart vehicle charging (TT#3)

The City Innovation Platform for Energy optimization and smart vehicle charging will be developed with city, corporate and national funding:

- First building pilots will start in 2022 with corporate funding (Vaasan Sähkö).
- City and national funding will be used to develop a central IOT-platform which can be used by different buildings owners for energy optimization and smart vehicle charging.
- Savings from energy optimization can be re-invested in the development of the city innovation platform.
- **Study case:** Gothenburg, Utrecht, Nice

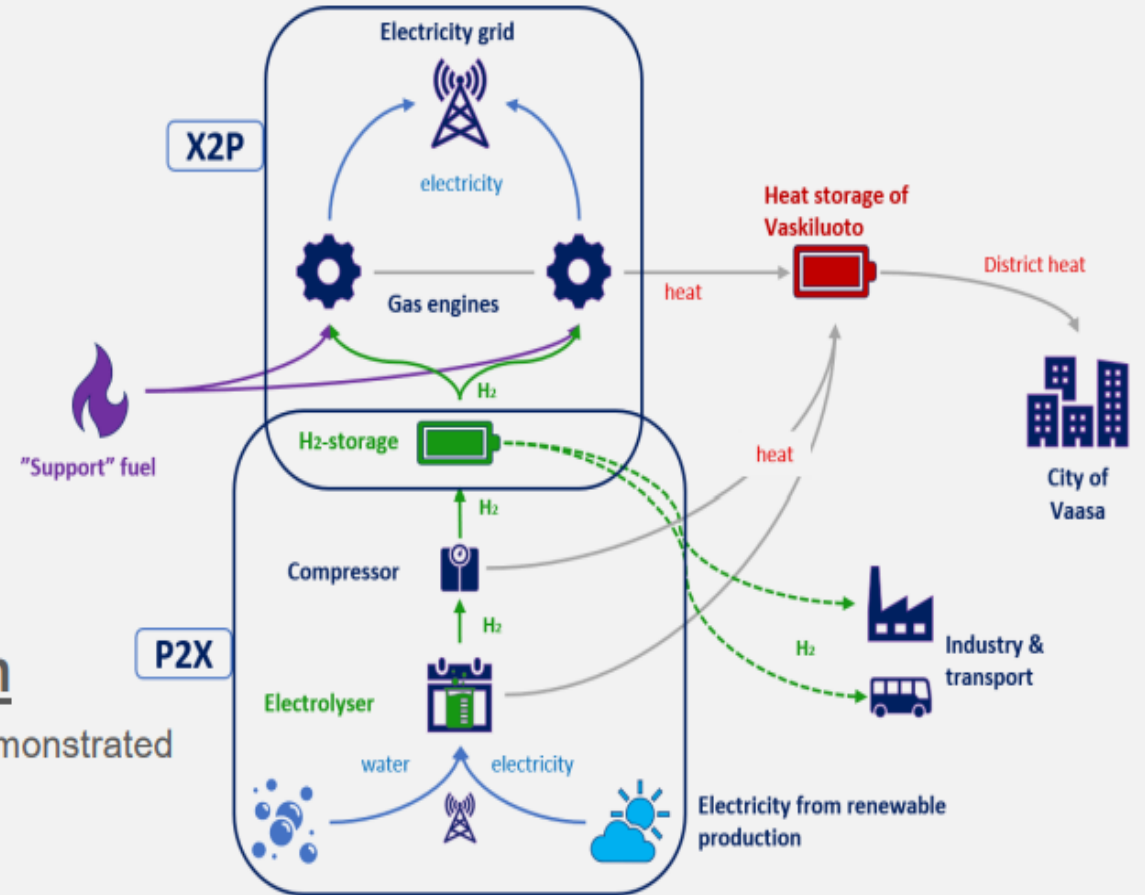


Energy Data Platform and Collaboration for R&D



Piloting New Circular Economy Concepts with national funding

- Renewable electricity
- Water cleaning (distillate)
- Electrolysis when electricity price is Low
 - Store excess heat and O_2^*
- Compressing H_2
 - Store excess heat
- Novel high pressure H_2 storage
- Reconverting H_2 to electricity when price is High
 - 24 MW plant in which the Hydrogen engine concept will be demonstrated
 - 25% vol. H_2 in 2023 + 75% vol. Biomethane/LNG
 - Aiming at 100% vol. H_2 in 2029
 - Store excess heat





THANK YOU

Mika Hakosalo, Energy and Climate Expert, Vaasa

mika.hakosalo@vaasa.fi



Free WiFi: Vasa Guest
User: energy22
Password: energy22

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