

## Integrated Power System Standard



### Overview

THE IMPERATIVE FOR INTEGRATED SYSTEM PLANNING Drawing on GE Vernova's global experience with utilities and system operators, this paper outlines the technic.

### Key Takeaways

The Integrated Power System Standard, IEEE 1662-2023, provides guidelines for the design, application, and maintenance of power electronics in land-based and marine electrical systems.

The Integrated Power System Standard (IEEE 1662-2023) addresses the design and application of power electronics in both onshore and offshore electrical power systems. It covers equipment with aggregated power ratings of 100 kW or higher and voltages up to 52 kV AC or DC. The standard provides recommendations and requirements to ensure reliable operation, including design, testing, and maintenance practices for integrated power systems .

#### Scope and Applications

- Land-based systems: Industrial facilities, commercial power networks, and utility-scale installations.
- Marine systems: Offshore platforms, ships, and other maritime power networks.
- Power electronics: Includes converters, inverters, and other devices that manage energy flow and system stability.

- Performance criteria: Covers operational characteristics, analytical methods, and engineering practices to ensure system reliability .

#### Integration and Interoperability

The standard references international and local standards to guide users in achieving interoperability with existing power systems. It aligns with broader initiatives in smart grids and distributed energy resources (DERs), ensuring that integrated power systems can interface with renewable energy sources, storage systems, and grid-supportive inverters .

#### System Planning and Reliability

Integrated power systems require holistic planning to optimize reliability and economic performance. Integrated System Planning (ISP) frameworks complement IEEE 1662 by enabling iterative, data-consistent analyses across generation, transmission, and distribution domains. This approach helps identify high-risk operational periods, coordinate resources, and plan for decarbonized energy systems .

#### Related Standards

- IEC 61850 series: Defines communication and control interfaces for DERs and smart grids .
- IEEE 1547 and UL 1741: Focus on interconnection and interoperability of distributed energy resources .
- Other IEEE PES standards: Provide guidance on testing, maintenance, and lifecycle management of power systems .

#### Key Benefits

- Ensures reliable and safe operation of integrated power systems.
- Facilitates interoperability with renewable energy and storage technologies.
- Supports regulatory compliance and alignment with modern grid requirements.
- Provides a framework for both design and operational excellence in complex power networks . In summary, IEEE 1662-2023 serves as a comprehensive reference for engineers and system planners to design, implement, and maintain robust integrated power systems across land-based and marine applications, while ensuring compatibility with evolving smart grid and DER technologies.

## Article Content

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It addresses not only electric power concerns but also the directly related communications and information technology

Emerging Integrated System Planning Methods

In addition to describing how utilities are implementing the process and applying new frameworks and methods, the paper presents

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Our overview provides the pros and cons of existing test systems, implying the lack of appropriate benchmarks for future power

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ABSTRACT For the past four years, Advanced Surface Machinery Programs (SEA 03R2) has been developing the Integrated Power

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IEEE 1547-2018

IEEE 1547-2018 IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric

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