

CONFIDENTIAL

PETRI HOVILA 25.3.2019

# Wireless communication in utility applications

An opportunity to 5G

IEEE 5G Summit - Levi



## Energy sector industry in Finland, Vaasa area

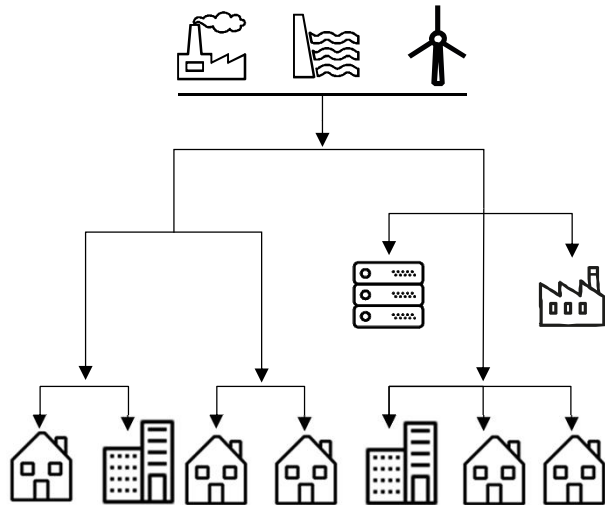
- Over 90% of Finnish electricity system automation related R&D located in Vaasa region
- 100% of countries on earth has technology in electricity system developed in Vaasa
- Over 140 companies
- Business turnover 4.4B€, export rate over 80%
- 30% of Finland's total export in energy technologies
- 25% of total manpower in the field of energy in Finland



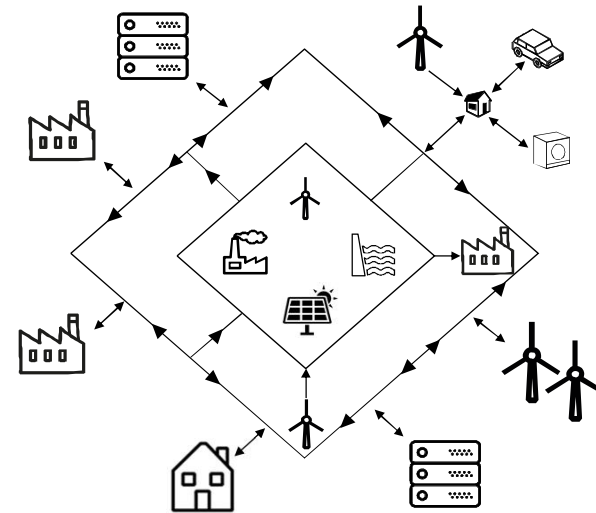
# Background

## Power distribution system

### Yesterday



### Today - Tomorrow

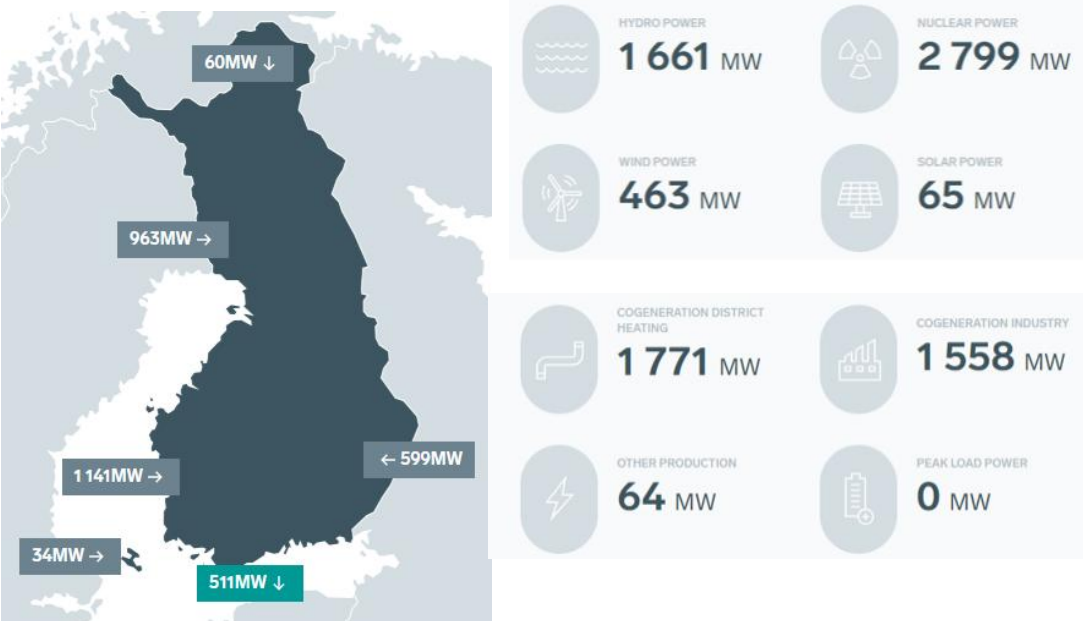


Towards expanding energy ecosystems

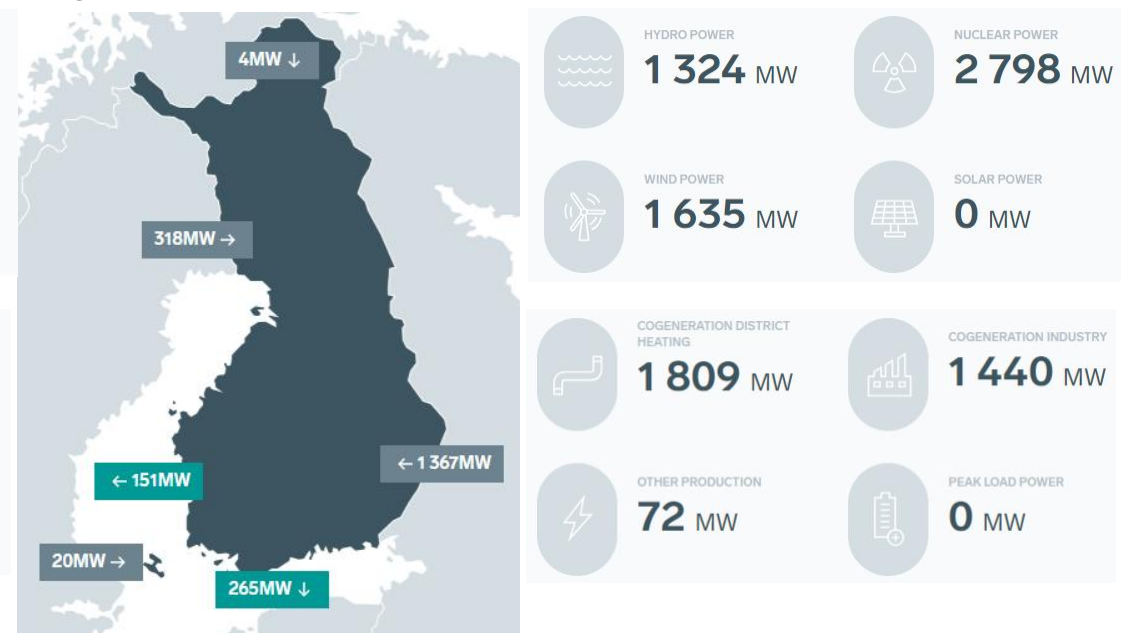
# Background

## Electricity import/export and production in Finland

Daytime 22nd March 2019



Night 22nd March 2019



Source: <https://www.fingrid.fi/en/electricity-market/power-system/>

# Background

## Utility network

- Utilities are operating electricity distribution network on wide area
- Today cellular and other wireless technologies applied
- Wired communication lines applied in protection communication applications due to strict latency and reliability requirements
- Horizontal and vertical integration of devices and system standardized
- Lifetime of assets and equipments are long, dozens of years

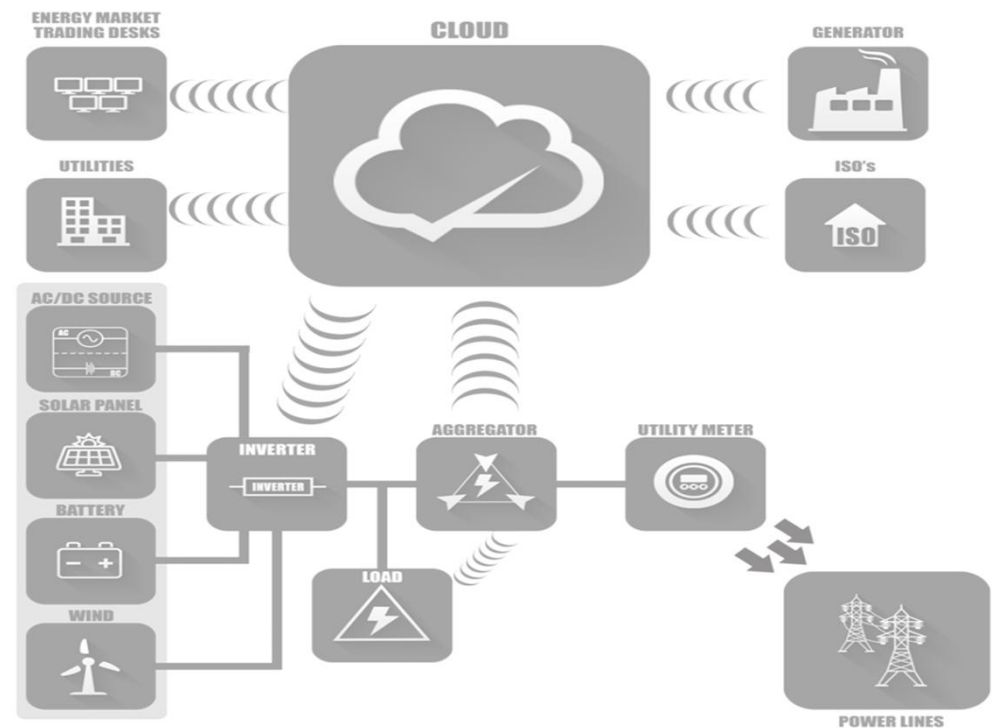


Source: <https://www.elenia.fi/>

# How to tackle increasing complexity

Drivers, energy revolution

- Energy revolution
  - Reducing Co2 emission
  - Prosumers, aggregators, electric transportation and energy communities popping up
  - Cooling and heating of facilities are more integrated to energy system
- Driving the change
  - Regulation and legislation
  - Standardization, interoperability of devices and systems
  - Proposals from working groups
  - Technologies, technology revolutions (e.g. 5G)





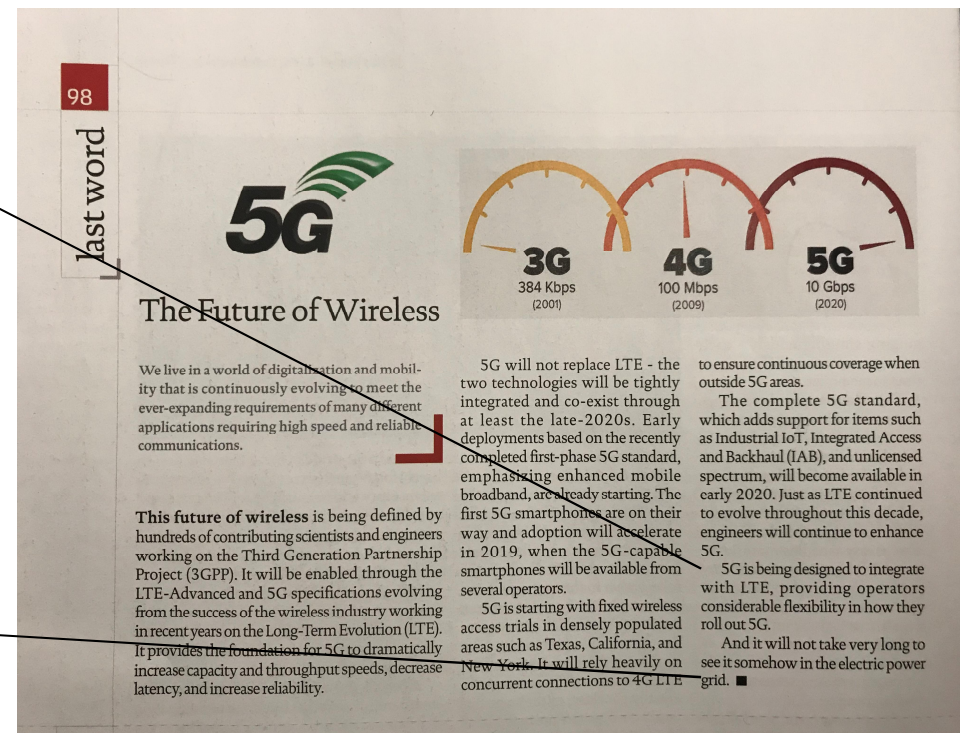
# 5G

Gaining interest

5G is being designed to integrate with LTE, providing operators considerable flexibility in how they roll out 5G.

And it will not take very long to see it somehow in the electric power grid. ■

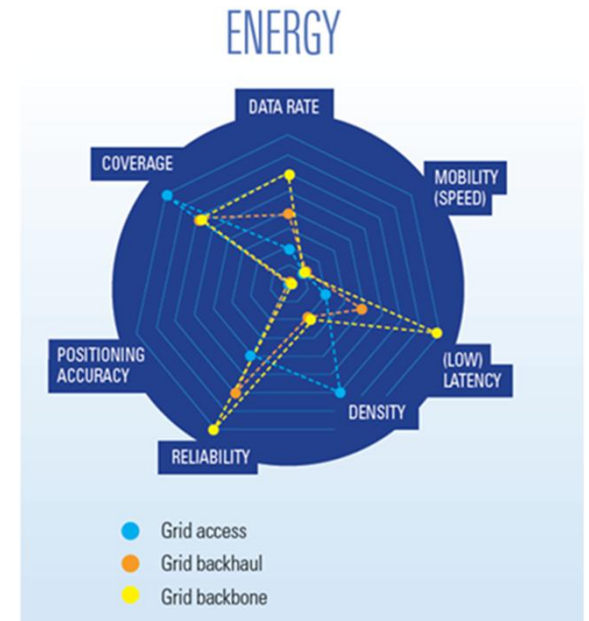
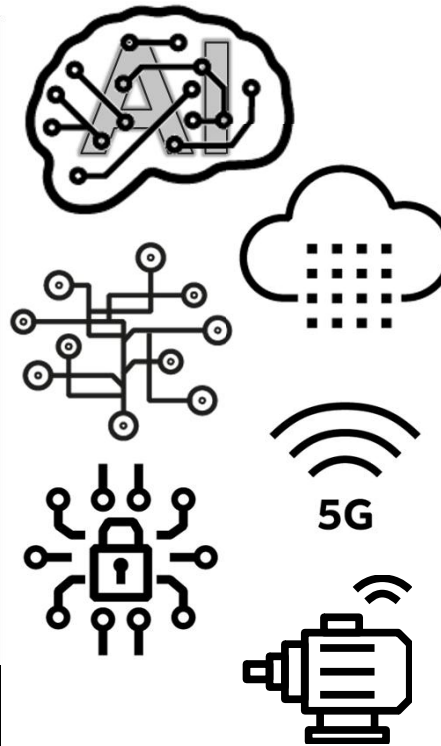
Source: Pac world magazine December 2018 – industrial wiseless technologies



## Opportunities to 5G

Digital technologies adding momentum

- Communication between systems and devices improves autonomous decision making
- Cyber security is the key element
  - Data, devices
  - Communication network
  - Time synchronization
- 5G
  - URLLC: new p&c applications
  - IoT: more independent sensors
  - eMBB: remote monitoring, high bandwidth sensors
  - Edge computing



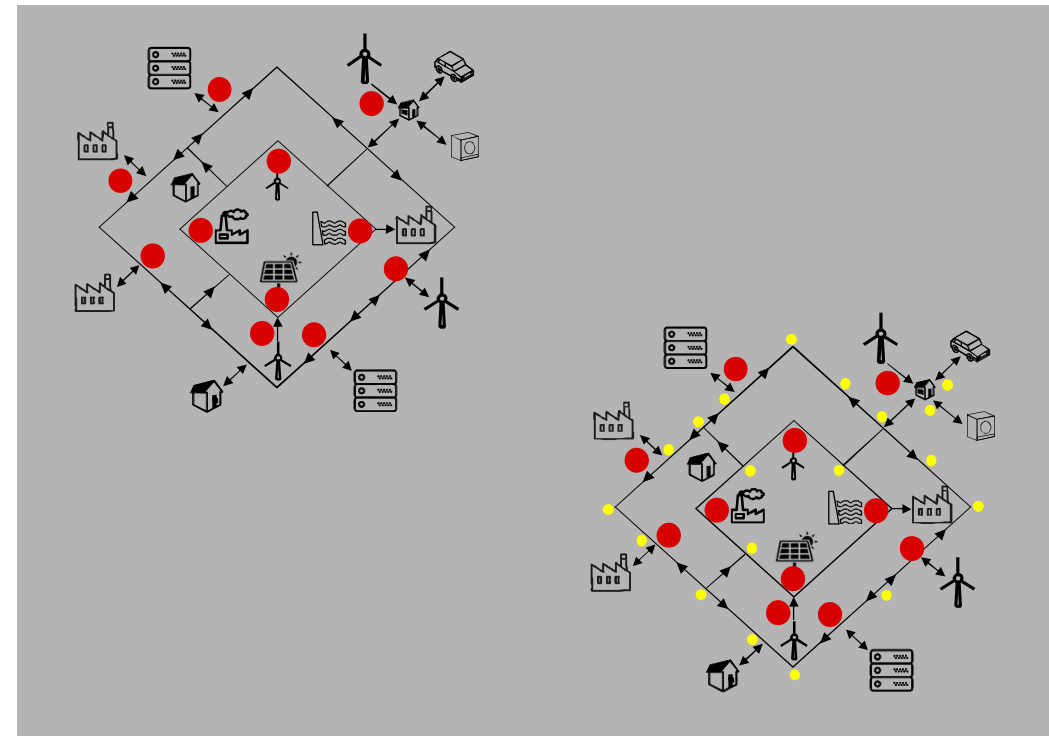
Source: 5GPPP 5G empowering vertical industries



# Energy system

Driving faster, turning the headlights on

- Connectivity and communication are in a key role as in any industrial application
- More practical use cases, pilots and collaboration with verticals
- More studies on value creation and business models required
- Predict faults



**ABB**