

Emerging technologies in Enedis

A technical base for smart grid solutions



2 major missions

Technical Roadmap for the Industrialisation of Smart Grid

Modernises network management processes and infrastructures

Assists actors of the electric power system and regions in the energy transition



Technical base of Smart Grid Solutions



Smart Cities



Electric Vehicle



New offers to customers and local authorities



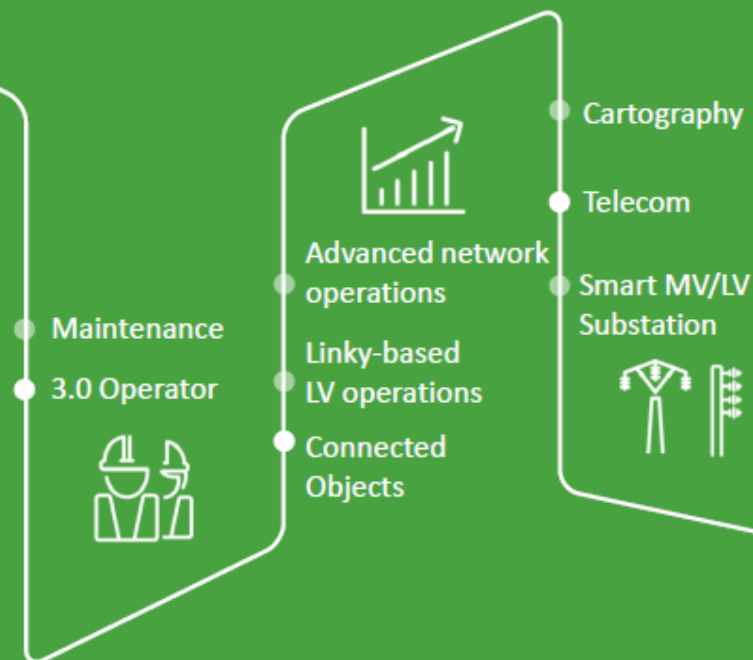
Data-related services



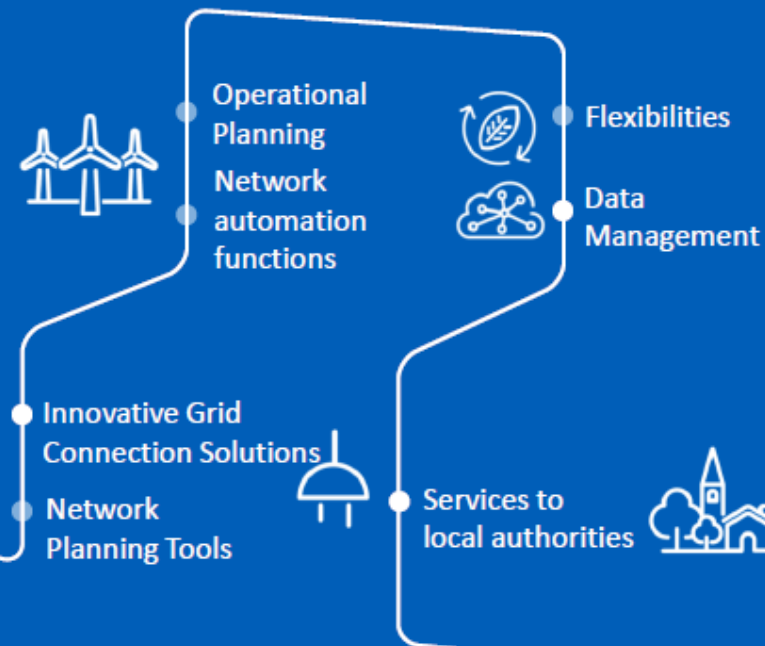
In parallel Linky Smart Meters roll out until 2021 (more than 7 million out of 35 deployed)
20 000 – 30 000 smart meters installed daily



Enedis modernises its network management processes and infrastructures



Enedis supports actors of the electric power system and regions in the energy transition



Enedis modernises its network management processes and infrastructures

Maintenance

3.0 Operator



Advanced network operations

Linky-based LV operations

Connected Objects

Cartography

Telecom

Smart MV/LV Substation

Enedis prepares tomorrow's maintenance

Optimise the maintenance of primary substations through sensors and big data

Detect anomalies, anticipate failures, and optimise HV/MV transformers, on an individual basis or with a fleet management approach



Improve the diagnosis of overhead lines through drones and optical sensors

Operate drones equipped with optical sensors:

- ✓ To occasionally examine network assets hardly accessible from the ground
- ✓ During a climatic variations
- ✓ To perform periodic diagnosis of MV overhead lines (pruning...)



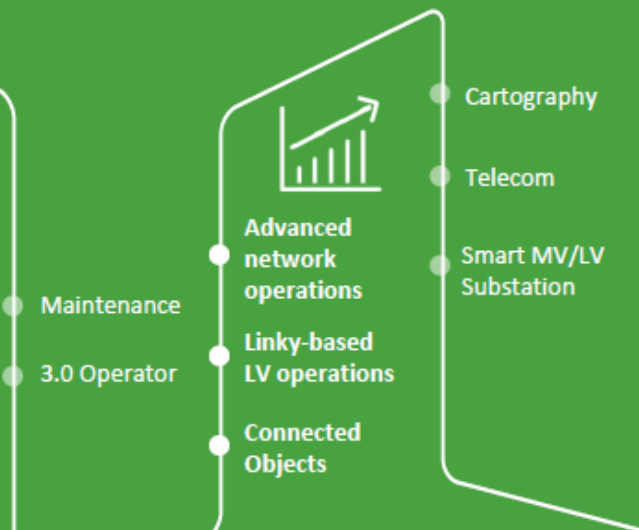
Improve safety and efficiency of field operations

Exploit new technologies:

- ✓ Virtual reality
- ✓ Enhanced reality
- ✓ Smart equipments



Enedis modernises its network management processes and infrastructures



Enedis improves quality of service for its clients

Expand automated MV fault management to all network situations

Localisation of MV faults and automatic service restoration based on the real time network configuration, in presence of Producers, and in case of fault at a primary substation (Advanced network operations)



Analyse / manage faults using the Linky system

- ✓ Detect and analyse MV and LV faults (LV individual power outage, MV or LV collective power outage...)
- ✓ Enrich quality of supply monitoring with data from Linky smart meters



Better operate the network using data generated by connected objects

Collect, archive, and process data generated by connected objects



Enedis develops innovative grid connection solutions designed for Grid Users

Improve network planning studies with a more efficient and evolutive tool

An information system for network simulations:

- ✓ With a higher performance and evolutive
- ✓ Taking into account new data, including those collected by smart meters and those from new automations and smart levers



Assess network constraints generated by grid connections in the service of Grid Users

- ✓ A simple tool for evaluating grid connections feasibility
- ✓ A web portal accessible by external parties

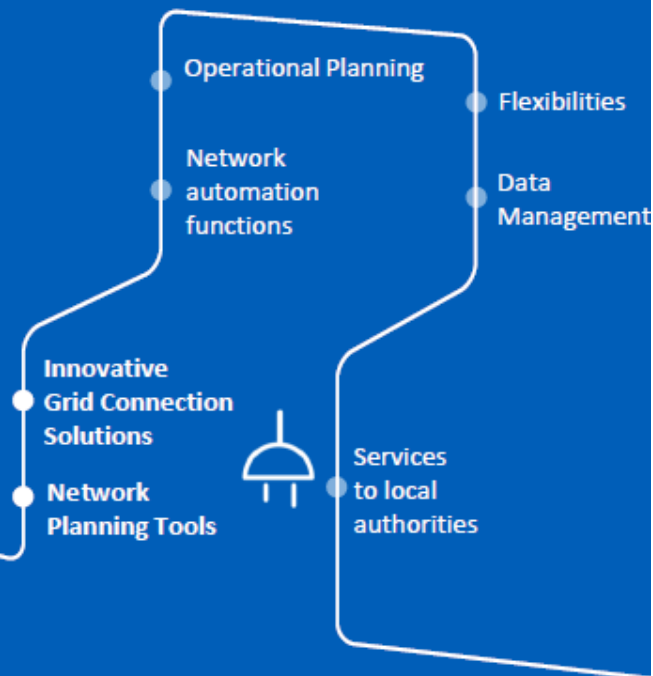


Better integrate DRES while managing their impact on the distribution system

- ✓ Modulate the active power of MV Producers in case of network constraint (alternative grid connection offer)
- ✓ Modulate the reactive power of MV Producers to control voltage (local voltage regulation law $Q=f(U)$ HTA)



Enedis supports actors of the electric power system and regions in the energy transition



Enedis facilitates DRES integration

Provide Enedis with an anticipated vision of network operations for the benefit of Grid Users

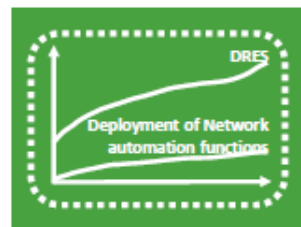
An Operational Planning system, with forecast and electrotechnical simulation functions, in order to:

- ✓ Optimise work programmes with producers and RTE
- ✓ Schedule works and optimise network operations near real-time



Control voltage on the MV network in a dynamic way in the presence of DRES

- ✓ Estimate the state of the network using voltage and current measurements
- ✓ Control voltage according to the network situation in real time



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Operational Planning

Network automation functions

Flexibilities

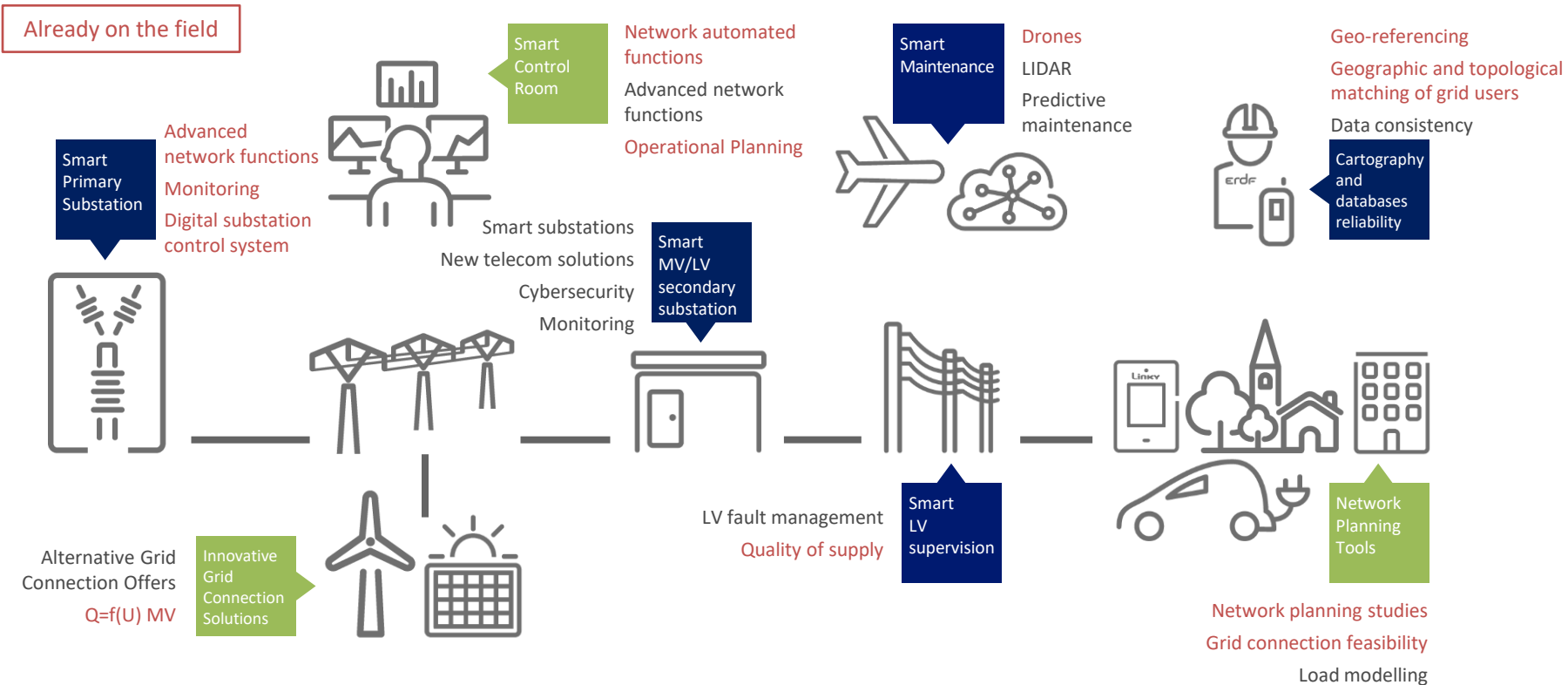
Data Management

Innovative Grid Connection Solutions

Network Planning Tools

Services to local authorities

SMART GRID DEVELOPMENTS BY 2018-2020



Thank you for your attention !



Eléonore CHABOD

Strategic partnerships & technology solutions

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