The International Smart Grid Action Network

The International Smart Grid Action Network (ISGAN) was launched in 2010 at the inaugural Clean Energy Ministerial (CEM), an international meeting of energy and environment ministers and high-profile stakeholders. Under the auspices of the International Energy Agency (IEA) Technology Collaboration Programme on Smart Grids, ISGAN provides a platform for multilateral government collaboration for the continued research, development, and deployment of improved smart electric grid technologies, practices, and systems. ISGAN's unique convening role prioritizes international knowledge sharing on the development and deployment of smart grid technologies and polices.

ISGAN engages with partners around the world, including its 25 official participants: Australia, Austria, Belgium, Canada, China, Denmark, the European Commission, Finland, France, Germany, India, Ireland, Italy, Japan, the Republic of Korea, Mexico, the Netherlands, Norway, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, and the United States.

ISGAN operates from the understanding that robust, reliable, and smart electric grids support international greenhouse gas emission reduction goals and enable scaled-up deployment of clean energy technologies globally. This document highlights overarching policy and regulatory messages from ISGAN's work. For further information, visit *www.iea-isgan.org*.

Different approaches may be deployed to meet challenges faced by today's power grid stakeholders. Regulators and policy makers play a vital role in supporting the development of clean, sustainable solutions, taking new opportunities for consumers into account.

Smart grid solutions can be found across the entire electrical system, from the high-voltage transmission grid, to the distribution grid and finally to the consumer level. While there are no one-size-fits-all solutions, best practices shared through international collaboration can be adapted by countries to make local implementation faster and more efficient.

Grid extension solutions can be evaluated based on a set of criteria such as distance; development of infrastructure; terrestrial conditions; and population density.
Clear regulation and adherence to relevant technical requirements will increase the potential for microgrids to become long-term solutions, leading to an improved business case for all stakeholders.

Ensuring the efficient functioning of smart grid systems within different grid environments throughout the world requires modeling complex electricity systems.
A new quantitative approach enables modeling of large-scale systems that include transmission, substation, and primary and secondary distribution. This holistic approach provides a unified view of the system.

Highlight on ISGAN Smart Grid International Research Facility Network (SIRFN):

Development of Energy Storage Test Protocols

When properly integrated into the electric grid, distributed energy resources like solar photovoltaics can provide multiple benefits, which may be enhanced when combined with energy storage.

SIRFN and its cooperating laboratories discovered a need for a single procedure with an inclusive set of tests for grid support functionality to understand the performance qualities of energy storage when combined with distributed energy sources.

The team created a concise set of test protocols for interoperability and functionality evaluation. This work brought together five SIRFN laboratories: Sandia National Laboratories (United States), Austrian Institute of Technology, Ricerca sul Sistema Energetico (Italy), National Institute of Advanced Industrial Science and Technology (Japan), and Fukushima Renewable Energy Institute (Japan). These standards may provide the basis for international energy storage grid support function testing standards and support smart grid development.

Transformations in the electricity sector, such as the increasing integration of renewables – including distributed systems – and load responsiveness from a variety of types of consumers results in more flexible resources that can be harnessed to support transmission and distribution grid operation.
An ever-closer cooperation between system operators will be needed to take advantage of this flexibility in a cohesive fashion. There are several approaches for the coordinated use of flexibility for system balancing and congestion management.

The technical and non-technical solutions required for a closer interaction between transmission system operators and distribution system operators are very similar in most cases.
Several non-technical issues, or points of discussion, are closely related to the regulated environment of system operators that maintain a balance between infrastructure investments and use of flexibility, the role of markets, setting a level playing field for flexibility, and the role of regulation. With regard to all these issues, a clear policy framework can encourage investments in smart grid solutions to address grid operation challenges.

ISGAN's unique convening power brings governments, industry, and research institutions together to accelerate the speed and scale of smart grid research, development, and policy. For more information or to get involved, contact isgan@smartgrid.or.kr.