

International Smart Grid Action Network (ISGAN)

Accelerating progress on key aspects of Smart Grid policy, technology and investment



Operating as both a CEM initiative and a Technology Co-operation Programme (TCP) of the IEA, ISGAN is an international platform for the development and exchange of knowledge and expertise on smarter, cleaner, and more flexible electricity grids ("Smart Grids"). ISGAN provides an important channel for communication of experience, trends, lessons learned, and visions in support of clean energy objectives as well as new flexible and resilient solutions for Smart Grids.

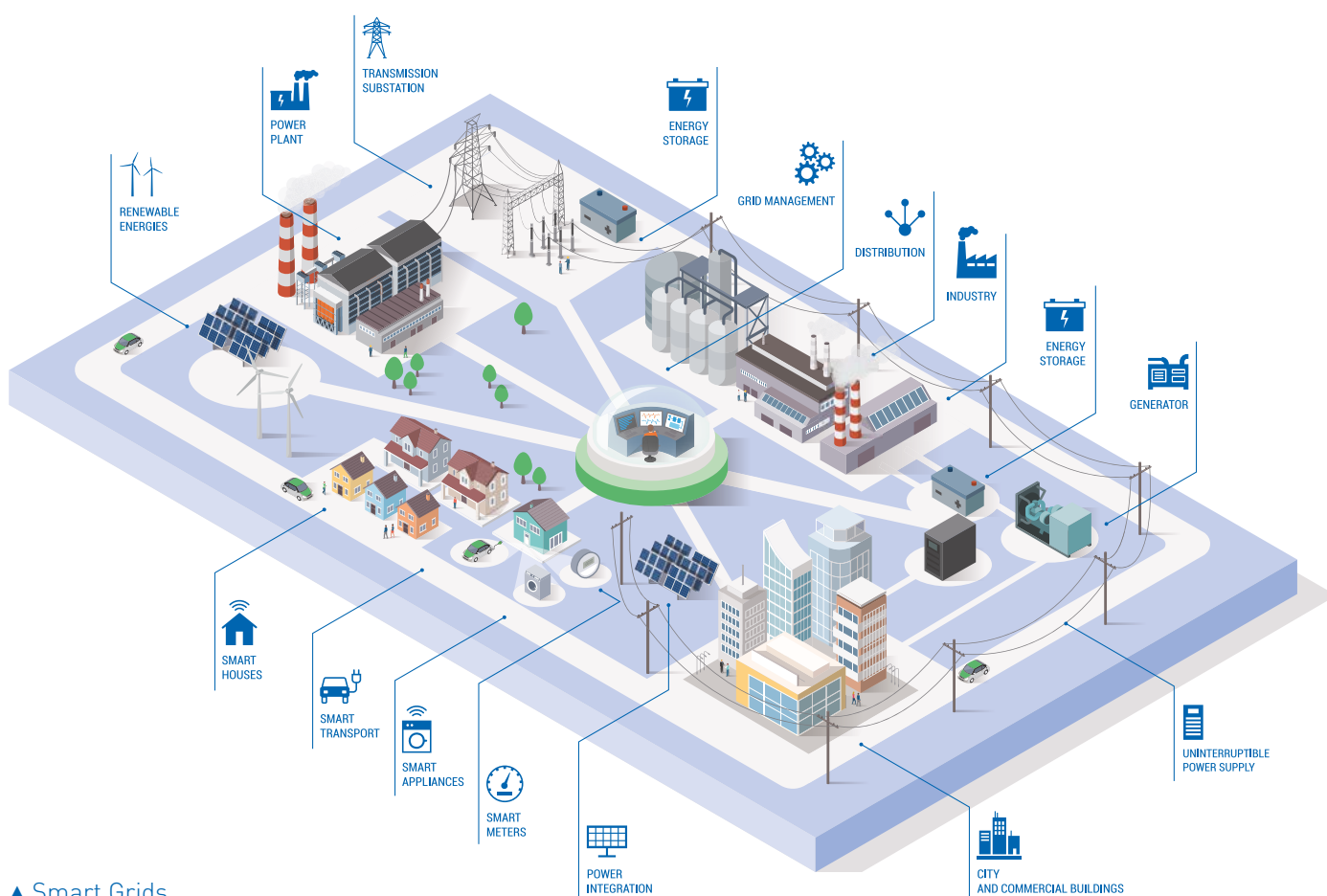
Key accomplishments

ISGAN is a **trusted partner and center of expertise** for a growing number of smart grid-related activities and events, such as India Smart Grid Week and European Utility Week. Other important ISGAN outreach tools are webinars organized by the **ISGAN Academy** or co-hosted with the Clean Energy Solutions Center, highly recognized public, Knowledge Transfer workshops, and thematic knowledge exchange events.

The latter **bring together leading participants from public, private, and academic sectors** to engage in discussions and sharing best practices on specific aspects of Smart Grid development, e.g. integration of distributed renewable energy sources and microgrids.

Furthermore, ISGAN has recognized and showcased the leadership and innovation of more than 20 distinguished Smart Grid projects through an annual **ISGAN Award of Excellence** competitions, each with a new theme in the area of Smart Grids.

ISGAN creates a strategic platform to support high-level government attention and action for the accelerated development and deployment of smarter, cleaner electricity grids around the world.



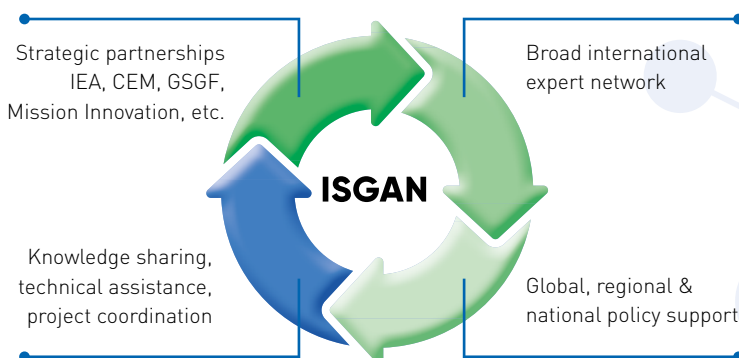
▲ Smart Grids

ISGAN Contracting Parties



ISGAN's objective and value proposition

The core objective of the International Smart Grid Action Network is to attain national, regional and global clean energy and climate goals supported by the integration of advanced technological, operational and analytical capabilities for electric power grids, including the smart management and coordination of the participants in the electricity system. To advance its goals and engage a broader audience of stakeholders, ISGAN has been successfully collaborating with several other IEA TCPs as well as other organizations and initiatives, among others, by involving experts into joint work and organizing joint events. ISGAN's current partners include: the International Energy Agency, Clean Energy Ministerial, Global Smart Grid Federation, India Smart Grid Forum, Mission Innovation IC #1 Smart Grids, 21st Century Power Partnership and Clean Energy Solutions Center.



ISGAN facilitates dynamic knowledge sharing, technical assistance, peer review and, where appropriate, project coordination among its Contracting Parties.

ISGAN Award of Excellence

ISGAN launched the Award of Excellence competition in partnership with the Global Smart Grid Federation (GSGF) to recognize excellence in smart grid projects, policies and programs around the world. The ISGAN Award of Excellence showcases leadership and innovation in smart grid projects around the world and highlights the tremendous value of smarter, more flexible electric grids.



Through four rounds of the previous awards competitions, ISGAN has recognized more than 25 distinguished smart grid pilot/deployment/demonstration projects around the globe, each with a new theme in the area of smart grids.

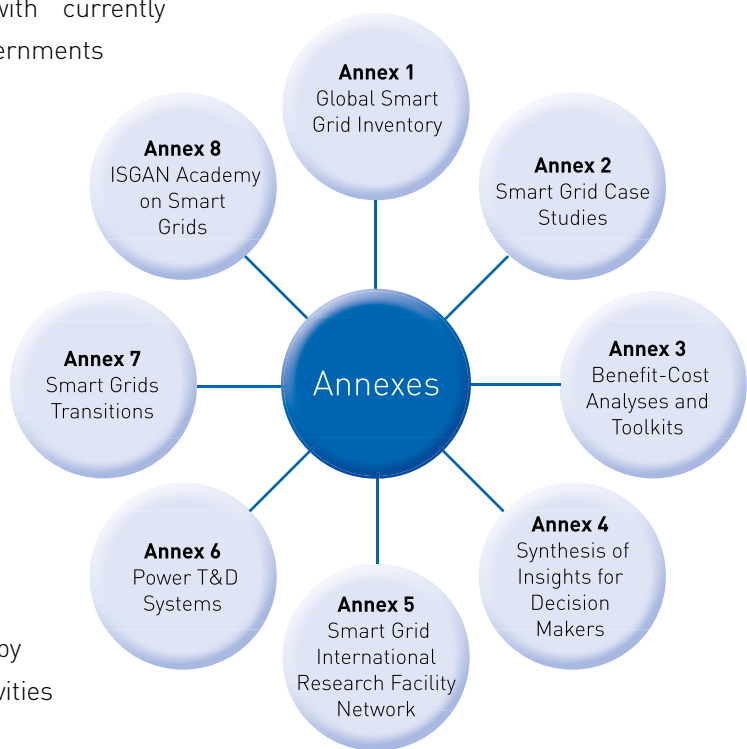
More detailed information about the awards competition and its winning projects could be found at <http://www.iea-isgan.org/awards/>.

ISGAN's organizational structure

ISGAN is an implementing agreement with currently 25 Contracting Parties, 24 country governments and the European Commission.

Their nominated representatives form the Executive Committee headed by the Presidium and assisted by the co-Secretariats and the Operating Agent of ISGAN. The work within ISGAN is organized into eight standing working groups, Annexes, which consist of national experts from participating Contracting Parties.

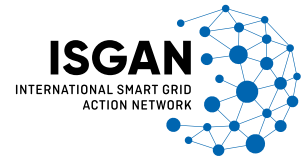
ISGAN Contracting Parties pay annual participation fees while working-group-level operating agents and project leads are funded by their host organizations and governments. Activities within ISGAN are task-shared.



Interested in joining ISGAN?

Step1. Talk to Us	Your country expresses interest in joining ISGAN by contacting the Secretariat or the Presidium at ISGAN@ait.ac.at .
Step2. Meet with Us	Your country attends Executive Committee (ExCo) meetings as an Observer.
Step3. Write to Us	To join, you country sends a letter to the Secretariat and to the IEA Executive Director identifying the Contracting Party that will sign the Implementing Agreement, the Executive Committee representative from your country, and the Annex(es) that your country will participate in.

ISGAN Annex 2: Smart Grid Case Studies



The objective of Annex 2 is to assess outstanding examples of current case studies, design and validate a common case study template and a methodological framework so as to develop in-depth case studies with its help. Annex 2 casebooks enable comparison of policies and technologies adopted in different regulatory, legislative, grid contexts. The overarching aim is to collect enough information from case studies around the world to extract lessons learned and best practices as well as to foster future collaboration among the participating countries. ISGAN participants contributing to this Annex shape the analyses of, and methodological frameworks for, Smart Grids-related case studies, as well as the selection of topics or projects for new case studies. The participants have first-hand access to the insights identified through analyses of new and existing case studies dealing with Smart Grid developments in specific countries.

Annex 2 Case Books

To date, ISGAN Annex 2 has published three casebooks: on Advanced Metering Infrastructure (AMI), Demand Side Management (DSM) and Consumer Engagement & Empowerment. These case books are easily accessible online at www.amicasebook.org and are also available for download on ISGAN website www.iea-isgan.org.



Annex 2 Knowledge Transfer Project

Since 2016, Annex 2, in part supported by Annex 4, has drawn special attention to its Knowledge Transfer Project (KTP) led by a task lead, Magnus Olofsson, and a knowledge transfer expert, Helena Lindquist.

Building on ISGAN's experience in delivering deep-dive workshops, the KTP fosters meaningful international dialogue on Smart Grids with a focus on developing competence and building capacity. The workshop



format, which requires significant prior preparation, promotes individual learning while emphasizing active participation in the co-creation of concrete results. This is achieved through collaboration among interdisciplinary group participants with complementary competencies. Informal and collaborative, KTP workshops:

- encourage open dialogue about successes and lessons learned from grid modernization efforts around the world
- promote cross-organizational dialogue inspired by experiences and results achieved
- create a forum for peer-to-peer learning where all participants can contribute to and benefit from the collective thinking process.

Up to date, the KTP team has successfully organized three workshops in different parts of the world. More information on KTP workshops can be found on ISGAN website:

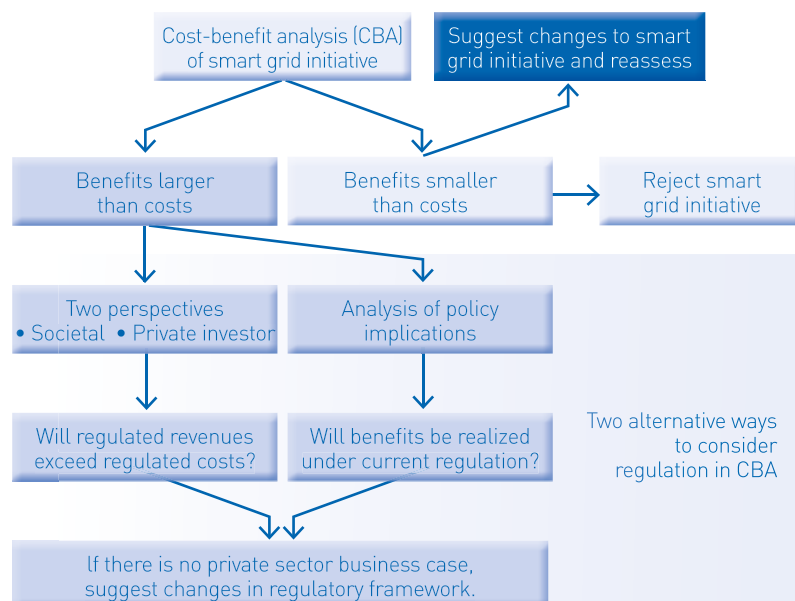
<http://www.iea-isgan.org/wp-content/uploads/2018/05/2.-KTP-FactSheet.pdf>



ISGAN Annex 3: Cost-Benefit Analyses and Toolkits



Annex 3 deals with methods and techniques aimed at guiding stakeholders' investment decisions related to Smart Grid technologies by considering economic and social welfare aspects. The scope of this Annex spans the development of tools for analysts, regulators, utilities and other actors to define and decide on system needs and priorities for Smart Grid system investment along with necessary regulatory changes. Annex 3 therefore seeks to develop a global framework and related toolkits, which would provide a way of identifying types of benefits of demonstration and deployment of Smart Grids technologies in a standardized way and contrast them with their relevant costs.



Recent activities

Annex 3 has been recently focused on evaluating existing approaches and developing new approaches to analysing the benefits and costs and comparing a range of scenarios at the electrical system level as well as on a regional level. In particular, the experts from Annex 3 have investigated socioeconomic impacts of Smart Grids and the related regulatory implications.

Three recently published reports identify existing gaps and shortcomings in current cost-benefit analyses when applied to Smart Grid projects. They include new metrics for the assessment of benefits that may not be uniformly distributed among the stakeholders and propose new tools that can further improve Cost Benefit Analyses (CBA). Specifically, a CBA can be enhanced with a Multi Criterial Analysis (MCA) that fills in some of the gaps typical of a CBA and is better suited for the evaluation of non-monetary and asymmetric benefits.

Planned: Web-based software for multi-criteria decision-making

Annex 3 is working on transforming ISGAN CBA toolkits and recently developed MC-CBA software into a web based application that can be used by any governmental and private entity as an aid for decision-making in the field of Smart Grids. With a modern and user-friendly web-based software application (to be potentially complemented with an app), the work carried out by ISGAN on the topic could be broadly disseminated. Furthermore, the toolkit/software testing phase will profit from a larger database of cases from international projects.



ISGAN Annex 4:

Synthesis of insights for decision makers



Given the wide variety of definitions and conceptual models for Smart Grid technologies and systems, quickly increasing body of literature and analysis, and rapid rate of change in the Smart Grid space, senior decision-makers and their staff would likely benefit from a common basis or language for discussion. The core objectives of Annex 4 are to organize knowledge, identify key issues, distill important themes, and provide insightful analysis for decision-makers. Another important task of Annex 4 consists in consolidating and disseminating the efforts of other ISGAN Annexes, as well as Smart Grid efforts beyond ISGAN, when appropriate, in support of a greater outreach and impact.

Annex 4 ultimately provides communication tools, products, and platforms that foster development of greater international understanding of Smart Grids, while recognizing a diversity of drivers and approaches among related technologies, policies, practices, and systems.



For the 2018-2019 timeframe, Annex 4 is focusing on the following activities:

- Deep-dive, peer-to-peer workshops on exchanging best practices on Smart Grid deployment enabled via policies, regulations, programs, and public-private partnerships
- Development of and building capacity to implement a corporate ISGAN Communications Strategy
- Additional work on policy insights and analysis delivered through synthesis papers and webinars
- Support for inter-Annex coordination and collaboration.

Past work: Highlights

- Policy insight reports and webinars on the role of Smart Grids in integrating variable renewable energy, Smart Grid cyber security, Smart Grid technology as an enabler of clean energy, and managing consumer benefits and costs
- Implementation of in-depth knowledge transfer workshops in Mexico and India in cooperation with Annex 2 to inform national Smart Grid strategies.

ISGAN Annex 5:

Smart Grid International Research Facility Network (SIRFN)

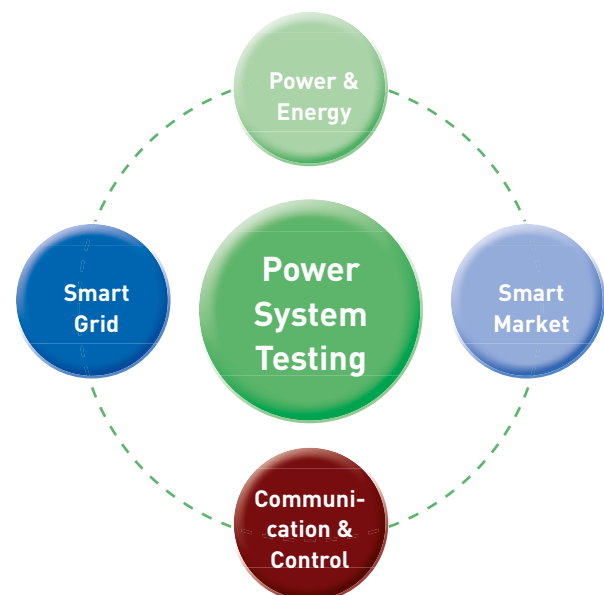


SIRFN enables participating countries to evaluate pre-competitive technologies and systems approaches in a wide range of Smart Grid use cases and geographies using common testing procedures. Research test-bed facilities were selected based on their complementary capabilities to conduct specialized, controlled laboratory evaluations of integrated Smart Grid technologies, including cyber security, plug-in hybrid integration, load management, automated metering infrastructure, protection, network sensing, energy management, renewable energy integration and similar applications. In this way, research within each individual participating country can derive value of the unique capabilities and environments of the other partner nations.

Data from these tests is made available to all SIRFN participants to accelerate the development of Smart Grid technologies and systems and enable appropriate supporting policies.

Power Systems Testing

- Numerous interdependencies in power system control
- Testing components alone may overlook these interactions/interdependencies
- Seeks to define requirements for true systems testing, applying state-of-the-art advanced lab testing methods



Smart Grid Modeling

- Developing model server for the use by SIRFN facilities
- One-to-one replica utility systems – using real-world data and network topologies wherever possible, allowing a holistic view of system effects
- Evaluation of alternative designs against policy goals



Microgrids

- Evaluate microgrid requirements for on-grid and off-grid operation
- Define the microgrid functionalities for on-grid operation
- Define the testing procedure for the functionalities



ISGAN Annex 6: Power Transmission and Distribution Systems

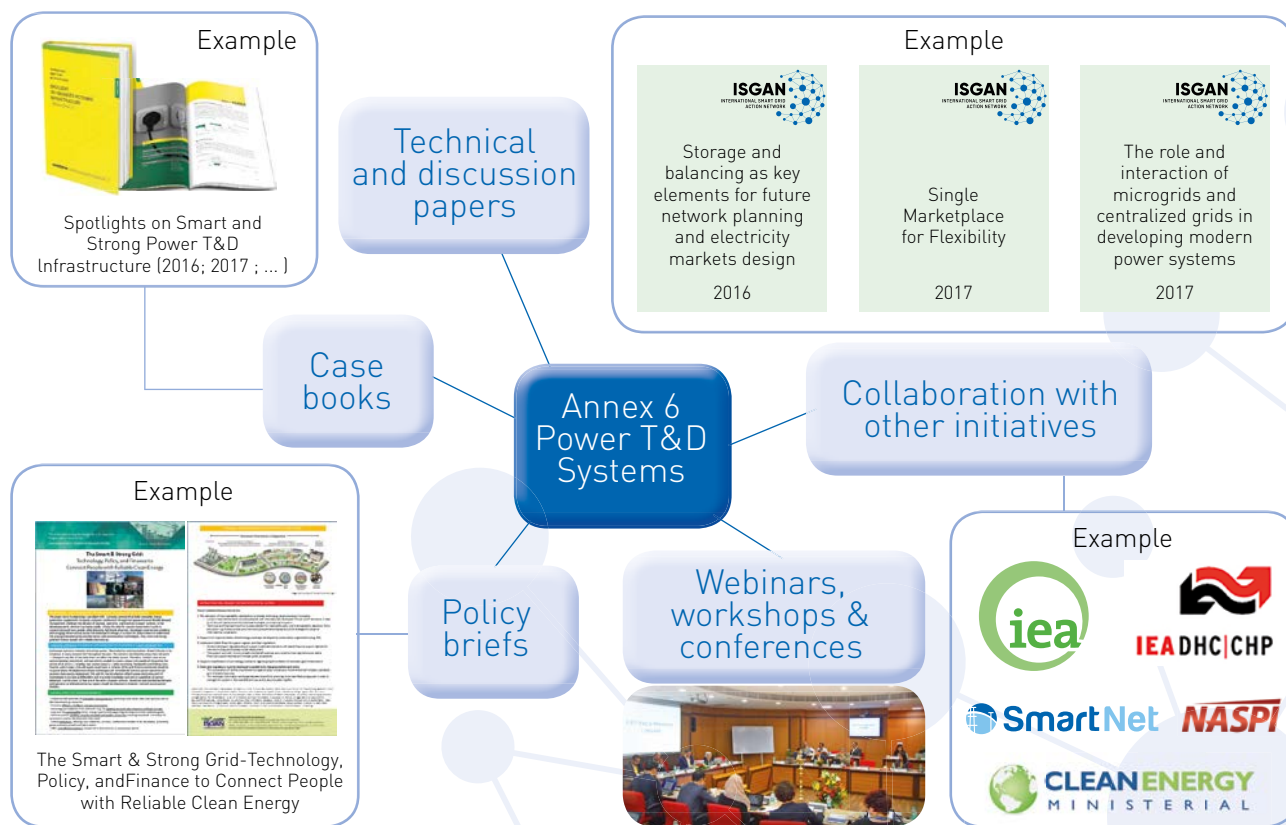


Annex 6 focuses on the potential system-related challenges in the development of future smarter grids. The Annex's main goal is to facilitate the application of advanced technologies needed for power grids to contribute in the best way to the attainment of clean energy and climate goals as well as sustainable energy access to all. The Annex promotes solutions that enable power grids to maintain and improve the security, reliability and quality of electric power supply.

The Annex's work is based on collecting, integrating, synthesizing, and distributing information on Smart Grid technologies, practices, policies, and systems through discussion papers, webinars, reports and presentations at relevant seminars, conferences and workshops. The Annex's goal is then not to repeat what is already done but to draw valuable lessons. Different countries around the world have different challenges, apply different solutions to those challenges, and have reached different maturity levels in the implementation of those solutions. By learning from each other, both when it comes to best practices and success stories and also from projects confronted with problems we can quicker reach solutions proven successful and avoid repeating previous mistakes.

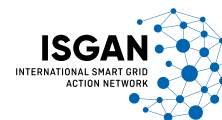
Annex participation gives access to an international network of experts in the area of building future grids. The possibility of gaining and sharing knowledge within the Annexes brings us closer to the goal envisaged by ISGAN, the one of achieving national, regional and global clean energy and climate goals with the help of Smart Grids.

Typical Annex 6 deliverables



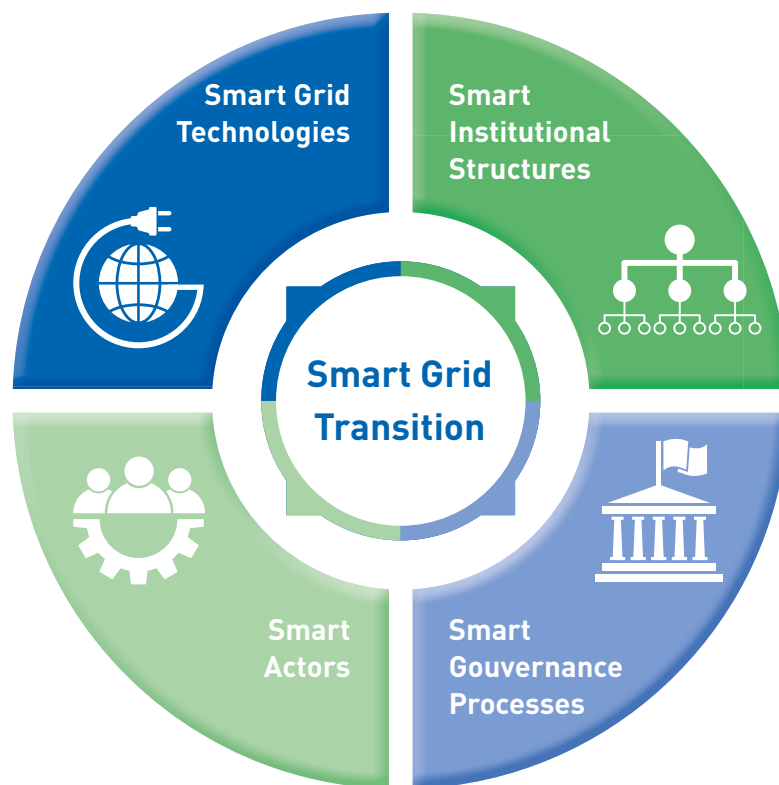
ISGAN Annex 7:

Smart Grid Transitions and Institutional Change



The transition of the energy systems describes the process of replacing a comparatively simple regime of just-in-time electricity production and unidirectional trickle-down distribution to complex, responsive, multidirectional systems. As a result, the electricity sector is undergoing a transformation into an industry providing energy logistics services to match demand with volatile energy supply. Smart Grids will become the backbone of smart energy logistics. First of all, this requires new institutional structures and governance processes, as well as shared views on socio-technical transition pathways.

How this institutional change shall be orchestrated is the key topic of Annex 7 and is one of core policy issues for the IEA and the Clean Energy Ministerial.



The scope of this Annex is to co-ordinate applied social science on the socio-technical change processes related to the transition towards a sustainable electricity system and to collect results to inform policymakers. The Annex experts further seek to analyze shared cognitive frameworks (e.g. shared visions, norms and concepts) and informal modes of social organization, reflecting human psychology, culture and habits. Thus, their work clearly complements the other approaches used ISGAN, such as technology development, technological system integration and techno-economic analyses. Hence, the Annex contributes analysis and policy advice regarding the framework conditions of the system transition from the fossil-based to a smarter, more sustainable decarbonized energy regime.

The Annex aims at establishing a network of researchers and practitioners sparking off an international, coordinated interdisciplinary research activity in the social sciences supporting and complementing technology-oriented Smart Grid activities. In short, Annex 7 accumulates information and knowledge from innovation studies, political sciences, institutional economics, sociology and energy law, and makes it palpable for policymakers and other stakeholders at multiple administrative levels. This includes supporting policy development in the field of Smart Grid-related research, technology development and innovation (RTI).

ISGAN Annex 8:

ISGAN Academy on Smart Grids



The ISGAN Academy offers the ISGAN community a possibility to share knowledge and engage with experts in the field of Smart Grids through an e-learning platform, where it presents webinars on topics ranging from power system fundamentals to more specialized seminars on breakthrough Smart Grids solutions. The information presented includes, among others, recent developments, best practices, interesting methodologies, Smart Grids theory, applications and deployment. The ISGAN Academy is therefore proposed as a set of e-learning modules dealing with different aspects of Smart Grids, where fundamentals and further reading material are considered as appendices out of the critical learning path.

With the help of Annex 8 developed webinars stakeholders obtain a means to stay updated on recent developments, pilot projects, demonstrations, software tools and case studies. Supporters of the Annex can further contribute by judging the quality of the content and the relevance of the selected topics by nominating representatives to the Academic Committee.



ISGAN Webinars

ISGAN Academy on Smart Grids is regularly organizing webinars covering a whole array of topics:

- Comprehensive On&Off: Grid Planning For Universal Access. The Reference Electrification Model
- Perspectives on ISGAN KTP in Mexico, Genk and Bengaluru
- Planning of Distribution Systems in the Era of Smart Grids
- Augmented reality applications for Smart Grids
- Cybersecurity for Smart Grids: Technical Approaches to Provide Cybersecurity
- Cybersecurity for Smart Grids: Vulnerabilities and Strategies to Provide Cybersecurity
- TSO Reliability Management: A probabilistic approach - Part 2
- TSO Reliability Management: A probabilistic approach for better balance between reliability & costs
- Integration of RES in power systems: Transmission networks issues
- Jeju Island Smart Grid Project
- Reference Network Models

More information about the upcoming webinars can be found on ISGAN website:

<http://www.iea-isgan.org/our-work/annex-8/>

as well as on the website of our partner, Leonardo Energy:

<http://www.leonardo-energy.org/resources/1070/isgan-academy-58ec8d2e7b9b0>



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