

# Net2DG

## Leveraging Networked Data for the Digital Electricity Grid

A Research and Innovation Action in Horizon 2020

Societal Challenge "Secure, clean and efficient energy" - Competitive Low Carbon Energy

### Efficiency and Reliability through Digital Technologies

Distribution System Operators (DSOs) assure the reliable and efficient electricity supply to geographically distributed customers. The medium-voltage and low-voltage (LV) grids are in most cases still designed and operated based on historical assumptions for consumption and generation profiles. Fault-localization in LV grids is to a large extent based on customers calls and subsequent inspection of grid components in the field. On the other hand, there is an increasing number of digital grid-related data sources, including smart meters at customer sites or smart inverters that connect storage or distributed generation (mainly from renewable energy sources), but the information from such sources has not yet been harnessed for grid planning and operation.

The Net2DG project will develop a proof-of-concept solution based on off-the-shelf computing hardware that uses available communication technologies to leverage measurement data from smart meters and smart inverters in LV grids. The Net2DG solution correlates these data with information from existing DSO subsystems, in order to enable and develop novel LV grid observability applications for **voltage quality, grid operation efficiency, and LV grid outage diagnosis**. The achieved observability is subsequently used by specifically developed novel control coordination approaches, which utilize the existing smart meter and smart inverter actuation capabilities in conjunction with selected existing DSO actuation for **voltage quality enhancement and loss minimization** in the LV grid.

The use of off-the-shelf components, the system level resilience and security solution, and the offered customizability of the Net2DG approach specifically address the needs of regional DSOs. Therefore, the Net2DG solution allows regional DSOs to become early adopters of digital technologies for LV outage diagnosis, grid operation efficiency optimization and voltage quality.

### A Digital Grid Distributing Fully Renewable Energy

The success of the Net2DG approach will enable regional DSOs to create value from smart meter and inverter data in a secure and privacy-protecting manner. It will enable DSOs to

1. detect and diagnose outages in low-voltage grids proactively and fast;
2. obtain a detailed measurement of the actual energy losses in the grid and subsequently reduce energy losses without investments into additional grid infrastructure
3. measure and predict voltage quality in the distribution grid and mitigate voltage quality issues without investments into additional grid infrastructure

As a consequence of the increased observability and novel control coordination, LV grid reinforcement investments of DSOs for **increased hosting of renewable generation** are expected to be reduced by 30% in comparison to the currently used worst case planning methods.

## Basic Data

Project Period	1.1.2018 – 30.6. 2021 (3.5 years)
Overall Project Volume	3,592 Mio EUR
Consortium	8 partners from 4 European countries
H2020 Energy Workprogramme Topic	Next generation innovative technologies enabling smart grids, storage and energy system integration with increasing share of renewables: distribution network
Call Statistics	54 proposals submitted, acceptance rate ~10%

## Consortium

Organization	City, Country	Scope
<b>Electricity Distribution System Operators</b>		
Stadtwerke Landau a.d. Isar	Landau a.d. Isar, Germany	Use-case provider, German field test
Thy-Mors Energi Service A/S	Thisted, Denmark	Use-case provider, Danish field test
<b>Technology Providers</b>		
Kamstrup AS	Skanderborg, Denmark	Smart Meter System Vendor
Fronius International GmbH	Pettenbach, Austria	Technology provider, manufacturer of smart inverters and supplier of related products and services
GridData e.K.	Anger, Germany	Energy data analytics solutions, Technical Coordinator of Net2DG
Resiltech SRL	Pontedera, Italy	ICT security and resilience
<b>Research</b>		
Aalborg University, Department of Electronic Systems and Department of Energy Technology	Aalborg, Denmark	Research on electricity grids, communication and control technologies, Project Coordinator
Technische Universität Wien, Institute of Energy Systems and Electrical Drives	Vienna, Austria	Energy Economics, Cost-Benefit Analysis

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