Smart Grid International Research Facility Network

ISGAN – Annex 5

ISGAN (International Smart Grid Action Network) is an initiative of the Clean Energy Ministerial and is 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.

SIRFN Description

The Smart Grids International Research Facility Network (SIRFN) is a network of smart grid testing facilities in countries participating in the ISGAN.

SIRFN coordinates joint testing-related activities relevant to "smart" electricity grids. SIRFN's collaborative testing and evaluation capabilities are meant to be leveraged by the international community to enable improved design, implementation, and testing of smart grids and their functionality, including the reliable integration of clean energy technologies.

SIRFN's Focus Areas bring together technical experts to consider the current state, identify issues for test facilities to collaborate on resolving, identify potential SIRFN users, and recommend and implement SIRFN activities to overcome obstacles.

SIRFN – Technical Task 4: Power System Testing

Power systems develop into cyber-physical systems where major aspects of the decision-making and dynamics become based on digital solutions. Fundamental power systems dynamics are increasingly reliant on digitally controlled electronics, interacting with conventional components. However, the state of the art lacks methodologies, test systems and benchmarks to assess solutions to these major challenges.

The SIRFN-Power System Testing task brings together a range of international laboratories with an interest in devising strategies for testing of systems aspects of digitized, renewables-based, cyber-physical power systems. In the scope of this technical task are emerging test cases for intended and unintended interactions of control structures, considering horizontal (cross-functional), vertical (cross-layer), and multi-faceted (cross-domain) interaction phenomena.

Activities of the “Power System Testing” Task

- Survey of power system test cases and applicable testbeds
- Networking and sharing of expertise on power systems testing across the globe
- Collaborative development of Power systems testing methodology
- Development and publication of Test systems

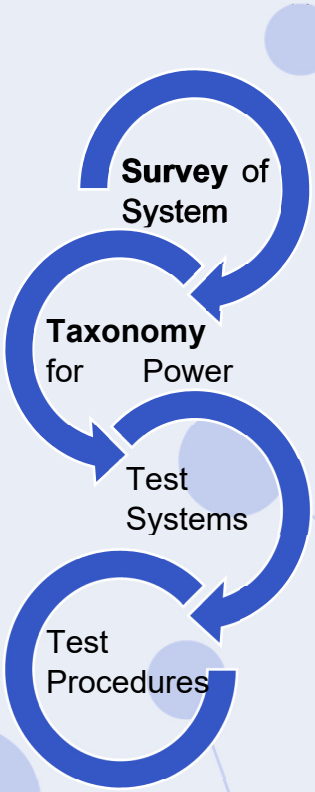
1. Coordinated Control Systems	• Distributed control with communication dependency
2. Microgrids and Inverter-dominated Distribution networks	• Multiple control levels • Inverter control interactions
3. Distribution Grid Protection & Reconfiguration	• Reconfiguration & stability • Quantify resilience benefits for networked microgrids
4. Stability of Low-inertia transmission interconnections	• Wide-area control systems with converter-based and demand-side resources

Topical clusters of power system test cases with their defining testing challenges

Current Work Programme

The current work programme for the task has a focus on:

- Identification and Collection of Test Cases
- Test Case harmonization and classification of power system testing problems
- Identification of gaps in testing methodology, test systems availability and benchmarks
- Laboratory Procedure Validation



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