International Smart Grid Action Network (ISGAN)

Working Group 9: Flexibility Markets

Task 4: Operational Planning

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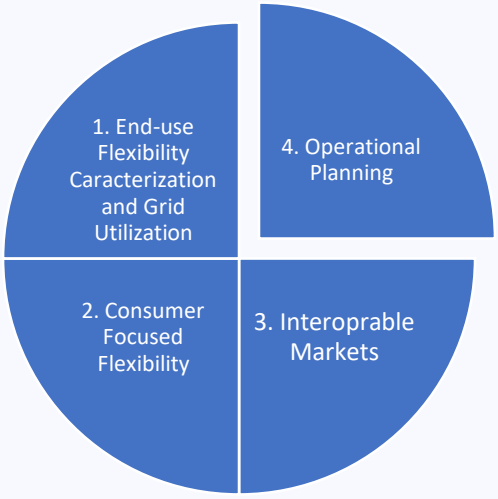
International Smart Grid Action Network (ISGAN) is an initiative of the ***Clean Energy Ministerial*** and an ***IEA Technology Collaboration Program***. The vision of ISGAN is to accelerate progress on key aspects of smart grid policy, technology, and related standards through voluntary participation by governments.

Energy systems around the world are undergoing a paradigm shift, driven by the need for decarbonization and the rapid growth of decentralized, variable renewable energy sources. A key element for the effective integration of renewable and decentralized energy sources into the power system is the use of flexibility from distributed resources, e.g., for market participation or the provision of grid services.

As part of the IEA TCP for a Co-operative Programme on Smart Grids (ISGAN) Working Group 9, we access insights from existing European and non-European power systems, markets, and pilots to understand the issues and implications of flexibility market design.



Methods:

- Survey among partners (India, Korea, Canada, Austria) concerning general market design, flexibility market design and flexibility services for system operators
- Country report: *„Characterization of the Electric Energy System in view of Flexibility Usage"*
- Stakeholder questionnaire to be directed at TSOs, DSOs, aggregators/flexibility service providers and consumer associations concerning operational planning and future flexibility.

The main barriers for using distributed flexibility can be grouped into three sub-categories:

- ***technical barriers***
- ***consumer engagement***
- ***regulatory barriers***

From the ***technical*** perspective, the lack of visibility of assets and observability in low voltage networks as well as real-time information on the distribution grid topology itself have been identified as one of the main barriers. Furthermore, as the grid structure is completely different at the distribution level than it is at the transmission level, flexibility markets for DSO purposes need to be designed differently from TSO markets and other mechanisms (e.g. flexible network tariffs) should be considered. In terms of technology and infrastructure for measurement and verification, smart meters are the primary used technology. It is found that their capabilities need to improve in terms of data resolution, frequency of data transmission, etc.

On the side of ***customer engagement***, stakeholders claim that there is still a lot of work to be done in terms of customer education, i.e., making them aware of their flexibility as well as introducing incentive schemes to increase consumers' willingness to participate in flexibility markets. Opinions differ on how to reduce the costs for end consumer flexibility provision. Suggestions range from capital expenditure for high growth and investment in new substations, lines and transformers, to increase the efficiency of the current network.

Although the existing ***regulatory framework*** for accessing flexibility at the distribution level is quite different in the countries analyzed, it has been shown that further development is needed. The introduction of integrated flexibility products aims at efficient provision but faces challenges in term of standardization. Market structure complexity hinders the ability of utilities to succeed as final dispatchers.

As more decentralized energy sources and flexible end-consumer assets are installed in the distribution network, the current basis for long-term and operational planning of grid operators needs to change.

In conclusion, the design of European and non-European electricity markets, and therefore the issues that countries face, differ significantly, implying that there will ***not be*** a one-size-fits-all solution for the successful implementation of flexibility markets related to operational planning.

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