Smart Grid International Research Facility Network (SIRFN)

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Experimental research and DER integration in the EU Energy System
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What is ISGAN?

• International Smart Grid Action Network =

Platform to bring high-level government attention and action to accelerate the development and deployment of smarter, cleaner electricity grids around the world.

• Activities build a global understanding of smart grids, address gaps in knowledge and tools, improve peer-to-peer exchange

• Includes representatives of governments, national laboratories and research institutions, transmission and distribution system operators, power generators, and others from 24 countries and E.C.

• An initiative of the Clean Energy Ministerial

• Organized as the Implementing Agreement for a Co-Operative Programme as Smart Grids (ISGAN)

Visit iea-isgan.org  
Member of the
ISGAN Participants

Contracting Parties: 25
Newest Participants:
E.C. (Feb. 2013)
South Africa (Feb. 2013)
Singapore (May 2013)
**Build Global Understanding and Tools, Foster Peer Exchange**

<table>
<thead>
<tr>
<th>ISGAN P Priorities</th>
<th>Building Knowledge Sharing by Design</th>
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<tbody>
<tr>
<td><strong>Catalogue Drivers, Priorities and Projects</strong></td>
<td><strong>Qualitative and Quantitative Analysis</strong></td>
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<tr>
<td>• Motivating drivers and technology priorities for smart grids</td>
<td>• Internationally-comparable case studies; casebooks</td>
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<td>• Inventory of key projects</td>
<td>• Methodologies for benefits &amp; costs, grid “smartness”</td>
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<td>• Lessons learned</td>
<td>• Integrated tools</td>
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<tr>
<th><strong>Lab &amp; Test Bed Network</strong></th>
<th><strong>Knowledge Sharing by Design</strong></th>
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<tbody>
<tr>
<td>• Evaluate smart grid concepts and technologies</td>
<td>• Translate complex data/info to inform decision making</td>
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<td>• Focus on niche between R&amp;D and commercialization</td>
<td>• Outreach &amp; education (e.g., discussion papers, webinars)</td>
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Where possible, common contextual information, metrics, KPIs
**Current ISGAN Work Program**

<table>
<thead>
<tr>
<th>Foundational Projects</th>
<th>Technical Projects</th>
<th>New Project*</th>
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</thead>
<tbody>
<tr>
<td><strong>Annex 1:</strong> Global Smart Grid Inventory</td>
<td><strong>Annex 2:</strong> Smart Grid Case Studies</td>
<td><strong>Annex 5:</strong> Smart Grid International Research Facility Network (SIRFN)</td>
</tr>
<tr>
<td><strong>Annex 3:</strong> Benefit-Cost Analyses and Toolkits</td>
<td><strong>Annex 4:</strong> Synthesis of Insights for Decision Makers**</td>
<td><strong>Annex 7:</strong> Smart Grid Transitions (Institutional Focus)</td>
</tr>
<tr>
<td><strong>Annex 6:</strong> Power T&amp;D Systems</td>
<td><em>Approved by ISGAN Executive Committee in March 2013</em></td>
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**Knowledge sharing by design**
The Smart Grid International Research Facility Network (SIRFN) is a coordinated network of Smart Grid research and test-bed facilities and selected projects in countries participating in ISGAN.

SIRFN’s collaborative test and evaluation capabilities can be leveraged by the international community (in particular, ISGAN Participants) to enable improved design and implementation of smart grids.
SIRFN’s Niche

- Leverage existing research infrastructure – world class labs & test beds
- Diversity in geography, networks and infrastructures enhance value of comparisons and sharing of best practices
- Implement complementary and effective pilot projects

SIRFN...

- targets the niche between R&D and commercialization.
- will be informed by tech. development processes
- will inform demonstration projects, ideally
- will likely not directly address certification or standards conformance (but could inform those processes)
## Current SIRFN Participants

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<thead>
<tr>
<th>Country</th>
<th>POC</th>
<th>Organization(s)</th>
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<tbody>
<tr>
<td>Austria</td>
<td>Helfried Brunner, Roland Bründlinger</td>
<td>Austrian Institute of Technology</td>
</tr>
<tr>
<td>European Commission</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>France</td>
<td>Nouredine Hadjsaid</td>
<td>Grenoble Institute of Technology</td>
</tr>
<tr>
<td>India</td>
<td>V. Shiva Kumar</td>
<td>Central Power Research Institute</td>
</tr>
<tr>
<td>Ireland</td>
<td>Joe Durkan</td>
<td>Sustainable Energy Authority of Ireland</td>
</tr>
<tr>
<td>Italy</td>
<td>Maurizio Verga</td>
<td>Ricerca sul Sistema Energetico (RSE)</td>
</tr>
<tr>
<td>Spain</td>
<td>Angel Diaz-Gallo</td>
<td>TECNALIA</td>
</tr>
<tr>
<td>U.S.</td>
<td>Russ Conklin, Charlie Hanley et al</td>
<td>US DOE and DOE Labs: SNL, BNL, PNNL, ORNL, NREL, ANL</td>
</tr>
<tr>
<td>Korea</td>
<td>Chung Ha KOH</td>
<td>Korean Agency for Technology &amp; Standards (KATS)</td>
</tr>
<tr>
<td>Finland</td>
<td>Kari Mäki</td>
<td>VTT Technical Research Centre of Finland</td>
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SIRFN Objectives and Approach

• Develop a comprehensive catalogue of facilities that can be used by participants, focusing on six key technical areas.

• Expand information sharing among facilities to include:
  o Non-proprietary results of current research
  o Best practices and methods
  o Internal efforts to improve and expand evaluation capabilities.

• Expand smart grid testing and evaluation capabilities by identifying gaps and coordinating joint research and evaluation efforts

• (Ultimate vision:) Create a framework for integrated project proposal, selection and implementation matching evaluation needs with testing capabilities and with a knowledge management program for sharing non-proprietary results
SIRFN Areas of Collaboration

- RENEWABLE ENERGY / DISTRIBUTED ENERGY INTEGRATION
- BUILDING AUTOMATION
- ELECTRIC VEHICLES INTEGRATION
- MICROGRIDS
- DISTRIBUTION AUTOMATION
- CYBER SECURITY

Activity In Progress

15 October 2013
ExCo5 - Annex 5 Update
SIRFN Tasks and Organization

- **Task 1: Definition and Development of SIRFN Management Structure**
  - Catalogue inputs from all participants
  - Catalogue organized by institution, country, and topic areas

- **Task 2: Information Sharing and Project Development in Six Technical Areas**
  - Leadoff activity in inverter test protocols proceeding
  - Activities in development for Distribution Automation and Renewable Energy/Storage integration with Forecasting
  - Grenoble workshop to expand first activity and concepts (June 2013)
  - Online area created for sharing internal documents, discussions and calendars

- **Task 3: SIRFN Knowledge Sharing**
  - ESCI page incorporated catalogue results
Task 1: Definition and Development of SIRFN Management Structure

- Improve the information available on smart grid test facilities and major demonstration projects to make the information more accessible and effective for both improving their capabilities and building a foundation for cooperation among institutions. Use this knowledge to form the basis of SIRFN, and develop a management structure to optimize the value of the network to the ISGAN community.

- **First activity**: Catalogue of participating facilities, updated as new members join
Task 2: Information Sharing and Project Development in Six Technical Areas

- This task seeks to bring together the technical experts in key topic areas to consider the current state-of-the-art in key smart grid topics, identify issues and opportunities where collaboration among test facilities would be most valuable, identify potential users and activities that could be served by SIRFN, and make recommendations for overcoming the obstacles to cooperation that can be specifically addressed by SIRFN.

- **First activity**: Solar PV inverter testing regarding “grid-facing” issues
- **Second activity**: Distribution Automation and utility simulation coordination and sharing of tools/results
- **Third activity**: RE, storage and forecasting to improve grid integration
Task 2 Leadoff Activity: Inverter Test Protocol

• Builds on collaborative work among Sandia, DERLab, UL, EPRI, IEC, IEEE, and NIST on inverter standards for key interactive functions (i.e., adjust power factor, voltage and frequency ride-through...)\(^1\)

• Will define test procedures for verifying that hardware adheres to emerging standards:
  
  o Procedures to become internationally-accepted basis to verify new advanced inverter capabilities
  
  o Reliable, comparable verification protocols helps ensure consumer safety, performance and durability -- the basis for widespread adoption.

Task 3: SIRFN Knowledge Sharing

- SIRFN requires a mechanism to share sensitive information among participating facilities and collaborate on work in progress. It also needs an area open to the public to provide access to the information tool developed in Task 1 and disseminate non-proprietary information and links to important test results, methods, and technical papers generated by SIRFN activities.

- This activity is restricted to expanding existing knowledge platforms to serve participants and potential users of SIRFN information. It will be coordinated with the information dissemination efforts of the other four ISGAN Annexes, particularly Annex 4: Synthesis of Insights for Decision Makers.

- **First activity:** Catalogue posted on existing knowledge platform, continued update of catalogue as members join
THANK YOU!


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Austrian Representative in Annex 5, SIRFN