



KINECTRICS
a **BWX** company

Integrated Power System Studies with Real Time Digital Simulation Laboratory

Independent and Comprehensive Solutions for
Modern Grid Reliability



The modern power grid is rapidly evolving with increasing penetration of Inverter-Based Resources (IBRs), growing system complexity, stricter compliance requirements with protocols such as IEC 61850, standards such as IEEE1547, UL1741 and the NERC series (MOD, PRC, CIP, etc.). Utilities must ensure reliable integration, proper protection performance, and effective management of transient and dynamic system behaviour.

Kinectrics provides a comprehensive suite of power system studies and real-time simulation services, including Distributed Energy Resource (DER) integration assessments, grounding and Transient Over Voltage (TOV) analysis, and protection performance evaluation. Our Real Time Digital Simulator (RTDS)–based testing enables closed-loop, hardware-in-the-loop validation of protection and control systems under realistic operating conditions.

With deep expertise in both analytical studies and real-time simulation, Kinectrics delivers flexible solutions, from targeted assessments to fully integrated system validation.



Full Close Loop Testing Suites (RTDS)

- Protection application type testing.
- Protection IED dynamic response assessment.
- End-to-end relay and scheme validation.
- RMS and EMT validation of inverter models for DER integration and compliance studies.
- Performance and control interaction assessment for islanded and grid-connected operation.
- Battery Energy Storage System (BESS) and protection.
- Protection end of life assessment.

Distributed Energy Resource Integration

Interconnection studies for transmission and distribution scale DER (IBR and synchronous):

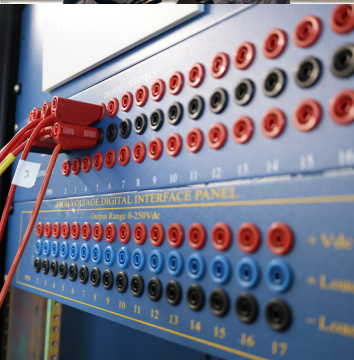
- IBR model validation (RMS and EMT) for planning and compliance studies.
- Dynamic and EMT analysis of stability, control interaction, and ride-through performance.
- Microgrid and BESS integration and control assessment.
- Protection, anti-islanding, and coordination validation.
- RTDS-based hardware-in-the-loop testing for controller and model validation.

Advanced IEC61850 Application Testing & Engineering

- End-to-end validation of IEC 61850–based protection and control schemes, including relay and gateway and RTU.
- Interoperability testing of IEC61850 based substation automation application using RTDS.
- Configuration review and testing of IEC61850 engineering, including MMS, GOOSE messaging, and sampled value for single or multi vendor applications.
- IEC61850 training and commissioning support.

Connection Impact Assessment

- Feeder and network load flow and voltage profile and regulation performance.
- Thermal rating verification.
- Short-circuit impact and equipment duty evaluation.
- Protection coordination and relay performance review grounding and TOV assessment.
- Compliance screening with utility and interconnection requirements.
- Harmonics and voltage flicker assessment.
- Islanding, transfer trip evaluation.



Kinectrics' advanced engineering and testing services deliver **safe, reliable, and cost-effective solutions** for the implementation and operation of advanced power systems, renewable energy, protection, and automation technologies.

Our team combines advanced tools and deep technical expertise to evaluate device and system performance under real-world and simulated power system conditions, enabling reliable operation and confident field deployment. Through robust infrastructure and proven methodologies, we provide end-to-end support for studies, modeling, and testing of power system reliability, protection, control, automation, DER integration, as well as microgrid applications.



Plant Modeling and NERC MOD Compliance Services

- Validation of generator, exciter, governor, and Power System Stabilizer (PSS) models against actual plant response.
- Dynamic and transient simulations to ensure compliance with NERC MOD-025/026/027 requirements.
- Assessment of plant contribution to system stability during contingencies and disturbances.
- Coordination with utility system models for accurate system-wide dynamic performance.
- RTDS-based simulation of generator behaviour under real-time operating conditions.

Operational Support

- Customized workshops and training programs focused on protection applications, IEC 61850, DER integration, and modern power system technologies.
- Ongoing support for fault and event analysis, including investigation of real-world disturbances to identify root causes and evaluate system performance.
- Event simulation and analysis through reproduction of system events in RTDS to support scenario evaluation, protection validation, mitigation development, and operator training.

NERC - PRC Compliance Services

- Development and delivery of NERC PRC compliance reports and technical reviews for generation and transmission owners.
- Support for the implementation of NERC protection requirements across the full system lifecycle, including design, settings development, configuration testing, maintenance, operation, and fault analysis.
- Assessment of protection system performance in accordance with NERC PRC standards under fault, switching, and contingency conditions.
- Evaluation of DER and microgrid impact.



Let's work together!

Contact us to explore how our expertise and capabilities can help strengthen your next utility project.

Powering innovative
and sustainable energy
solutions globally.

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