

Summary of the proceedings of the 1st Stakeholder Conference for projects SuSustainable, IGreenGrid and Singular, in Athens, Greece, 11th April 2014.

The SmartPV project was represented in the above Conference by three members of the project team, Ioannis Papageorgiou (Electricity Authority Cyprus), Monica Ioannidou Polemitis (Deloitte), and Eliza Loucaidou (Deloitte). The event was opened by the Chief Executive Officer of Hellenic Electricity Distribution Network Operator (HEDNO), who in his speech mentioned the five (5) FP7 projects that HEDNO participates in, and also presented the pilot projects taking place in Greece in the field of smart meters. Pedro Godinho Matos (Co-ordinator of the SuSustainable Project) welcomed the participants and presented the event's agenda. Moreover, Mrs. Irene Bonvissuto project officer of the three (3) projects SuSustainable (<http://www.sustainableproject.eu/>), IGreenGrid (<http://www.igreengrid-fp7.eu/>) and SiNGULAR (<http://www.singular-fp7.eu/home/>), on behalf of the European Commission, in her presentation mentioned the Energy Roadmap 2050, and emphasized in particular the Energy R&D Support in the framework of Horizon 2020 (5 Calls for Proposals for the period 2014-2015 - €100 mil. funding).

Presentations on the three (3) above-mentioned projects belonging to the same family followed, presenting the concept and objectives, the work package structure, the projects' footprints, functionalities, deliverables submitted so far and other relevant information (see attached). Important information could also be found during the Poster Session, where participants were able to observe the Projects' Posters which contained crucial information about the project. We were also able to observe a short demonstration of the Load and PV Forecasting Tool, as well as the Power Flow Simulation Tool developed by the National Technical University of Athens.

The event continued with a Panel Session, moderated by Prof. Hatziaargyriou of the National Technical University of Athens, touching about the following issues:

- DSO role towards the achievement of Europe's Energy Targets
 - Contributions of iGreenGRID, SiNGULAR and SuSTAINABLE
 - Which RES are more promising? (Micro Generation, Electrical Vehicles, Storage, ...)
 - 2010 vs. 2020 DSO – differences and similarities
 - Present and Future Role of DSOs
- How do the 3 projects contribute to the objectives
 - Grid codes
 - Flexibility
 - Data Management
 - Cyber security

The panelists included representatives of the EU projects iGreenGRID, SiNGULAR, and evolVDSO, as well as the European Distribution System Operators' Association for Smart Grids (EDSO4SG - <http://www.edsoforsmartgrids.eu/>). During this Conference SmartPV project members were able to meet participants of the other EU projects with the same topic, learn about their experiences so far and establish the links for future co-operation.

1st Global Joint Stakeholders Conference



Athens 11th April 2014



Venue: Hellenic Electricity Distribution Network Operator

20, Perraivou & 5, Kallirrois str. Athens - Greece

AGENDA

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|-------|---|--|
| 09h00 | Participant Reception | |
| 09h30 | Opening | Mr. Georgios Kollias (Hedno CEO) Mr. Pedro Godinho Matos (SuSTAINABLE Coordinator) |
| 09h45 | Key Note Speaker | Mrs. Irene Bonvissuto (European Commission) |
| 10h15 | <u>Projects Presentation</u> -iGreenGRID - SiNGULAR -SuSTAINABLE | Mr. Jesus Varela Prof. João Catalão Mr. Pedro Godinho Matos |
| 11h00 | Coffee Break + Poster Session | Projects Representatives |
| 11h30 | <u>Panel Session</u> Moderator: Prof. Hatziargyriou DSO role towards the achievement of Europe's Energy Targets <ul style="list-style-type: none"> • Contributions of iGreenGRID, SiNGULAR and SuSTAINABLE • Which RES are more promising? (Micro Generation, Electrical Vehicles, Storage, ...) • 2010 vs. 2020 DSO – differences and similarities • Present and Future Role of DSOs | <u>Panelists:</u> Mr. Jesus Varela (iGreenGRID Project) Prof. João Peças Lopes (SuSTAINABLE Project) Prof. João Catalão (SiNGULAR Project) Mr. Per-Olof Granström (EDSO4SG) Mr. Carlos Costa (evolvDSO EU Project) |
| 12h45 | Closing Remarks | Prof. Hatziargyriou |
| 13h00 | End of Session | |

IGREEN Grid



Demos



Integration of renewable energy resources into existing distribution grids using a smart planning, monitoring and control approach. The Methods use in this approach are:

- **Voltage Control:** Develop new planning rules, monitoring techniques and introduce robust active control where necessary.
- **Load Generation Management:** Customer engagement and automated load control using the Building Energy Agent.



Analysis which innovative grid concept is the most efficient solution in terms of environmental policy and energy management for Smart Grid concept implementation. The objectives of this demo are:

- Scientific development of grid concepts that are geared towards current and future customer requirements.
- Development of methods and tools.
- Implementation of a grid concept using the developed planning and resource principles in a test area.
- Further development of planning and resource principles for networks derived from the theoretical grid concepts.



Adapting the electric network in order to have a better integration of renewable energies into the network. The methods use in this approach are:

- Active data exchange with the wind power generator.
- Use of generation forecast and voltage regulation.
- MV/LV network automation improvement and development of new products.
- Determine the impact of RES on quality and reliability of energy supply.
- Multi-users/multi-services storage use



Deployment of a global intelligent electrical network solution, in order to get experience and knowledge in deploying and managing intelligent power systems. The objectives of this demo are:

- Interoperability and common open standards.
- DRES monitoring system based on state estimation.
- Improve the integration of existing DRES.
- Improving MV/LV observability, operation and maintenance.
- DSVC system for voltage stabilization in MV feeders and LV generators.
- Specification of a DRES Control Center.



Test under real field conditions new SmartGrids technologies (including storage systems). The Methods use in this approach are:

- Smart info gives customers easy access to their consumption and shall also play the role of a key element of a domestic network.
- Multifunctional storage to optimize the energy management, the load profiles and ancillary services to the distribution network.
- Substation automation through a dedicated communication infrastructure, a new automation logic for fault identification and for anti-islanding functionalities will be implemented.



Testing of advanced management tools and monitoring applications on DRES installations at MV networks. The Methods use in this approach are:

- Congestion Management.
- RES Hosting Capacity Estimation (and Management).
- Power Quality and RES Condition Monitoring.
- Reduction of network losses.
- Evaluation of Control Policies.



IGREEN Grid



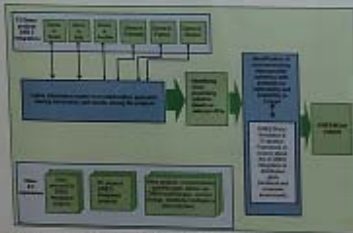
Introduction

IGREENGrid (Integrating Renewables in the European Electricity Grid) project focuses on increasing the hosting capacity for Distributed Renewable Energy Sources (DRES) in power distribution grids without compromising the reliability or jeopardizing the quality of supply.

Objectives

The core of IGREENGrid is to share knowledge and promote the best practices identifying potential solutions for the effective integration of DRES in the six existing Demo Projects in LV and MV grids participating to the project and validating them via simulation in other environments to assess the scalability and replicability at EU level.

Approach



- Select a family of local projects (or FPT initiatives).
- Using EEGI KPIs, establish an economic and technical evaluation framework and assessment methodology for the evaluation of different DEMO projects.
- Using EEGI approach, evaluate relevant DER integration initiatives and provide feedback to GRID.
- Using EEGI KPIs, evaluate and classify the solutions developed for the effective integration of DER in Europe.
- Identify the most promising solutions and learn lessons of DER penetration in distribution grids.
- Design and development of IGREENGrid simulation & evaluation framework in order to simulate and test these solutions.
- Share the knowledge about the different solutions based on real experience and simulation studies among the IGREENGrid DSOs.
- Produce guidelines for the DER future massive integration in distribution grids.

Key figures

| |
|---|
| Project coordinator: Iberdrola |
| 12 partners from six European countries |
| 8 DSO and 4 R&D institutes |
| 6 Demonstrators |
| 7 Work Packages |
| 32 Deliverables |
| Budget: 8,6 ME (EC grant 4,3 ME) |
| Execution period: 01/01/2013-31/12/2015 |

Results

IGREENGrid main final result will be a set of guidelines:

- Identification of barriers for DRES integration.
- Most promising solutions selection.
- Recommendations for the integration of DRES, methodologies and tools.
- Criteria to establish hosting capacity and to manage curtailment procedures.
- DRES: Guidelines for technical requirement, equipment manufacturers & technology providers.
- Assessment of the scalability and replicability at EU level (from technical, regulatory and economic point of view) of most promising solutions.

References

Website: <http://www.igreengrid-fp7.eu>

Partners





Smart distribution System operation for mAximizing the INtegration of renewABLe generation.

ENERGY2012.7.1.1: Integration of Variable Distributed Resources in Electricity Distribution Networks

Coordinator: ADG

Partners:

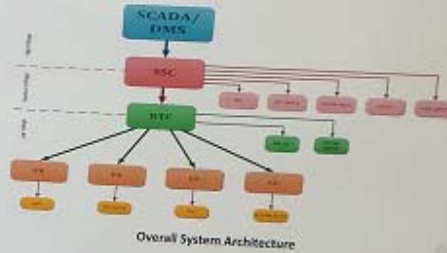


www.sustainableproject.eu

A reference architecture for distribution system control is proposed...

SuSTAINABLE Architecture

- Based on the one already deployed in the Inovgrid test site in Évora, Portugal;
- Main Objective → To allow large scale DER integration, namely DG based on variable RES in a secure and efficient way;
- This requires developing advanced algorithms and tools to support distribution system operation, namely Load / RES Forecasting, State Estimation and Voltage Control.



... including several different control layers...

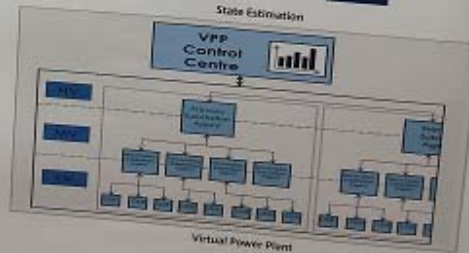
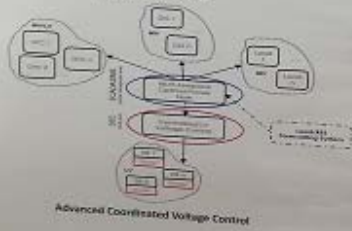
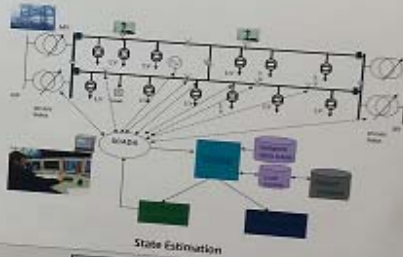


Functionalities and Control Layers

SuSTAINABLE Functionalities

- Advanced Functionalities will be implemented at each control layer (local / field, LV, MV and Central levels);
- MV functionalities will be at the functional level of the HV/MV primary substation but will reside at the Central SCADA / DMS level (distributed processing using parallel computing).

... with specific functionalities for distribution system control...



ENERGY.2012.7.1.1: Integration of Variable Distributed Resources in Electricity Distribution Networks

Coordinator: INESC Porto



Partners: INESC Porto MNH TU COMILLAS efacec HEDVO

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SuSTAINABLE experienced Smart Grid team is ...

SuSTAINABLE in Numbers

- 8 Partners + 7 Advisory Board Members
- 9 EU Member states involved
- Proof of Concept and Demonstration coordinated by DSOs
- 1 main Demonstration site using the existing project inovgrid – Portugal



... developing Smart Grids with a cloud-like concept ...



SuSTAINABLE Objectives

- Design and demonstrate new operation practices;
- Assess the impact in terms of DG hosting capacity;
- Provide a cost benefit analysis and recommendations;
- Analyze the scalability of the concept and propose a roadmap for replication.

... creating advanced tools towards an evolved DSO architecture ...

SuSTAINABLE Functionalities

- Load and Generation Forecast
- Coordinated + Local Voltage Control
- Technical Virtual Power Plant
- Grid Monitoring + State Estimation
- Advanced Protection Schemes
- ...



... validating in European reference Smart Grids Laboratories and Projects!

inovgrid
 Main Validation Site
 (Portugal)



Meltemi Test Site (Greece)



INESC Porto Lab (Portugal)



TU Berlin SENSE Lab (Germany)



ICES/NTUA Lab (Greece)





