

Transmission Planning and Operations

Powering Current and Future Energy Demands

Innovative Solutions for an Evolving Energy Landscape

The power industry faces unprecedented pressure to adapt. The rapid integration of renewables into aging infrastructure is colliding with new demands—green hydrogen, large-scale electrification, and energy-intensive sectors like AI data centers and cryptocurrency mining. Addressing the urgency and scale of change requires foundational shifts, not incremental adjustments. To stay ahead in a rapidly evolving energy landscape, transmission planners and operators must accelerate innovation and action.

EPE studies both people and systems, collaborating to identify limitations and designing execution-focused solutions to help navigate future grid challenges with confidence.



Why EPE



Industry-Leading Expertise

EPE brings deep knowledge in transmission planning and operations—providing analytical insights to anticipate and address grid challenges.



Advanced Technologies

EPE's cutting-edge tools and purpose-built software help identify constraints and streamline operations, verifying a smarter, more responsive energy infrastructure.

Our Focus Areas



ISO/RTO Planning Services

Independent System Operators/Regional Transmission Organizations (ISO/RTO) coordinate with local utilities to plan the future power system, operate the grid in real-time, and facilitate competitive electricity markets. To help ISO/RTOs ensure a stable and reliable power system, encourage energy innovation, and facilitate economic growth, EPE provides:

- Data review, base case development, and modeling
- Generator interconnection cluster analyses including steady state, short circuit, transient stability, and electromagnetic transient studies
- Large load interconnection studies
- Long-term planning studies
- Upgrade development
- Affected system studies
- Electromagnetic transient (EMT) studies including frequency scan, SSO, SSCI, SSFR, TRV, and TOV
- Black start and restoration path studies
- As built, limited operations and material modification analysis
- Economic analyses including capacity expansion, congestion, and production costs



Transmission Owner Operational Studies

Transmission owners face numerous operational challenges such as ensuring the security of the system in real-time across all possible operating conditions, integrating modern technologies, developing resilience strategies, and bridging meeting system demands until planning solutions are in place. To help transmission owners ensure reliable, efficient and future-ready grid operations, EPE provides:

- System operating limit development
- Event forensic analysis
- Operability assessments
- Remedial action scheme design



99%

Customer Satisfaction Rate



Transmission Owner Planning Services

Transmission owners own and maintain the high-voltage transmission infrastructure used to transport electricity over long distances from power generation facilities to local distribution systems and large load customers. To help transmission owners plan for future infrastructure needs, ensuring that their lines, substations, and related equipment are capable of meeting current and anticipated electricity demands, EPE provides:

- Load and generation modeling
- Model performance validation, including voltage and frequency ride-through
- Large load interconnection studies (serial and cluster)
- Generation interconnection studies
- Long-term strategic planning
- Regulatory studies including annual transmission planning (TPL) assessments and critical infrastructure protection (CIP) analysis
- EMT studies including frequency scan, SSO, SSCI, SSFR, TRV, and TOV
- Protection coordination and design
- Working group support
- Facility commissioning analysis and as-built model validation
- Interregional planning studies
- Competitive window studies
- Grid Enhancing Technology integration into planning
- Economic analysis including project viability, congestion and production cost analyses
- 7 Factor testing
- State and federal regulatory support



EPE is actively engaged in industry forums such as NERC, ESIG, IEEE, and CIGRE.

- As the leader of the ESIG Integrating Transmission Silos Task Force, EPE aims to identify innovative strategies to achieve more comprehensive and integrated transmission planning.
- EPE is leading ESIG large load task force streams for load forecasting and performance requirements.

Expert Insights to Inform Strategic Planning and Operations

The transmission planning process involves integrating more detailed analysis of anticipated future changes, such as the shifting generation mix and the growing demand from large loads and electrification. While the process considers a wide range of potential benefits when developing new transmission infrastructure, including economic, policy, and environmental – it prioritizes reliability as its central objective.

Across different regions, the influence of policy objectives, resilience, and cost-efficiency varies considerably in shaping transmission plans. Transmission companies benefit from insights that inform strategic design, build, and management of the high-voltage infrastructure that transport electricity from generation to load.

EPE provides a range of innovative solutions to help you meet the grid challenges of the future.



Your Trusted Energy Partner

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.

Let's Engineer Success Together

Visit epeconsulting.com/solutions/transmission-planning to learn how EPE can accelerate your next project with confidence.

