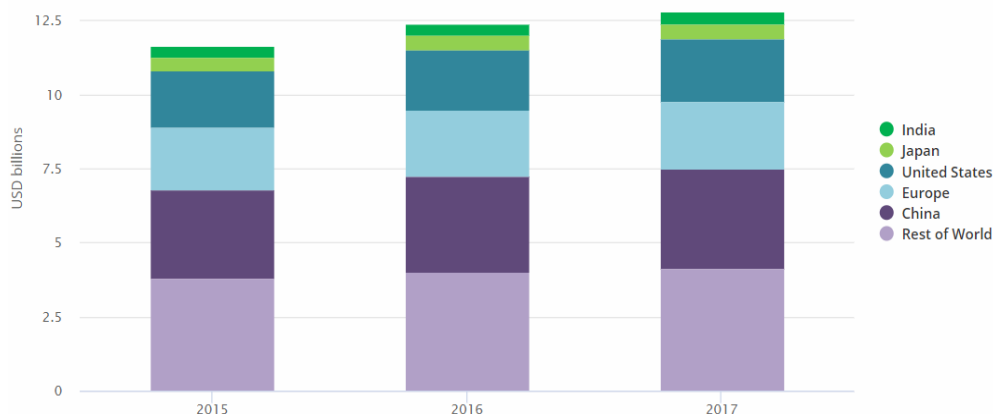


Synthesis of Insights for CEM10: “Smart Power Market Designs are Needed for Smart Grid Development and a Clean Energy Future”

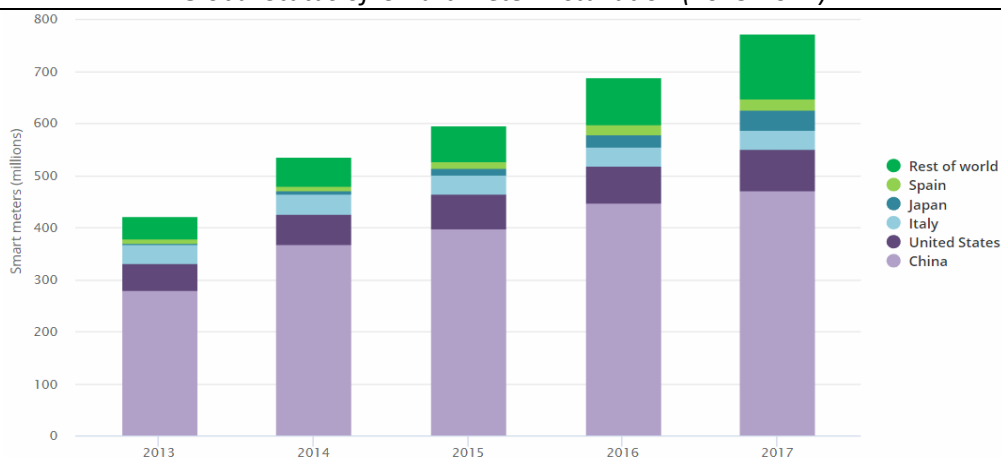
Around the world, investments in smart grid technologies and approaches, including smart meter deployment have grown rapidly in recent years. Increasingly, smart grids are playing a critical role for the affordable and reliable integration of clean energy technologies. To ensure that smart grids can continue to meet current and future power system challenges, there is a growing need for more adaptive regulatory frameworks and market designs that enable the development of innovative business models and accelerate market uptake. Challenges that smart grids will be expected to manage in parallel include:

- Integration and interaction among an increasingly complex and diverse set of clean energy technologies, including “sector coupling” across electricity, space heating/cooling, transport, etc.;
- Accommodation and coordination of all available sources of flexibility with the ability to improve system efficiency, maintain system reliability and resiliency, and manage costs;
- Increased use of local energy systems and microgrids including energy storage; and,
- Sustained engagement of a growing variety of power systems stakeholders in an increasingly connected society, taking advantage of new digital tools, business models and market roles that support delivery of data-driven energy services (beyond simple electric power).

Recent Trends of Smart Grid Investment (2015-2017)



Global Status of Smart Meter Installation (2013-2017)



Sources: IEA Tracking Clean Energy Progress (2019)

Regulatory Sandboxes, a Potential Enabler for Faster Smart Grid Deployment

There is a growing consensus among experts that technology is not the primary factor limiting smart grid deployment. Similar to the trends in other fields, rapid changes in energy technologies, economic environments and societal expectations – coupled with the present magnitude of energy-related challenges – are driving a need in the power sector for swifter, more agile policy reactions, in part to assure that the barriers to new products, business models, and services are minimised.

An ISGAN Knowledge Transfer Program (KTP) workshop in Stockholm in April 2019 brought together ISGAN experts and members of the International Confederation of Energy Regulators (ICER) to explore the added value from emerging experimental instruments, including “sandbox” programs and regulatory-innovation zones, which allow real-life testing of potential policy and regulatory solutions in limited, well-defined environments. The ISGAN KTP event highlighted how these instruments can be used by policymakers and regulators to more quickly gain experience with and evaluate new business models than through traditional policy-regulatory approaches. The workshop also drew attention to the need for effective coordination among all relevant actors in the smart grid innovation eco-system, including energy innovators, grid program and project owners, and policy-regulatory bodies.

Increasing the Flexibility of Power Systems is Key for Next Generation Electric Grids

Additional power system flexibility allows countries to reliably use more variable renewable energy in coordination with other clean energy sources, increase power system reliability and resilience to disruptions, improve system efficiency and performance, and reduce the investment needed for new and existing assets.

Increasingly, digital technologies are being employed to better track and dynamically manage electricity production, transmission, distribution and use – a small part of the broader societal trend toward “digitalization.” Energy storage systems are another emerging and potential source of power system flexibility and will likely play a pivotal role in next generation electric grids, acting as a flexible bridge between the needs of utilities (and other energy service providers) and their customers.

Although energy storage systems, digital sensors and controls, and other smart grid-relevant technologies that improve power system flexibility are already being deployed globally, considerable research and development (R&D) is still needed for them to reach their full potential. Recognizing that smart grids cut across R&D and deployment, Mission Innovation (MI) Innovation Challenge #1 on smart grids (IC1) and ISGAN have agreed to join forces. A letter of intent (LOI) agreed November 23, 2018 in Rome paves the way for increased cooperation between the two initiatives and their growing expert networks. Initial deliverables include the joint Clean Energy Ministerial (CEM) ISGAN—MI IC1 forum on “Cooperation to Accelerate Smart Grid Market Uptake,” a full-day CEM10/MI-4 side event on May 29, 2019 in Vancouver, as well as joint fact sheets on energy storage and flexibility options released at this event.

Recognition of Excellence in ‘Smart Microgrids’ Projects

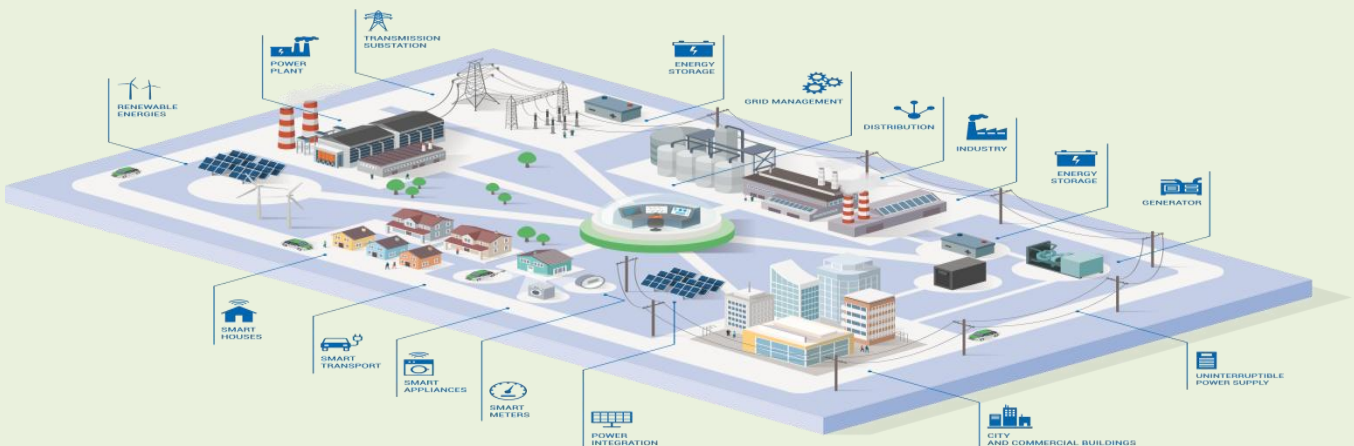
For its 2019 Award of Excellence competition, ISGAN chose the theme, “Smart Grids for Local Integrated Energy Systems (Smart Microgrids),” to highlight the important role that smart grid technologies and approaches play in sustaining reliable, resilient, and affordable electricity distribution systems capable of integrating a variety of energy sources and demands. An expert jury organized by ISGAN’s private-sector partner, the Global Smart Grid Federation (GSGF), selected eight nominated projects to receive recognition (one winner, one runner-up and six honourable mentions). These honoured projects will be officially announced at the CEM ISGAN-MI IC1 forum on May 29, 2019 in Vancouver. In the months ahead, ISGAN will share the proven lessons learned from these projects via case studies, webinars, workshop presentations, and similar means.



International Smart Grid Action Network (ISGAN)

Why Smart Grids?

From electrical generators to end consumers, the sources and uses of electric power are becoming much more varied and complex. To address this trend, the power sector has already begun integrating a range of advanced information, sensing, communications, control, and energy technologies and concepts, collectively called smart grids, into their power networks. Whether building new grids or improving existing infrastructure, smart grids are a key tool for 21st century competitiveness. However, the transition to truly “smart” grids capable of intelligently and efficiently integrating the actions of all connected users – from power generators to electricity consumers to those that both produce and consume electricity (“prosumers”) – will ultimately take decades.



Why ISGAN?

ISGAN provides a strategic platform for high-level government attention and action to advance the development and deployment of smarter, cleaner, and more flexible electricity systems around the world. ISGAN’s working groups develop and share knowledge and tools that identify trends, highlight emerging solutions, and point to opportunities for policy and standards development. In doing so, ISGAN provides an important channel for international exchange of experience, lessons learned, trends and future plans in support of national, regional and international clean energy objectives.



Policymakers and other stakeholders can leverage ISGAN’s activities, outputs, and growing network of experts to support power system modernization and, by extension, their deployment of clean energy.

ISGAN works closely with its private-sector partner, the Global Smart Grid Federation, and is broadening its collaboration with other international power systems activities, including relevant CEM initiatives like the 21st Century Power Partnership and the Electric Vehicles Initiative.

ISGAN is an international forum for the development and exchange of knowledge and expertise on smarter, cleaner, and more flexible electricity grids (“smart grids”). As the only global government-to-government forum on smart grids, ISGAN provides an important channel for communication of experience, trends, lessons learned, and future plans in support of clean energy objectives as well as new flexible and resilient solutions for smart grids. ISGAN operates as both a CEM initiative and an International Energy Agency (IEA) Technology Collaboration Programme (TCP).

Recent Publications & Webinars

- Casebook on energy storage systems (ESS)
- Casebook on experimental, regulatory sandboxes
- Discussion paper on ICT aspects of TSO-DSO interactions
- Discussion paper on social costs and benefits of smart grid technologies
- Discussion paper on multi-criteria and cost-benefit analysis (MC-CBA) toolkit: model and case study
- Discussion paper on flexibility in future power systems
- Discussion paper on system efficiency
- Executive summary of KTP on public support to smart grid research, development and innovation (RD&I), with focus on key performance indicators
- Policy brief and workshop summary on opportunities to accelerate smart grid development through innovative market design
- Webinar on how to replicate solutions for power system flexibility
- Webinar on vehicle-to-everything (V2X) energy services
- Webinar on coordinating power control (2018 ISGAN Award Winner)
- Webinar on multicriteria and cost benefit analysis for smart grid projects

Recent and Upcoming Events

- ISGAN public workshop on the future of electricity markets in a low-carbon economy, April 2019, Stockholm, Sweden
- ISGAN workshop on experimental (regulatory) sandboxes to enable smart grid deployment in cooperation with ICER, April 2019, Stockholm, Sweden
- ISGAN Annex 6 workshop in cooperation with the IEA DHC Annex "TS3: Hybrid energy networks on smart grids and district heating and cooling – key integration aspects, April 2019, Stockholm, Sweden
- ISGAN Annex 6 workshop 'Steering our energy future - Making our power system fit for variable renewables' in conjunction with Innogrid 2020+, May 2019, Brussels, Belgium
- ISGAN public workshop on TSO-DSO interaction, October 2019, Montreux, Switzerland
- 18th ISGAN Executive Committee meeting, October 2019, Montreux, Switzerland
- ISGAN Smart Grid International Research Facility Network workshop on smart grids testing, October 2019
- Launch of next ISGAN Award of Excellence competition (*theme to be announced*)
- ISGAN Academy bi-monthly smart grid training webinar series

ISGAN Participants (26 organizations)



ISGAN Operating Agent & Co-Secretariat



ISGAN Co-Secretariat



ISGAN operates under the *Clean Energy Ministerial* and *IEA Energy Technology Network*

