Technical Assistance for Large Loads Integration

The Challenge

The United States is facing an unprecedented surge in electricity demand, driven by the rapid expansion of data centers, hyperscale facilities, and other large loads. These facilities, often requiring hundreds of megawatts of capacity, are straining existing grid infrastructure and challenging traditional planning, interconnection, and deployment processes.

Key challenges include:

- **Grid capacity and stability** — Sudden demand spikes from large loads can outpace infrastructure readiness, threatening reliability.
- **Interconnection backlogs** — Long queues and complex study processes stall projects for months or years.
- **Siting constraints** — Power availability, water access, land use, permitting complexity, and community acceptance all complicate deployment timelines.
- **Cost and market uncertainty** — Unclear cost allocation, volatile markets, and regulatory fragmentation add risk for developers and utilities alike.
- **Cybersecurity and supply chain risks** — Rapid deployment of new digital infrastructure introduces vulnerabilities that require proactive management.

Without coordinated action, these challenges can lead to increased outage risk, higher costs for utilities and ratepayers, and delayed economic development.

How Idaho National Laboratory (INL) Can Help?

INL's Data Center & Large Load project offers **Technical Assistance (TA)** to utilities, generation developers, data center developers, regulators, and regional entities navigating large load integration. Drawing on INL's expertise in grid readiness, Cyber-Informed Engineering (CIE), nuclear energy, and supply chain security, our team provides practical, decision-ready support tailored to your organization's specific challenges.

TA is available at three engagement levels:

Level	Timeline	Output
Short Advisory	**1–2 weeks**	Decision memo with findings and next steps
Expert Match	**3–6 weeks**	Analysis + workshop; decision pack with templates and shortlist
Deep Dive	**6–8 weeks**	Full package deliverables (tradeoff matrix, risk register, implementation guide)

Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy.

INL Idaho National Laboratory

TA Packages Available

1. **Grid Constraints & Large Load Readiness Assessment** — Identifies key grid barriers to large load interconnection and evaluates what the data center can build or offer to address them. Outputs include a barrier summary paired with data-center-side solution options.
2. **CIE Interconnection Risk Assessment** — Cyber-Informed Engineering analysis of large-load substations and behind-the-meter boundaries. Outputs include a risk memo, mitigation checklist, and procurement language.
3. **On-Site Generation Mix: Feasibility Analysis & Tradeoffs** — Technical feasibility comparison of Battery Energy Storage System (BESS), variable generation, gas/hybrid, and future nuclear-ready interconnect options. Outputs include an option matrix and fast-path vs. future-ready recommendations.
4. **Nuclear Co-Location Pre-Feasibility & Flexible Interconnect Planning** — Pre-feasibility assessment for developers and utilities exploring SMR adjacency or phased nuclear integration. Outputs include a phased plan concept and risk register.
5. **Interconnection Process Support** — Research-backed technical guidance for under-resourced utilities and developers navigating novel interconnection approaches. Outputs include an annotated, stage-by-stage readiness packet.
6. **Supply Chain Digital Assurance & Vendor Risk Watch** — Continuous vendor risk profiling for utilities and developers procuring Inverter-Based Resources (IBRs), BESS, transformers, and Operational Technology (OT) gear. Outputs include risk scorecards and sample procurement contract language.

Our Boundaries

INL TA provides **recommendations and analysis** — we are not a replacement for Engineering, Procurement, and Construction (EPC) contractors or market operations implementers. Where requests fall outside our core capabilities or compete with commercial services, we coordinate with partner national laboratories to connect you with the right expertise or recommend industry options to explore.

GRIDS: The Decision Support Tool Behind Our TA

Our TA is informed by **GRIDS (Grid Readiness and Integration Decision Support)** — a curated library of vetted solutions spanning Demand-Side Management, Transmission & Distribution, Generation & Storage, Grid Modernization, Site Optimization, and Regulatory/Market Solutions. GRIDS characterizes each solution by technology readiness, cost, deployment timeline, permitting complexity, and supply chain availability, allowing us to rapidly select ranked, actionable options for your specific context.

Request Technical Assistance

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