Nice Grid, The French Smart Grid Project within Grid4EU

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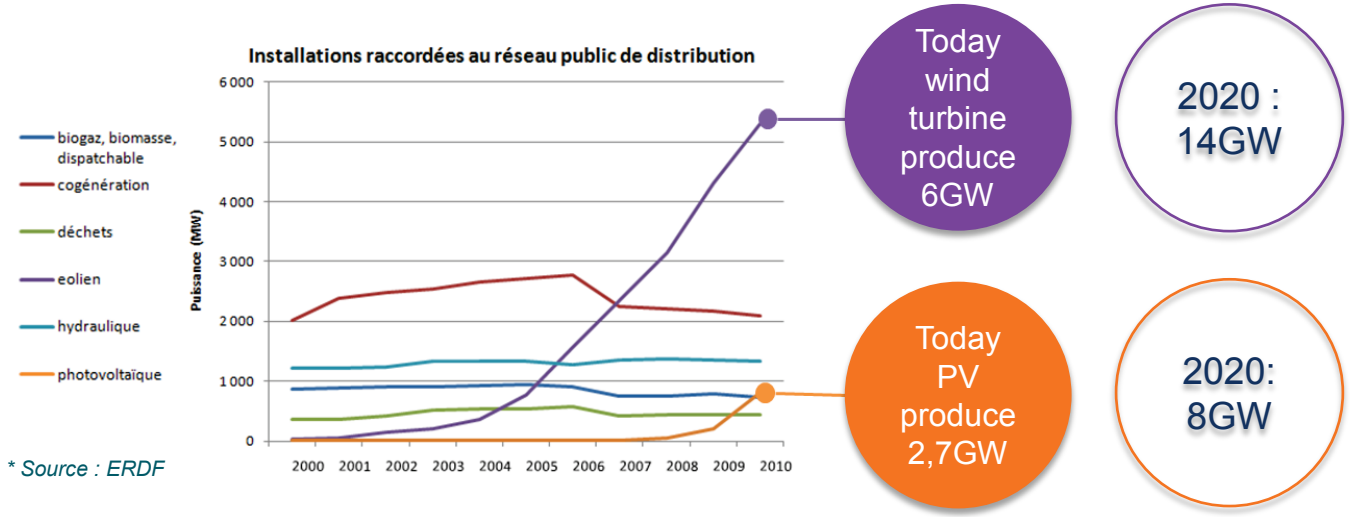
SEVENTH FRAMEWORK PROGRAMME

GRID4EU
INNOVATION FOR ENERGY NETWORKS

Integrating RES: an opportunity for ERDF

- In the latest years RES have dramatically increased.



- This additional production is beneficial to some regions with current weak supply while impacting the network deeply with new technical and organisational constraints.

➡ **A smart integration of this intermittent and decentralised energy supply would enable ERDF to better manage the grid and reap full benefits from it.**

Smart Grids a key enabler for a successful RES integration

- We believe Smart Grids solutions are the best way to maximise the benefits of integrating RES smoothly thanks to:

- In ERDF we are currently developing projects on smart grid applications to design the best of breed future network.

We are not starting from scratch: the network is already smart

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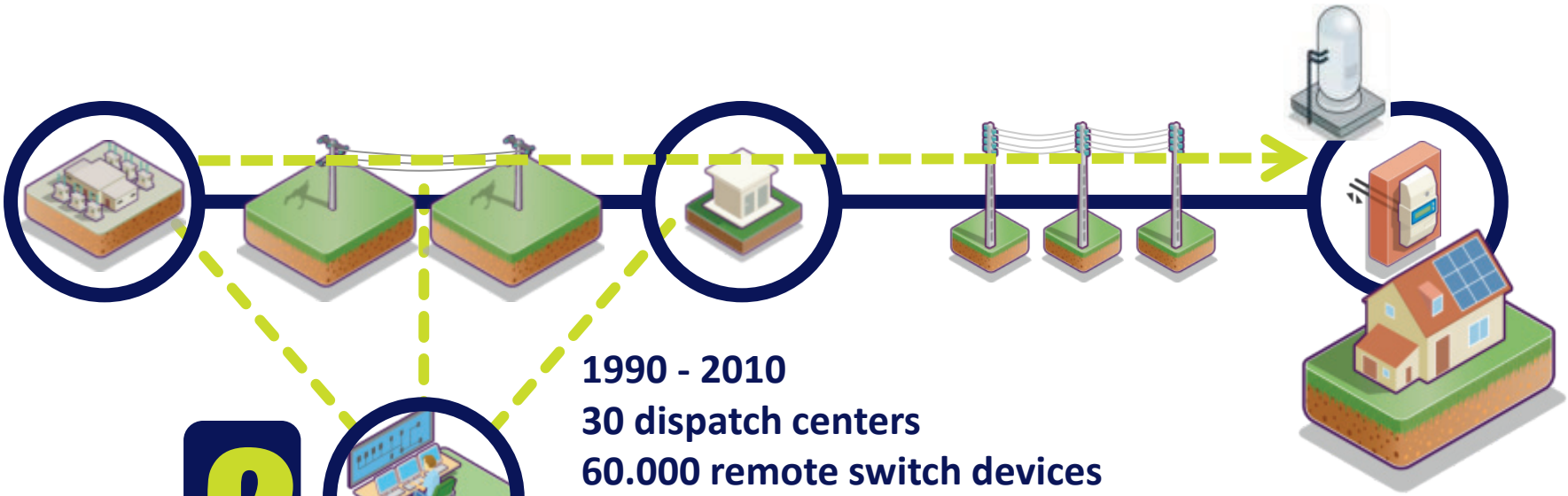
1

Tariff signals (175 Hz Power Line Carrier)
12 millions water boilers controlled (allowing heat storage during off-peak hours and heat delivery during peak hours)
22 days / year peak-shaving ("EJP" / "Tempo")



2

1990 - 2010
30 dispatch centers
60.000 remote switch devices
MV loops
Self healing and optimisation schemes

And thanks to our projects we are making the grid even smarter

- Since 2010 we are developing several projects to achieve an efficient smart grid.

- Each project with the following characteristics:
  - An extensive R&D program
  - The setting up of demonstrators in France and Europe
  - Partnerships with a broad spectrum of companies, from the major distribution utilities to innovative start-ups

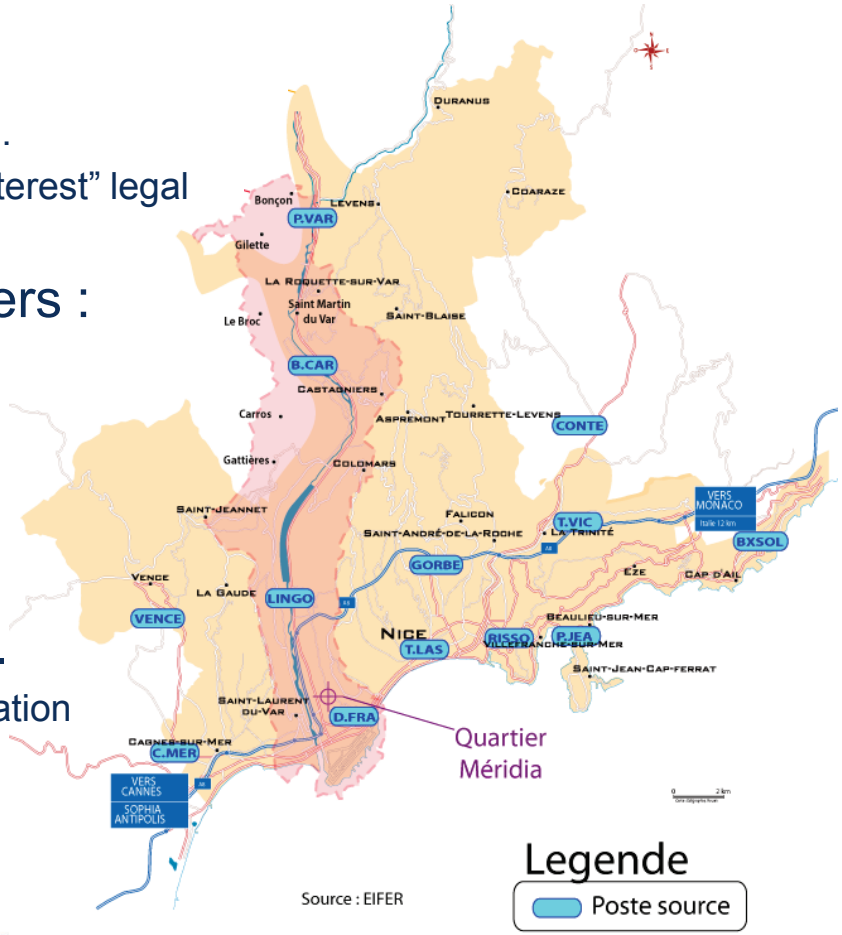
Nice Grid: an illustration of smart RES integration

- Optimization of a distribution network with massive integration of Distributed Energy Resources (DER)
- Proactive customers with regard to their consumption & generation of electricity
- Innovative services and business models
- Implementation of 1,500 smart meters
- Islanding of a micro-grid
- Budget : 30 million €
- Duration : 4 years

NICE GRID
A SMART SOLAR DISTRICT

Nice Grid pilot location

- The demonstrator will be set up is located in the municipality of Carros
  - Increase of PV connections (LV).
  - Fragility of the electrical system in South East of France.
  - Specific urban planning project with a “major national interest” legal status
- The demonstrator geographical area covers :
  - the existing Carros industrial district
  - the existing residential district “Carros le Neuf”
  - the under construction eco-district “Lou Couletas9”
- The geographical area is fed by several feeders linked to two primary substations.
  - Three of them will be specifically used for the demonstration purposes.



Nice Grid : Description and objectives

4 use cases:

- Islanding
  - Studying and testing the technical and economic interest of distributed electric storage at different integration levels
- Reduction of power demand
  - Develop and test a system managing all local network components in production and consumption context
- Management of PV
  - Testing tools managing the impact of massive PV injection on the electric network voltage control
- Encourage customer
  - Developing and testing information solutions for customers , and test their behavioral response

Nice Grid: a smart solar district

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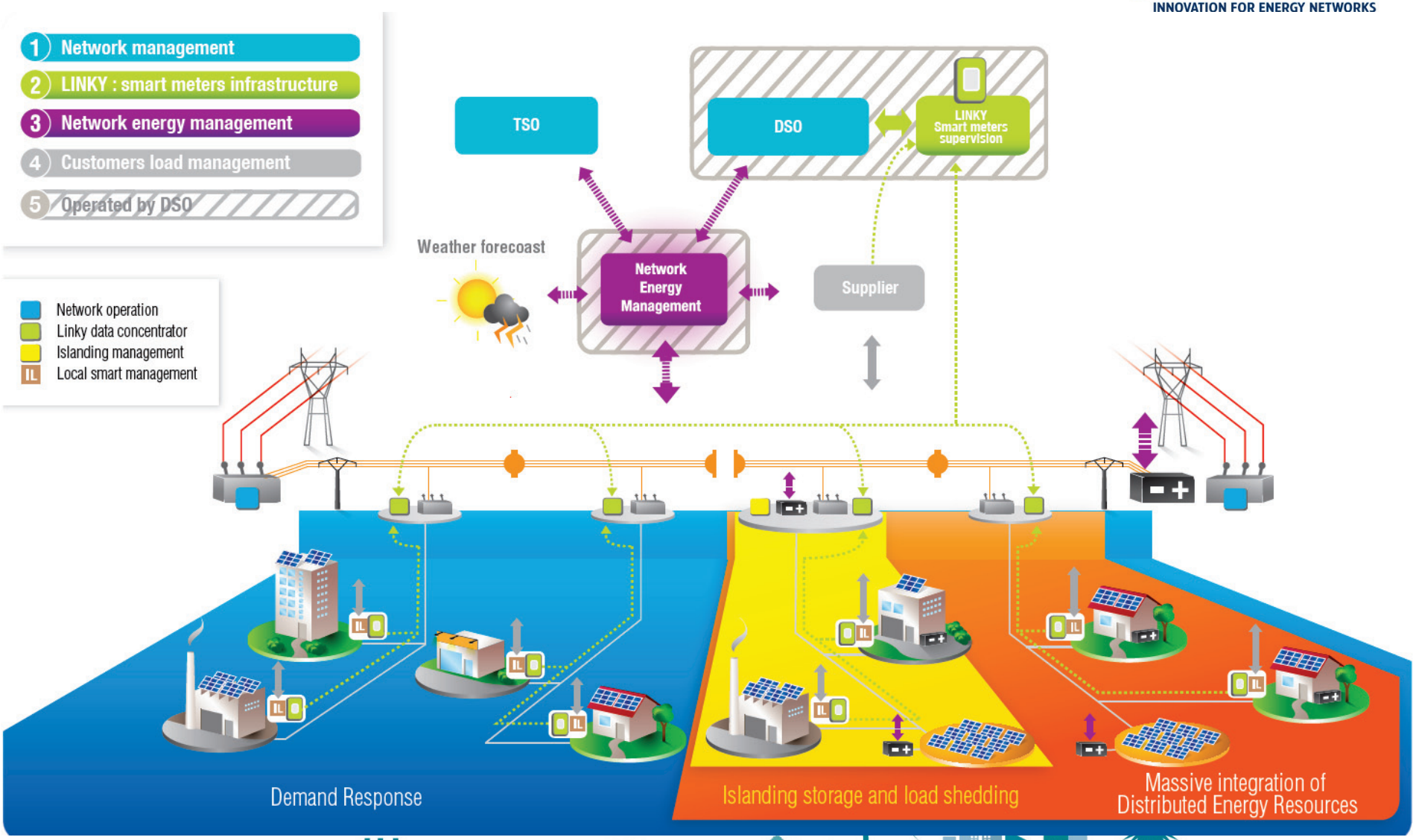


The NICE GRID consortium

- **Leaders**
- **Participants**
  - Industrials
  - Academics, R&D
- **Sponsors , Local Authorities**

Nice Grid the French cornerstone of the Grid4EU project

- A European Smart Grid Project:
  - Carried by 6 DSOs (cover more than 50% of the metered electricity customers in Europe)
  - 27 partners (Utilities, Energy Suppliers, Manufacturers, Research Institutes)
  - Project Coordination: ERDF
  - Technical Director: ENEL
  - General Assembly Chairman : IBERDROLA

- Grid4EU Budget : 54 M€

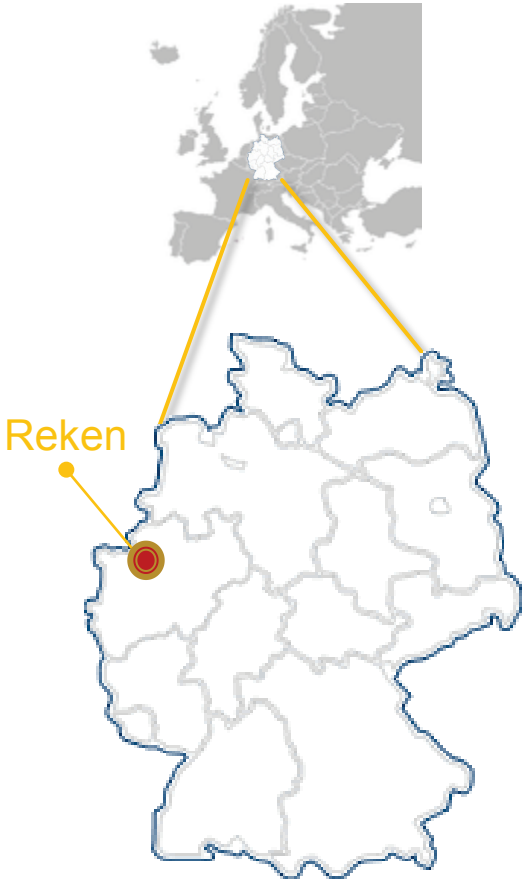
- Duration : 4 years (Nov.2011 – Jan 2016)

RWE – Reken, Germany:

Advanced MV network operations using a multi agent system

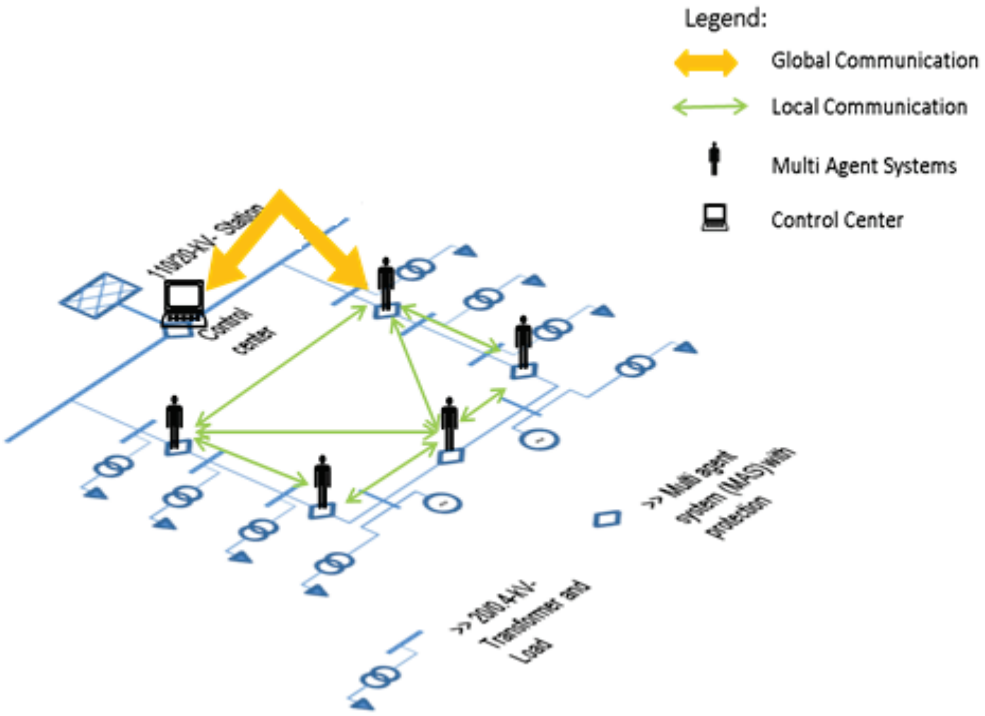
Demo 1: Description and objectives

- Boundary conditions and location
  - Located in Germany, North-Rhine Westphalia, area of the municipality of Reken
  - Semi-urban area with moderate continental climate conditions
  - MV-grid with approx. 100-120 substations, partly to be equipped with switching facilities
  - The number of substations to be equipped with switching agents will be around 10-20.
  - Ratio between max load and DG almost balanced, massive increase in DG expected



Demo 1: Description and objectives

- Background
  - Massive increase of DG
  - Power flow becomes less predictable
  - Hardly any surveillance or automatic control in MV and LV in Germany
- Concept
  - Approach is based on autonomous working agents and a lean control center
  - Agents communicate amongst each other and can act remote-controllable switches
  - Derivation of decisions based on measured operating parameters

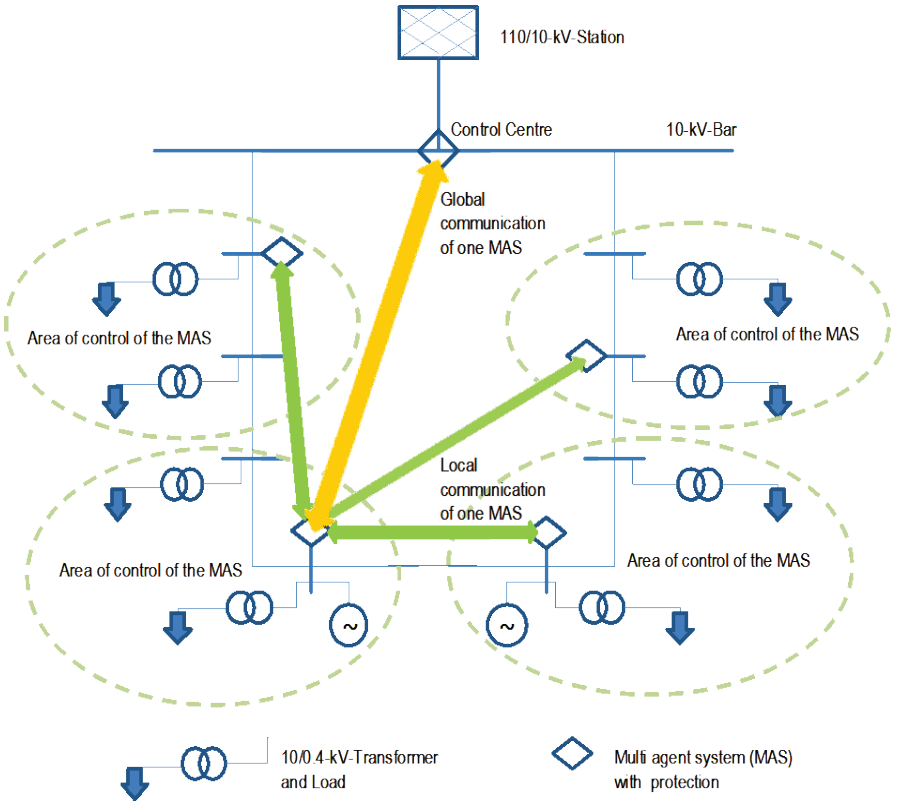


Demo 1: Description and objectives

- Concept
  - Control Centre receives information about grid status and topology
  - Control Centre can overrule decisions of the agents
  - Otherwise only surveillance purposes

Agents act and optimize locally!

- System can be…
  - Pre-stage of MV/LV SCADA system
  - Part of an existing MV/LV SCADA system to minimize central tasks



Thank you for your attention

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Grid4EU web site: *www.grid4eu.eu*