

Smart Otaniemi Innovation ecosystem – energy solutions for better world

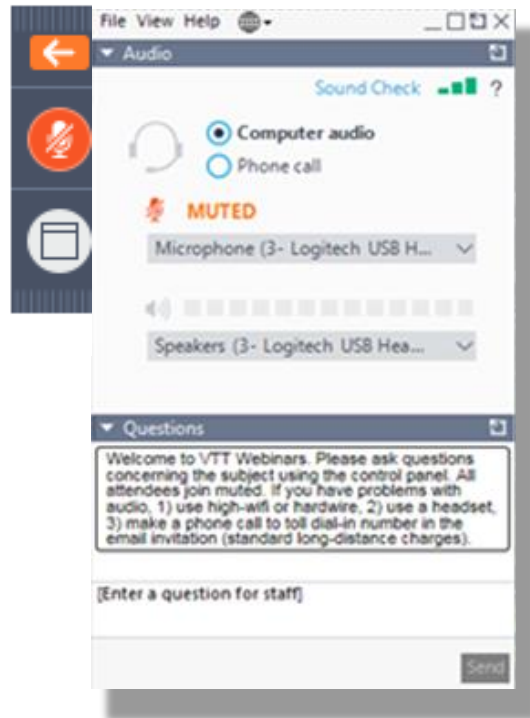
#smartotaniemi
www.smartotaniemi.fi



Smart Otaniemi- webinar hosted by VTT



Practicalities of the webinar



All attendees join muted

Please ask questions via the control panel

- Moderator will address the questions to presenters in Q&A

Having problems with audio?

- Please use high-wifi or hardwire
- Please use a headset to optimise
- Make a phone call: Toll dial-in numbers in the invitation (standard long-distance charges)

Presentation material and handouts

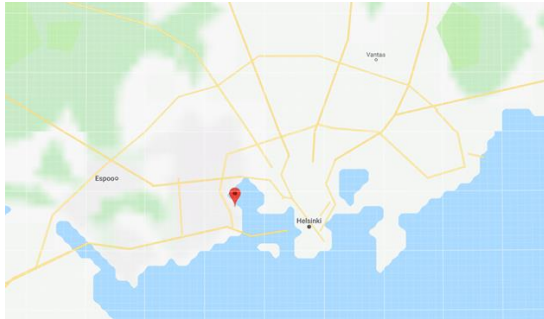
- A follow-up email will be sent with presentation material included

Contents



1	Intro - Antti Ruuska
2	Smart Otaniemi, Nokia viewpoint - Jarno Halme - Poll question
3	Smart EV charging - Marko Paakkinen - Poll questions
4	Wrap up and conclusions - Antti Ruuska
5	Q&A

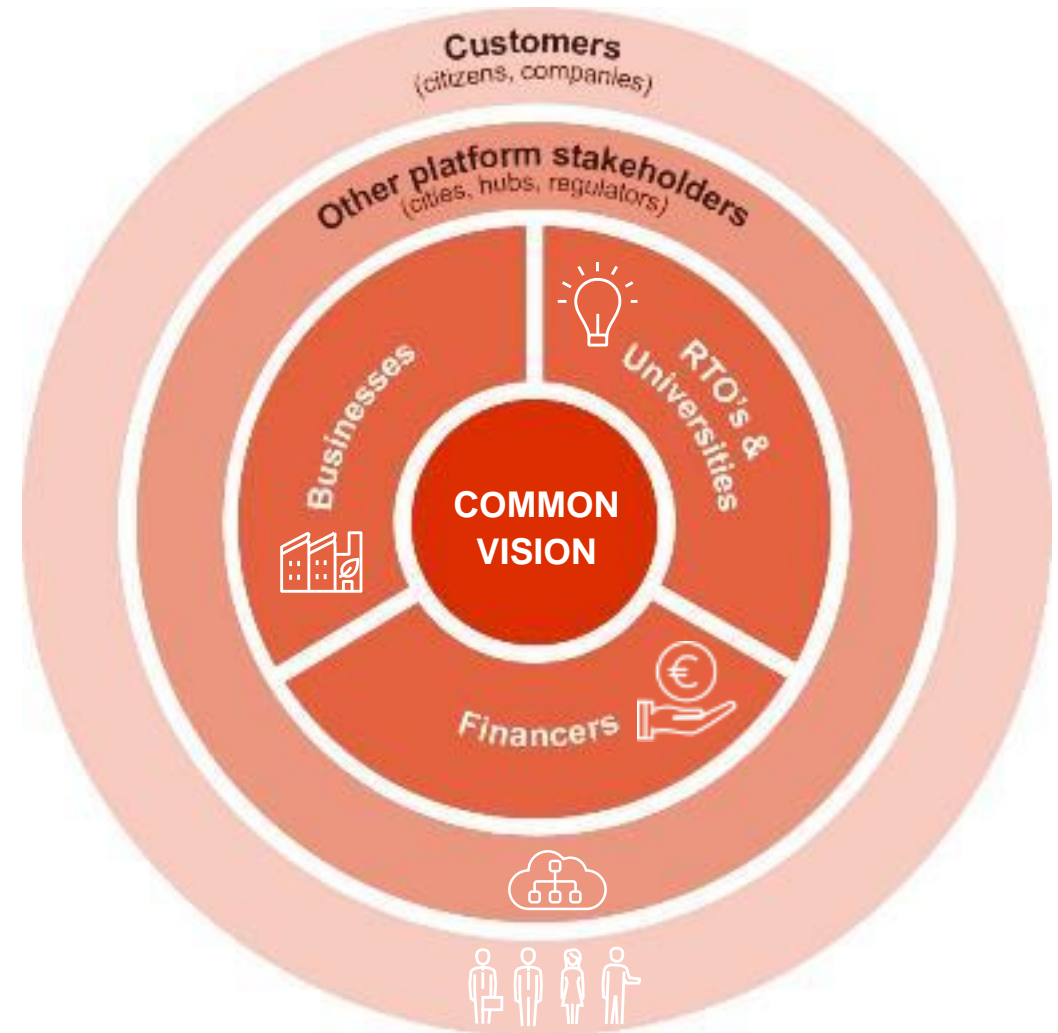
Where are we today?



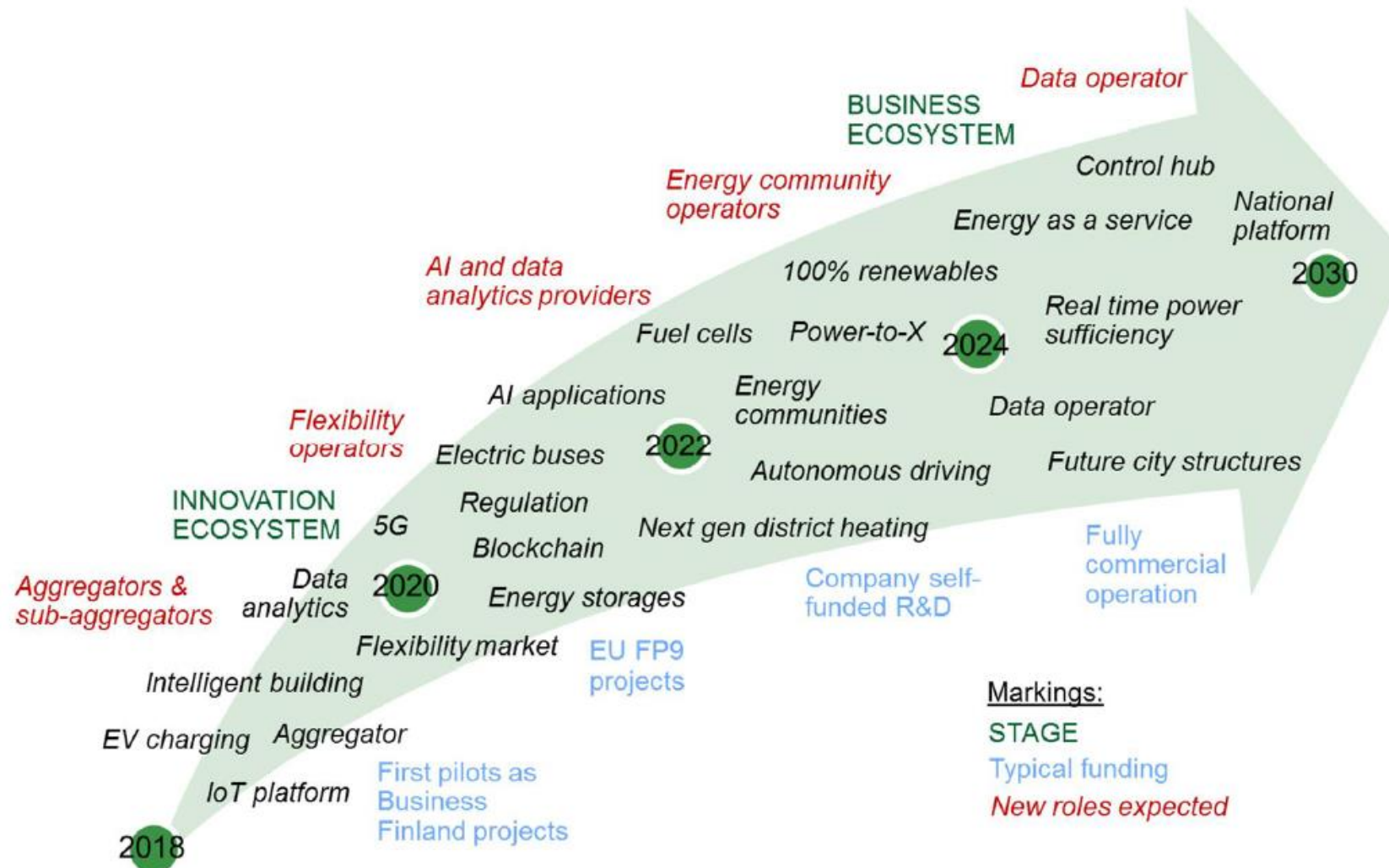
What is an innovation ecosystem?

A partnership of complimentary players who share the same vision and are willing to contribute to joint actions in order to achieve the individual and joint goals.

Innovation ecosystems are necessary, because challenges and solutions are so **complex and systemic** that no actor has the capacity nor the capability to create successful business applications alone in the needed time frame.



What is the common vision?



What do businesses get from innovation ecosystems?



R&D efficiency

Faster time - to - market.
Radical innovation with diverse ecosystem.
Efficient resource use and access to infrastructure.
Shared risk and courage to take more risks.



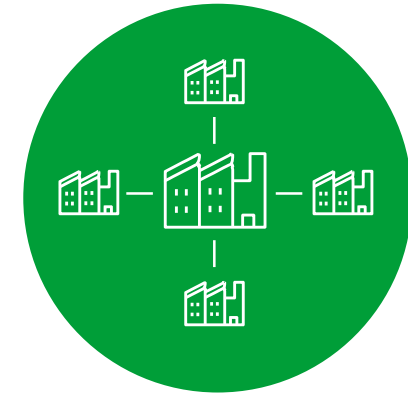
New revenues

The company creates new revenue streams (with new business models and radical innovation) that increase growth & profitability.



Momentum

The agile culture and “attitude” within the innovation ecosystem impacts positively the company’s momentum. Skill exchange within the ecosystem works as a talent magnet.



Attractiveness increase

Partnering and co-branding with the good reputation key companies within the innovation ecosystem increases the profile, position and brand value of a company in the market. Reversed, the large key companies also benefit from being involved with the agile start-ups and other innovators.

Why to focus on pilots?

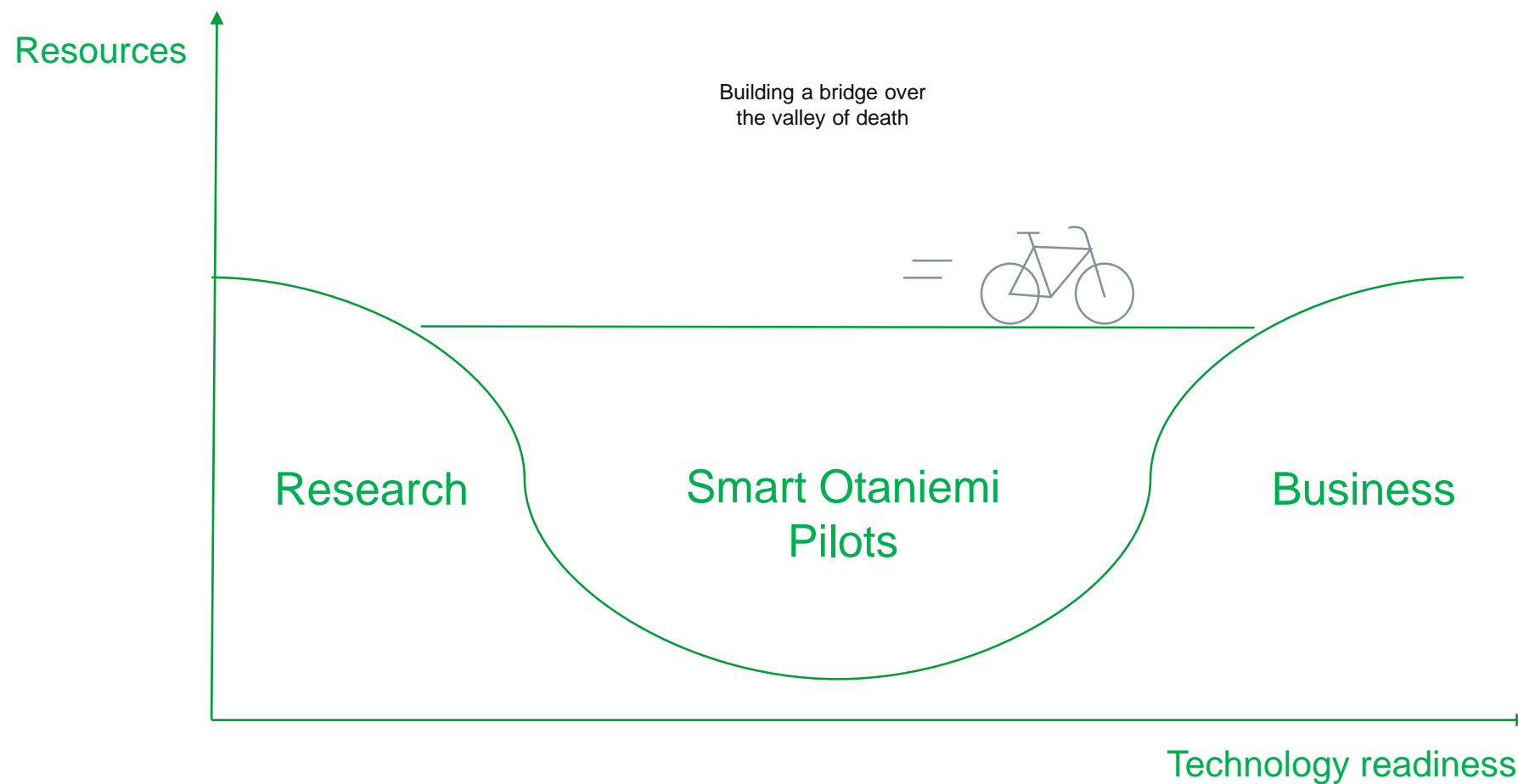


Figure: Antti Ruuska 2019,
inspired by: "What is an
Innovation Ecosystem?"
Deborah J. Jackson
National Science Foundation,
Arlington

What is piloted in Smart Otaniemi?



Introduction

PRESENTERS



Jarno Halme
Head of Data Strategy,
Nokia Mobile Networks



Marko Paakkinen
Senior Scientist, VTT

Contents



1	Intro - Antti Ruuska
2	Smart Otaniemi, Nokia viewpoint - Jarno Halme - Poll question
3	Smart EV charging - Marko Paakkinen - Poll question
4	Wrap up and conclusions - Antti Ruuska
5	Q&A

Smart Otaniemi

Nokia

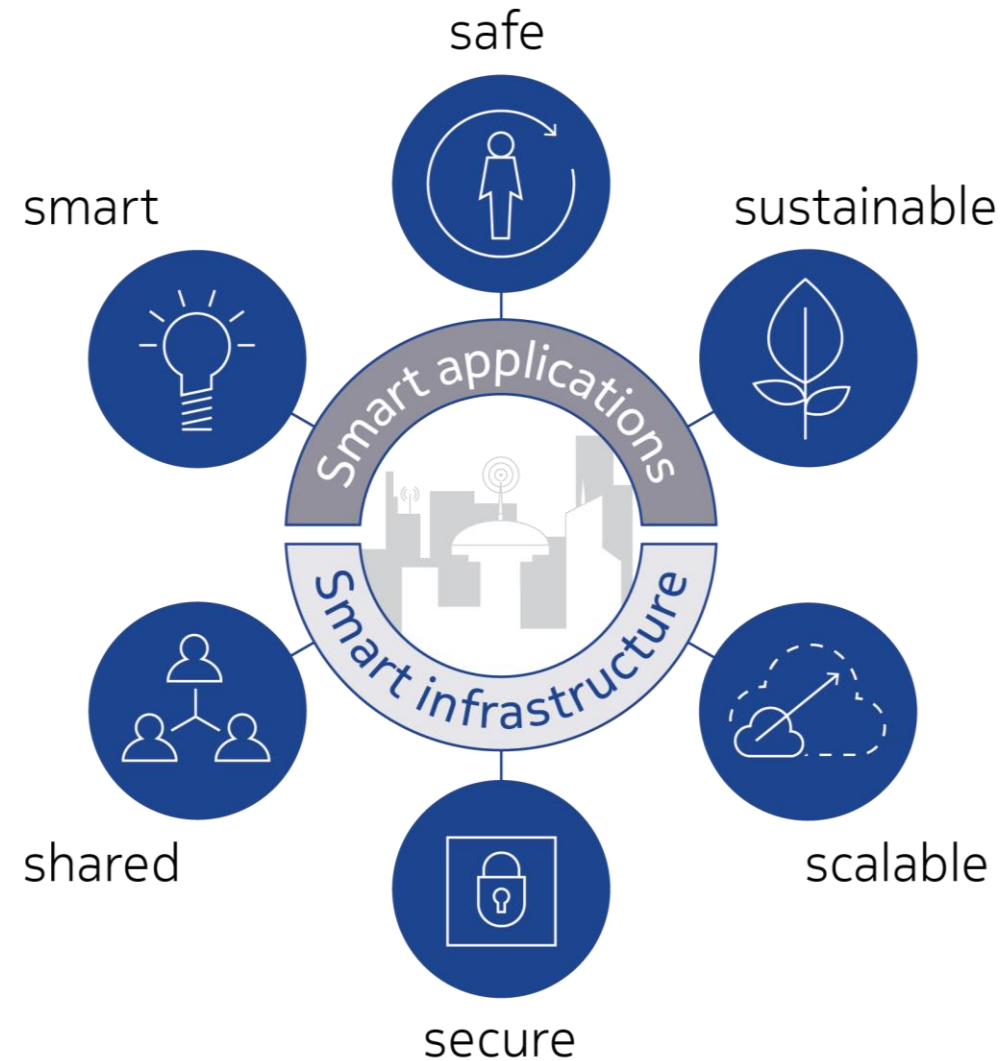
Jarno Halme

17.01.2019



Creating smart, safe and sustainable world

Advanced technology that ensures the best use of assets and data is what creates **smart**, **safe** and **sustainable** environments.

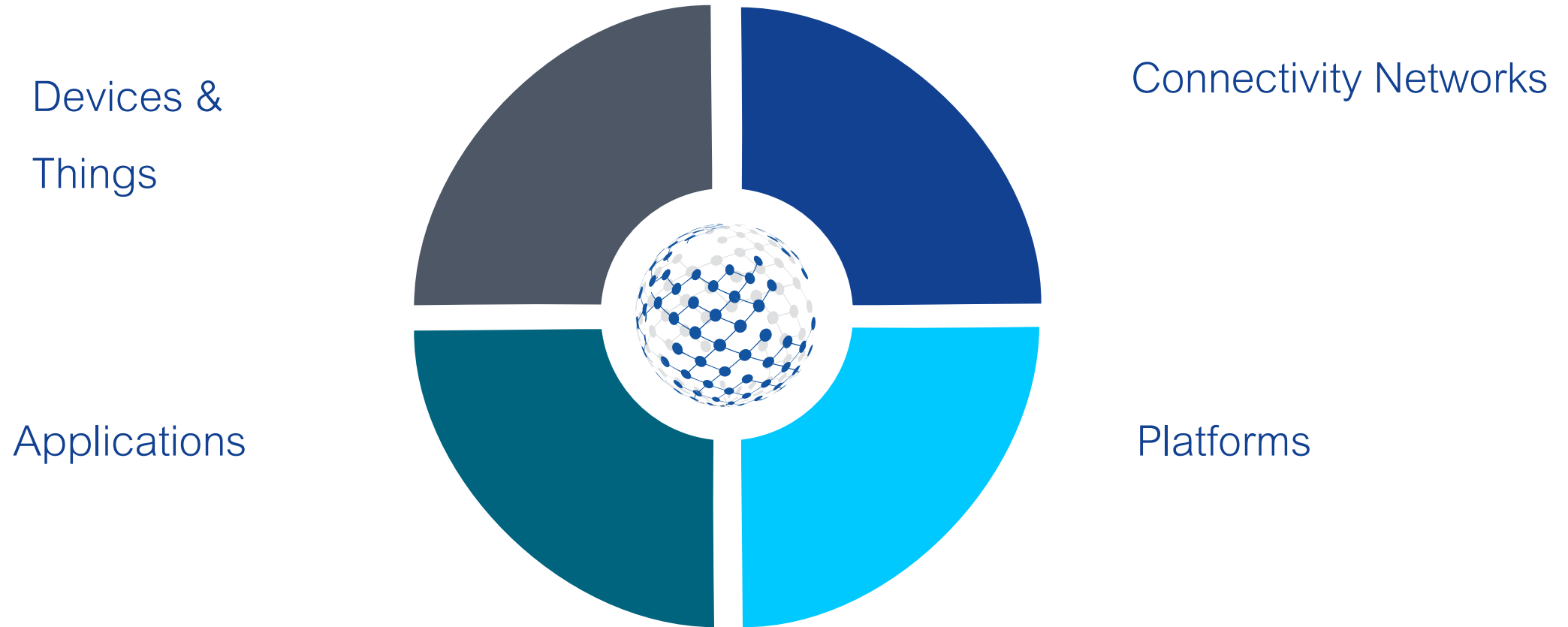


This requires a **shareable**, **secure** and **scalable** infrastructure that combines everything from the network to the devices and applications.

Network as a Service

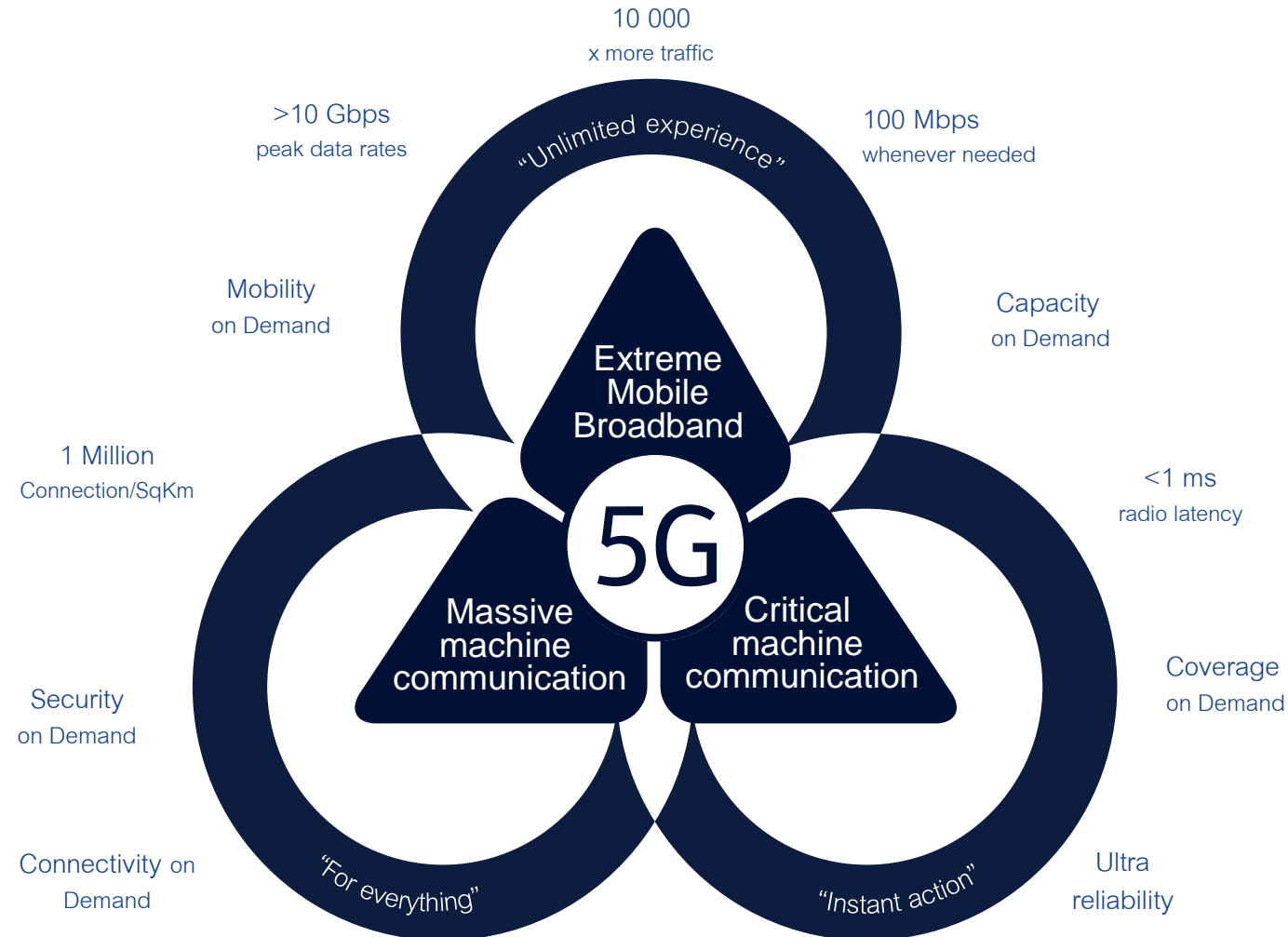


Smart Solution basic building blocks

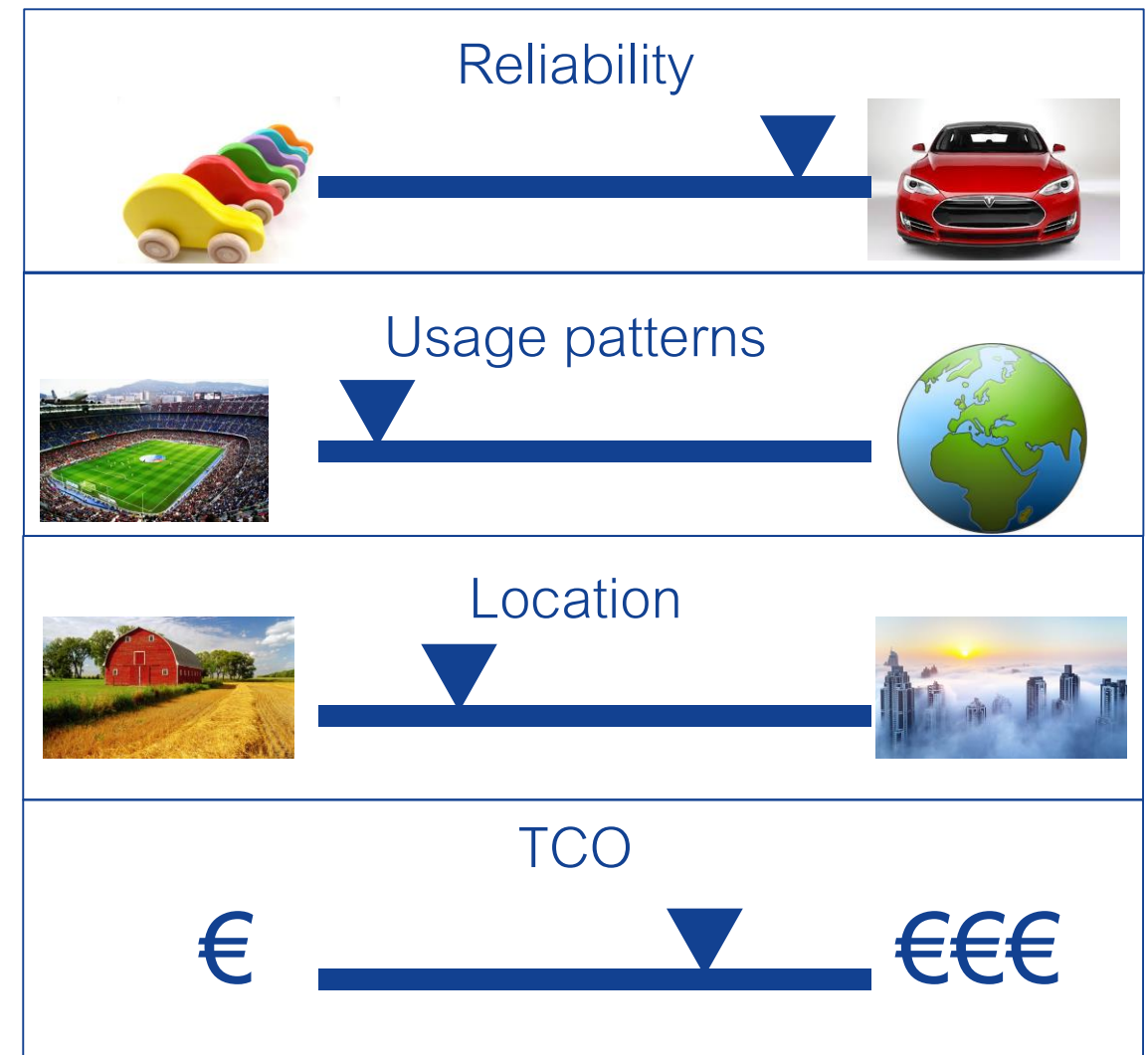
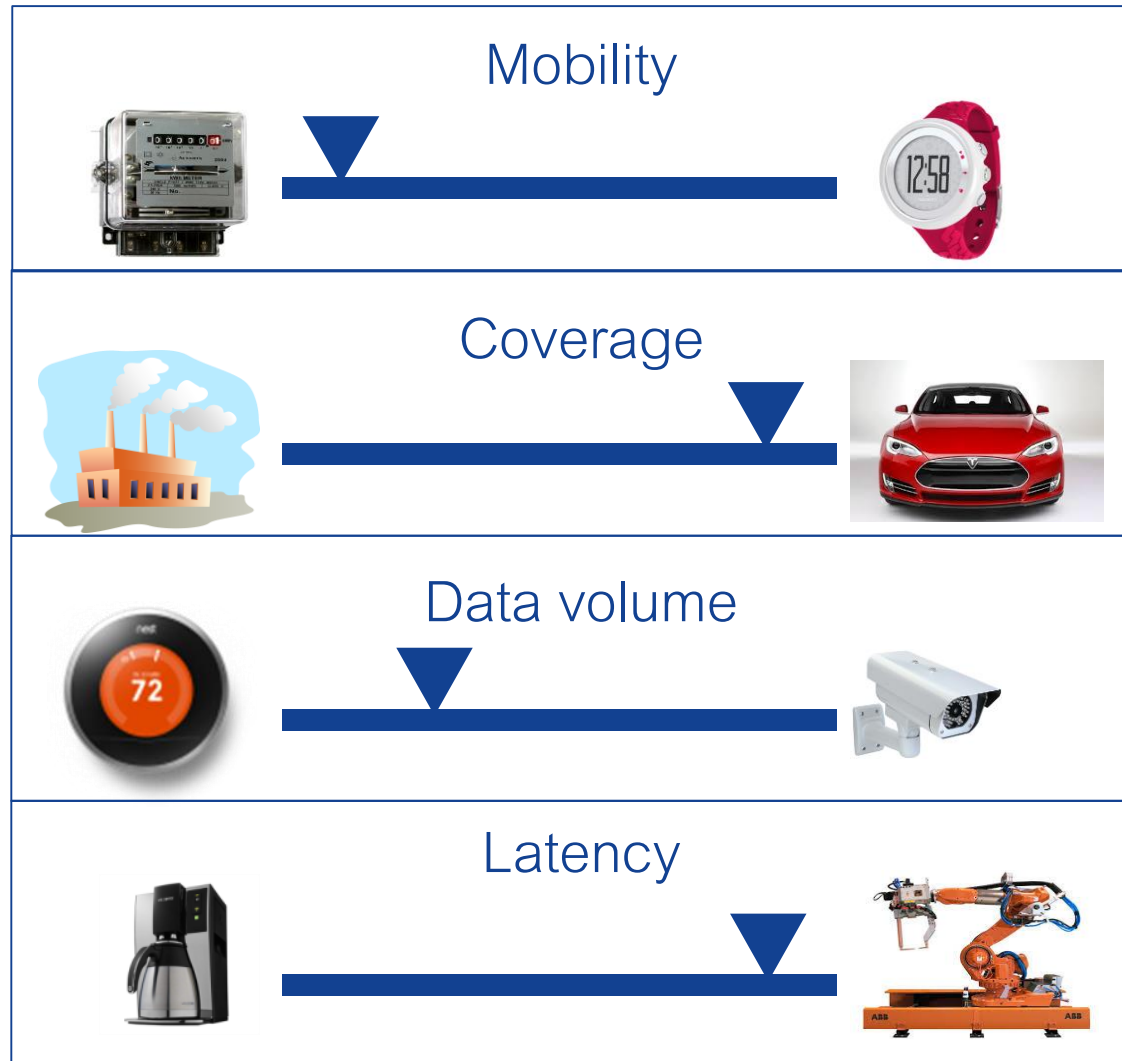


Stretching three performance dimensions in 5G opens up new possibilities

Extreme mobile broadband, massive sensors, and ultra-reliability, low latency



Connectivity – select the right connectivity for the application



Smart ecosystem



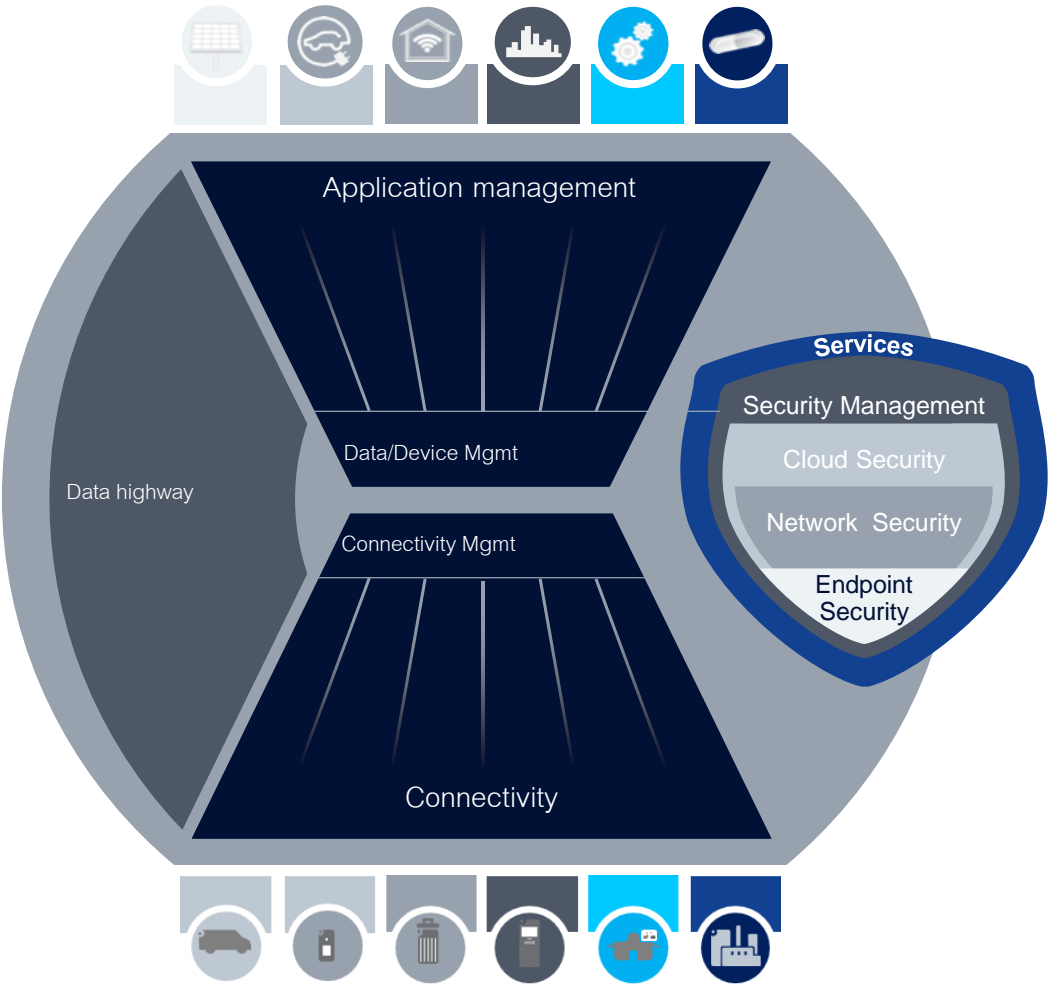
Horizontal platform for every vertical



Unlimited scalability



Installation options, on-cloud or on-premises installation



A Library of out of the box use cases



End to end security



IoT Community for smart ideation and fast deployments



Global reach



NOKIA

Contents



1	Intro - Antti Ruuska
2	Smart Otaniemi, Nokia viewpoint - Jarno Halme - Poll question
3	Smart EV charging - Marko Paakkinen - Poll question
4	Wrap up and conclusions - Antti Ruuska
5	Q&A

Smart Otaniemi Smart EV Charging pilot

Marko Paakkinen, Senior Scientist

18/01/2019 VTT – beyond the obvious

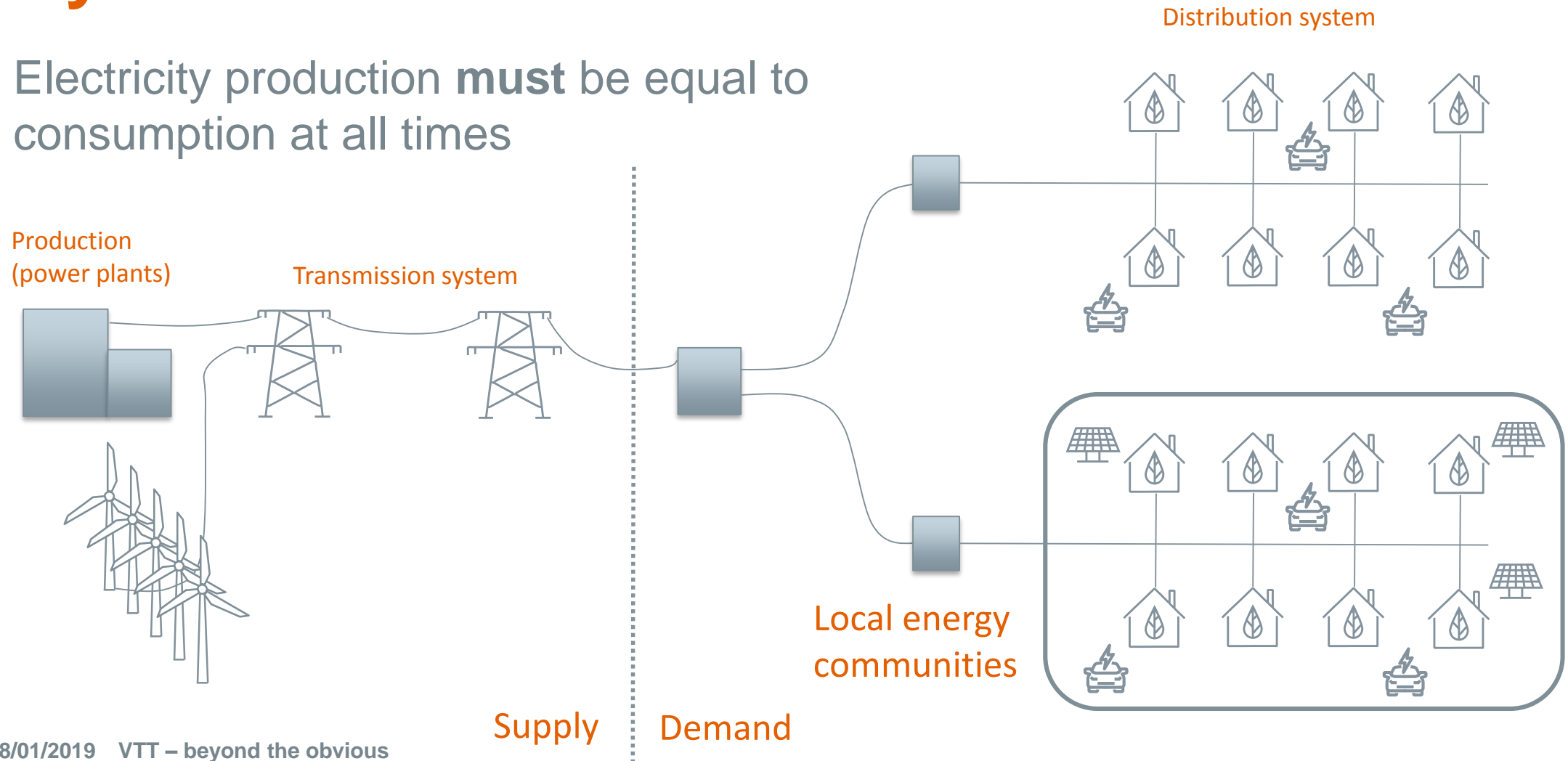
Smart Electric Vehicle (EV) Charging

- What makes charging "Smart"?
- Commonly used term for solving the challenges to the electrical grid created by large-scale EV charging
- Requirement e.g. in public charging point subsidies in Finland
- Can be applied in multiple levels in electricity system
- Pooling of resources is required for grid-level effects

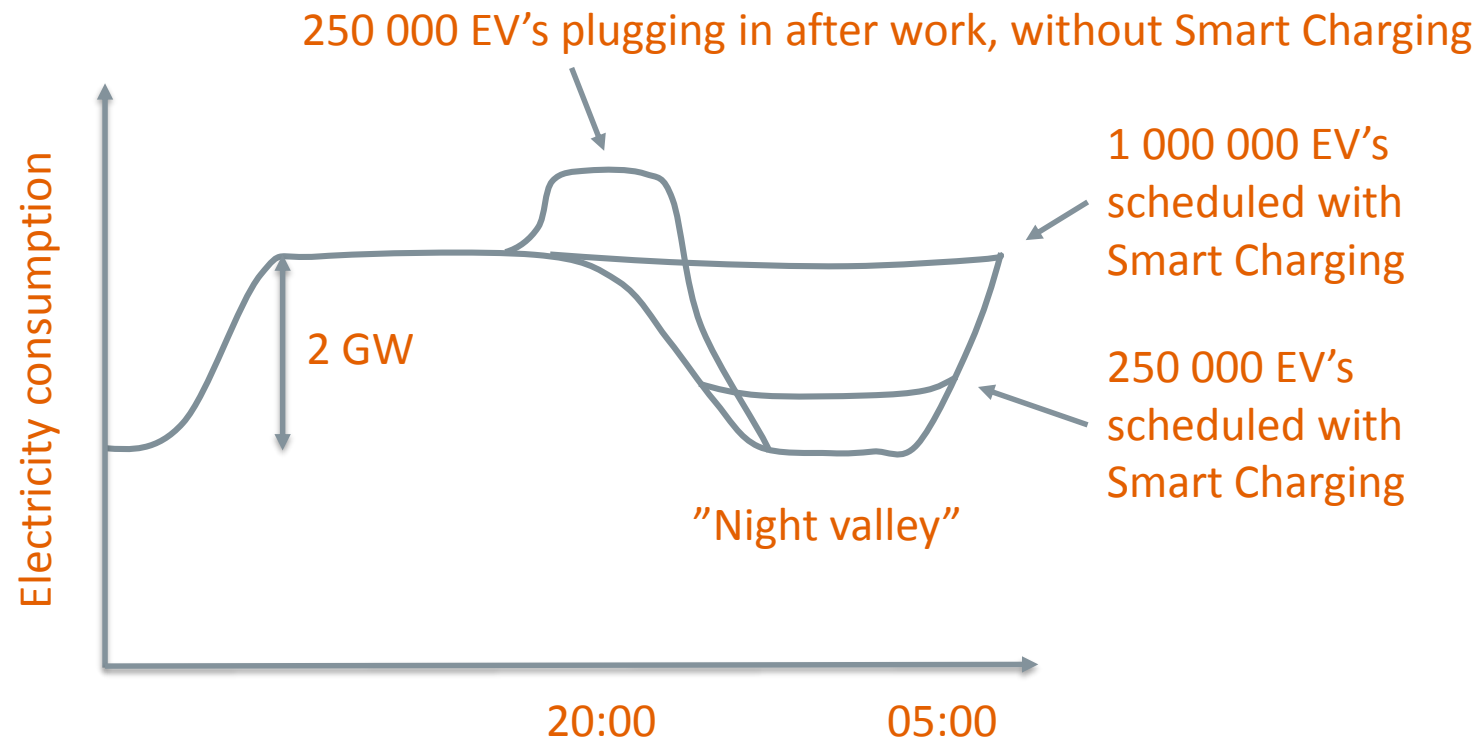


Why? Grid balance.

- Electricity production **must** be equal to consumption at all times



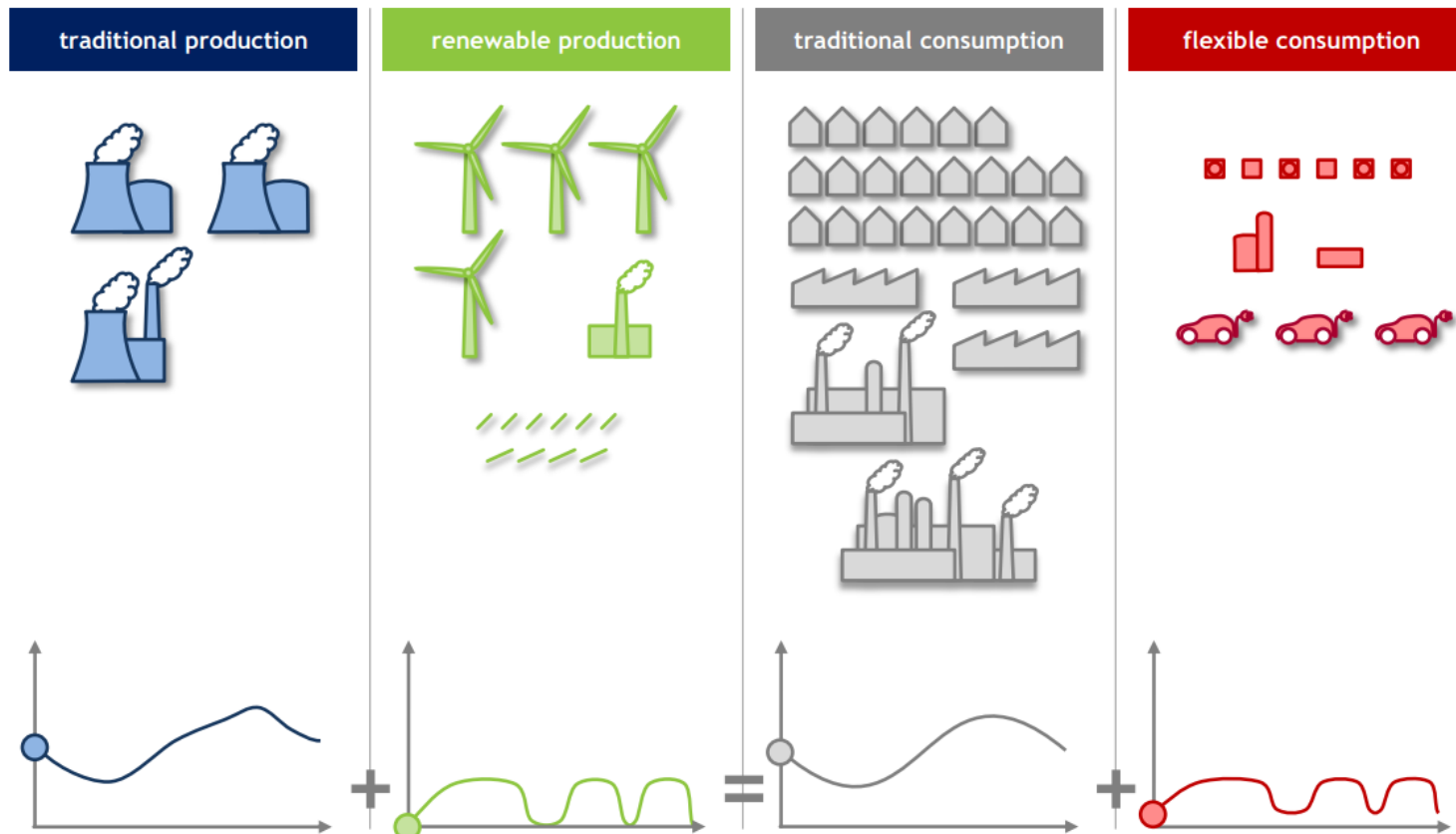
Grid effects of EV charging in Finland



But wait... where do we get the energy for the "night valley"?

- Hydro resources?
- Burn more fuel?
- Build more baseload power?

Better approach - flexibility



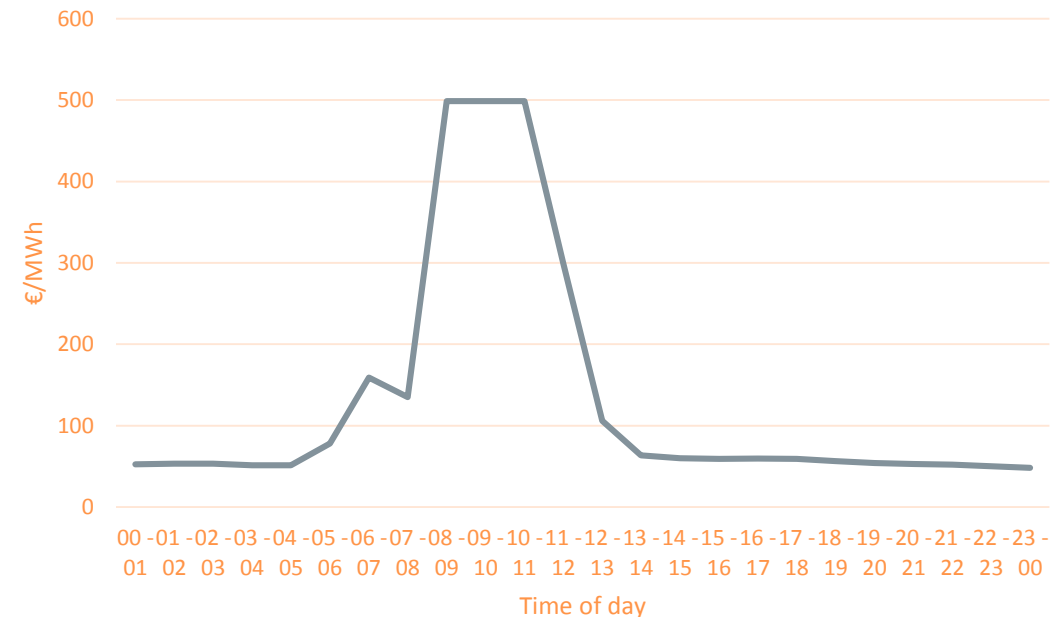
Requirement:
Vehicles plugged
in always when
parked

EnergyVille, "What is the potential of EV flexibility in the current electricity market?", 2017

Does it pay off?

- Imbalance power pricing > normal electricity production
- Example
 - 150 EV's charging at 6.6 kW
=> 1 MW controllable load
 - 1 MW is the minimum requirement to enter Fingrid FCR (Frequency Containment Reserve) market

Regulating prices (up) for Jan 10 2019 (Nordpool)



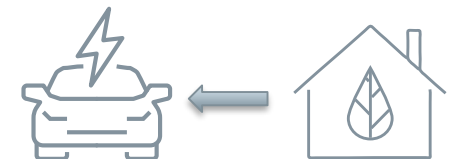
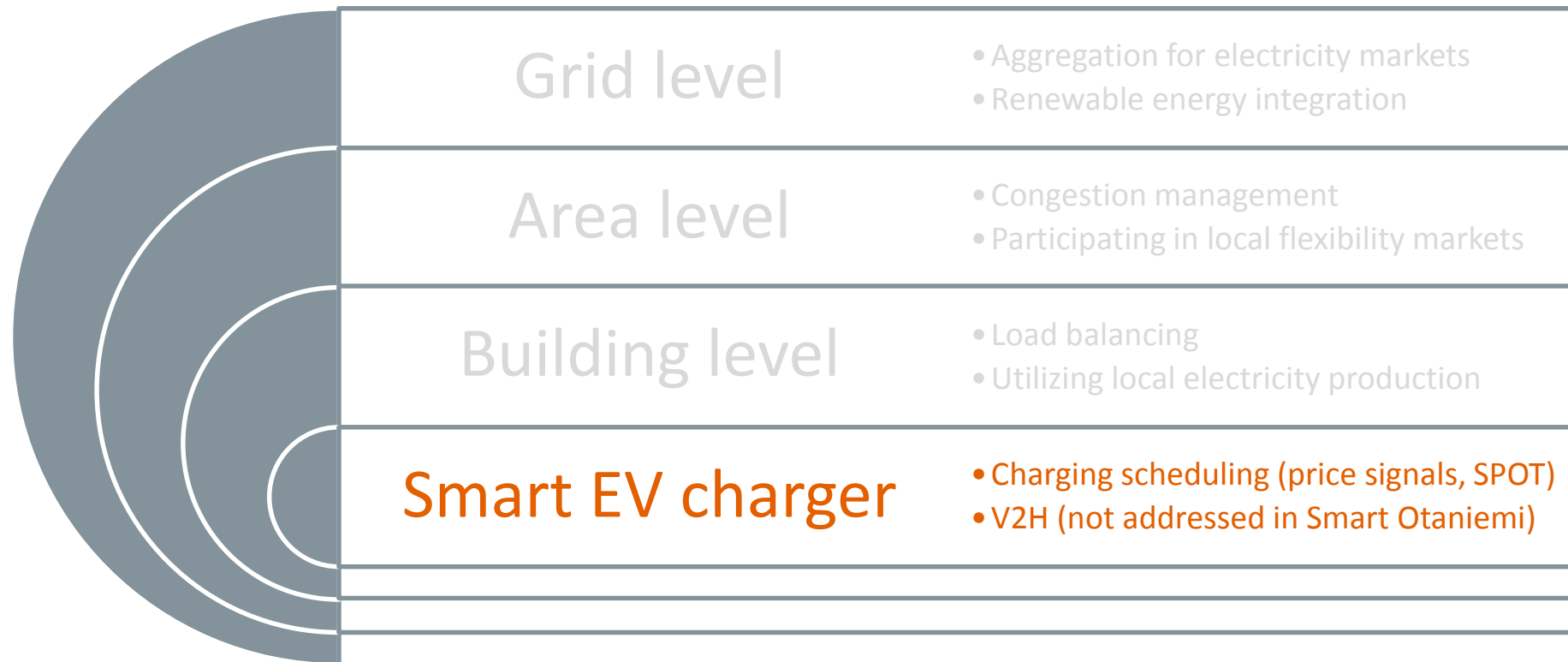
If we could have delayed the charging of 150 EV's for 3 hours, we would have earned 1497 €

Challenges with Smart EV Charging

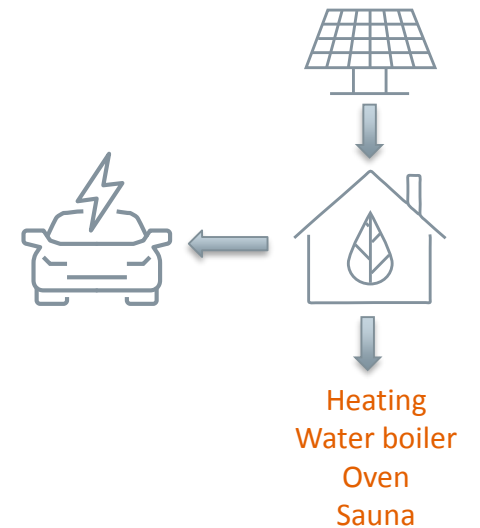
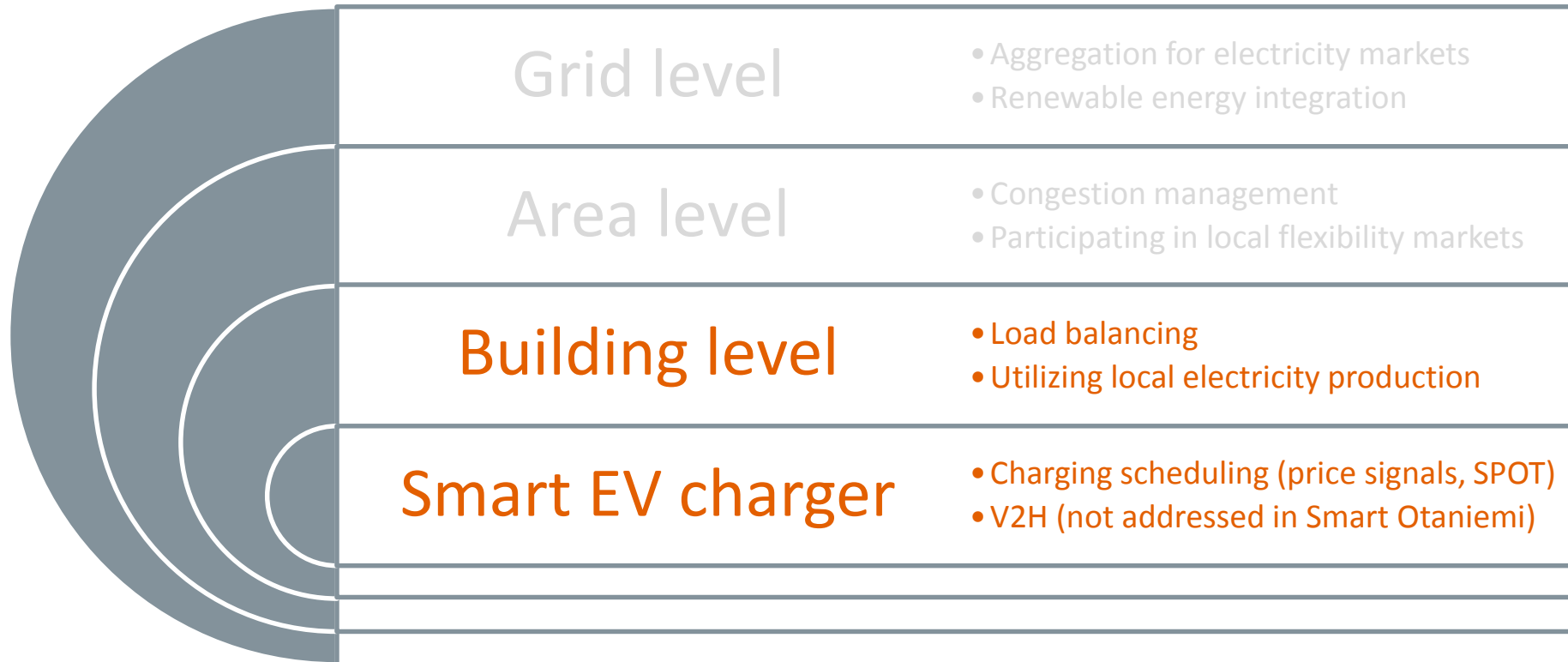
- Volatility of the loads
 - Availability prediction (machine learning; communication)?
 - Requires fleets to minimize effects
- End user incentivization
 - User consent is needed for using their resources
 - How to match grid and EV user requirements
 - How to take into account different individual needs
 - How to compensate for the participation in flexibility
- Achieving symmetry in regulation markets
 - Easier to lower the consumption than to increase
 - V2G



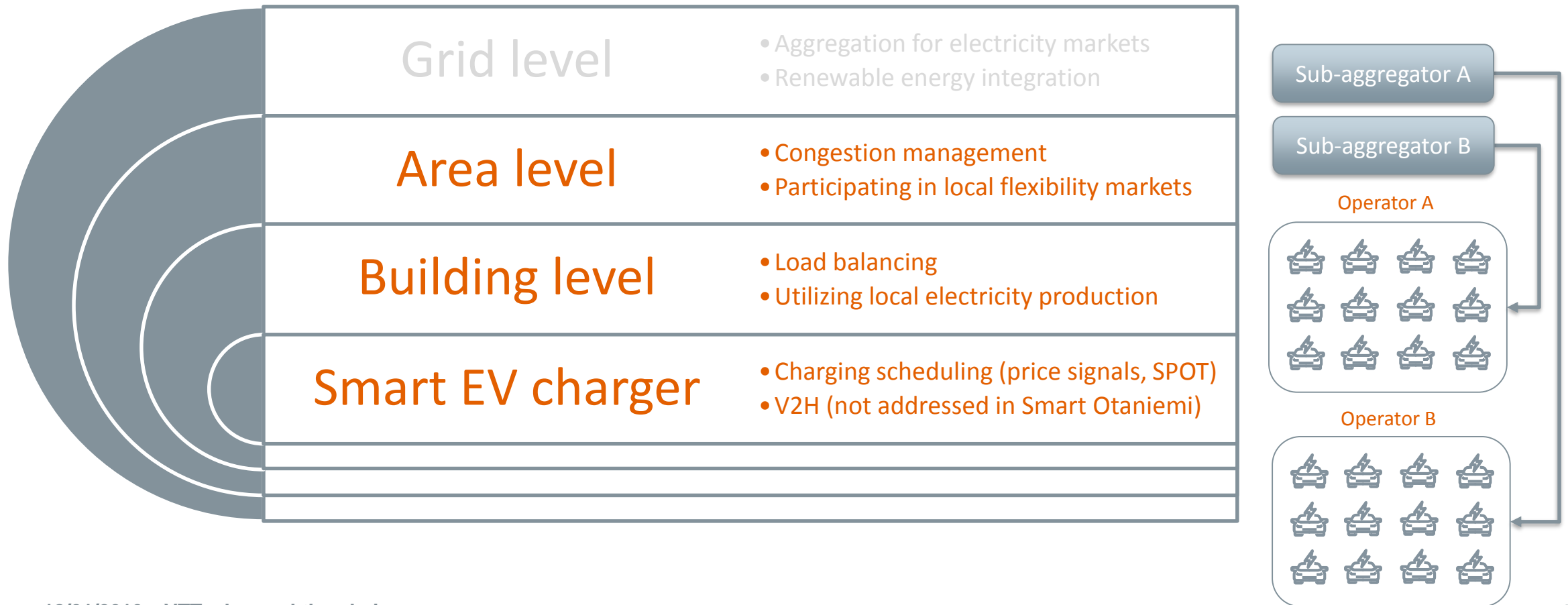
Levels of "Smartness" in EV charging



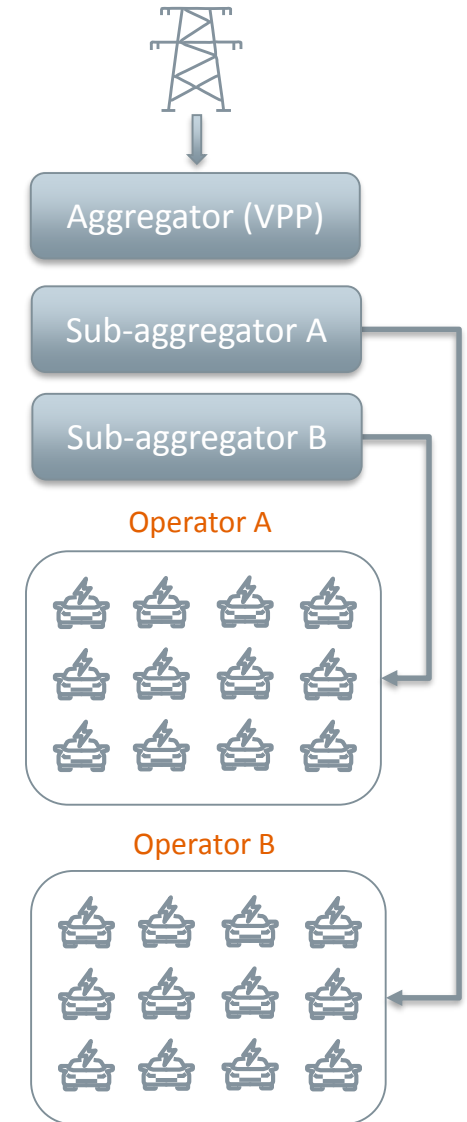
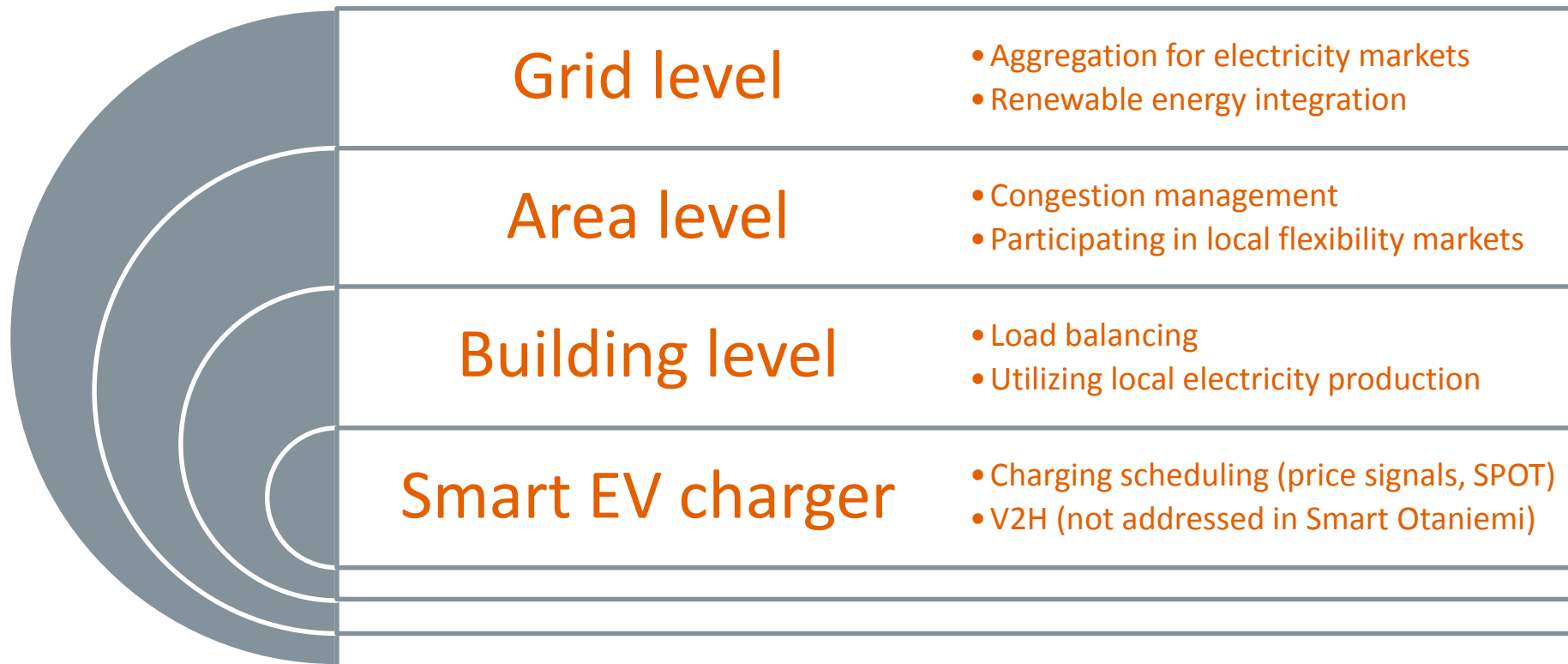
Levels of "Smartness" in EV charging



Levels of "Smartness" in EV charging



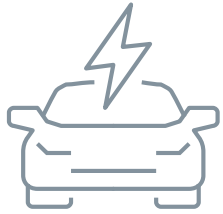
Levels of "Smartness" in EV charging



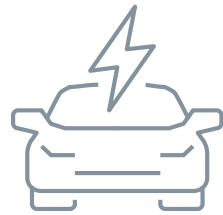
Goals

- **Main goal: To create a platform for testing of Smart EV Charging in all levels**
- **Goals for the first wave of pilots:**
 - Create a holistic area plan for Otaniemi for support of e-mobility
 - Test interfaces between subaggregator and aggregator
 - Test participation in local and grid-level electricity markets
 - Create a business model for aggregation of EV charging
 - Test building level integration of EV charging

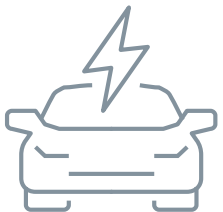
Visitors
Employees
Car sharing



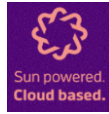
Visitors
Logistics
E-taxis



Employees
Students

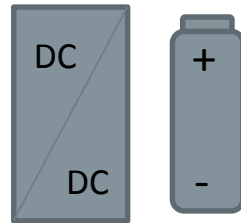
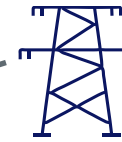


Basic charging

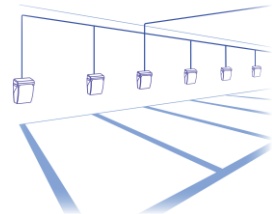


Smart
Otaniemi
platform

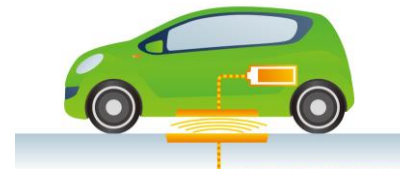
VPP



Superfast charging



Slow charging



Wireless charging



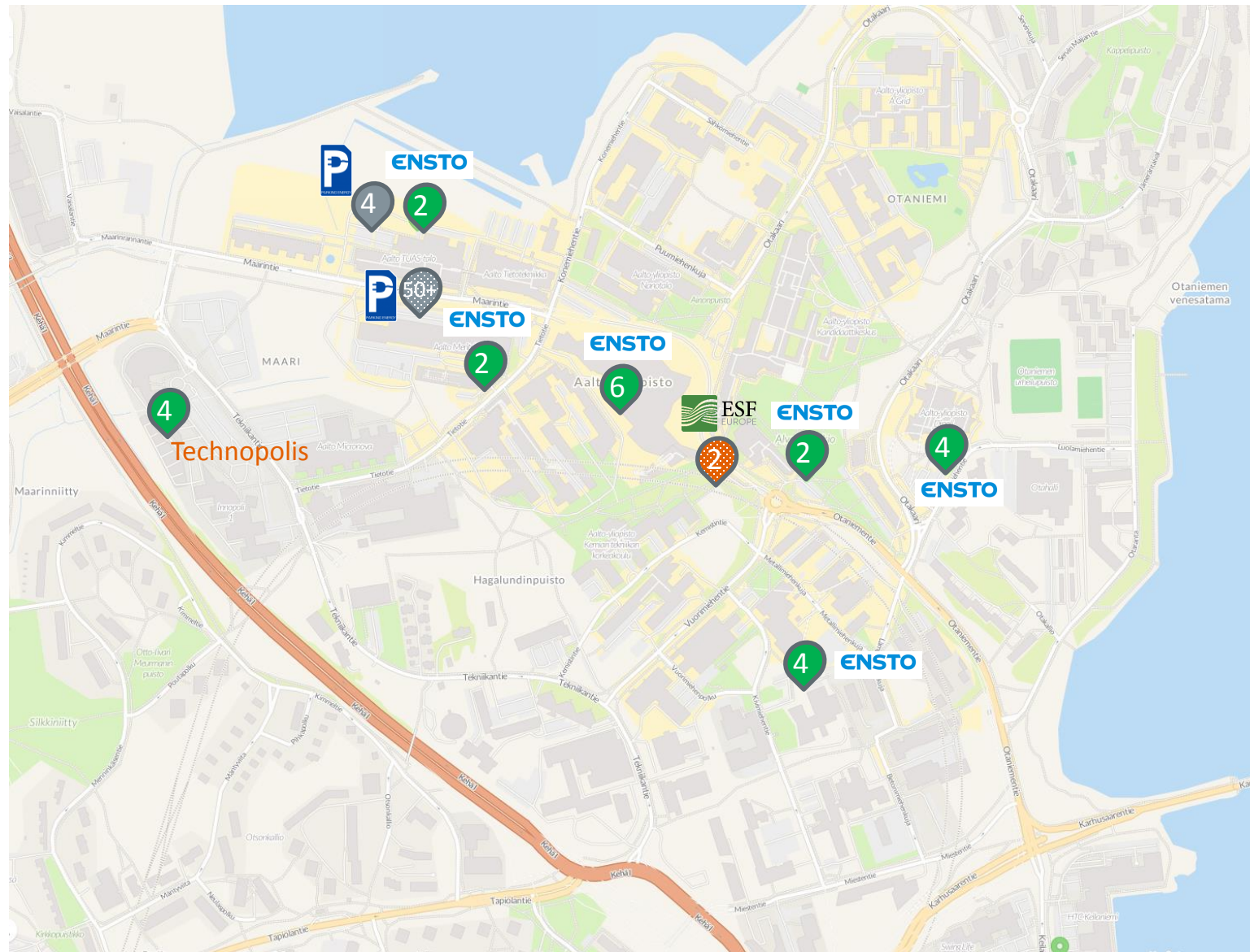
Smart EV charging pilot

Locations

Ensto: 18 charging points, potential for 20+ more in the project

Parking Energy: 4 charging points, seeking 50+ more in the project

ESF: Planning 1 fast charger near Aalto library



What's next?

Bring in YOUR brilliant new ideas!



Thank you for your attention!

Contents



1	Intro - Antti Ruuska
2	Smart Otaniemi, Nokia viewpoint - Jarno Halme - Poll question
3	Smart EV charging - Marko Paakkinen - Poll question
4	Antti Ruuska – Wrap up and conclusions
5	Q&A

Who is in?



Aalto University
ABB
ACRE
Caruna
e2m
Empower IM
Eneron
Ensto
ESF Europe
Espoon kaupunki (The City of Espoo)
Fidelix
Finess Energy
Fingrid
Fortum
Fourdeg
GEF
Granlund
Grid.vc

Merus Power
Motiva
Mount Kelvin
Nokia
Nuuka Solutions
Parking Energy
Pilaster
Process Genius
Salusfin
Senaatti-kiinteistöt (Senate Properties)
Senego
Smart & Clean Foundation
Solixi
Streamr
Tieto
VTT (Coordinator)

What kind of role could you have in Smart Otaniemi?



Investor partner

Invests in pilots and companies in Smart Otaniemi. Business Finland is the biggest investor at this phase in Smart Otaniemi. Other investors like Startup incubators and angel investors are also invited to join.



Piloting partner

Pilots, co-develops and tests together with other partners in Smart Otaniemi smart energy solutions and new innovations. A pilot can be located in Otaniemi area or elsewhere in Finland or abroad.



Research partner

Research partner supports ecosystem partners to innovate, develop and create solutions for common challenges and create new information for the ecosystem and the surrounding world.



Follower partner

Joins in the Smart Otaniemi network being part of the communication platform receiving newsletters and invitations to different events and workshops. Not taking active part in piloting and building consortiums.



Networking partner

Brings its own network next to Smart Otaniemi network and thus accelerates the impacts of the ecosystem. Networking partner can be public or private. They are easy and productive connections to new areas, partners and ideas.



Innovation ecosystem partner

Innovation ecosystem partners are other testbeds and similar areas like Smart Otaniemi. This collaboration helps companies to go abroad and develop their solutions as well as get references.



Business ecosystems partner

Business ecosystems are the ones who deliver, export and expand the commercial innovations that are originated from the innovation ecosystems. Business ecosystem will drive the growth and business for each partner.

Contents



1	Intro - Antti Ruuska
2	Smart Otaniemi, Nokia viewpoint - Jarno Halme - Poll question
3	Smart EV charging - Marko Paakkinen - Poll question
4	Wrap up and conclusions - Antti Ruuska
5	Q&A

Q&A

#smartotaniemi
www.smartotaniemi.fi



Contact information



Antti Ruuska
Co-creation manager
+358401763142
Antti.Ruuska@vtt.fi



Jarno Halme
Head of Data Strategy,
Nokia Mobile Networks
Jarno.Halme@Nokia.com



Marko Paakkinen
Senior Scientist, VTT
Marko.Paakkinen@vtt.fi



SMART OTANIEMI