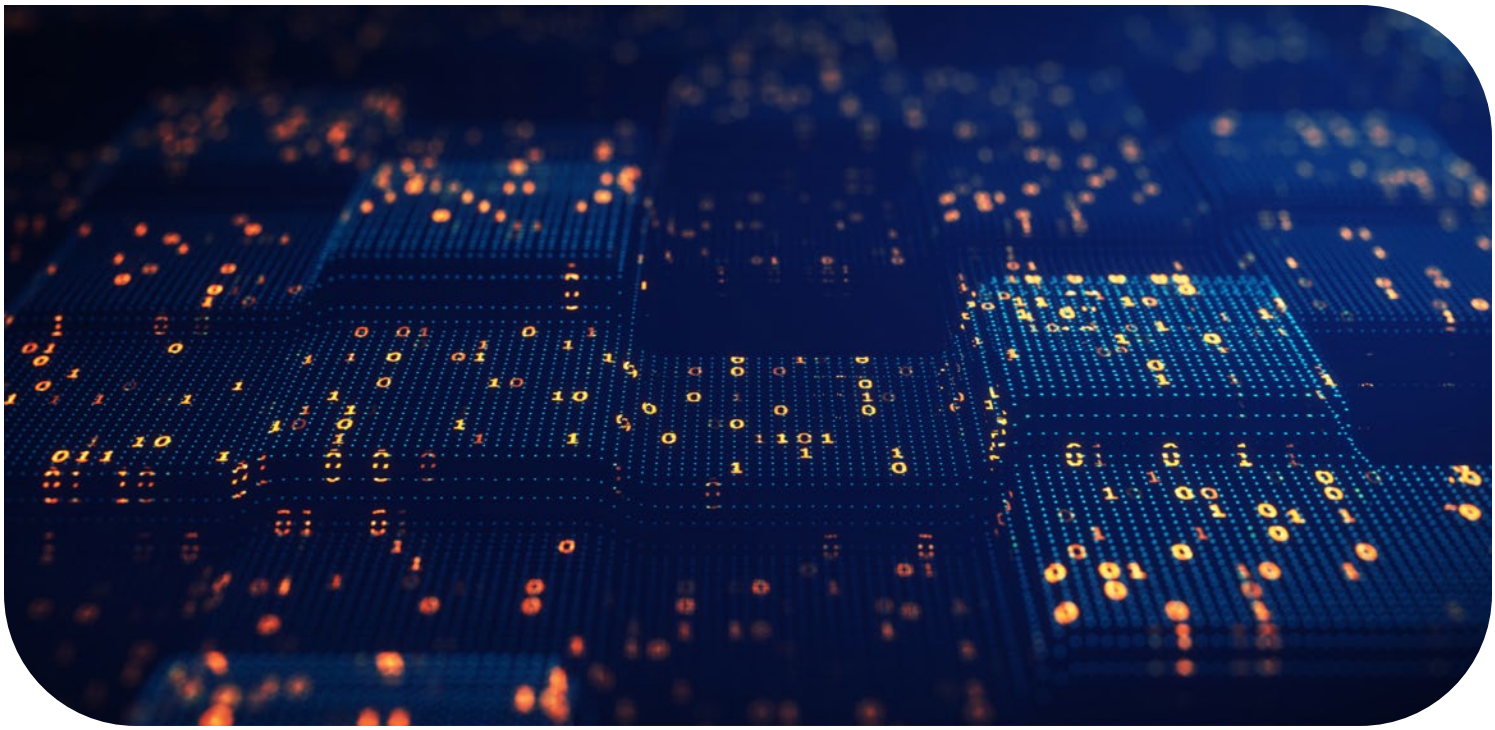


WHITE PAPER

Large Computational Loads

What developers of data centers, AI, cryptocurrency and other high density computing facilities, as well as the Reliability Entities serving them, need to know.

Status as of October 2026: *NERC's proposed computational load registration framework and Project 2026-02 standards continue to move through approval and implementation. Preliminary results show the foundational standards passed an initial ballot, but requirements, thresholds, and dates may still change. Developers and site owners need to be aware of the scope of anticipated regulations which will affect interconnection studies, utility agreements, equipment choices, commissioning protocols, communication responsibilities, and operating systems.*

hsi

Executive Summary

Large computational facilities are no longer viewed only as customers requesting electric service. When a site's size, connection, controls, or response to disturbances can affect the Bulk Power System (BPS), its owner or operator may fall within the NERC reliability framework.

NERC is developing a registration framework for Computational Load Owners and Computational Load Operators (CLO). It is also advancing standards that address interconnection studies, modeling, operational data, communications, protection coordination, and disturbance monitoring. At the same time, FERC is pushing regional grid operators to make large load interconnection rules clearer and more consistent while protecting other customers from inappropriate cost shifts.

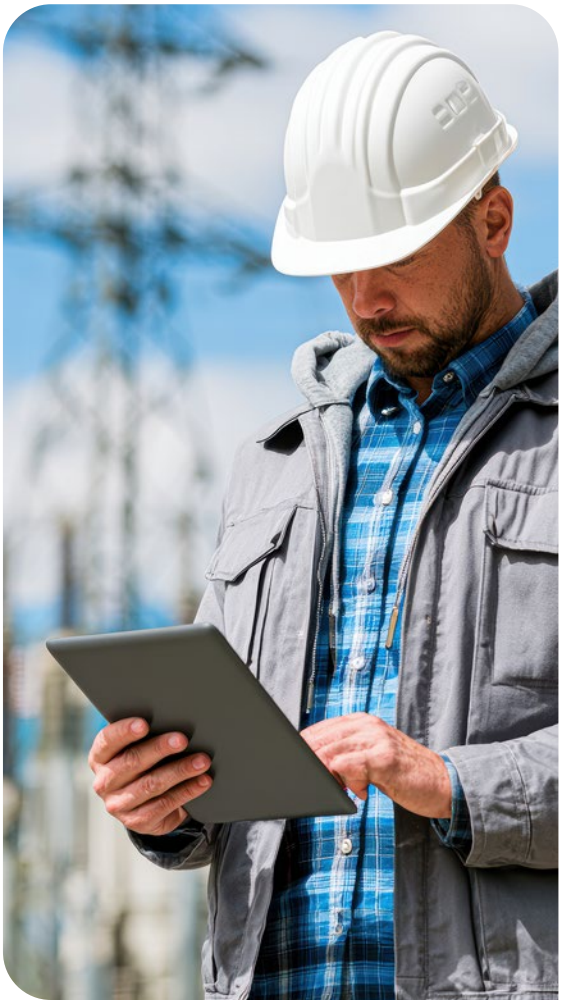
The Practical Takeaway

Treat grid reliability as a core project workstream from the start, not as late stage permitting or paperwork.

Four early actions a developer should take:

- Engage the serving utility, Transmission Provider (TP), and Regional Planning Organization (RPO) early
- Share accurate technical and operating information, including expected load behavior
- Maintain the ability to communicate and respond during grid events
- Assign accountability between the site owner, tenant, operator, control room provider, and utility

Waiting too long can trigger redesign, schedule delays, unexpected network upgrade costs, restricted energization, contractual exposure, or future compliance findings.



How This Can Affect Your Project

Possible NERC registration

Do not assume that a behind-the-meter location, distribution level voltage service, multiple buildings, or tenant operation removes the issue. The electrical point of interconnection, aggregate capability, ownership, and operational control all matter.

More rigorous interconnection work

Expect detailed questions about staged and ultimate MW demand, ramp rates, power factor and reactive capability, harmonics, short-circuit contribution, ride-through performance, protection and control settings, UPS and backup generation, load transfer logic, and dynamic models. Material design changes may require a new study.



Commissioning constraints

Energization and load ramp up depend on test plans, model validation, telemetry, communication, protection coordination, operating procedures, and utility approval. A successful construction test doesn't automatically demonstrate acceptable grid performance.

Ongoing operating obligations

Grid operators and planners will need reliable real-time contacts, forecast and outage data, notices of major operating changes, disturbance records, and a way to follow agreed curtailment or restoration protocols. Automated transfer, ride-through limits, UPS, or workload-management logic should not create an unexpected simultaneous drop or return of load.

Cost and schedule exposure

Studies, transmission or distribution upgrades, special protection, metering/telemetry, communications, model development, and compliance systems can affect capital cost and construction timelines. FERC's large load proceedings also emphasize transparent study processes and avoiding cost shifts to other customers.



Seven Areas That Deserve Attention

1. **Registration and accountability:** Confirm who owns the facilities and who has authority over real-time operation. Multiple tenants, campuses, phased projects, affiliates, and contracted operators can blur accountability.
2. **Complete operating data:** Nameplate megawatts and annual energy forecasts are not enough. Studies may need fast ramp behavior, coincident restart, cyclic operation, voltage sensitivity, power electronic controls, and planned expansion.
3. **Disturbance response:** Protective settings and electronic controls can cause many devices to reduce consumption or trip at the same time during voltage or frequency disturbances. The response needs to be understood before operation. Additionally, if the loss of load can cause exceedance of grid operating limits, there may need to be coordinated disconnection of generation during disturbances.



4. **Model and study quality:** Planning teams need usable steady state, short circuit, power quality, and dynamic data. Vendor models must match installed equipment and be updated when firmware, controls, UPS topology, or operating modes change.
5. **Protection and restoration:** Poor coordination can trip too much load, fail to isolate faults, or cause a rapid synchronized return after an event. Restoration sequencing and cold load behavior should be studied and tested.
6. **Communication and control:** Define how 24/7 communication will work, what the grid operator may request, how instructions are authenticated, and how the site responds if normal communication or automation fails.
7. **Evidence and change control:** If the organization is registered, it will need documented procedures, assigned owners, retained records, training, internal controls, and evidence that required work was completed.

Build the Right Team Early

Higher risk projects need a coordinated team rather than one consultant. Bring the right specialties together before the interconnection application is locked and before major electrical, UPS, or control equipment is purchased.

Capability	Primary Focus
Power system engineering	Interconnection, dynamic, harmonic, protection, and restoration studies
NERC registration and compliance	Applicability, organizational roles, evidence, and implementation timing
Operations and controls	Telemetry, communication, alarms, curtailment, and restart logic
Utility and regulatory counsel	Tariffs, agreements, allocation of owner and operator duties, confidentiality, and cost responsibility
Project controls	Connections among study assumptions, procurement, commissioning gates, and compliance deliverables



Eight Question Project Risk Assessment

Score each question using 0 for no or low risk, 1 for uncertain or partial risk, and 2 for yes or high risk. Use the highest reasonable score until the facts are verified. Note: this screening tool is not a registration determination or engineering study.

#	Question	Score
1	Does the proposed site include computational load that may warrant NERC registration review based on size, electrical configuration, point of interconnection, or common control? Consider a site, campus, or commonly controlled aggregation of approximately 20 MW or more as an early screening signal, not a final threshold.	0 1 2
2	Will the facility directly connect to the BPS or interconnect at a voltage level that warrants evaluation under NERC registration criteria?	0 1 2
3	Could normal operations, contingencies, workload shifts, UPS transfers, or automated control actions change facility demand by 10 MW or more per minute?	0 1 2
4	Is expected response to voltage and frequency disturbances unknown, undocumented, or unvalidated?	0 1 2
5	Are the models and data needed to evaluate reliability impacts incomplete, unavailable, or unvalidated?	0 1 2
6	Are ownership, operating authority, and responsibilities for NERC and utility requirements unclear or split among multiple parties?	0 1 2
7	Are operating communicaiton, telemetry, disturbance monitoring, curtailment procedures, or restoration capabilities incomplete, unavailable, or not established?	0 1 2
8	Could interconnection or reliability studies require more analysis, grid upgrades, operating limits, or facility changes that affect the planned in-service date?	0 1 2

How to interpret the score

0-3	**Lower apparent risk.** Confirm the key assumptions Document the NERC registration and standards applicability review with the serving utility qualified advisers.
4-7	**Moderate risk.** Complete targeted power system engineering and a NERC applicability review before final design or major procurements.
8-11	**High risk.** Create a cross-functional reliability and compliance workstream. Integrate requirements into interconnection, contracts, design, and commissioning.
12-16	**Very high risk.** Create a cross-functional reliability and compliance workstream. Integrate requirements into interconnection, contracts, design, and commissioning.

Escalate regardless of the total score when registration may apply, loads may be aggregated, credible performance data are unavailable, or one facility event could remove hundreds of megawatts of load.

Immediate Actions

Early coordination can help developers and reliability entities reduce uncertainty, avoid costly project changes, and prepare for evolving requirements. The following actions establish clear accountability and put the technical groundwork in place.

1. Designate an executive sponsor and technical lead responsible for grid reliability and NERC readiness.
2. Ask the serving utility or transmission provider for a pre-application meeting. Cover aggregation, interconnection study requirements, model data, commissioning, operating communication, curtailment, and potential NERC registration.
3. Create a controlled grid data book with one-line diagrams, equipment and control descriptions, demand profiles, models and settings, study assumptions, planned expansion phases, and revision history.
4. Perform preliminary studies appropriate to the site. These studies may include load flow, short circuit, dynamic and ride-through, harmonic, protection coordination, and restoration assessments.
5. Document the owner, operator, tenant, utility, and vendor responsibilities. Preserve access to models, settings, event records, firmware information, and technical support.
6. Monitor NERC Project 2026-02, proposed Rules of Procedure revisions, Regional Entity guidance, and RTO/ISO or TP requirements through final approval and implementation.
7. Assess CIP and cybersecurity readiness for any systems that support operational communication, telemetry, disturbance monitoring, remote access, vendor maintenance, authentication of grid-operator instructions, and control actions. Even where final applicability is still evolving, treat cyber controls for these interfaces as part of NERC readiness and document ownership, access control, logging, incident response, and change-management expectations.

Start Before Design is Fixed

Early coordination gives the project team more room to manage equipment choices, study assumptions, contracts, commissioning gates, and schedule risk.

Selected Public Sources

NERC, Large Loads Action Plan
Program overview, active standards work and stakeholder comment opportunities.

NERC, Proposed Changes to Rules of Procedure
Computational load registration materials and comment history.

NERC, Aggregated Level 2 Alert Report
Interconnection, study, commissioning, forecasting and operating recommendations.

NERC, Large Load Industry Recommendation
Disturbance experience and reliability concerns associated with large loads.

FERC, Large Load Interconnection Docket RM26-4
Interconnection process, cost responsibility, flexibility and colocation issues.

Note: *This white paper is an educational planning aid. It does not replace a determination by NERC or a Regional Entity, an interconnection study, tariff review, legal advice, or site-specific engineering.*

About HSI

HSI is your single-source partner for EHS, Compliance, and Professional Development solutions. HSI provides integrated e-learning content, training solutions, and cloud-based software designed to enable your business to improve safety, operations, and employee development. Across all industries, HSI helps safety managers, and technical employees, human resources, first responders, and operational leaders train and develop their workforce, keep workers safe, and meet regulatory and operational compliance requirements. HSI's focus is on training, software, and services for safety and compliance, workforce development, industrial skills, and emergency care. HSI is a unique partner that offers a suite of cloud-based software solutions including learning management, safety management, chemical SDS management, and more, integrated with content and training so businesses can not only monitor and manage multiple workflows in one system, but train employees via one partner.

For more information, visit **hsi.com**