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https://www.nsgm.gov.in

ISGAN – International Smart Grid Action Network

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ISGAN in a Nutshell

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ISGAN is the short name for the International Energy Agency (IEA) Technology Collaboration Programme (TCP) for a Co-operative Programme on Smart Grids (ISGAN – International Smart Grids Action Network).

It is also an initiative of the Clean Energy Ministerial (CEM) and was formally established at CEM2 in Abu Dhabi, in 2011 as an Implementing Agreement under a framework of the International Energy Agency (IEA).

The International Smart Grid Action Network (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.

ISGAN's Strengths

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

① Broad Expert Network

ISGAN leverages expertise from governments, national laboratories and research institutions, transmission and distribution system operators, power generators, and others from 25 countries from five continents

② Partnerships with Thought Leaders

ISGAN engages leading private sector smart grid initiatives, the IEA Energy Technology Network, and other Clean Energy Ministerial initiatives to advance systems perspectives on power grids and grid integration

③ Diverse Portfolio

ISGAN implements a range of activities to support a better global understanding of smart grids and the value they offer, address gaps in knowledge and tools, enhance peer-to-peer exchange, and otherwise improve international coordination

ISGAN Vision and Mission

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Vision

- The attainment of national, regional and global clean energy and climate goals supported by the integration of a variety of smart grid technologies, applications an policies.

Mission

- To provide a platform for the development and exchange of expertise and competence on smarter, cleaner electric power systems and to serve as an important channel for communication of related knowledge.

ISGAN Executive Committee

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ISGAN currently consists of 26 Contracting Parties.

Their nominated representatives form the Executive Committee headed the Presidium assisted by two co-Secretariats and the Operating Agent of ISGAN.

ISGAN Annexes

(1/2)

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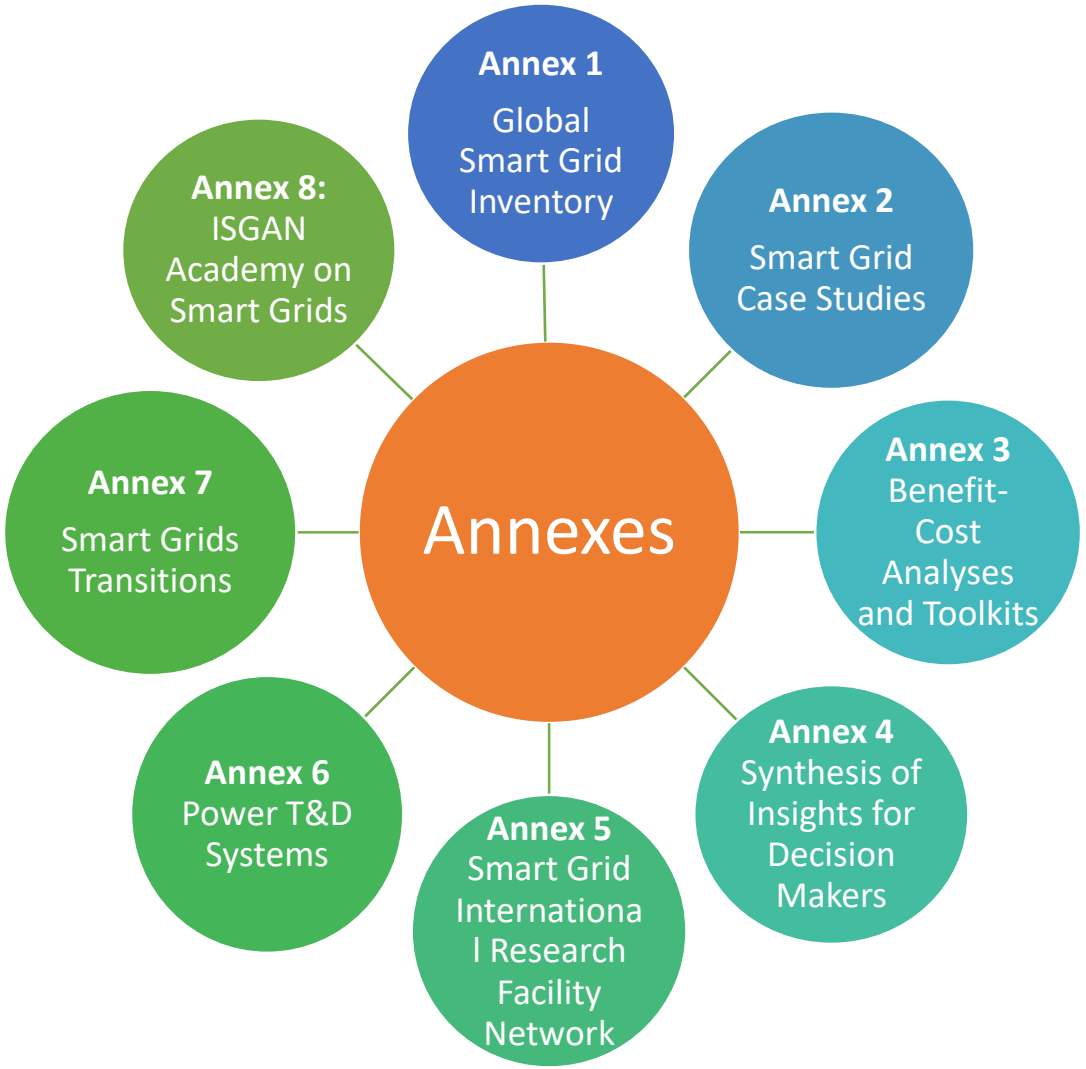
- The activities of ISGAN are organized into eight Annexes.
- The Annexes are standing working groups continuously dealing with certain topics and updating their plans and objectives for the upcoming year at spring ExCo meetings.
- Only Annex 1 Smart Grid Inventories delivering a general picture of on-going Smart Grid project deployment has been completed.



ISGAN Annexes

(2/2)

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ISGAN activities build a global understanding of smart grid, address gaps in knowledge and tools, improve peer-to-peer exchange and recognize excellence

- No direct technology development or demonstration activities.
- Develop protocols, tools and best practices, identify environmental issues and mitigation options.
- Focus on exchange and dissemination of information and perspectives.
- A global benchmark and collaborative attitude among participating countries.
- Indicate to emerging economies the technological alternatives available for their own development.

Value Proposition

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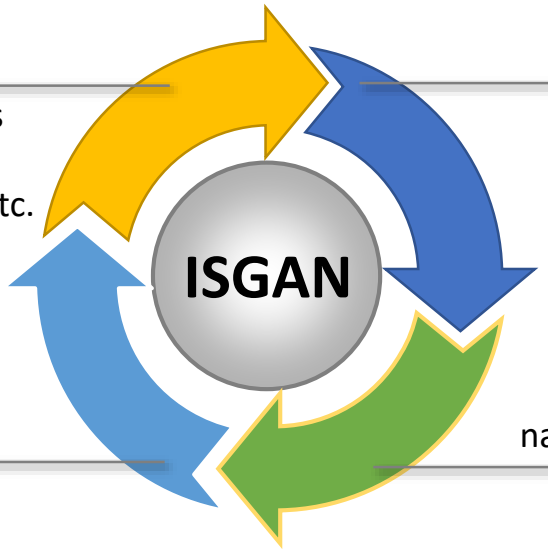
Strategic partnerships
IEA, CEM, GSGF,
Mission Innovation, etc.

Knowledge sharing,
technical assistance,
project coordination



Broad international
expert network

Global, regional &
national policy support

ISGAN Achievements-Mid Year 2019 (1/3)

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- Workshops and contributions to conferences
  - **micro vs MEGA grids –** At Montreux from Oct 2nd – 3rd, 2019. Presentations from RISE, NTNU, CIGRE, Power Grid Corporation of India, Universidad Pontificia Comillas, KU Leuven, SuperGrid Institute, OFFIS, and Chalmers University of Technology. A total of 30 participants from Italy, India, Spain, Belgium, France, Germany, Norway and Sweden.
  - **Public Workshop: "Needs, challenges and opportunities of TSO-DSO coordination" –** Swiss Federal Office of Energy (SFOE) and Research Center for Energy Networks – ETH Zürich in cooperation with ISGAN Annex 6 (Power Transmission & Distribution Systems) hosted workshop in Montreux, Switzerland on Oct 3,2019. Stakeholders from Research and Industry discussed current and anticipated future interaction between the TSO and DSO
  - **Digitalization, Research and Testing of Energy Systems for Energy Markets decision** support – 30th Sep 2019 at Montreux, organised by SIRFN (Smart Grid International Research Facility Network), ISGAN, Clean Energy Ministerial, DERlab, EERA – The European Energy Research Alliance JP Smart Grids, Mission Innovation and International Energy Agency (IEA) Energy Technology Network gathered representatives to discuss about the opportunities of Energy System Digitalization
  - **Knowledge Exchange Project (KTP) on Experimental (Regulatory) Sandboxes to Enable Smart Grid Deployment –** The project led by an international team of ISGAN experts and involved about 45 participants from more than 20 countries; key project results include:
    - ISGAN Policy Messages on Sandboxes to the Clean Energy Ministerial
    - ISGAN Casebook including examples from seven countries: "Innovative Regulatory Approaches with Focus on Experimental Sandboxes"
  - **Knowledge Transfer Project (KTP)on Upscaling of Smart Grid Research and Innovation –** Removing barriers to upscaling of smart grid and energy system innovation in focus at international transdisciplinary workshop in Montreux, Switzerland; The insights from the project will be summarized into policy messages to be published on ISGAN website and distributed to relevant stakeholders at international and national level; This KTP on upscaling is the third under the umbrella initiative "Public Support to Smart Grid Research and Innovation" (2017-2019) in which countries have come together to share knowledge and experiences on aspects related to public funding and other support mechanisms relevant to smart grid development.

ISGAN Achievements-Mid Year 2019 (2/3)

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- Workshops and contributions to conferences
  - **ISGAN and Mission Innovation (MI) Innovation Challenge 1 on Smart Grids (IC1) –** Co-organized the joint 1st CEM ISGAN—MI IC1 forum on "Cooperation to Accelerate Smart Grid Market Uptake," (see draft agenda), a full-day CEM10/MI-4 side event on May 29, 2019 at **Vancouver** where Ministers from over 25 countries gathered to accelerate progress toward a clean energy future.
  - **Contributions to InnoGrid 2019 –** Making our power system fit for variable renewables: focused on the recent developments and innovations undertaken by network planners and regulatory bodies to increase coordination and control of interconnected systems and markets on the global scale
  - **Workshop 'Steering our energy future - Global grid solutions to overcome new power system challenges' –** Organized by ISGAN Annex 6 as a side-event of the InnoGrid 2020+ conference, to which ISGAN was one of the organizing partners

- Webinars
  - **Dynamic Line Rating: Principles, Applications, Benefits –** The webinar introduced the physics of Dynamic Line Rating (DLR), and calculation methods based on CIGRE and IEEE standards
  - **ISGAN Award 2019 Webinar: Excellence of the Local Integrated Energy Systems (Microgrids) –** This webinar introduced advanced electricity grid concepts through two concrete projects: - Open Micro Grid Project of Korea Electric Power Corporation - RIGRID - Rural Intelligent Grid Project (net zero energy system)
  - **Flexibility needs in the future power system –** This webinar introduced the flexibility needs in the future power system. Multiple angles were considered: stability, frequency, voltage, power quality and balance at different time scales (from seconds to hours and seasonal adequacy)

ISGAN Achievements-Mid Year 2019 (3/3)

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- Publications
  - **Casebook on Energy Storage Systems (ESS) –** The final version of the ESS Case Book was released with 14 cases from 7 countries (Austria, Canada, France, India, Korea, Netherlands and Sweden). Specifically, in this casebook more focus was on the economic benefits in the real operating system
  - **Casebook on Innovative Regulatory Approaches with Focus on Experimental Sandboxes –** This casebook provides detailed information on planned or implemented Sandbox Programs for Australia, Austria, Germany, Italy and The Netherlands. An overview of the previously well documented program in the UK is provided as well

- Actions points /Future
  - **KTP proposed for**
    - ✓ **Experimental Regulatory Sandboxes** for Smart Grids 2.0
    - ✓ **Sector Coupling** – Electricity & Transport system In line with CEM initiative for horizontal project on sector coupling
    - ✓ **Grid Scale ESS** – Energy Storage Systems in line with the proposal of the Energy storage partnership of the World bank and in cooperation with the Cost benefit Analysis tool developed under ISGAN
  - '**Digitalisation Incubator**' to scope activities related to development of "flexibility markets" with intent to address the parallel aspects of policy, regulation and business models, on the one hand, & interoperability, digitalization, and related technological aspects, on the other
  - ISGAN ExCo representatives to contact CEM Secretariat, if they see a possibility of hosting a workshop on the Horizontal Accelerator for **Power System Integration of EV Infrastructure**

India Representation in ISGAN

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- Director NPMU elected as Vice Chair to support ISGAN Presidium during ExCo-15 held at Australia in April 2018
- Participation in ExCo – 12 through 18. Latest ExCo-18 held at Switzerland.
- Following is the India representation in various Annexes of ISGAN as of March 2019.

ExCo Representatives from India	Sh. S K G Rahate, AS (Trans), MoP (Primary Member)		Sh. Arun Kumar Mishra, Director NPMU (Alternate Member)	
Annex I & II – Smart Grid Case Studies	Smt. Kumud Wadhwa Sr. GM, NPMU		Sh. Vivek Goel CE (DP&T), CEA	
Annex III – Benefit and Cost Analysis Tool kits	Sh. Ghanshyam Prasad CE, MoP	Prof. Suryanarayana D IIT Mumbai	Sh. Sachin Shukla DGM, PFCCL	Sh. Arun Kumar Mishra Director, NPMU
Annex IV – Synthesis of Insight for Decision Makers	Sh. Atul Kumar Bali Sr. GM, NPMU	Sh. Sachin Shukla DGM, PFCCL	Mr. Rajesh Kumar Jain AGM (Solar), SECI	Sh. Reji Kumar Pillai President, ISGF
Annex V – Smart Grid International Research Facility Network (SIRFN)	Sh. Shivakumar V Joint Director, CPRI	Smt. Kumud Wadhwa Sr. GM, NPMU	Prof. Sukumar Mishra IIT Delhi	
Annex VI – Power T&D System	Sh. Rajil Srivastava Sr. GM, POWERGRID		Sh. C P Awasthi DGM, POWERGRID	
Annex VII – Smart Grid Transitions	Sh. Sanoj Kumar Jha Secretary, CERC	Sh. Ankit Kumar Assistant Chief (Engg), CERC	Sh. Atul Kumar Bali Sr. GM, NPMU	
Annex VIII – ISGAN Academy	Smt. Kumud Wadhwa Sr. GM, NPMU	Sh. Reji Kumar Pillai President, ISGF	Dr. Mini Thomas Director, NIT (Trichy)	Sh. S K Srivastava Asst. Prof., NPTI (Durgapur)

Indian Side Contribution

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- 13th ExCo of ISGAN organized in India in March 2017
  - First ever ExCo in India.
  - 39 members from 19 countries participated.
- India's Smart Grid training course and Model Smart Grid Regulations shared with ISGAN community.
- ISGAN Knowledge Transfer Project (KTP) workshop organized in India in November 2017.
  - Public conference on Smart Grid technologies.
  - Showcased CESC Mysore Smart Grid pilot project.
  - 85 participants (both national and international) attended.
- Regular participation in the ExCo – 14 through 18.
  - Active involvement in KTP workshops.
  - Inputs for global case studies and reports preparations etc.

Thank You

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About ISGAN

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- ISGAN is the short name for the International Energy Agency (IEA) Technology Collaboration Program (TCP) for a Co-operative Program on Smart Grids (ISGAN – International Smart Grids Action Network).
- It is also an initiative of the Clean Energy Ministerial (CEM) and was formally established at CEM2 in Abu Dhabi, in 2011 as an Implementing Agreement under a framework of the International Energy Agency (IEA).
- The International Smart Grid Action Network (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.
- ISGAN currently consists of 26 Contracting Parties. Their nominated representatives form the Executive Committee headed the Presidium assisted by two co-Secretariats and the Operating Agent of ISGAN.
- India is one of the founding members of ISGAN and is being represented by Ministry of Power.

ISGAN Annexes

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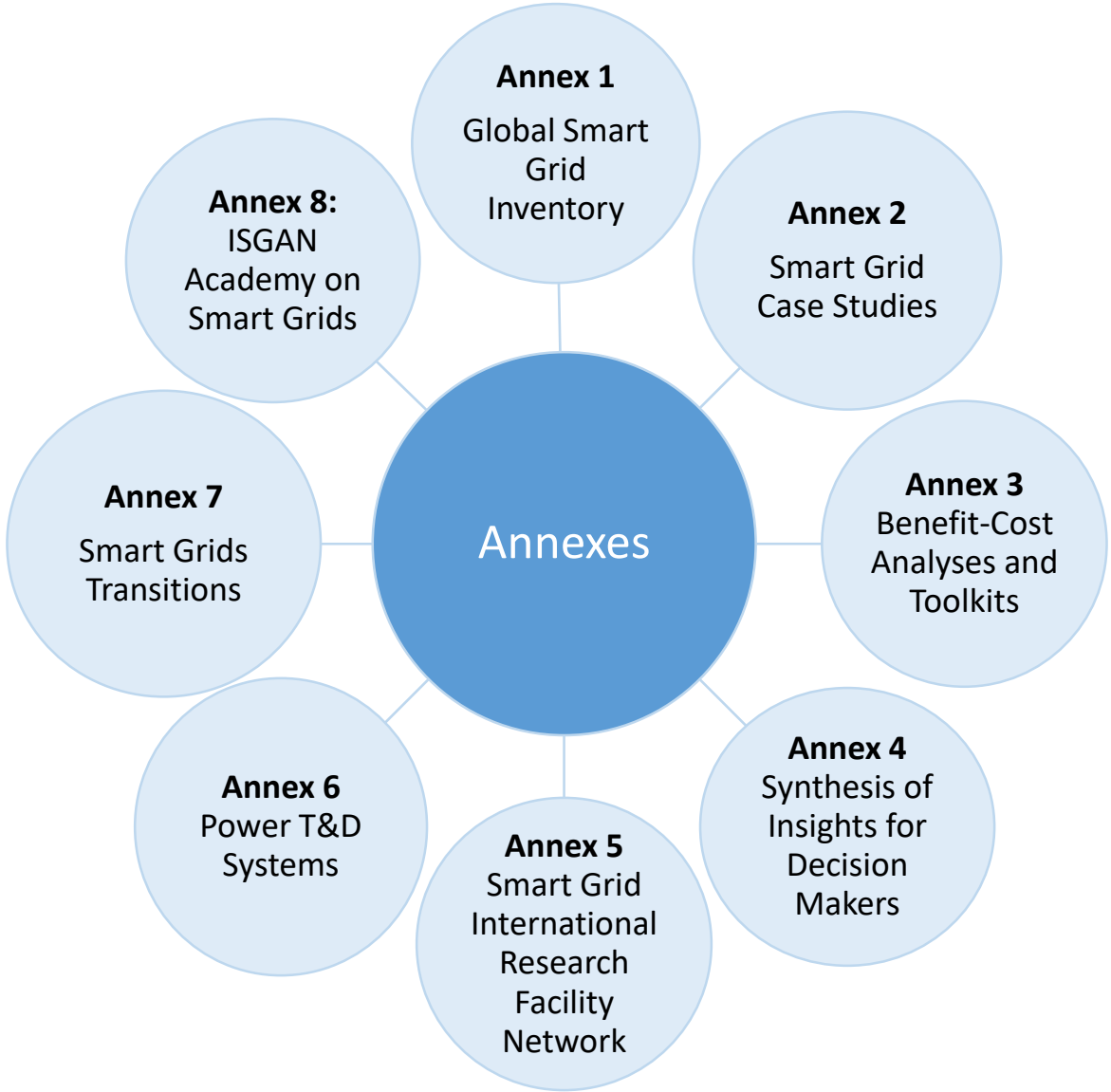

ISGAN Annex 1

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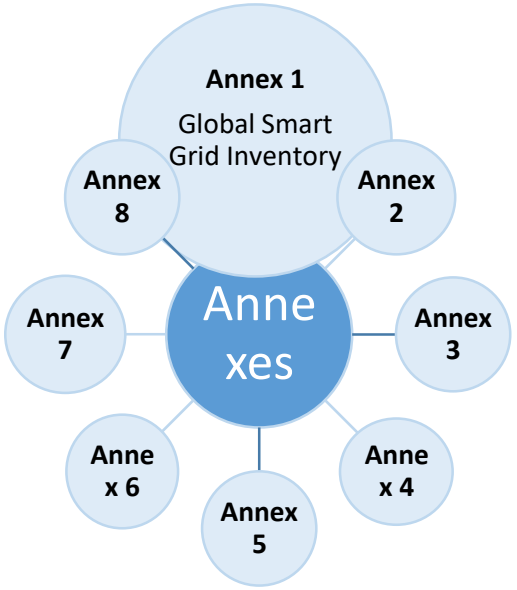
- Main drivers that motivate the governments to develop and apply smart grid solutions and the related technologies.
- Identify gaps, opportunities, synergies among smart grid activities and programmes.
- Catalogue the wide range of smart grid activities underway, mapping the actual activities against the drivers and interests.
- Several outstanding smart grids projects have been discussed during webinars and workshops



Annex 1 Smart Grid Inventories delivering a general picture of on-going Smart Grid project deployment has been completed.
Any activities or updates necessary are included in Annex 2.

ISGAN Annex 2

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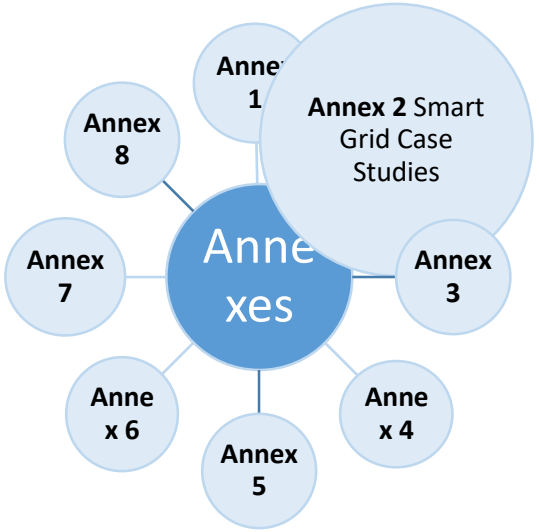
- Case Books dedicated to outstanding smart grid applications published:
  - Advance Metering Infrastructure (AMI)
  - Demand Side Management (DSM)
  - Consumer Engagement & Empowerment
- The Case Books have been transformed into web-based dynamic documents and are meant to be updated on a regular basis.
- KTP workshops encourage open dialogue about successes and lessons learned from grid modernization efforts
- Promote cross-organizational dialogue inspired by experiences and results achieved and create a forum for peer-to-peer learning where all participants can contribute to and benefit from the collective thinking process.



ISGAN Annex 3

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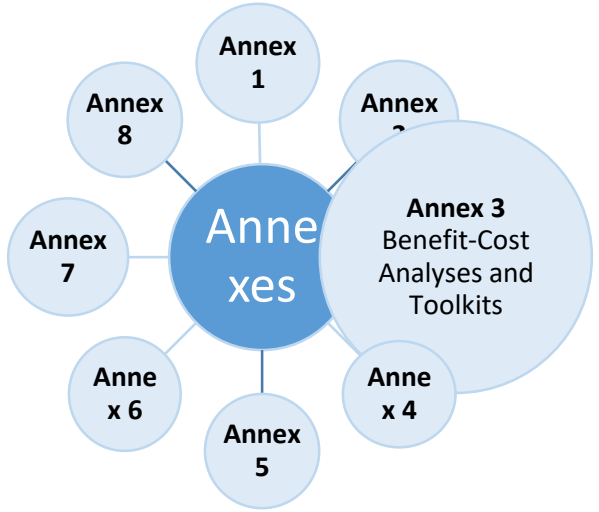
- Tools for the assessment of the present smartness of electricity networks
- Tools for the evaluation of benefits and costs of smart grids projects characterized by a limited system impact (i.e. local projects).
- Six toolkits have been developed covering storage, network automation, ICT and AMI.



ISGAN Annex 4

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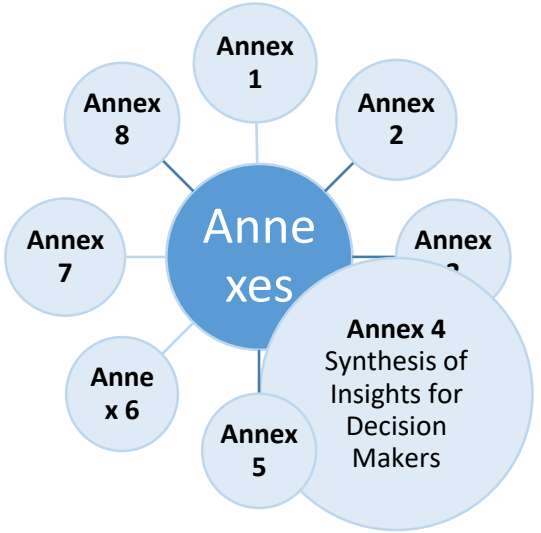
- Organization of knowledge, key issues, important themes, insightful analysis for the benefit of decision makers.
- Lessons learned and best practices on smart grid.
- Dissemination of efforts of other ISGAN Annexes
- ISGAN interface towards the “Ask an Expert” initiative
- Interaction with the CEM Clean Energy Solution Centre (webinars, knowledge sharing, ISGAN On-line Smart grid glossary.



ISGAN Annex 5

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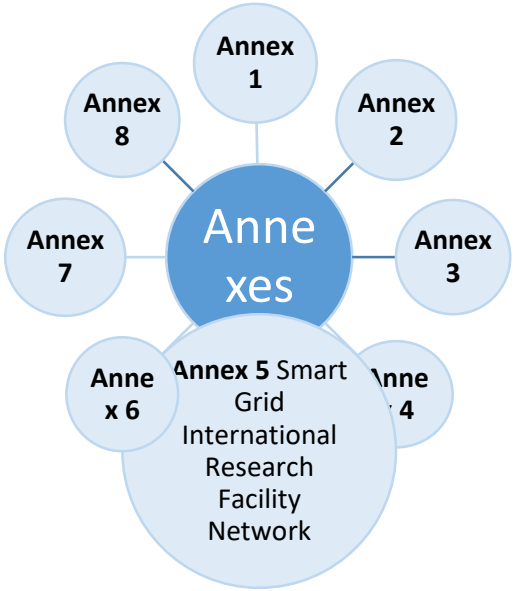
- Smart grid research and testing facilities, test beds, testing projects: identification of collaboration opportunities among test facilities, state of the art testing practices, identification of testing protocols needing attention,
- RES integration: Test Protocols for Advanced Inverter Functions for PV and storage integration
- Smart Grid Modelling: Server and interfaces to use these systems/topologies. SunSpec Alliance System Validation Platform, to reduce barriers to testing in emerging / developing economies



ISGAN Annex 6

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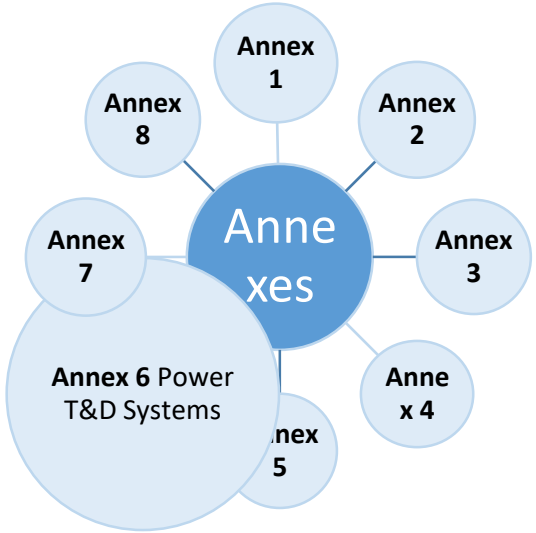
- The main objective of Annex 6 is to establish a long term vision for the development of the future sustainable power systems.
- main goal is to facilitate the application of advanced technologies needed for power grids to contribute in the best way to the attainment of clean energy, climate goals and sustainable energy access to all.
- solutions that enable power grids to maintain and improve the security, reliability and quality of electric power supply while facing challenges related to significant trends in the electricity sector.
- Condense to conclusions and recommendations for policy makers: Case Books, Discussion papers, collaboration with other initiatives, workshops



ISGAN Annex 7

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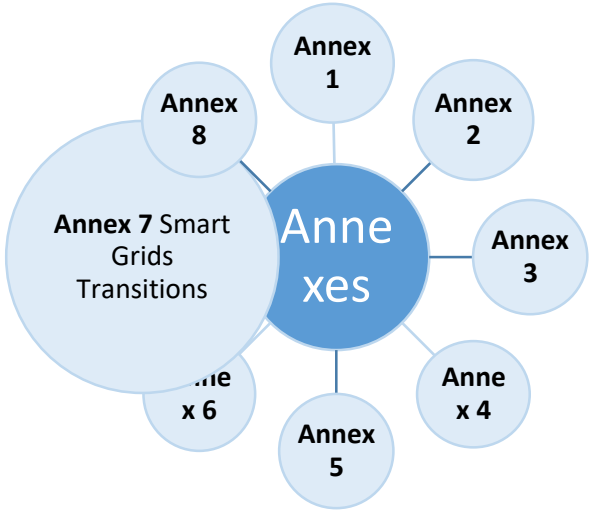
- Governance and socio-technical issues associated with smart grids deployment.
- Preparation of a prototype of a smart grids foresight process to help policy makers to orchestrate a sustainable transition.
- Evaluation of processes of market forming, actor involvement and integration
- LinkedIn Discussion group entitled “smart grid transition”



ISGAN Annex 8

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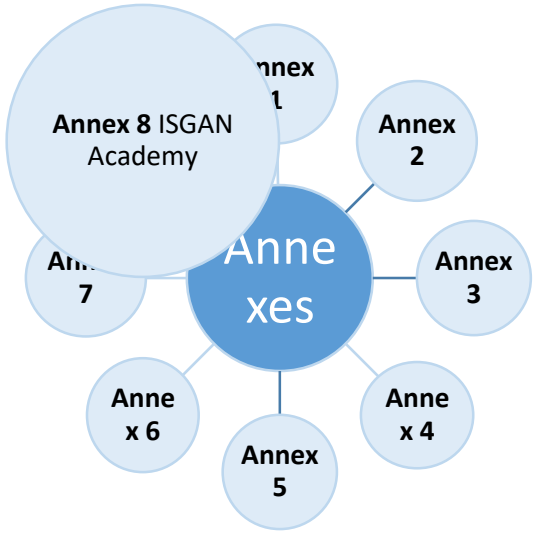
- Offer the ISGAN community of high level engineers and decision makers a means of rational and efficient continuous technical skills complement and update in the field of smart grids.
- The Academy is proposed as a set of e-learning core modules dealing with the entire value chain of smart grid.
- Fundamentals and further reading modules are also provided as appendices



Examples of Outreach Activities

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- Webinars, organized by the ISGAN Academy (every two months) or co-hosted with the Clean Energy Solutions Center
- Highly recognized public workshops normally back-to-back with EXCo meetings
- Thematic knowledge exchange events (KTP) bringing together leading participants from public, private, and academic sector to engage in depth in discussions and sharing best practices on specific aspects of smart grid development, e.g. integration of distributed renewable energy sources and microgrids.
- Since 2014 ISGAN recognize and showcase leadership and innovation through an annual ISGAN Award of Excellence (AoE) competition each with a special focus

Examples policy briefs & publications:

- Spotlight on Customer Engagement and Empowerment – case book
- Why We Do Not Know Much About the Social Dimension of Smart Grids Transition
- Draft Test Protocols for Advanced Battery Energy Storage System Interoperability Functions
- Discussion papers on System Efficiency and a Single Marketplace for Flexibility
- Social costs and benefits of smart grid technologies and assessment of cost benefit analysis (CBA) when applied to large-scale smart grids projects

Partnerships

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- IGSAN's current partners include:
  - International Energy Agency
  - Clean Energy Ministerial
  - Global Smart Grid Federation
  - India Smart Grid Forum
  - 21st Century Power Partnership
  - Clean Energy Solutions Center
  - Mission Innovation Innovation Challenge 1 Smart Grids