

POWER GENERATION SERVICES



EN Consulting, a sector of ENTRUST Solutions Group, has extensive operations, maintenance, OEM, and power plant design experience, including conventional and renewable generation, with regionally focused resources to deliver convenient, safe, and reliable solutions. Whether you require NERC services, turbine and generator expertise, outage services, resources for major projects, or design solutions for operational, environmental, or regulatory issues, we are a trusted provider of power generation services. Our expert teams of testing, engineering, and design professionals provide a comprehensive range of services, including:

STRATEGY & PLANNING

Our highly skilled professionals provide planning services for new generation, capital upgrades, and O&M projections for existing power plants. Clients find the following services very useful:

- Strategic and planning studies
- Project feasibility
- Business model feasibility and development
- Economic decision-making analysis
- Market definition and evaluations
- Specifications for procurement of power plant equipment
- Third-party design reviews for new or retrofit equipment
- O&M projections and planning

CONCEPTION & DEVELOPMENT

EN Consulting has extensive experience interfacing with hundreds of utility companies, operators, asset managers, reliability councils, and ISOs/RTOs. Clients depend on us to assist them with:

- Project scope development and refinement
- Stakeholder identification and strategy
- Comprehensive economic evaluations
- Regulatory process preparation, testimony, and support
- Site investigation and evaluations
- Technical and commercial contract development and negotiation
- Conceptual design development
- Preliminary engineering and technical studies

DUE DILIGENCE

Our teams have the experience and proper risk assessment tools to critically evaluate financials, facilities, projects, and equipment. Our expertise includes:

- Full power plant equipment health assessments, including steam and gas turbines, generators, HRSGs, boilers, and BOP equipment
- Using risk assessment tools to assist clients who are evaluating an asset prior to purchase
- Facility and equipment inspections and evaluations
- Support of merger and acquisition activities
- Insurance and risk management evaluations
- Banker's engineer services

EXECUTIVE & PROJECT MANAGEMENT

We also have experience that includes managing initiatives across multiple markets and areas within the energy industry, including:

- Project management through complete project lifecycle
- Risk management
- Scheduling and budgeting
- Interface management and coordination
- Engineering and technical support
- Project controls and quality assurance
- Commissioning coordination and support
- Construction observation
- Witnessing equipment tests
- Owner's engineer services



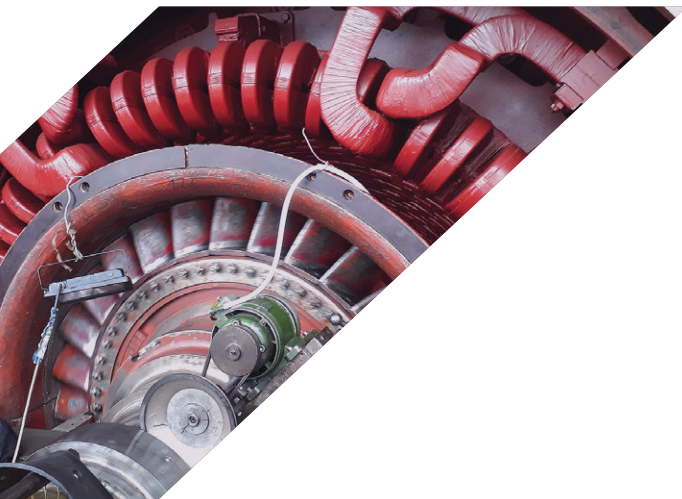
OUTAGE PLANNING & EXECUTION

We know how critical it is to appropriately scope and execute on major outages within scheduled timeframes and budgets. We help clients with:

- Outage scope and bid development
- Outage project management
- Owner's field engineer
- Shop surveillance during equipment repairs
- Independent engineering dispositions of outage findings
- QA/QC overhaul services

ELECTRICAL/POWER SERVICES

- Power system/arc flash modeling and studies
- Protective relaying specification, design, coordination, and commissioning
- Operator NEC, NFPA 71A, electrical safety, and training
- Motor and motor protection specification, design, commissioning, and startup support



ENGINEERING & ANALYSIS

From preparing technical data to applying technology, our experts can provide state-of-the-art engineering analysis to support root cause analysis, equipment life assessments, operational optimizations, and condition-based maintenance of power plant equipment. Specific areas of focus include:

- Finite element analysis
- Fatigue and fracture mechanics assessments
- Equipment life extensions
- Power plant flexibility optimizations--on/off and load cycling and minimum load
- Operational troubleshooting--vibration, performance deficiencies, and off-design operation
- Root cause analysis of power plant equipment: steam and gas turbines, generators, and BOP equipment
- Metallurgical analysis
- Outage deferral assessments
- Performance optimization
- Operation and maintenance system and procedure refinement
- Expert witness testimony

NERC COMPLIANCE SERVICES

EN Consulting has years of experience providing NERC and regional reliability services throughout North America for conventional and inverter-based generation resources. Clients depend on us for:

- NERC MOD modeling standards
- NERC PRC protection and coordination standards
- NERC/RRO VAR standards
- NERC standard related training
- NERC reliability standards (PRC, CIP, etc.), monitoring, and documentation

INSTRUMENTATION & CONTROLS SERVICES

- Generator excitation system specification, commissioning, tuning, troubleshooting, and routine maintenance
- Generator electrical test data review and maintenance recommendations
- Generator rewind engineering support and surveillance
- Instrumentation specification, engineering, design, and commissioning
- DCS & PLC control system specification, engineering and design, factory acceptance, commissioning, and startup support for hardware and software upgrades
- Expertise in Emerson, ABB, and GE DCS systems
- Alarm system prioritization, philosophy, and upgrades
- Network switch, fiber optic, ethernet, and system upgrades

PROCESS, MECHANICAL & PIPING SERVICES

- Process flow diagram (PFD) and piping & instrumentation diagrams (P&IDs)
- ASME Power Piping Code B31.1 Pipe Stress Analysis
- Line size--pipe size and schedule, flow velocities, and pressure drops
- Pump sizing and specification--GPM, TDH, and HP calculations
- Heat exchanger sizing and specification--duty and LMTD calculations
- Vessel sizing and specification--D&L, internal, and ASME inspection work
- Control valve sizing and specification
- Development of process simulation models (ASPEN Plus, HYSYS, etc.)

CIVIL/STRUCTURAL SERVICES

- Pipe support/rack specification, modeling, and engineering (STAAD)
- Subsurface utility inspection/engineering
- Site survey, environmental analysis, and permitting overview support
- H-frame specification, design/engineering, and installation support
- Duct-bank and manhole system inspection, specification, and engineering
- 3D scanning and modeling



CORROSION SERVICES

- Cathodic protection system inspection, evaluation, and engineering
- Metallurgical analysis
- Soil and water corrosion/resistivity studies, analysis, and surveys
- Corrosion mitigation studies and reports
- AC and DC stray current mitigation evaluation and design solutions



TECHNICAL TRAINING (CUSTOM, PLANT-SPECIFIC EQUIPMENT TRAINING)

- Cathodic protection system inspection, evaluation, and engineering
- Steam and gas turbine operations, failure modes, and maintenance
- Root cause analysis training
- Power plant outage execution
- Generator controls training for power plant personnel
- Generator controls training for system operators
- Generator controls training for operators
- NERC MOD & PRC training
- Excitation system training, including equipment-specific courses