



SooGREEN addresses the need to reduce the energy consumption of services in different mobile network architectures, while taking into account the development of smart grids.

# SooGREEN

## MAIN FOCUS

- Modeling the energy consumption of services in different mobile network architectures taking into account the end-to-end path.
- Definition of KPIs for energy efficiency of services and adequate measurement and reporting methods (for energy efficiency standard evolutions).
- A joint dynamic optimization of the mobile access network and content delivery solutions.
- Design of energy efficient Virtualized and Centralized Radio Access Networks considering hardware, software, network link and cloud orchestration.
- Proposal of solutions for enabling the bidirectional interaction of the mobile network and the smart grid by exploiting the flexibility of some services and the energy storage capabilities in the network.
- An efficient passive cooling solution for central offices hosting centralized base stations.
- The optimization of the energy storage in base station sites of mobile access network, thanks to an innovative Battery Management System and a new energy concept of integrated fuel cell and in situ production of hydrogen by electrolysis.

## EXPECTED RESULTS

- Global models for end-to-end energy consumption of services (OTT, P2P, web browsing, IoT/WoT)
- Definition of adequate measurement data for energy consumption of services, and methodologies for correlating these in order to create KPIs for service energy consumption.
- An energy efficient Virtual RAN demonstrator.
- Solutions and demonstrators for improving the network energy efficiency by a joint optimization of network configuration and service parameters. This includes the dynamic reconfiguration of the access network parameters and the adaptation of the service delivery solutions.
- Demonstrator for efficient cooling solutions in telecommunication centers.
- Solutions for an adaptation of the service delivery in mobile networks to the smart grid.
- A demonstrator on the peak shaving capability.
- Enhanced storage capabilities enablers for increasing the energy autonomy of mobile network sites.

## IMPACT

- In a context where mobile network ecosystem evolves quickly with actors coming from software and Internet, SooGREEN industrial partners expect to benefit from the project results:
- Telecom manufacturers target to keep their leadership thanks to the performance optimization in virtualized network.
  - Mobile Network Operators are obliged to optimize their network costs, as well for CAPEX and OPEX, OPEX that are currently being dominated by Energy costs.
  - Mobile Network Operators target at playing a central role through connection and control of connected objects.
  - Telecom Operators will profit from smart grid development for diversifying their offer.

## PARTNERS

**FRANCE**  
Alcatel-Lucent Bell Labs  
Arelis Broadcast SAS  
Ataway  
Institut Mines Télécom  
Lemasson  
Orange SA  
Université de Caen

**FINLAND**  
Elisa Corporation  
Nokia Oy

**PORTUGAL**  
Eurico Ferreira Portugal  
INESC TEC

**SWEDEN**  
MIC Nordic  
Flexenclosure  
KTH  
Tele2

**TURKEY**  
Polaran Ltd.

**PROJECT ID**  
C2014/2/14

**START DATE**  
1 July 2015

**CLOSURE DATE**  
30 June 2018

## COORDINATOR

Gwénaëlle Delsart  
Orange SA  
gwenaelle.delsart@orange.com