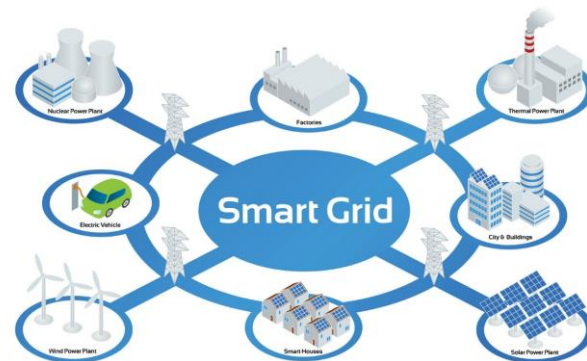


Romanian approach on investing in smart grids and good practices

Mihai MLADIN
Romanian Energy Center

2nd July 2019, Sofia, Bulgaria





Represents the voice of the Romanian energy sector in Brussels



Members cumulate over 72.000 employees and 15 bn. euro turnover



8 Horizon Europe (2020) projects



Energy diplomacy – Center for Dialogue and Cooperation on Energy projects 16+1

EUROPEAN PROJECTS IMPLEMENTATION



Renewables in a
Stable Electric Grid



SUCCESS - Securing
Critical Energy
Infrastructures



Wide scale demonstration of
Integrated Solutions and
business models for
European smart GRID



Enabling Smart
Energy as a Service
via 5G Mobile Network
advances



CROSS BOrder management of variable
renewable energies and storage units
enabling a transnational Wholesale market



SOGNO - Service
Oriented Grid for the
Network Of the Future



The vision of Romania's Energy Strategy

“growth of the energy sector in terms of sustainability, high efficiency and based on the latest technologies towards the new era of **smart grids**”

*“Without **serious upgrading of existing grids and metering**, renewable energy generation will be put on hold, security of the networks will be compromised, opportunities for energy saving and energy efficiency will be missed, and the internal energy market will develop at a much slower pace”*

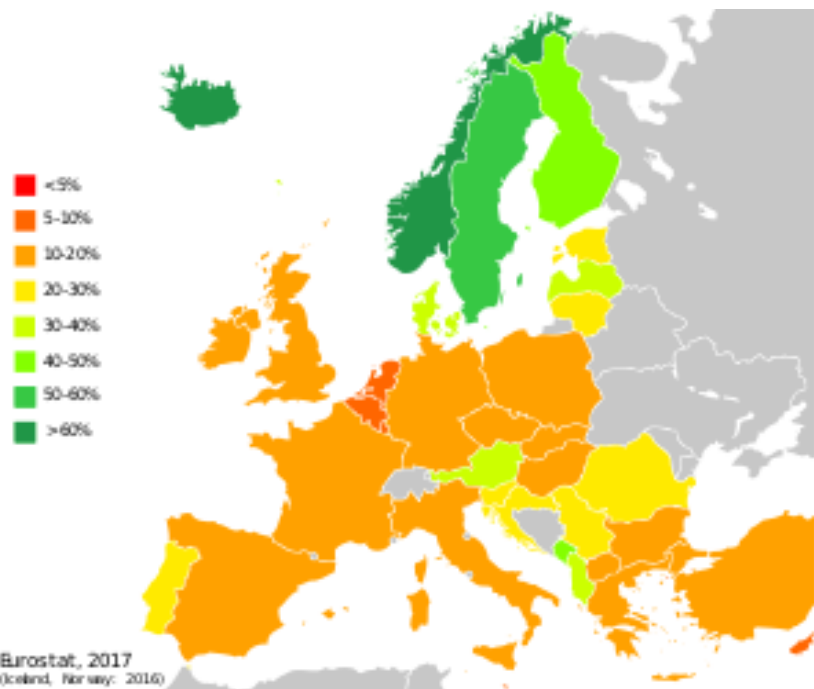
EC - Smart Grids: from innovation to deployment

Romania is aiming to promote evolved electricity distribution networks, considering:

- high share of RES-based distributed generation
- high reliability and resilience.



EC TARGETS ENABLING SMART GRIDS DEVELOP.



Share of renewable energies in gross final energy consumption in selected European countries (2017)

EC target of 32% RES up to 2030
Important trigger and enabler
for the smart grids development



New EC target recommendation for the
Romania: increased from 27% to 34%

According to recently published version of National
Energy and Climate Plans (NECPs), from June 18,
2019

TECHNOLOGIES QUALIFY FOR SMART GRIDS

- Deployment and integration of **distributed generation**, including renewable energy
- Development and incorporation of **demand response**, demand-side resources and **energy-efficiency** resources;
- Deployment and integration of **smart technologies for metering and monitoring energy use**, and of **smart appliances** for the grid management;
- Deployment of **advanced electricity storage** and **peak-shaving technologies**, including **plug-in electric vehicles** and thermal-storage air conditioning;
- Development of **standards for grid communication and interoperability**.

Smart Grids: “an upgraded electricity network to which two-way digital communication between supplier and consumer, intelligent metering and monitoring systems have been added



GOOD PRACTICES FOR SMART GRIDS ENABLING

NORM – the 3rd Smart meter generation developed in SUCCESS project

Enabling up to 100% RES Power Electronic Driven Grid

Turnkey cloud Services for DSOs enabling financial optimisation of their operations

Blockchain based Plug' n' Play 5G enabled Smart Meters facilitating real-time microgrid transactions



SUCCESS - Securing Critical Energy Infrastructures



Renewables in a Stable Electric Grid



SOGNO - Service Oriented Grid for the Network Of the Future



Enabling Smart Energy as a Service via 5G Mobile Network advances



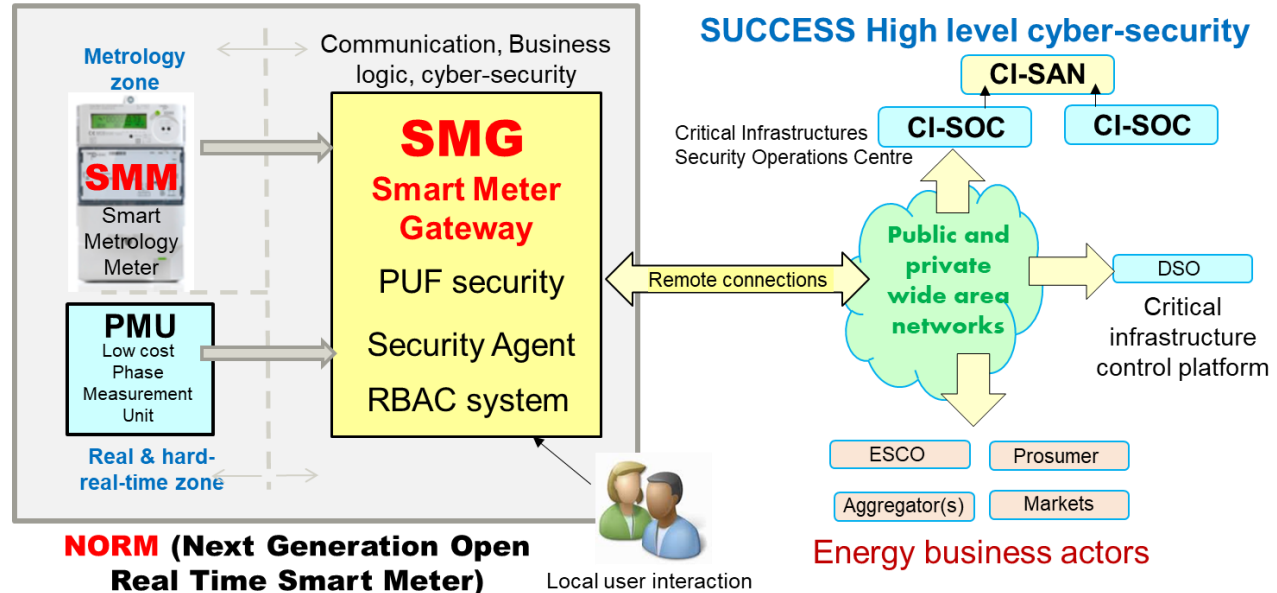
Good practices and knowledge transfer from EU H2020 projects

SUCCESS – SECURING CRITICAL ENERGY INFRA.



BUILDING ON SUCCESS Results – Business Case

NORM → considered as a potential future equipment to replace existing Smart Meters in the next wave of Smart Meters deployments → May be considered as a third generation.

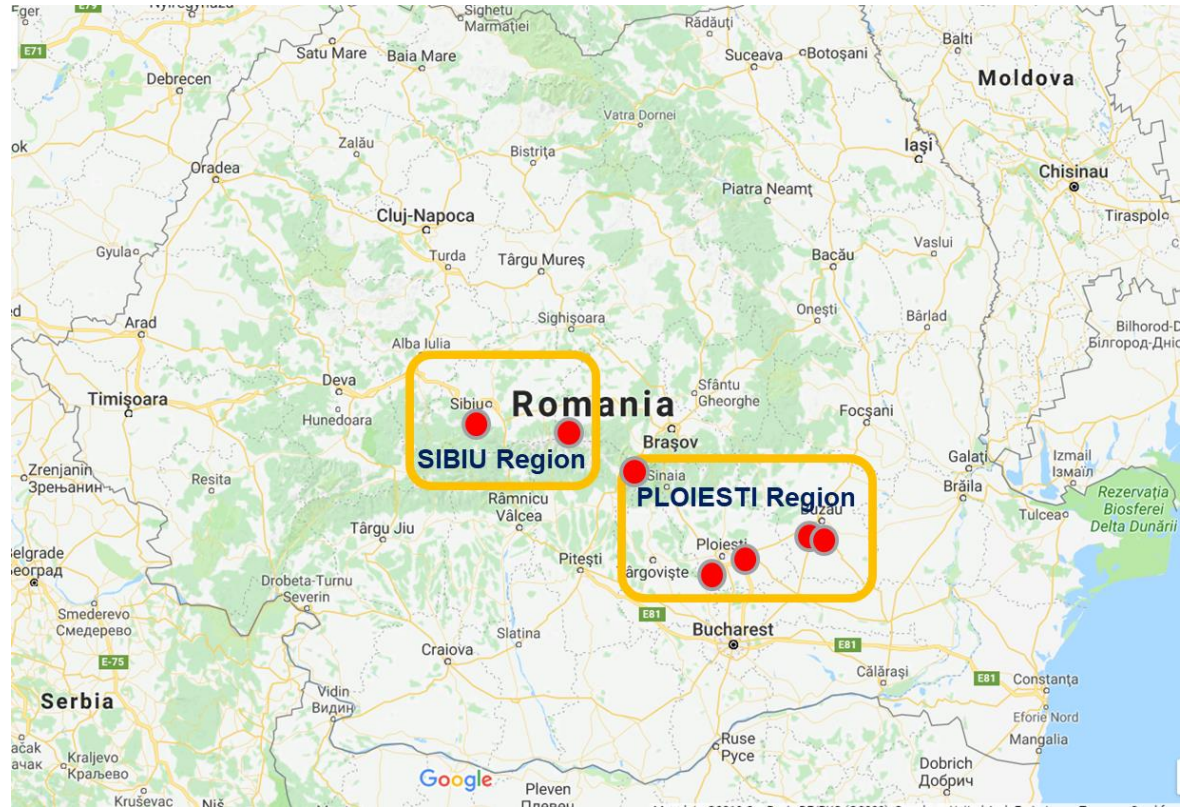


BUILDING ON SUCCESS Results – Digital Grid Pilot Project

CRE promotes setting up a Digital Grid Pilot Project (DG PP) targeting more than 5.000 users in Romania, building on the results of SUCCESS, enabling innovative applications and bringing added value through new services within the emerging Smart Decentralised Energy System.

SUCCESS FIELD TRIAL IN ROMANIA

SUCCESS has designed, developed and validated on small scale Field Trials a **novel holistic adaptable security framework** which is able to significantly **reduce the risks of cyber threats and attacks** when next generation, real-time, scalable, **unbundled smart meters NORM** are deployed in **Smart Electricity Grids**.



SUCCESS Romanian Trial: 7 NORM deployment

RESERVE – RENEWABLES IN A STABLE EL. GRID

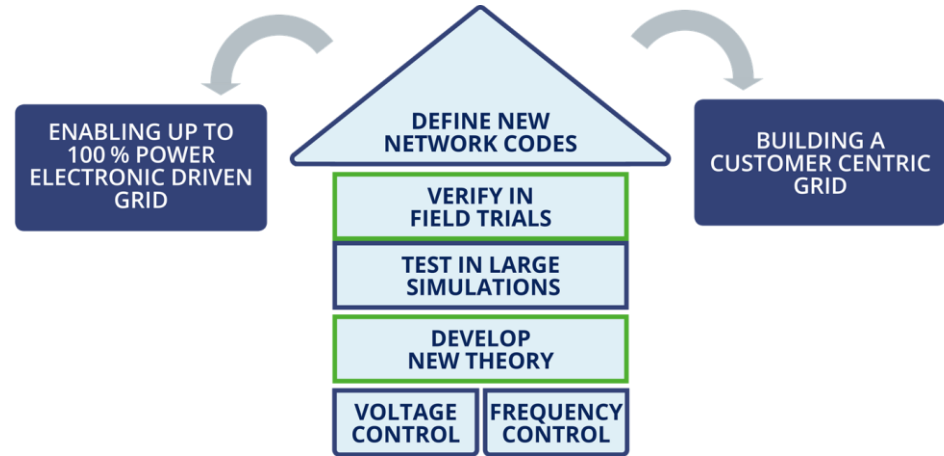
RESERVE Strategic Objective: To enable up to 100% penetration of renewable by developing innovative approaches to **system level automation** based on an innovative **ancillary service provision** to a close to market level of maturity.

High share of renewables

System support functions provided today by SYNCHRONOUS GENERATION

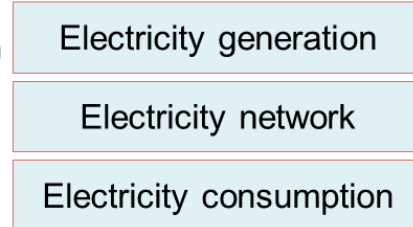
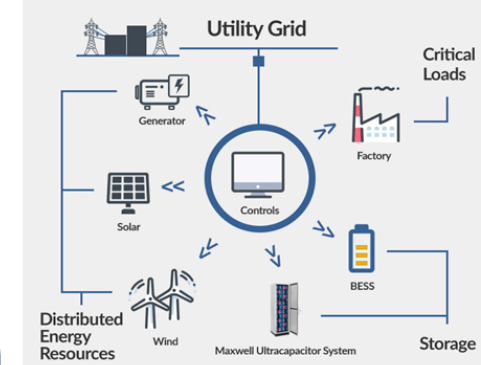
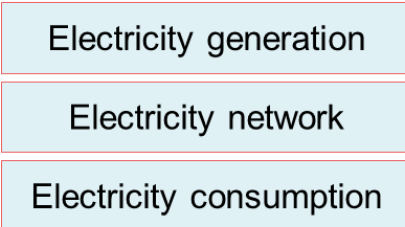
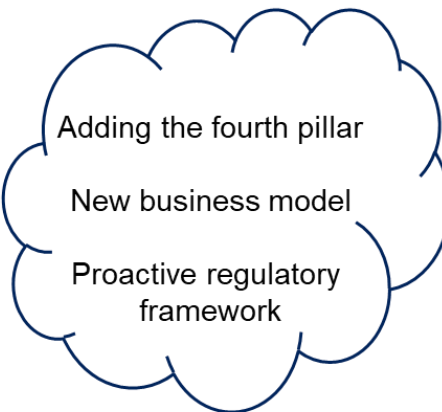
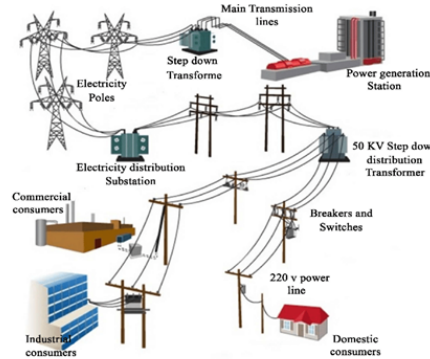
Up to 100% renewables

RENEWABLE GENERATION



RESERVE - A NEW POWER SYSTEM THEORY

- **Grid Automation framework for up to 100% RES tested and reviewed**
- **2 frequency control and 2 voltage control Scenarios developed**
- **Associated Ancillary Services and Network Codes updates defined**
- **Scenarios tested in simulation, deployed in Field Trials**

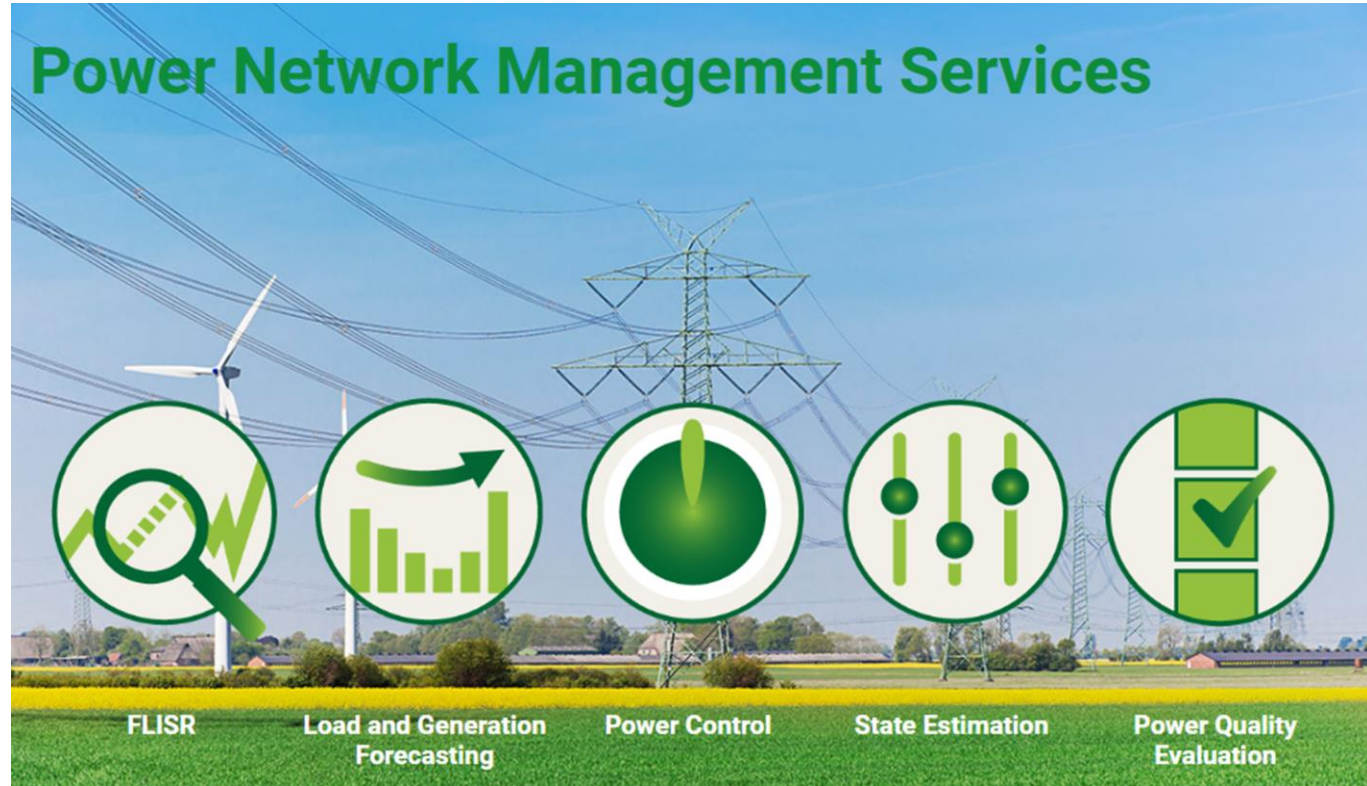



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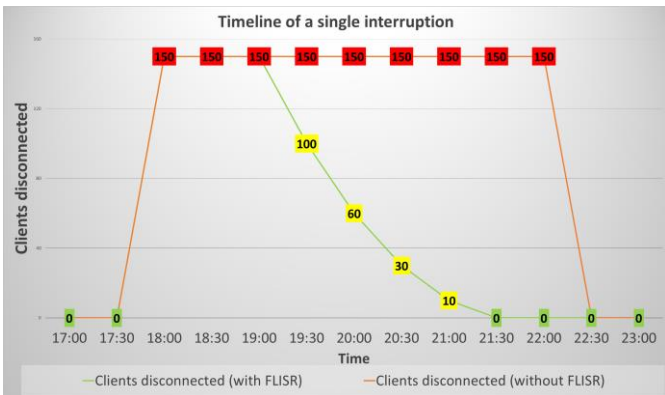


SOGNO – SERVICE ORIENTED GRID

Turnkey cloud services, implementing next generation data-driven monitoring and control systems, enabling financial optimisation of the DSOs operations



SOGNO SERVICES BUSINESS VALUE



Region in Romania	Babaita	
Grid level	LV	MV
Interruptions (No./year)	124	64
Penalty cost reduction	-17.39%	-32.77%

Illustration of FLISR
(Fault Location Isolation and Service Restoration)



More efficient Grid Operation
Reduced risk of contingencies
Incentives (or lower penalties) for reliable power supply
Incentives (or lower penalties) for quality of power supply

Reliability of power supply
Better quality of power supply
Smaller curtailments of power generation

Higher penetration of RES
More efficient use of energy sources and grid assets
Reduced needs for grid reinforcements



Thank you for your attention!



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