



Data Centers Capabilities

March 2026

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Executive Summary

Your Trusted Partner

EPE is more than a consultancy or technology company; we're architects of the future of energy.



With a legacy spanning five decades, our name has become synonymous with innovation, reliability, and excellence in the electric power industry. Our team brings together diverse expertise in electrical engineering, generation and load integration, grid modernization, and beyond. With deep technical knowledge and a passion for problem-solving, we tackle the toughest challenges head-on, turning obstacles into opportunities for growth and innovation.

In 2025, EPE supported more than 100 individual data center developers across 270+ data projects — including 25% of the top 20 — navigating the most complex grid interconnection challenges in North America. Our clients don't just need engineering. They need a team who knows how Utilities and System Operators actually work — and can deliver speed to power.

Powering the Future of Data Centers

By 2030, U.S. data centers are projected to consume up to 20% of the nation's electricity, with hyperscale facilities surpassing 1,000MW. The rise of AI-driven workloads, increasing power density, and curtailment risks require a new approach to energy strategy.

EPE helps data center developers secure scalable, reliable power through grid intelligence, rapid interconnection, and resilient energy design. Our proprietary software and consulting solutions offer predictive analytics for site selection, while grid-first engineering prevents costly delays and maximizes operational uptime.



Smart Site Selection & Market Intelligence: Identify optimal sites using a consulting and software-driven approach that provides accurate grid capacity insights and detailed market analyses to proactively mitigate future curtailment risks.



Resilient Energy Design for Maximum Uptime: Design resilient data centers with co-located generation and storage, maximizing reliability during grid stress events while proactively mitigating congestion risks for future scalability.



Streamlined Interconnection & Grid Integration: Accelerate interconnection with EPE's unmatched expertise in grid planning and large-scale energy integration, reducing approval timeline risk and accelerating power-ready deployment.



Operations & Risk Management: Establish uninterrupted performance and sustained reliability with proactive grid assessments and energy resilience strategies. EPE's predictive solutions minimize downtime and secure long-term operational stability.

Section 1: About EPE

Who We Are

EPE supports clients across the energy ecosystem with end-to-end solutions. Our work spans utility engineering, grid integration, regulatory compliance, and advanced analytics – delivered with the expertise needed to navigate the energy landscape. As consultants, engineers, and technologists, we act as an extension of your team, bringing decades of experience and a shared commitment to building a resilient, reliable, flexible, and affordable energy future.



Our Mission

To harness world-class expertise and innovative power systems technology to **engineer a successful energy transition.**

Our Vision

To be the leader and innovator in applying a holistic approach to study, design, and implement an **infrastructure that enables an integrated grid of the future.**

Our Values

- **Lead as a trusted partner:** Acting with integrity, professionalism, and care
- **Support each other toward excellence:** Prioritizing collaboration and continuous growth
- **Inspire impactful change:** Delivering meaningful results for people and the planet
- **Embrace inclusion:** Celebrating our differences and fostering belonging
- **Go where others think is not possible:** Innovating boldly, always a step ahead

Industries We Serve

EPE partners with clients across the energy ecosystem — public and private, regulated and deregulated, local and global. Our backgrounds in regulatory environments and our work across data centers, utilities, and government agencies give us a deep understanding of the environments our clients operate in. We translate that experience into solutions tailored to each organization’s goals and operational realities.

- **Commercial & Industrial:** We support energy efficiency, cost reduction, and resilience for high-demand users.
- **Data Centers:** Our team designs and implements scalable, reliable power systems for always-on operations.
- **Government:** By modernizing public infrastructure, we help to ensure energy security and resilience.
- **Power Delivery:** We partner with utilities on planning, modernization, and regulatory compliance.
- **Renewables & Storage:** In providing end-to-end support, we help accelerate clean energy.
- **Investment Stakeholders:** We equip investors with risk analysis and technical due diligence for confident decisions.
- **Power Generation:** We focus on maximizing performance and profitability for traditional and energy generation assets.



Project Management, Engineering, and Consulting Services

EPE provides a full suite of consulting services designed to navigate the increasing complexity of today's grid. Whether supporting long-range planning, enabling energy integration, or addressing emerging regulatory demands, we empower clients to plan smart, move fast, and deliver confidently.

- **Project Management:** We deliver disciplined, expert-led oversight of complex energy programs by applying a structured, stage-gated methodology that ensures governance, risk mitigation, schedule adherence, and seamless cross-functional coordination to support the successful delivery of projects.
- **Energy Market Analysis:** We use sophisticated and detailed simulation forecasts to help clients seize market opportunities, minimize exposure, and plan strategically.
- **Grid Analysis & Interconnection:** We deliver integrated interconnection solutions — from feasibility through integration — grounded in regulatory knowledge and technical accuracy.
- **Transmission Planning & Operations:** From long-term system modeling to day-to-day operations planning, we help clients optimize transmission reliability and support renewable integration.
- **Distribution Planning & Engineering:** From load growth to DER integration, we help modernize distribution systems for a more resilient, future-ready grid.
- **Engineering Services:** Our experts function as part of your internal team, supporting system design, performance evaluation, and procurement support.
- **Digital Transformation:** We streamline complex energy projects using proprietary and industry-standard software to automate precise workflows.
- **NERC & Regulatory Compliance:** Our advisors help you stay ahead of the curve, navigating compliance requirements with minimal disruption and maximum confidence.



**10,000+ Projects
with Proven Results**



**50+ Years
in Operation**



**650+
Employees**

Section 2: Capabilities

Data Center Services

In 2025, EPE supported more than 100 individual data center developers – including 25% of the top 20 – across approximately 270 projects throughout North America.



Our work helps energy and infrastructure teams accelerate site due diligence and interconnection timelines, as well as optimizing power delivery strategies. Our customers leverage our expertise in working on the transmission planning and load screening with most of the major utilities in the U.S. which gives us unparalleled knowledge on their processes and requirements.

EPE’s advantage is being present on both sides of the table. Through our utility business unit, which works directly with utilities on interconnection studies, we gain valuable visibility into processes, challenges, and best practices from the utility perspective. Outside of project-specific, firewalled discussions, there are dedicated forums allowing teams to share insights, compare approaches, and continuously exchange knowledge, deepening our understanding of interconnection dynamics.

We’re With You at Every Step

EPE operates at the intersection of utilities, ISOs, and developers. We know how MISO runs queue studies, how Dominion evaluates load requests, and where PJM has available capacity – because we work with all of them.



Trusted Grid & Reliability Expertise: With four decades of experience, deep regional insights, and strong utility partnerships, we offer unmatched grid and reliability expertise for dependable energy solutions.



Proprietary Software: EPE’s proprietary tools, Insights & NuCast, deliver predictive modeling and real-time energy planning, driving smarter, more efficient energy management.



Speed-to-Power Advantage: Offering seamless end-to-end support, EPE streamlines data center development—from site selection to interconnection, EPC project delivery, and ongoing operations—reducing overall complexity and risk.



Future-Proof Design: By integrating co-located generation, storage, and multi-source grids, EPE strengthens long-term resilience, optimizes power efficiency, and secures reliable uptime in all conditions.

Who We Serve



Hyperscalers & Cloud Providers: Supporting large-scale, AI-driven workloads with seamless power solutions



Co-location Providers: Optimizing interconnection and grid resilience for scalable data center infrastructure



Enterprise Data Centers: Custom energy solutions to maximize uptime and operational efficiency



Feasibility and Site Selection

Early site selection requires understanding grid deliverability for large-scale loads. EPE uses proprietary analytics to quickly pinpoint viable sites and mitigate downstream issues.

- **Transmission Screening & Statewide Load Analysis:** Developers require rapid, early insight into where the grid can feasibly support large-scale data center loads without triggering major upgrades. EPE leverages utility and ISO planning models to perform super-fast wide-area transmission screening using regional planning cases. Our analysis evaluates thermal bottlenecks, voltage constraints, import capability (115–765 kV), and interface limits under both system-intact and N-1 conditions. We develop a range of base cases that reflect approved and planned transmission owner (TO) projects, generation interconnection queue additions, updated load forecasts, and long-term planning upgrades – rather than relying solely on outdated published planning models. This approach provides a more accurate representation of future grid conditions and quickly pinpoints viable regions for large-load interconnection.
- **Advanced N-1/N-1-1 Transmission Analysis:** Large HPC campuses require validation that capacity remains available under multiple contingency conditions. EPE performs detailed N-1 and N-1-1 analyses aligned with RTO and utility study methodologies to evaluate how line outages, double contingencies, transformer loss, or generation outages affect load deliverability, voltage performance, and overall system reliability. Using customized transmission planning cases that incorporate updated load forecasts, approved and queued generation projects, retirements, and planned network upgrades, EPE assesses whether upgrades, reconfigurations, or additional switching are required to maintain compliance under stressed system conditions. This rigorous approach helps to identify that capacity is robust, defensible, and reflective of realistic future grid scenarios.

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- **SCED-Based Hosting Capacity & Siting for Large Loads:** For hyperscale campuses and large-load clusters, EPE supplements traditional transmission screening with Security-Constrained Economic Dispatch (SCED) modeling to evaluate how large loads interact with real-time grid operations. Using forward-looking market cases that incorporate updated generation queues, transmission upgrades, and load growth forecasts, EPE runs 8,760-hour simulations to assess the operational hosting capacity of candidate POIs and zones. These simulations capture congestion patterns, locational marginal price (LMP) trends, curtailment risk, and system constraints under realistic dispatch conditions. The results allow developers and utilities to rank sites and portfolios based on deliverability, congestion exposure, cost-to-serve, and incremental upgrade requirements, ensuring that siting decisions reflect how the grid operates rather than relying solely on static planning assumptions.
 - **GIS Mapping & Grid Heat Maps:** Developers need fast visual comparisons of grid strength. EPE's Insights delivers geospatial layers showing substation locations, line voltages, congestion zones, and thermal headroom, helping to rapidly identify high-probability POIs.

Power Strategy

EPE develops flexible power strategies to match AI-driven growth, balancing cost and long-term reliability through detailed forecasting and market analysis.

- **On-Site Generation & Storage Portfolio Design:** EPE routinely evaluates combinations of co-located storage and thermal generation as private firming for data center campuses and large industrial loads. Within a SCED framework, we run full 8,760-hour simulations to forecast nodal LMPs, congestion patterns, and economic curtailment at candidate POIs, then model storage and thermal fleets as system assets co-optimized with the grid to minimize system cost and unserved energy. We test multiple BESS durations, MW sizes, and thermal configurations to understand how each option mitigates congestion and curtailment at the POI and quantify the impact of on-site resources on nodal prices, congestion rents, and effective levelized cost of energy supply to the load. This work allows our clients to narrow down to a shortlist of technically robust, commercially realistic configurations before they enter detailed financial modeling or negotiate offtake structures.
- **Tier III / Tier IV-Aligned Reliability & Cost-to-Serve:** For campuses targeting Tier III or Tier IV-like reliability, EPE extends SCED analysis beyond pure economics to focus on uptime and firm service. We model large loads as curtailable in the base case, then progressively introduce storage and firm generation to close the “reliability gap”. Moreover, we estimate hours and MWh of economic unserved energy, outage-like events, and residual exposure under extreme system conditions. We then recommend least-cost mixes of BESS and thermal capacity that achieve targeted availability (e.g., ~99.995%) while remaining compatible with ISO operational and market rules. The result is a direct link between grid behavior and campus reliability planning, giving clients a defensible story for their boards, counterparties, and lenders.
- **Revenue & Cost Optimization Modeling:** Developers need clear economic pathways to reduce OpEx at the multi-GW scale. EPE models alternative procurement structures (renewables, BESS

hybrids, thermal PPAs), quantifying savings from avoided LMP spikes, load shifting, and participation in structured bilateral agreements.

- **Grid-Aware Flexible Load Design:** EPE designs grid-aware flexibility strategies that turn operational curtailment and ramping capability into real, quantifiable hosting capacity. By modeling campuses as controllable loads in SCED and reliability studies, we show how specific flexibility attributes can unlock MW at constrained POIs, defer transmission upgrades, and reduce interconnection risk while maintaining target availability.
- **Risk Management Strategy:** Data centers exposed to real-time volatility face unpredictable operating costs. EPE evaluates DA/RT market exposure, congestion hedging tools, basis risk, and hybrid procurement structures to propose a stable, long-term cost strategy.

Interconnection

Interconnection for large load developers poses increasing risk; EPE participates in every stakeholder session and forum to stay at the forefront of new requirements, help expedite approvals and reduce iterations.

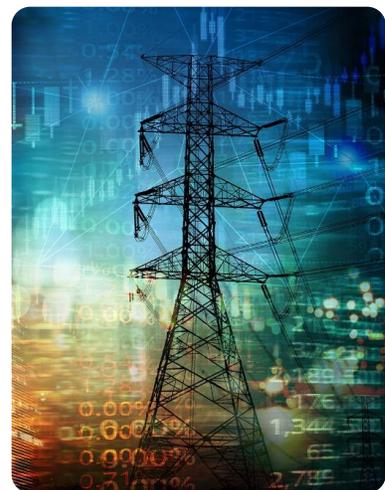
- **Utility & Regulatory Outlook:** EPE's Market Intelligence Advisory empowers data center customers to stay ahead of evolving interconnection requirements across North America. EPE offers two flexible options: ad-hoc process support covering financial commitments, emerging modeling standards, and stakeholder representation; or a comprehensive state-of-the-market report with ongoing advisory across key markets including PJM, MISO, SPP, and ERCOT — ensuring customers fully understand the interplay between RTO and transmission owner requirements.
- **Load Interconnection Support:** Large loads require precise modeling inputs to avoid delays in approval to energize. EPE completes TSP/ISO forms with accurate transformer data, load profiles, relay summaries, and system diagrams, accelerating acceptance and study initiation. EPE participates in scoping meetings, reviews Load Impact and Facilities Studies, answers operator technical questions, and helps minimize delays as the project moves through the ISO and utility approval process.
- **Flexible Interconnection Pathways and Stakeholder Engagement:** EPE pairs traditional load interconnection studies with flexibility-based solutions that help large data centers reach energization sooner. We translate study results into regulator-ready narratives that show how flexible load and on-site resources can serve as credible, capacity-enabling alternatives to traditional upgrades, and we support engagement with ISOs and TSPs to align on practical, approval-ready paths to service.
- **PSS®E Steady-State Model Development:** ISOs require complete and accurate load and transformer models. EPE builds models capturing tie lines, grounding configurations, step-up transformers, and aggregate load characteristics tailored to ISO formatting standards.

- **Dynamic Stability and Electromagnetic Transient Modeling** Data centers must demonstrate accurate dynamic stability behavior. EPE builds Composite Load Models including chiller motors, fan motors, and electronic/GPU loads to show voltage, frequency, and recovery performance according to the TSP requirements. AI workloads introduce rapid MW-scale variations. EPE models GPU power swings, cooling motors, UPS interactions, and rectifier behavior in PSCAD to replicate real operating conditions and inform control strategies.
- **System Ride Through Assessment:** In addition to the capacity challenges of large datacenter load, Utilities and ISOs have proposed stringent low voltage ride through (LVRT) requirements. This is due to the sensitive nature of datacenter UPS operation and the associated impact to grid balance. EPE performs detailed assessments of electrical equipment at the datacenter facility to understand the current LVRT response. Based on region-specific requirement, EPE will flag gaps in the LVRT capabilities. EPE can also support various mitigation options such as parameter tuning or advanced technology integration similar to load smoothing mitigation.
- **Utility-Aligned Planning and Mini-IRP Support:** In joint developer–utility engagements, EPE helps align campus development with local planning objectives. We embed large loads and their on-site fleets into utility planning cases and mini-IRP-style studies focused on a specific service territory or substation, perform constraint root-cause diagnostics to pinpoint the lines, transformers, and interfaces that drive curtailment or upgrade needs and evaluate whether flexible load behavior, BESS, and on-site generation can defer or resize traditional transmission upgrades while preserving reliability and regulatory acceptability. By connecting market simulations, local reliability concerns, and long-term planning, EPE enables both utilities and large-load customers to co-design solutions that are technically sound, regulator-ready, and financeable.

Power Quality, Stability and Compliance

Power quality and compliance services safeguard data centers against voltage disturbances, harmonics, and regulatory risks, helping to ensure reliable operations that meet all industry standards.

- **Dynamic GPU Load Modeling:** Large-scale AI operations require precise load representation. EPE develops customized modular load models in PSCAD to accurately represent highly fluctuating GPU workloads. These models dynamically adjust real and reactive power output based on input load profiles to benchmark against actual performance, serving as a reusable building block for the entire data center facility.
- **Flicker, Harmonic and Power Quality:** AI training workload causes significant load fluctuations. The cyclic load results in sharp voltage change and poor power quality within the data center building and at the point of grid interconnection. EPE develops high fidelity models of the



systems and performs flicker evaluation to assess whether Pst and Plt values exceeds industry standard IEEE 1543 limits.

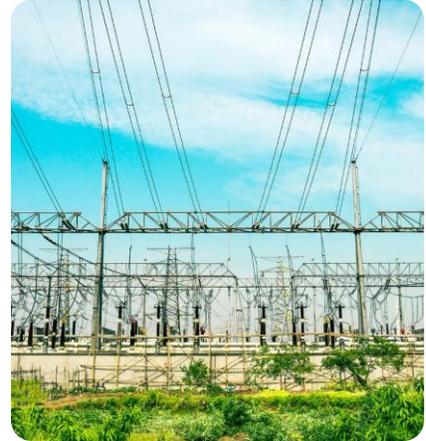
EPE also performs harmonic studies (IEEE 519-2022 compliant) to identify resonance points and facilitate proper plant operation. The analysis utilizes frequency scans to assess harmonic distortion sources, such as non-linear power electronic loads, inverters, and switch-mode power supplies, so that the electrical network remains within industry-recognized limits.

- **Load Smoothing Mitigation Evaluation:** Various mitigation options are available for smoothing out AI training workload. These include grid forming BESS, E-STATCOM, advanced UPS and rack level devices. Each option presents unique advantages and drawbacks regarding the effectiveness of limiting the load fluctuations. EPE performs time domain simulation utilizing the OEM equipment models in conjunction with the data center system PSCAD model to comprehensively assess the load smoothing technology. The study output is then used to suggest the solution implementation overall system integration.
- **Microgrid Frequency & Transient Stability:** EPE performs detailed dynamic stability studies using PSCAD to evaluate the effectiveness of BESS systems in compensating for high-fluctuation GPU workloads. This includes modeling steam turbines and black-box BESS controls to help ensure that the system achieves required response times (e.g., 50 ms) to load swings. EPE further analyzes transient stability to assess synchronism, voltage recovery, and frequency deviation under disturbance events like faults or sudden generation loss, allowing for rotor angle stability and providing mitigation strategies for any violations.
- **Reliability, Availability, and Maintainability (RAM), Microgrid Resource Sizing:** To support Data Center availability targets, EPE conducts stochastic modeling in accordance with IEEE 3006.7 practices. This assessment evaluates failure modes across electrical and mechanical infrastructure, considering individual component Mean Time before Failure (MTBF) and Mean Time to Repair (MTTR), while analyzing redundancy schemes (N+1, 2N) to identify overall system availability target. (e.g., 99.99%).
- **Sub-synchronous Oscillation Protection Studies:** EPE evaluates Sub-Synchronous Oscillation (SSO) risks arising from data center interconnections by integrating EMT load models into utility network models to simulate potential triggering conditions. The assessment examines interactions between data center load fluctuations, nearby synchronous generator torsional modes, UPS and BESS controllers, series compensation, and low short-circuit ratio networks. Where risks are identified, EPE designs mitigation solutions including controller tuning, STATCOM-based damping controllers, and protective relay deployment – safeguarding grid stability and preventing wide-area instability.
- **Protection System Impact Studies:** EPE performs protection coordination evaluations to ensure transmission protection systems operate selectively and reliably following large data center interconnections. The assessment reviews primary and backup protection, RAS, UFLS, and UVLS programs, analyzing impacts on overcurrent, distance, out-of-step, and loss-of-field protection. Key data center conditions – including motor starting, transformer energization, and UPS behavior – are evaluated to prevent unintended relay operations. Using industry-standard tools like ASPEN OneLiner and PSCAD, EPE ensures grid reliability while adhering to IEEE, ANSI, and NERC requirements.

Substation Design & Resilient Engineering

Substation and distribution designs from EPE leverage real operational data for reliability, scalability, and efficient construction.

- **Preliminary Site & Facility Layout:** Developers need early confirmation that the site physically supports the required power infrastructure. EPE produces land-use layouts showing substation placement, construction clearances, cable routing zones, and DC facility footprints.
- **Conceptual & Preliminary Electrical Design (10%–30%):** Early-stage designs determine cost and constructability. EPE prepares EPC technical specification, testing specification, preliminary engineering design of SLDs, general arrangements, protection Single Line Diagram (SLD), and phasing strategies to establish accurate budget, schedule, and procurement alignment.
- **Detailed Substation Design (60%–IFC):** EPE develops detailed engineering package, including HV & MV system, cable routing plans, grounding grids (per IEEE 80), protection & control, SCADA, civil & structural, permitting. Produces IFC packages ready for construction.
- **Data Center MV–LV Distribution Design:** High-density AI loads require efficient downstream architecture. EPE defines MV distribution, LV transformer sizing, generator architecture, UPS integration, Solid State Transformer (SST) in DC application, and 480V switchgear design aligned with reliability goals.



Procurement and Commissioning

EPE's structured oversight manages procurement, factory testing, and commissioning to improve performance and support reliable project energization.

- **Owner's Engineer (OE) Advisory & Oversight:** Developers need an independent technical partner to help protect their interests as projects move from design to procurement to commissioning. EPE serves as the Owner's Engineer by reviewing vendor designs, validating system performance assumptions, monitoring EPC and OEM compliance with specifications, and providing continuous oversight across engineering, procurement, and construction milestones. This allows the project to remain aligned with technical, regulatory, schedule, and budget objectives while giving the developer a single, unbiased point of accountability.
- **Long-Lead Equipment Procurement (Transformers, Breakers & Major Substation Equipment):** Major electrical equipment has long manufacturing cycles and requires early,

technically informed decisions. EPE manages procurement of transformers, breakers, switchgear, and protection/controls by developing precise data sheets, aligning equipment ratings with study results, analyzing vendor proposals, and facilitating compliance with ISO/TSP, utility, and national standards to prevent delays and redesigns later in the project.

- **RFP & Technical Specification Development:** Competitive and technically compliant bids for transformers, breakers, surge arresters, relays, generators and storage depend on accurate, comprehensive RFPs. EPE prepares detailed technical specifications covering equipment ratings, protection philosophies, communication designs, environmental requirements, testing procedures, and acceptance criteria, helping vendors to provide comparable proposals that reduce change orders and engineering conflicts during construction.
- **Factory Acceptance Testing (FAT) & Vendor Quality Audits:** Critical equipment must be verified before shipment to avoid defects, delays, or rework in the field. EPE conducts FATs for transformers, switchgear, breakers, control panels, and protection systems—confirming nameplate ratings, electrical tests, logic correctness, wiring integrity, and compliance with project specifications. EPE also performs vendor audits to assess QA/QC processes and manufacturing readiness.
- **Field Inspections, Commissioning & Energization Support:** Reliable energization requires rigorous field validation and close coordination with utilities. EPE provides onsite installation reviews, grounding inspections, cable and insulation testing, relay setting verification, point-to-point checks, SCADA integration validation, and commissioning oversight. During energization, EPE supports switching coordination, safety procedures, and technical issue resolution to allow for a safe and successful transition to commercial operation.

Project Management Office (PMO)

- **EPCM (Engineering, Procurement, and Construction Management):** End-to-end project delivery framework that combines technical design leadership, strategic sourcing, and site execution oversight under a single management structure. In mission-critical environments where uptime, scalability, and energy efficiency are paramount, EPE's EPCM teams coordinate multidisciplinary engineering, manage procurement of long-lead and specialized equipment, and oversee contractors to help meet schedule, budget, and quality targets. Unlike traditional EPC models, EPCM offers greater transparency and flexibility, enabling developers to retain contractual control while benefiting from expert risk management, cost control, commissioning oversight, and compliance with standards, ultimately accelerating time-to-market and reducing overall project cost.



- **Project Management:** Focused leadership over individual projects, allowing scope, schedule, cost, quality, and risk to be controlled across a multitude of stakeholders. Project management supports overall execution by managing schedules, tracking milestones, reviewing design

packages, coordinating interfaces, maintaining risk registers, and monitoring procurement and construction progress. This allows all parties to remain aligned and the project to advance cleanly toward energization.

- **Program Management:** Program management services support developers overseeing multiple concurrent projects by aligning them under a unified strategic and governance framework. Beyond managing individual builds, program management establishes standardized processes, capital planning controls, portfolio reporting, supply chain strategies, and design consistency across sites to drive economies of scale and repeatability. Program management enables developers to optimize capital deployment, accelerate delivery across markets, and maintain consistent quality and compliance standards throughout their data center platform.

Section 3: Relevant Project Experience

1.7 GW Data Center in New Mexico

EPE provided comprehensive power system stability and reliability studies for a 1.7 GW AI-driven hyperscale data center microgrid to help facilitate Tier III uptime and resilience against rapid GPU load fluctuations.

Challenge

The client required validation that their BESS-integrated microgrid could maintain system stability and achieve a critical 50 millisecond (ms) response time to compensate for massive, fluctuating AI (GPU) workloads, while also remaining resilient under N-1 contingency scenarios (e.g., loss of 235 MW steam turbine)

Approach

EPE developed a customized, high-fidelity PSCAD Dynamic Load Model to accurately simulate the GPU workload. This model was used as the foundation for a full suite of stability and compliance studies, with BESS control system tuning performed in collaboration with the OEM to meet the 50ms response requirement.

Solution

EPE successfully executed the following seven tasks, resulting in a validated, de-risked design:

- **Task 1:** Data center frequency and voltage stability study
- **Task 2:** Transient stability study
- **Task 3:** Load flow analysis
- **Task 4:** Short circuit study
- **Task 5:** Reliability, Availability and Maintainability (RAM) analysis
- **Task 6:** Dynamic load modelling
- **Task 7:** Harmonic study

Client:

Major Hyperscaler

Type: Data Center**Sector:** Hyperscale**ISO:** New Mexico**Line of Business:**

System Studies

Services Provided: Dynamic

Load Modeling, Freq. & Voltage Stability, Transient Stability, RAM Analysis, Load Flow, Short Circuit, and Harmonic Studies

Location: New Mexico**Completion Date:** January 2026

1.4 GW AI Load in ERCOT

Limitless Energy Group (Limitless) engaged EPE to provide end-to-end technical support and power system modeling for a large-scale load's interconnection process within the Electric Reliability Council of Texas (ERCOT) market.

Challenge

Limitless needed to navigate the complex ERCOT interconnection process for a new large load and required the development of accurate, compliant power system models, including a dynamic load model, to satisfy the Transmission Service Provider (TSP) and ERCOT requirements for system stability analysis.

Approach

EPE acted as Limitless' technical representative, managing the entire interconnection application process and developing the required PSS®E models. The approach focused on creating a WECC Composite Load Model to accurately represent the dynamic behavior of electronic loads (computing processors), induction motors (chillers/fans), and other components, ensuring the model was tested and compliant for ERCOT's stability studies.

Solution

EPE successfully executed the following three tasks to secure the client's position in the ERCOT interconnection queue:

- **Task 1:** Load interconnection support (completed load application form, preliminary one-line, technical Q&A with Client, TSP, and ERCOT)
- **Task 2:** PSS®E Model Development (Developed plant-level PSS®E model in .raw and .seq format, including all loads, transformers, and the transmission tie line)
- **Task 3:** Dynamic load model (developed a tested dynamic PSS®E model (*.dyr) using the WECC composite load model to accurately represent electronic and motor loads)
- **Value Delivered:** Accelerated the client's interconnection timeline by providing compliant, high-quality PSS®E models and expert technical representation, de-risking the project's entry into the ERCOT system.

Client:



Type: Data Center

Sector: Hyperscale

ISO: ERCOT

Line of Business:
Interconnection Services

Services Provided: Load Interconnection Support, PSSE Model Development, Dynamic Load Model.

Location: Texas

Completion Date: January 2025

Odessa Data Center

EPE provided comprehensive engineering design services for a new greenfield load-serving substation and the associated data center MV-to-LV power distribution system in West Texas, from preliminary layout through 30% design.

Challenge

The client required rapid, compliant design and engineering support for a new load-serving substation to interconnect a greenfield data center facility with Oncor's transmission system. The challenge was to progress the design from preliminary layout to the 30% design phase while ensuring spatial feasibility, redundancy, and compliance with all industry codes and standards.

Approach

EPE executed a phased design approach, starting with preliminary layouts to validate land use and spatial constraints. The core of the approach was the development of the 10% and 30% substation electrical design packages, which included detailed single-line diagrams, general arrangements, and long-lead equipment Bill of Materials (BOM) to support construction planning and budget estimation

Solution

EPE successfully executed the following three mandatory tasks, with additional optional tasks available for the full project lifecycle:

- **Task 1:** Preliminary substation and data center layout (Assessed spatial feasibility and planned for proper clearances and equipment placement)
- **Task 2:** 10% substation electrical design (developed preliminary single line diagrams and general arrangement layouts, accounting for redundancy)
- **Task 3:** 30% substation electrical design (developed detailed design package including single-line, relaying, general arrangement, AC/DC load calculations, and long lead equipment BOM)
- **Value Delivered:** Accelerated the project timeline by delivering compliant, construction-ready 30% design packages, enabling the client to proceed with preliminary construction planning and long-lead material procurement for the critical substation infrastructure.

Client:

Major Hyperscaler

Type: Data Center

Sector: Hyperscale

ISO: ERCOT

Line of Business:

Owner's Engineer

Services Provided:

Preliminary Substation and Data Center Layout, 10% Substation Electrical Design, 30% Substation Electrical Design

Location: Texas

Completion Date: June 2025
- Ongoing

1.5 GW Curtailable Load in Texas

EPE provided advanced transmission analysis and SCED LMP market forecasting to determine the feasible load size and long-term economic viability for a proposed 1.5 GW load project within the ERCOT market.

Challenge

The client needed to determine the maximum feasible load size that could be served at their Point of Interconnection (POI) without triggering transmission upgrades, and to forecast the long-term energy costs and potential curtailment risks for the project, which was modeled as a 1.5 GW curtailable load for sizing purposes.

Approach

EPE utilized proprietary databases and advanced modeling techniques to perform two key analyses: ERCOT Transmission Analysis to identify thermal limitations under system-intact and multi-contingency conditions, and SCED LMP Forecasting to model market behavior, including generator bidding strategies and congestion, to provide a confidence interval for the load that can be served.

Solution

EPE successfully executed the following four tasks to de-risk the project's technical and economic feasibility:

- **Task 1:** ERCOT transmission analysis – summer peak conditions (identified thermal limitations and capacity analysis at the POI)
- **Task 2:** Load interconnection support (provided technical support and completed the load interconnection application with TSP and ERCOT)
- **Task 3:** SCED LMP forecasting analysis – sizing the feasible load (modeled 1.5 GW curtailable load to determine MW withdrawal limits and confidence intervals for load served)
- **TASK 4:** SCED LMP forecasting analysis – modeling the fixed Load (modeled the project as a fixed load to forecast hourly, monthly, and annual LMP prices and curtailment hours)
- **Value Delivered:** Provided the client with a clear, data-driven confidence interval for the maximum feasible load size and a comprehensive forecast of long-term operational costs, enabling a final investment decision on the large-scale load project

Client:

Major Energy Company

Type: Data Center

Sector: Hyperscale

ISO: ERCOT

Line of Business:

Energy Market Analysis

Services Provided:

ERCOT Transmission Analysis, Load Interconnection Support, SCED LMP Forecasting – Sizing the Feasible Load, SCED LMP Forecasting – Modeling the fixed load.

Location: Texas

Completion Date: June 2025
- Ongoing

Section 4: Technical Approach

Project Management

EPE's project management delivers clear, hands-on oversight with consistent process execution and accuracy. We build strong stakeholder relationships that keep all parties engaged throughout the project life cycle, resulting in successful execution that meets and exceeds requirements.

Project Management Strategy

Our project management approach has been developed to minimize the possibility of project delay. Our strategy is as follows:

- Each project task will be considered a milestone with segmented sub-tasks.
- Each project task will allocate an appropriate amount of time to account for unforeseen issues.
- When possible, project tasks will be completed in parallel to allow for efficiency.
- Each project task will be well-staffed with multiple contributors allowing for continual project support.
- Primary, alternate, and second alternate contributors will be available for each task of the project.
- Frequent updates and progress reports will be provided to the client via email and via reoccurring meetings which can be scheduled at a frequency that is best suited for the client.
- Possible delay risks (external or internal risks) will be identified and communicated with the client.
- In the case of a risk event, the consultant and client will collaborate on a new due date that will satisfy the client's needs.

In the event of a delayed project schedule, EPE has developed a recovery plan to check that the overall due dates and deliverables will satisfy the client's needs. EPE's project recovery plan is as follows:

Project Recovery Plan

- Quickly identify the root cause of the project delay and if possible, mitigate the issue.
- Allocate additional resources to the project by increasing the overall availability of the project team.
- Evaluate the remaining tasks that need completion and reprioritize as needed.
- If needed, collaborate on a new project plan that will outline new due dates that still satisfy the client's needs.
- Document all changes to the original project plan.
- Communicate any further risks (external or internal) with the client to prevent additional delays.

Project Controls

EPE applies a disciplined and data-driven approach to project controls, allowing engineering projects to be executed safely, efficiently, and in full alignment with client goals. Our framework integrates proven methodologies in cost control, scheduling, risk management, and performance tracking, providing full transparency from project initiation through closeout.

We leverage industry best practices, established work processes, and advanced project management tools to maintain control of scope, schedule, and budget. Our team emphasizes proactive planning, rigorous quality control, and clear communication to anticipate challenges early and mitigate potential risks before they impact delivery.

By combining technical expertise with structured governance, we deliver engineering solutions that are efficient, accountable, and aligned with our clients’ operational and financial objectives. Our culture of continuous improvement ensures that lessons learned are systematically captured and integrated, enhancing project consistency, operational reliability, and long-term value.

Communication Plan

EPE believes that effective communication throughout the project is key to creating successful project outcomes. As part of EPE’s communication strategy, we proactively identify all key stakeholders at the outset of the project, including project sponsors, internal team members, project managers, subcontractors, and other critical contributors to facilitate clear alignment and effective coordination from day one. We will determine the most effective communication channel for each stakeholder group, such as email, meetings, project management tools, Microsoft Teams, or phone calls. Once that is determined, we will agree on a regular communication schedule, such as frequency of timing updates, meetings, and reports based on stakeholder needs and project milestones.

Response Time

Early in the project, EPE and Client will align on Key Performance Indicators (KPIs) for response time expectations. The table below presents a sample of potential response time KPIs to be established between key stakeholders and EPE.

Response Time Expectations	
Key Performance Indicator	Target
Average time to respond to stakeholder inquiries (emails, messages, or other forms of communication)	Within 24 hours
The time to resolve issues	< 48 hours
The time between receiving a request and providing a response	< 48 hours
Response rate	100%
Frequency of stakeholder updates and communication	Weekly

Change Management Plan

Any material change to EPE's budget, scope, or schedule will be identified, documented, and submitted for approval, by the EPE project manager. If client has a preferred template for change management, EPE will use the client's template. Otherwise, EPE will propose a change request or change order template, as appropriate.

Changes to the approved man-hour/cost budget and schedule will be made only after approval of a variance. To control the work, project personnel shall not begin work on changed scope elements until instructions have been issued by the EPE project manager.

Risk Management

EPE will document a risk matrix and suggest ratings based on each risk's likelihood and impact. The matrix will also capture issues, recognizing that an issue is simply a risk that has already materialized. For each risk identified, EPE will conduct a qualitative risk assessment to understand the risk well enough to assign a risk likelihood and impact. When appropriate, certain risks may also be quantified through targeted research and analysis to better assess their potential impact.

Our approach uncovers environmental, technical, or financial risks early, allowing us to act before they escalate.

For each risk, EPE will suggest one or more risk control strategies and collaborate with client to align on risk control(s). In general, risk control strategy options include Accept, Avoid, Minimize, and Transfer.

Some risks can be completely avoided while other risks can merely be minimized or transferred to a third party. There are also risks where the best option may be to accept the risk and continue monitoring (e.g., many risks that are both low likelihood and low impact are often not worth the cost to control.)

Throughout the project lifecycle, the EPE Project Manager will actively monitor identified risks and issues in collaboration with client. The EPE Project Manager will also regularly update the risk matrix with support from the project team.

Quality Assurance

EPE's quality management approach protects your project's technical accuracy, schedule, and budget through structured review protocols at every phase. We develop a project-specific quality control plan that defines review checkpoints, validation criteria, and acceptance standards aligned with your requirements and applicable codes.

Our quality assurance process includes:

- **Independent technical review** of all analyses and deliverables by senior engineers not directly involved in day-to-day execution
- **Systematic validation** of modeling assumptions, input data, and calculation methods against industry standards and utility requirements
- **Progressive stakeholder review** at defined milestones to identify and resolve issues early, before they impact schedules or require costly rework
- **Documented traceability** from source data through final deliverables, providing clear audit trails for regulatory review or future reference

This structured approach has consistently delivered accurate, defensible results that support timely interconnection approvals and minimize study delays.

QA Practices

- **Procedure Creation and Maintenance:** EPE maintains standardized procedures that guide our technical staff in executing analyses, reviews, and deliverables according to established quality standards. We regularly update these procedures to reflect evolving industry codes, utility requirements, and lessons learned from previous projects.
- **Checklists:** EPE uses discipline-specific checklists at each project phase to verify that all required analyses, stakeholder coordination, and technical validations have been completed before deliverables advance. Project managers review these checklists to confirm compliance with both EPE standards and your project-specific requirements.
- **Training and Knowledge Sharing:** EPE provides ongoing training to engineering staff on quality assurance protocols, technical standards, and emerging industry practices. We encourage knowledge sharing through regular technical reviews where engineers discuss complex problem-solving approaches, building institutional expertise that benefits all client engagements.
- **Monitoring, Feedback, and Reporting:** EPE regularly monitors quality performance through internal audits and actively solicits your feedback on deliverable quality at project milestones. When issues arise, we immediately notify appropriate stakeholders, implement corrective actions, and document root cause analysis to prevent recurrence on future work.

Data Storage and Security

As verified during the SOC 2 Type II audit, EPE utilizes Transport Layer Security Version 1.3 (TLS 1.3) and Advanced Encryption Standard with a 256-bit key (AES-256), which signifies a high level of data encryption and protection during transmission and at-rest. Our information security program also uses the National Institute of Standards and Technology (NIST) framework as a standard. Our information security protection program meets or exceeds all applicable state and federal regulations and data breach laws.

Threats and Incidents

To address nation state threats, we have implemented a zero-trust network with defense-in-depth. All activity is monitored on endpoints using two sources: Microsoft Defender 365 and ActZero. EPE also has a DLP monitoring and logging program through Microsoft Purview to address insider threats. Our Incident Response Team conducts bi-monthly table-top-exercises to practice incident response procedures. If we see that a breach has affected customer data, our IT director will inform the customers affected as soon as possible.

Data Storage

Internally, data will be saved on our internal Microsoft SharePoint and Microsoft OneDrive systems that are available to all employees. Microsoft SharePoint offers a comprehensive set of features that enable us to effectively manage all our documents and facilitate compliance.

Our data is stored in a data center which is owned and managed by Digital Realty out of Dallas, Texas. Data will be retained for a set amount of time. After the data retention date, the data will be destroyed/wiped from storage.

Access Controls

EPE adheres to the principle of least-privilege, where access to sensitive information is granted only to individuals who have a legitimate need to know. This access is meticulously managed through our active directory system, allowing us to safeguard our data while maintaining operational efficiency and integrity.

Documentation and Archiving Software

EPE has implemented a document management/control system process, leveraging Microsoft SharePoint as our primary tool for document control. Other software options are used as supporting document control solutions.

Documentation Software	
Software	Purpose
Microsoft SharePoint	Used for content management, document management, knowledge management, and internal communications.
Microsoft OneDrive	Used to manage all documents saved on company hardware and to backup files and computer systems automatically.

Managing Confidential Information

Data Management

In today's digital landscape, the management, collection, and storage of confidential information are critical for maintaining organizational integrity and trust. As data breaches and privacy concerns continue to rise, it is essential to adopt a structured approach that safeguards sensitive information. Following the Service Organization Control 2 (SOC 2) framework provides a comprehensive methodology to handle confidential data with the utmost care. This approach encompasses a series of strategic steps and procedures designed to protect sensitive information from unauthorized access, misuse, and potential breaches, thereby fostering a culture of security and compliance within the organization.

EPE has achieved both SOC 2 Type I and Type II certification. The IT & Security Policy packet (available upon request) includes the following company policies:

- Access Control Policy
- Cryptography Policy
- Incident Response Plan
- Third-Party Management Policy
- Data Management Policy



SOC Type I
SOC Type II

Built for What's Next

As the energy landscape continues to evolve, so do the industry's needs. At EPE, we remain focused on delivering thoughtful, technically sound solutions that reflect the complexity and urgency of today's grid. With a global presence and a collaborative approach, we support clients across the energy value chain as they plan, adapt, and navigate change.

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