European Research Infrastructure supporting Smart Grid Systems Technology Development, Validation and Roll Out

Project Overview and Trans-national Access Possibilities

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(Project Coordinator)
Project Fact Sheet

- H2020 call
  - INFRAIA-1-2014/2015: Integrating and opening existing national and regional research infrastructures of European interest

- Funding instrument
  - Research and Innovation Actions (RIA) Integrating Activity (IA)

- 18 Partners from 11 European Countries + 3 Third Parties involved

- Involvement of 19 first class Smart Grid labs

- 10 Mio Euro Funding from the EC

- ~1000 Person Month
Main Goals

- Supporting the technology development as well as the roll out of Smart Grid approaches, solutions and concepts in Europe with a holistic, cyber-physical systems approach.

- Integrating the major European research centres with a considerable, outstanding Smart Grid research infrastructure to jointly develop common methods, concepts, and procedures.

- Integrating and enhancing the necessary research services for analysing, validating and testing Smart Grid configuration.

- System level support and education for industrial and academic researchers in Smart Grid research and technology development is provided to foster future innovation.

- Strengthening the technical leadership of the European Research Area in the energy domain.
Overview ERIGrid Approach

- Leading research infrastructure in Europe for the domain of Smart Grids

- **Networking Activities (NA)**
- **Joint Research Activities (JRA)**
- **Trans-national Access (TA)**

**Holistic Validation Procedure (NAS)**
(iterative process)

**Smart Grid Configurations**
(Power + ICT system)

**System Validation and Testing Approaches**
(cyber-physical systems based)
- Virtual-based methods
- Real-world-based methods
- Combination of virtual & real-world-based methods (HIL)

**Validated Smart Grid System Configurations**
- Validated concept / architecture
- Substantiated comparison
- Test report
- Improvement and innovation potential
- Certificate

**Improved Methods and Tools (JRA2, JRA3)**
- Co-simulation / simulator coupling
- Integrated power system and ICT models
- Controller & Power HIL
- Laboratory experiments
- Cyber-security analysis and ICT-based assessment methods

**Distributed and Integrated Research Infrastructure (JRA1, JRA4)**
Installations for
- Component characterisation and small-scale system evaluation (Micro Grids)
- System integration and large-scale system testing

**Networking Activities (NA)**
- Joint Research Activities (JRA)
- Trans-national Access (TA)

**Stakeholder**
- Liaison with Initiatives and Associations (NA1)
- Dissemination and Communication (NA2)
- International Cooperation (NA2)
- Staff Exchange, Education and Training (NA4)

**User**
- Trans-national Access to ERIGrid Research Infrastructure (NA3, TA1, TA2)
  - Industrial user groups / vendors
  - Academic user groups
  - Project consortia (European & national projects)
Networking Objectives (NO)

- NO1: Integrated European Smart Grid research infrastructure
- NO2: Reinforced collaboration of key research institutions and industry / utilities fostering innovative Smart Grid solutions
- NO3: Staff exchange of researchers, technicians and research infrastructure managers
- NO4: Training / education of power system and ICT professionals
- NO5: International collaboration
Joint Research Objectives (JRO)

- JRO1: Technology development and roll out support
- JRO2: Development of advanced system validation method and tools
- JRO3: Common models, harmonized validation and deployment procedures
- JRO4: Implementation of advanced services in the integrated research infrastructure
Trans-national Access Obj. (TAO)

- **TAO1**: Provision of user access to research infrastructure of the main players in the Smart Grids European Research Area
- **TAO2**: Attracting industry-related user projects

### Facilities for improved component characterisation and Micro Grid validation (TA1)

*CEA, CRES, DTU, ENEL, ICCS, SIN, TEC, UST, VTT*

### Facilities for large-scale Smart Grid system integration and testing (TA2)

*AIT, DNVGL, ENEL, GINP, IWES, OCT, OFF, RSE, TUD, UST, VTT*

### Provided services to external users

<table>
<thead>
<tr>
<th>R&amp;D topic</th>
<th>Provided services to external users</th>
</tr>
</thead>
</table>
| DER components | - PV-inverter tests (component, integration)  
- Storage, charging devices test (component, integration)  
- ... |
| Development of new network components | - Test of new component concepts  
- Validation of advanced control methods for components  
- ... |
| Smart Grid ICT / Automation | - Validation of controller implementation and integration  
- Validation of communication protocols  
- Test of SCADA system developments and integration  
- Cyber-security assessment  
- ... |
| Co-simulation | - Co-simulation tests power grid ↔ communication network  
- Co-simulation tests power grid ↔ components ↔ communication network  
- ... |
| Real-time simulation and HIL | - Integration tests for inverter-based devices  
- Validation of new power electronic component topologies  
- ... |
| ... | ... |
Long-Term Cooperation

### Advanced Community

<table>
<thead>
<tr>
<th>Activity</th>
<th>Involved partners</th>
<th>Covered topics</th>
<th>Input for ERIGrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP7 DERri</td>
<td>AIT, CEA, CRES, DERlab, DNVGL, DTU, ICCS, IWES, RSE, TEC, UST, VTT</td>
<td>Research infrastructure supporting DER topics</td>
<td>HIL testing methods for DER, lab-procedures for testing DER, experiences from TA projects</td>
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<tr>
<td>FP7 SOPHIA</td>
<td>AIT, CEA, CRES, DERlab, DTU, IWES, OFF, RSE, SIN, TEC, UST, VTT</td>
<td>Research infrastructure supporting PV components and systems</td>
<td>Lab-procedures for testing PV systems and components, experiences from TA projects</td>
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<tr>
<td>FP7 ELECTRA IRP</td>
<td>AIT, CEA, CRES, DERlab, DNVGL, DTU, ENEL, GINP, ICCS, IWES, RSE, TEC, UST, VTT</td>
<td>Architecture and concept of the future European electricity system</td>
<td>Requirements for operating future Smart Grids, Smart Grid concepts, inputs for roll out scenarios</td>
</tr>
<tr>
<td>FP7 COTEVOS</td>
<td>AIT, DERlab, DTU, IWES, RSE, TEC</td>
<td>Concepts, capacities and methods for testing EV systems</td>
<td>Experiences for testing EV systems (incl. charging stations)</td>
</tr>
<tr>
<td>FP7 STAR-GRID</td>
<td>DERlab, IWES, RSE, TEC</td>
<td>CSA analysing standardization activities for Smart Grids</td>
<td>Comprehensive overview of Smart Grid standardization activities</td>
</tr>
<tr>
<td>FP7 GRID+</td>
<td>AIT, RSE, SIN</td>
<td>CSA providing operational support for the development of EEGI</td>
<td>Industrial perspective on future Smart Grid developments, requirements for roll out scenarios</td>
</tr>
<tr>
<td>IEA ISGAN / SIRFN</td>
<td>AIT, DERlab, GINP, IWES, RSE, DNVGL, TEC, UST, VTT</td>
<td>International Smart Grid research facility network</td>
<td>International activities related to Smart Grid research facilities (incl. requirements and concepts)</td>
</tr>
</tbody>
</table>
Project Plan

MGT: Project Coordination and Management (AIT)

Networking Activities (NA)

NA1: Innovation and exploitation management (DVNGL)

NA2: Dissemination, Communication and International Collaboration (DERlab)

NA3: Organisation and Management of Trans-national Access User Projects (TEC)

NA4: Training/Education of Power Systems and ICT Professionals, (Young) Researchers, ...

ICCS)

NA5: Holistic System Integration and Testing Procedure (OFF)

Sharing of knowledge, harmonization, training, and dissemination

Joint Research Activities (JRA)

JRA1: Use Case / Scenario Identification, Analysis and Selection (VTT)

JRA2: Co-Simulation based Assessment Methods (TUD)

JRA3: Integrated Laboratory-based Assessment Methods (IWES)

JRA4: Implementation and Demonstration of Use Cases / Scenarios in the Integrated RI (RSE)

Improves research services and integrates them

Trans-national Access Activities (TA)

TA1: Facilities for improved component characterisation and Micro Grid validation (DTU)

(CEA, CRES, DTU, ENEL, ICCS, SIN, TEC, UST, VTT)

TA2: Facilities for large-scale Smart Grid system integration and testing (UST)

(AIT, DVNGL, ENEL, GINP, IWES, OCT, OFF, RSE, TUD, UST, VTT)

Provides trans-national access to outstanding facilities

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EU H2020 Programme GA No. 654113

Projet Summary 08/05/2017
Strong Stakeholder Group Support

- 35 support letters received
  - National, European and international networks
  - Technology platforms
  - Industry (manufacturers, vendors – power & ICT system)
  - Utilities / grid operators
  - Standardization bodies
  - Research institutes
  - Public bodies / national authorities
Access to Infrastructures (labs)

- Free of Charge
  - ERIGrid is supported by the H2020 programme of the European Commission under the research infrastructure funding scheme
  - Access to research infrastructures is called Trans-national Access
  - Access and use of the installations (labs) is absolutely free of charge for users (industrial and academic)
  - All expenses, including travel and accommodation are reimbursable, under the conditions agreed with the hosting infrastructure
Access to Infrastructures (labs)

- Who?
  - Accordingly with the EC Rules for Transnational Access the following Rules for eligibility of the Users Groups being access yield
  - The user group leader and the majority of the users must work in an institution established in a Member State or Associated State
  - The user group leader and the majority of the users must work in a country other than the country(ies) where the legal entity(ies) operating the infrastructure is(are) established
  - Only user groups that are entitled to disseminate the foreground they have generated under the project are eligible to benefit from access free of charge to the infrastructure
Access to Infrastructures (labs)

- When?
  - After the acceptance, the experimental access time interval will be allocated in the next part of the year, therefore allowing sufficient time for the hosting facility and the user group to agree on the technical and administrative details of the experiment activity.
Coordinator Contact

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