



Distribuzione

ENEL DISTRIBUZIONE

Progetto Isernia (CP Carpinone) Delibera AEEG ARG/elt 39/10

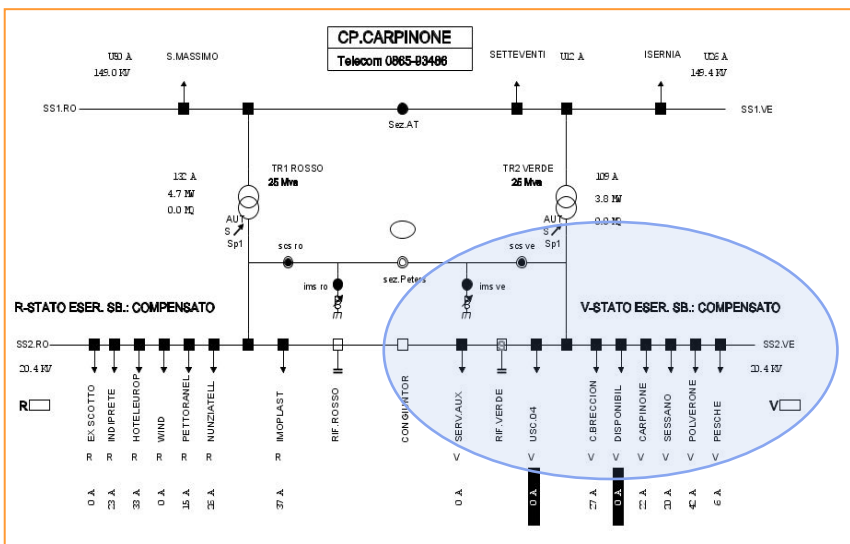
Giorgio Di Lembo
Sistemi di Telecontrollo e Automazione

Milano, 28 Novembre 2013

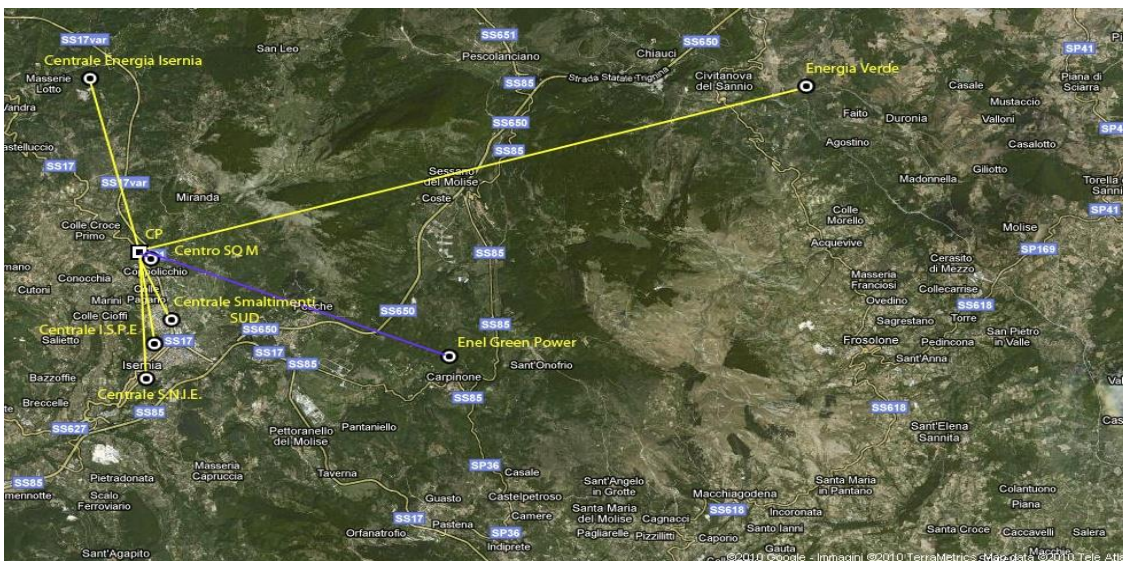
Isernia Project

Site information

"Zona" Enel - Isernia



Primary substation and MV network



HV/MV substation: "Carpinone"

- Bus bar: "Verde")
- TR 25 MVA, Compensated MV neutral point ;
- Inversion of power flow: 1,4% of time
- 5 MV feeders + "Centro Satellite"

Passive Users:

- 157 Secondary Subs (7.294 LV users) - 18.540kW
- 25 MV users - 12.970 kW

Active Users (Producers)

- 5 Hydro 8.967 kW
- 1 biogas 650 kW
- 1 Photovoltaic 82 kW
- Connection requests (3.728,3 kW)
In acceptance phase (4.686,3 kW)

Relevant Operative Center

- Campobasso



Distribuzione

Isernia Project

Overview

Integration of Smart Grid key elements

Project cost ≈ 6,5M€
Time span ≈ 3 years



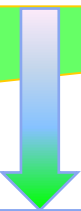
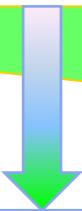
31/12/2013 ≈ 5M€

DG Management

Energy Storage System

Smart Info

Electric Vehicles



Same functions already developed in POI-P3 project ("Energie Rinnovabili e Risparmio Energetico 2007-2013": Regolazione evoluta della tensione

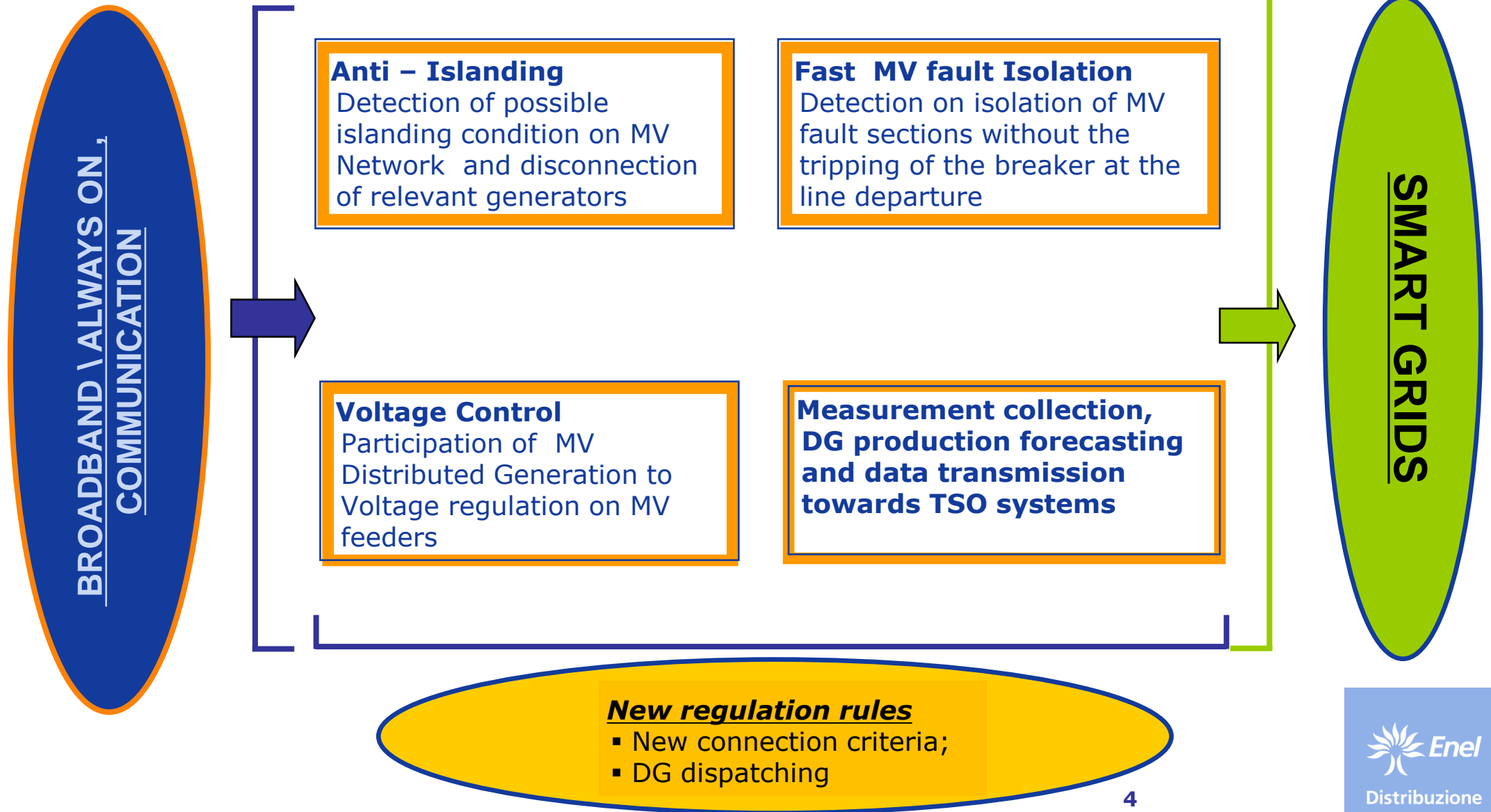
First ESS on MV network installed in Italy

First field test of large scale (8000 customers)

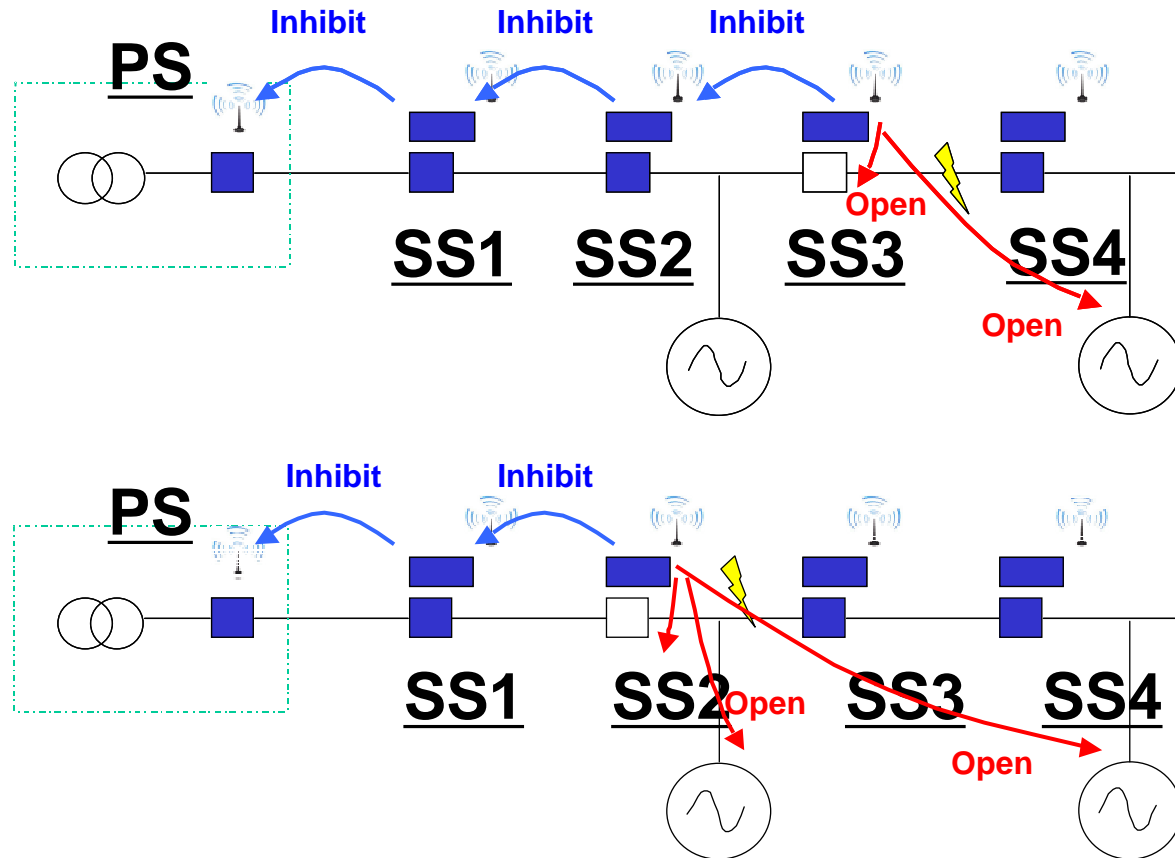
Integration of recharging infrastructure with solar power plant and Storage; usage test of EV for Enel field crews

Isernia Project

DG Management – Main Functions

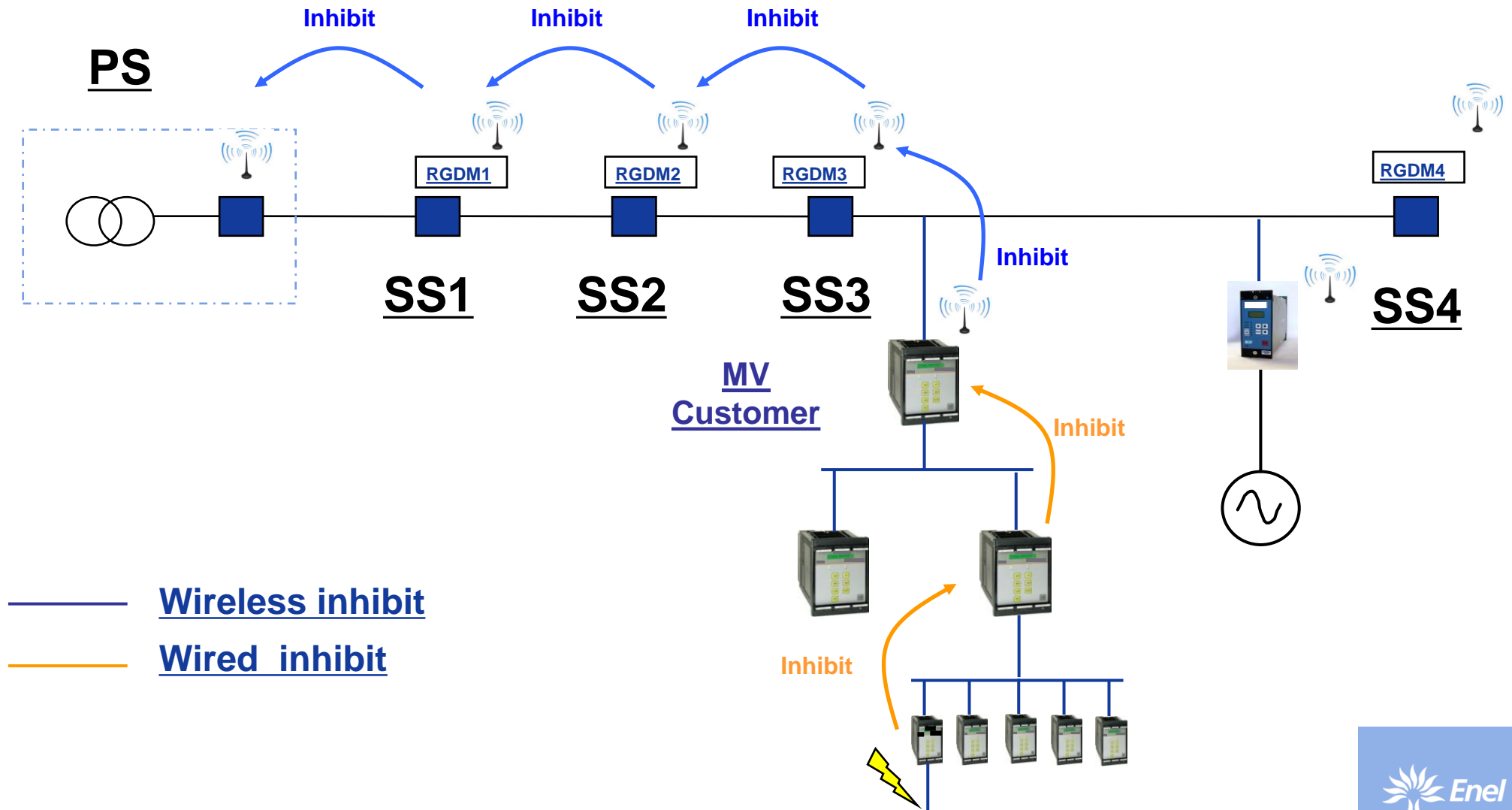


DG Management – Fast MV fault isolation and anti-islanding

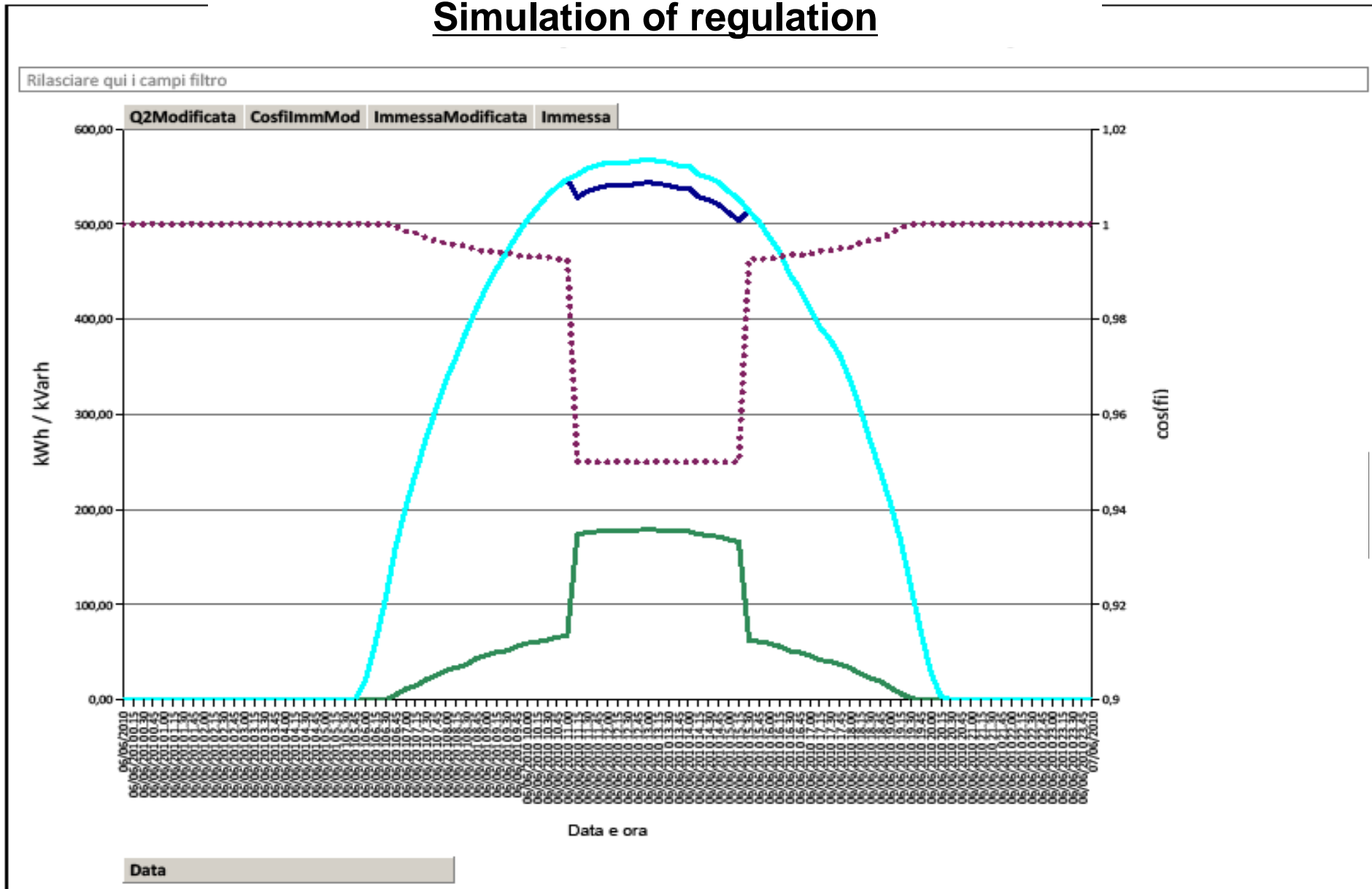


Isernia Project

DG Management – Fast MV fault isolation and anti-islanding

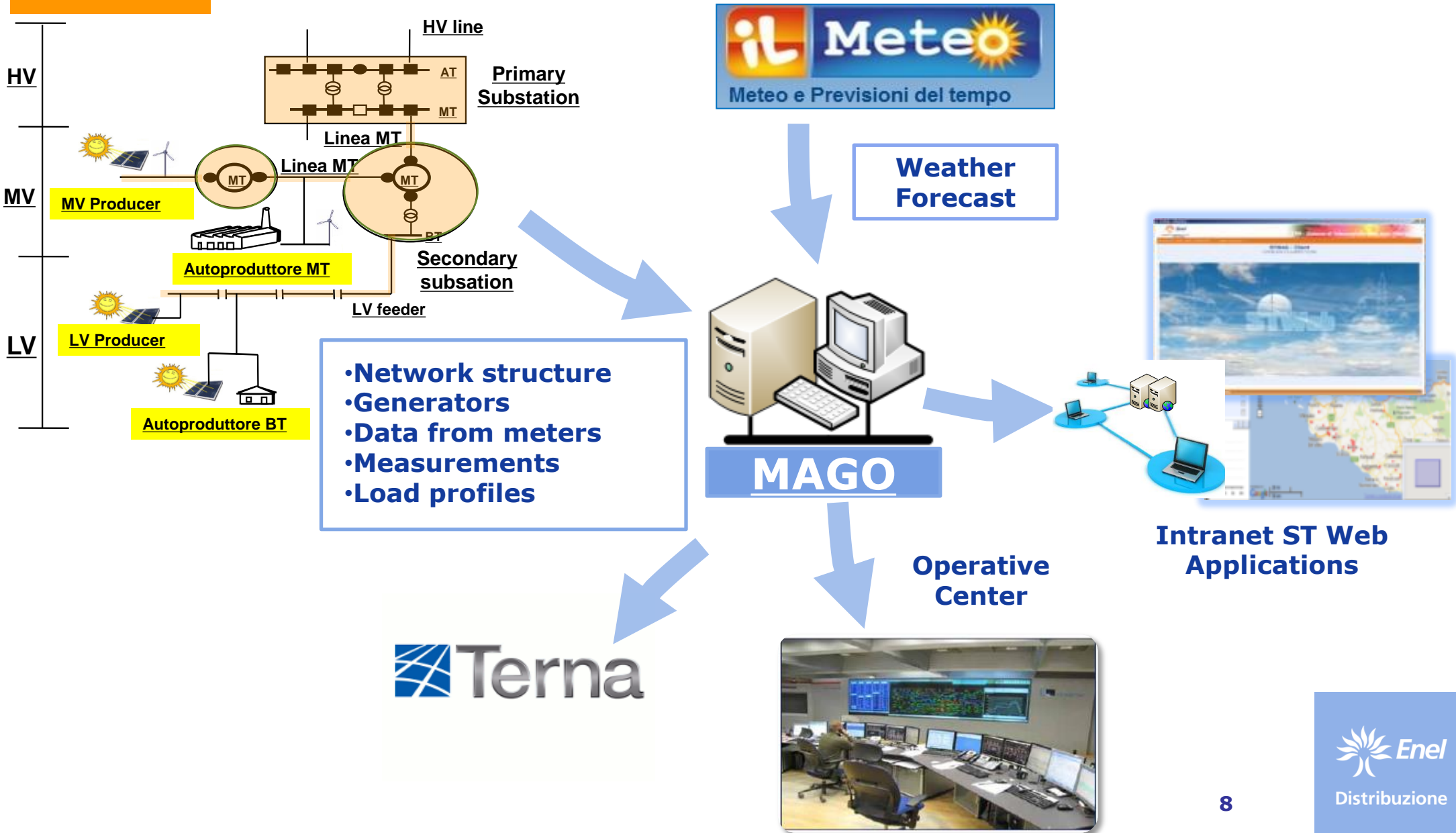


Simulation of regulation



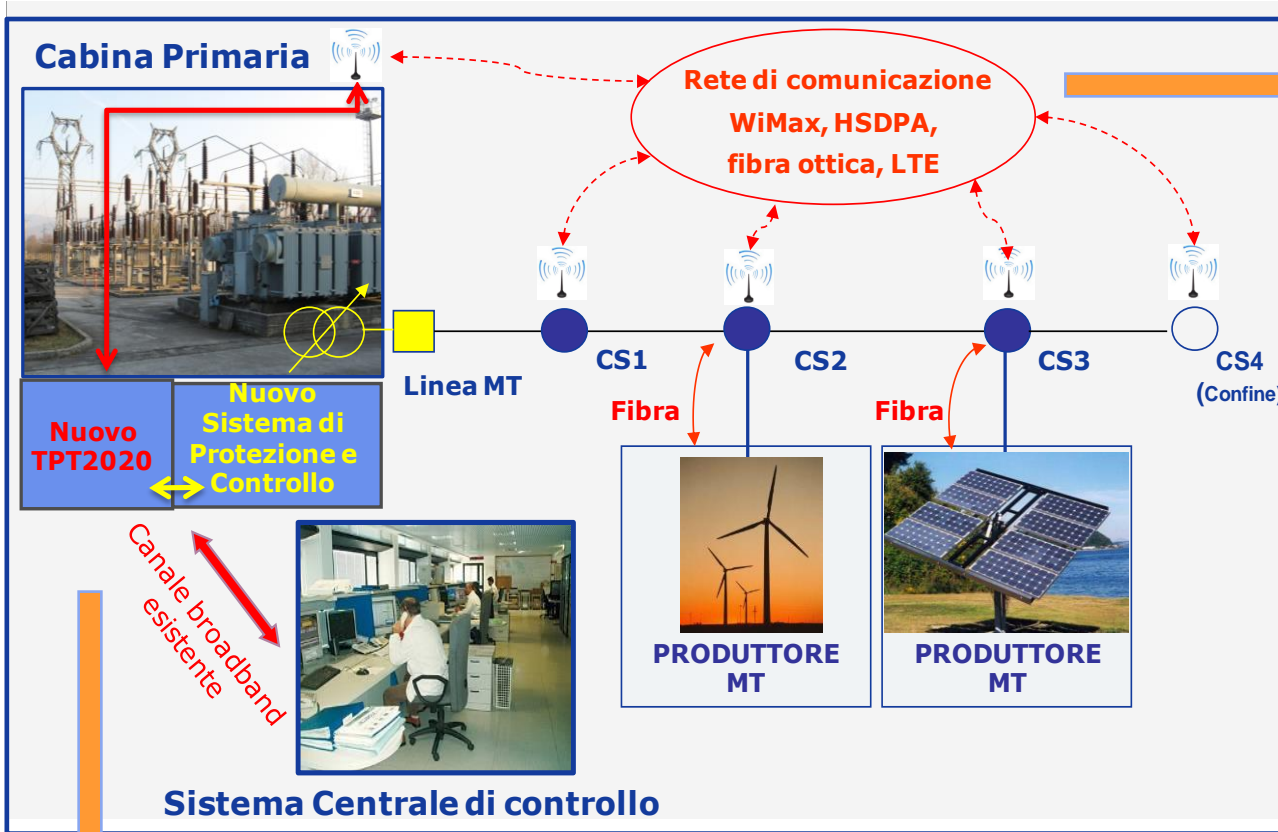
Isernia Project

Measurement collection, DG production forecasting and data transmission towards TSO systems



Isernia project

DG Management: Telecommunication and Primary substation



Wireless

The competition for this service was won by Telecom Italia that will provide LTE (4G) connectivity for about 70 secondary substations



Optical fiber (ADSS)

Section 1: Carpinone-Carovilli
Section 2: Carpinone- Carpino

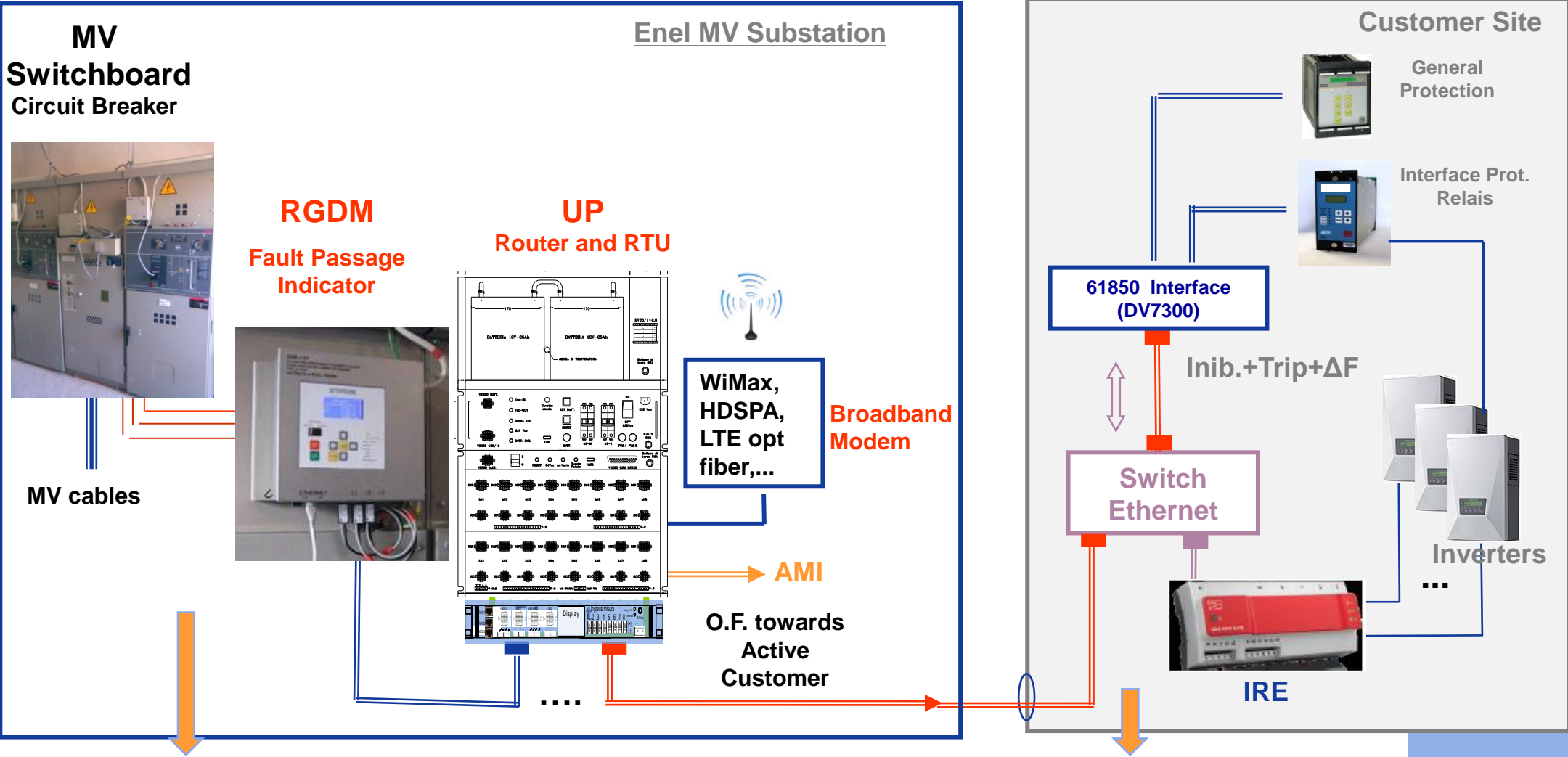


TPT2020 + Centralized Protections (Carpinone + Carovilli):
in operation within December 2013;

New transformer Panel (PIT): in operation within December 2013

Isernia project

DG Management: Secondary substations and producers



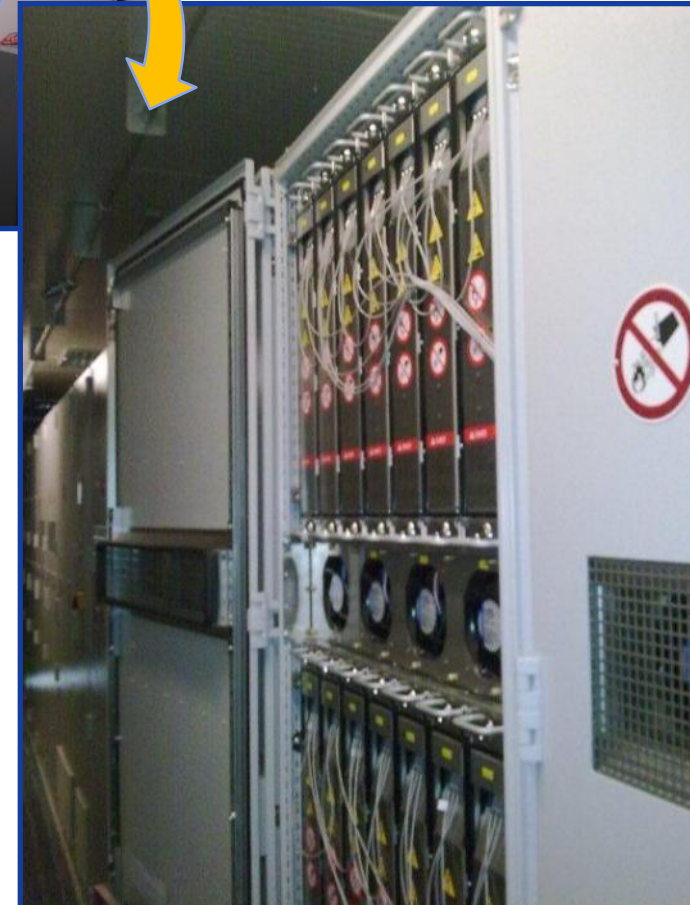
RGDMs + MV Switchboard (DY800)
 Installation = done;
UP + Routers + Modem: within March 2014

DV7300 + Ethernet Switch: within Sept. 2014
IRE: within September 2014

Isernia Project

Energy Storage System

Battery Technology: Li-ion
Maximum Power: 1 MVA
Energy Capacity: 500 kWh
Number of Cycles: 2000
Efficiency: 85%
Installation Area: 90 m²



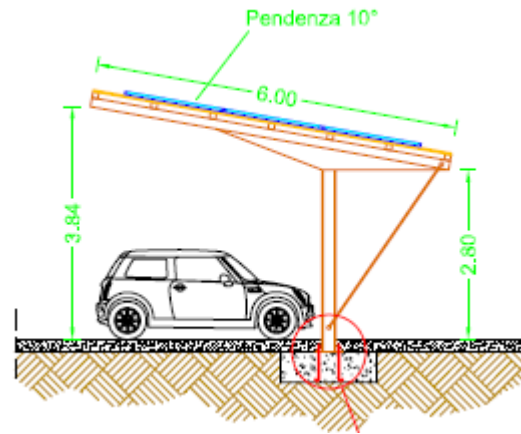
Basic functions (P,Q,cosφ): in operation;

Advanced functions: September 2014;
(Peak shaving, voltage regulation,
optimization functions and integration with
recharging station)

Isernia Project

Electric Vehicles 1/2

Uso: AZIENDALE

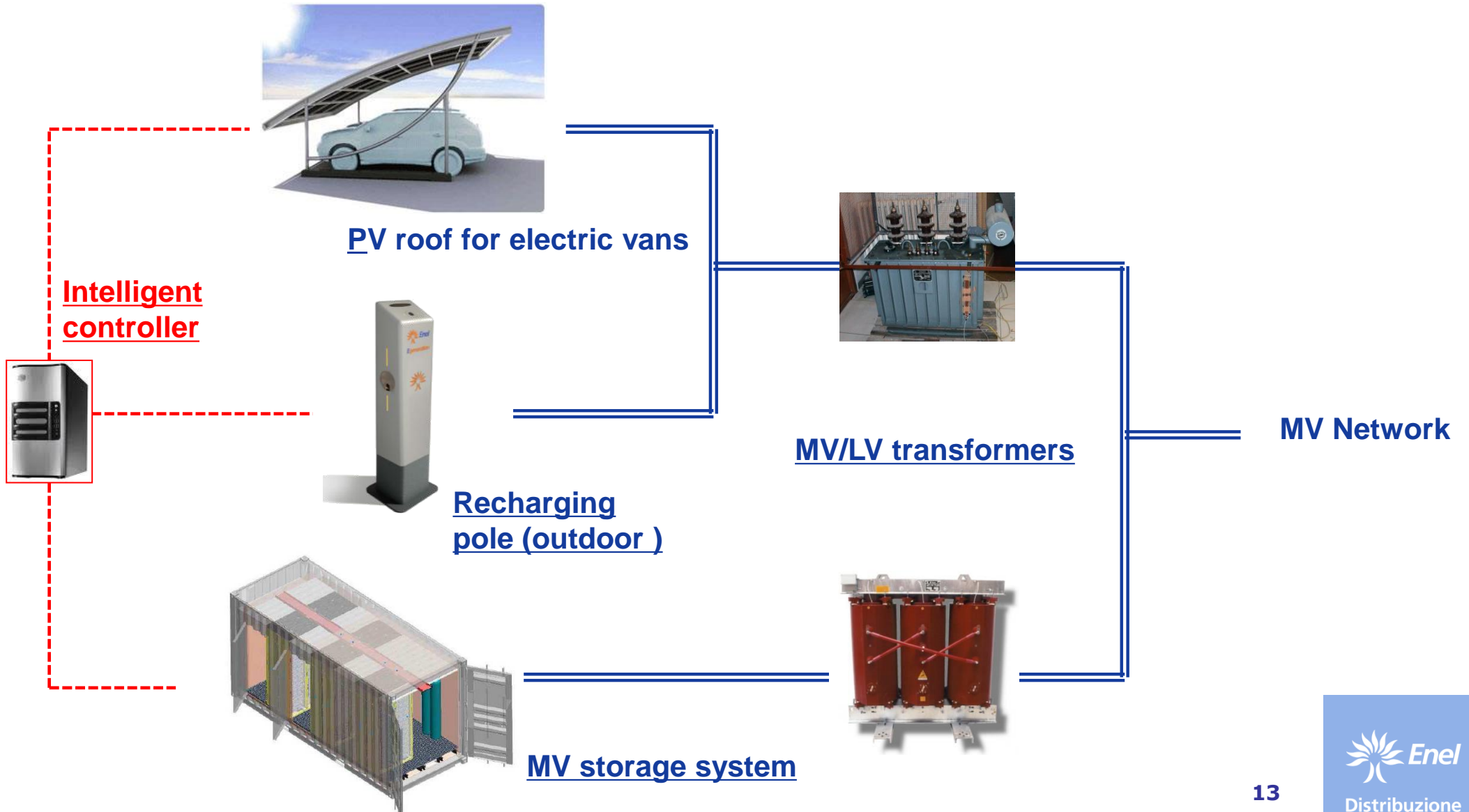


5 Renault Cangoo to be used by Enel Crews (average trip: 90km per day)



Isernia Project

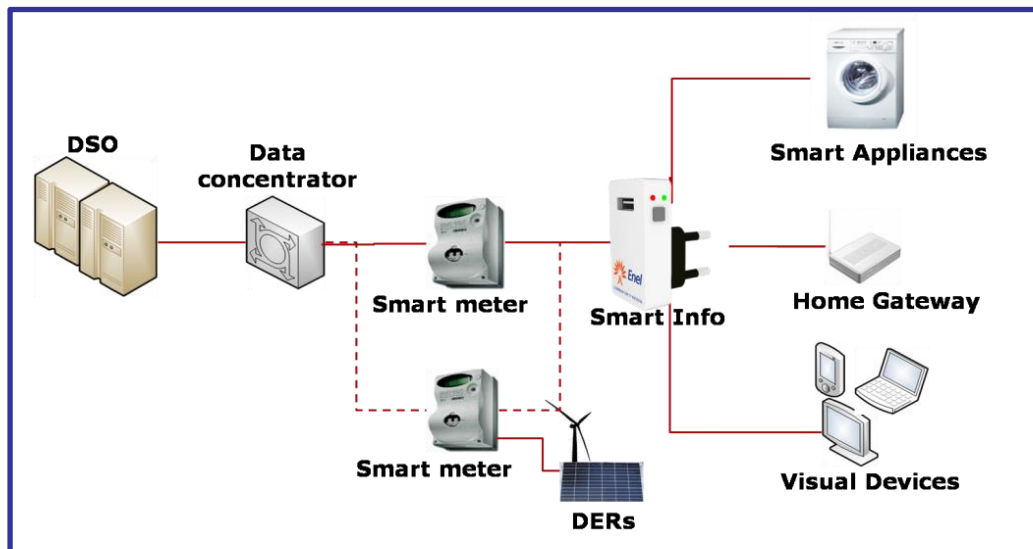
Electric Vehicles 2/2



Isernia Project

Smart Info: Overview

The project includes the installation of approximately 8,000 devices in order to increase the participation of the end user to the electrical system and promote an efficient use of energy;
it gives the customer readable information on energy consumption and provides home controllers with data for load management (home automation)



Smart Info is based on Enel remote metering system activated more than 10 years ago, on the whole national territory:

- plugged into one of the house electricity sockets;
- univocally associated to customer's own meter;
- makes consumption or generation data available.

Isernia Project

Smart Info: Main functions of Enel Info+

SEE: Smart Info Display

- Current, historical, tendency consumption
- Tariff time bands notification
- Power/Consumption limits monitoring
- Contractual data visualisation
- Messages from SO
- Extra information (date, hour...)

ANALYSE: Smart Info Manager

"SEE" plus:

- Detailed analysis of load profile
- Comparisons in time
- Comparison generation vs consumption
- Energy efficiency suggestions

EXPLORE: Smart Info Mobile

"SEE" + "ANALYSE" accessible from a smartphone



Data Analytics



Isernia Project

Enel Info+: 2013 activities

- Progress: **3300** households recruited (~30% of the invited households)
- Forecast 2013: **4500** households
- Project launched in **19** towns with dedicated events



Enel Info+ Kit



Isernia Project

Lesson learned



Unexpected component costs:

- Telecommunication (LTE, Optical fibre, Routers, and switches);
- IRE interface.



Difficulties and time consuming activities:

- To involve producer and to equip their plants;
- To involve people in Enel smart info trial;
- To involve the main European producers of inverters;
- To obtain permission for PV power plant.

