Demonstration of 5G solutions for SMART energy GRIDs of the future
Energy Vertical
Traditional grid

Power Transmission
Transmission System Operator (TSO)

Power generation

Power Distribution
Distribution System Operator (DSO)

Customers
Market Operators
How we arrived here today?
H2020 ICT-41-2020 Call for proposal: challenges, scope and impact

Specific vertical sector
Open Source repository
NetApps
50% of SMEs
Third party markets
Structure of the project

Overall project plot

- Kick-Off
- Use cases
- Integrated 5G network facility and open repositories
- Open 5G Platform Architecture and Technical requirements
- Technology Readiness Evolution for NetApps Development
- NFV automatic testing and validation framework
- Roadmap for third party experimentation
- Four advanced 5G real-life demonstrators
- Impact creation
- Market analysis, business models and exploitation
- Finalization of goals and results
- Liaison and Interaction with 5G-PPP Program

Smart5Grid
Objective #1
To specify the critical architectural and technological enhancements from previous 5G PPP Phases needed to fully enable an open experimental platform for the Energy vertical.

Objective #2
To design, deploy, operate, and evaluate in real world conditions the baseline system architecture and interfaces for the provisioning of an integrated, open, cooperative, and fully featured 5G network platform, customised for smart energy distribution grids.

Objective #3
To develop an open NetApp repository. In conjunction with the 5G network facility, the Open Service Repository will have access to network resources and it will be used to develop and accommodate NetApps, providing rapid access and execution environment to developers, third parties, and SMEs from the energy vertical sector.

Objective #4
To develop high-performance NetApps that will support the ambitious Smart5Grid energy-oriented use cases.

Objective #5
To provide a Validation and Verification (V&V) experimentation framework for NetApp automatic testing, certification, and integration

Objective #6
To realise four advanced 5G real-life demonstrations over a wide set of energy related use cases. To exhibit that performance has been conforming to 5G PPP KPIs

Objective #7
To conduct a market analysis and to establish new business models. Detailed techno-economic analysis and road mapping towards exploitation and commercialisation by industry partners and SMEs are also of high priority for the project.

Objective #8
To ensure maximisation of Smart5Grid impact to the realisation of the 5G vision by establishing close liaison and synergies with 5G PPP Phase-2 and 3 projects and the 5G PPP. To pursue extensive dissemination and communication activities, as well to assess the perceived impact from the stakeholders and the wider community.
Smart5Grid
Demonstration of 5G solutions for SMART energy GRIDs of the future

GENERAL INFORMATION

THE CONSORTIUM
24 EUROPEAN PARTNERS
COVERING 7 EU STATES

DURATION
3 YEARS

TOTAL BUDGET
8M€
Consortium Composition
24 partners, 2 Linked Third-parties, 13 SMEs

Coordinator
enel

Tech Companies
ENGINEERING
Atos

TELCOs
v3
OTE
NET IS SAT

Universities/Research institutions
Hellenic Republic National and Kapodistrian University of Athens
University of Cyprus

DSOs
e-distribuzione
e-distribución

TSOs

SMEs
EightBells
INFO Lysis
SC
NBYCOMP
NearbyComputing

(Linked third-parties of Enel GI&N)
Main expected outcomes and opportunities
- Open NetApp Repository
- Test and validation facility
Italian Demo | Olbia
Automatic Power Distribution Grid Fault Detection

Spanish Demo | Barcelona
Remote Inspection of Automatically Delimited Working Areas at Distribution Level

Bulgarian Demo | (Southern region)
Millisecond Level Precise Distribution Generation Control

Bulgarian-Greek Demo | (Cross-border)
Real-time Wide Area Monitoring
UC1 (DSO - Operations) Automatic Power Distribution Grid Fault Detection

E-Distribuzione developed the most advanced grid automation system, that is able to reconfigure the grid during an outage, minimizing the number of affected customers. This system will be tested using the 5G infrastructure in a real life environment.

UC2 (DSO - Safety) Remote Inspection of Automatically Delimited Working Areas at Distribution Level

A system for monitoring the safety of people working in a power plant will be implemented using a private 5G facility. High resolution 3D sensors combined with AI will support workers during maintenance, avoiding to reach live parts of the power plant.
Energy Vertical
Smart grid

Power generation
Power Transmission
Transmission System Operator (TSO)
Power Distribution
Distribution System Operator (DSO)
Customers
Market Operators

Greek- Bulgarian demo
Bulgarian demo
Aggregator

Country border
High Voltage grid
Medium Voltage grid
Low Voltage grid
**Bulgarian and Greek demos**

**UC3 (Aggregator) Millisecond Level Precise Distribution Generation Control**

Smart5Grid will enable the connection of thousands of Medium Voltage (MV) and High Voltage (HV) level decentralised RESs units and their inverters, to a platform with installed 5G communication protocols, which will allow their aggregation and control in millisecond rates.

**UC4 (TSO-TSO) Real-time Wide Area Monitoring**

Smart5Grid aims to demonstrate the 5G virtual PDC capabilities for serving the Wide Area Monitoring of end-to-end electricity networks: from Distributed Energy Resources at Medium Voltage level operated by DSOs, to High Voltage level operated by TSOs, as well as inter-TSO cross border Regional Security Coordination.
Conclusions
Main project elements and expected results

- Open NetApp repository
- NFV automatic testing and validation framework
- Four advanced 5G real-life demonstrators
- Roadmap for third party experimentation
- Liaison and Interaction with 5G-PPP Program
- Impact creation and exploitation
Follow us!
Check out our channels

smart5grid.eu
Thank you!

Daniele Porcu
Project Coordinator
daniele.porcu@enel.com