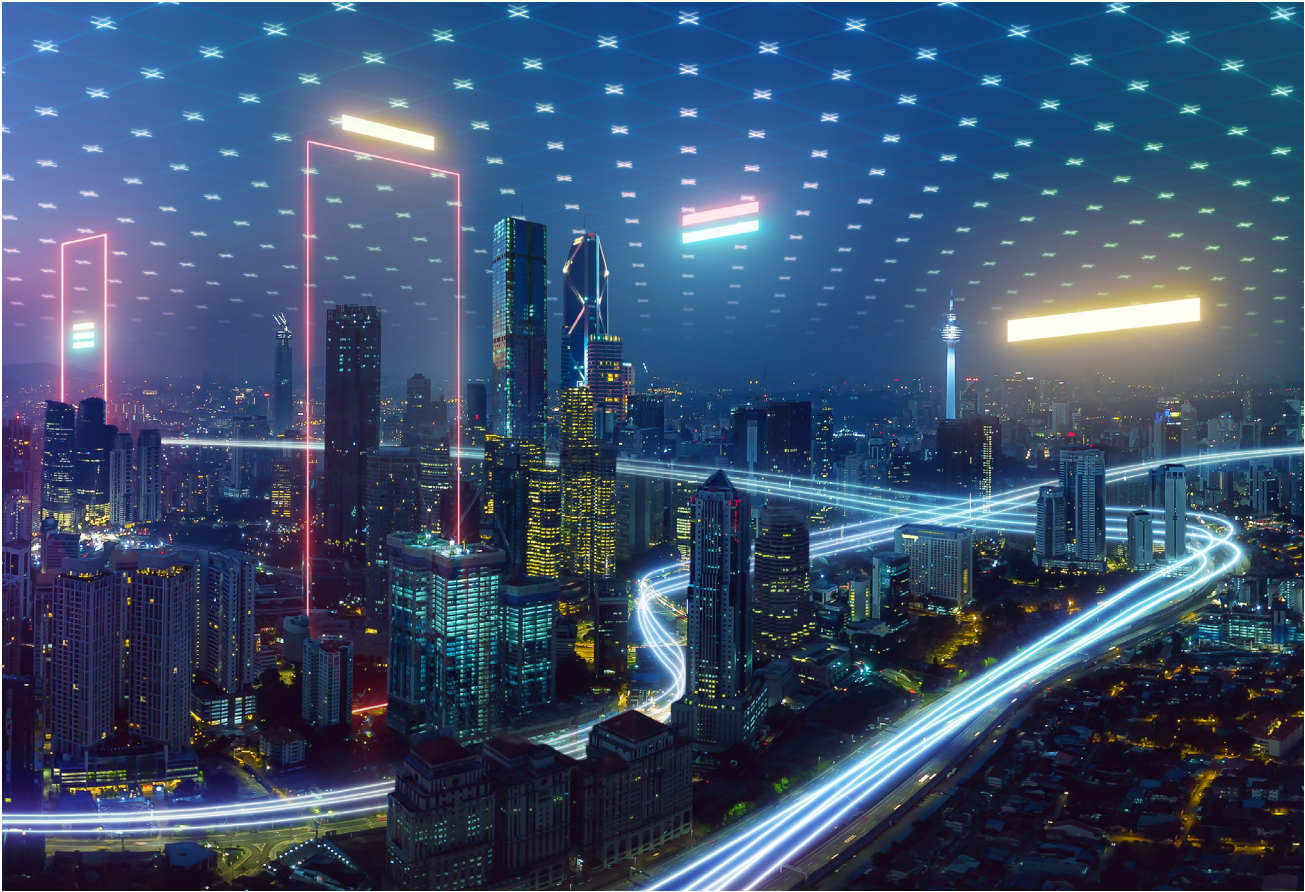


Grid Planning for Utilities

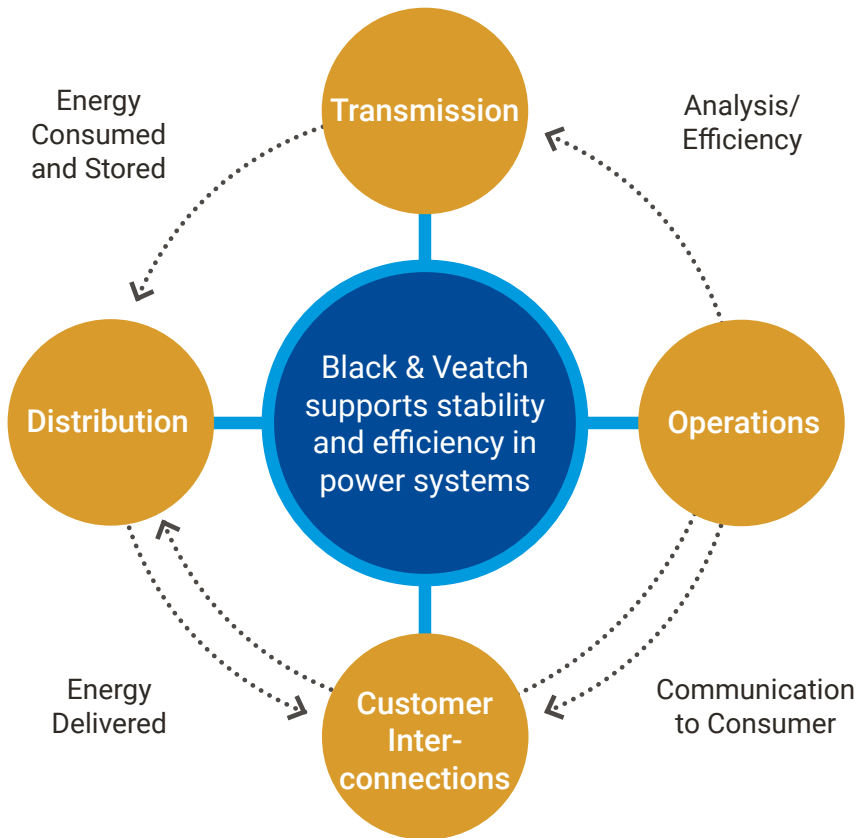
Optimize Power Supply & Demand for
Next-Gen Energy Infrastructure





The grid is undergoing a major transformation. Whether it's expansion or accommodating the integration of distributed energy resources (DERs), renewable energy or fleet electrification, it's becoming increasingly important to conduct efficient and accurate system models to ensure reliable and resilient grid performance.

Black & Veatch's grid planners are well-versed in the tools, standards, applications and regulations to deliver an independent perspective and analysis required to understand and manage the impact of new grid assets or interconnections on the grid. To ensure your project is on the right track, let us help you conduct the right electrical studies, planning and conceptual designs necessary to move your project forward with certainty.



Transmission & Distribution Planning & System Studies

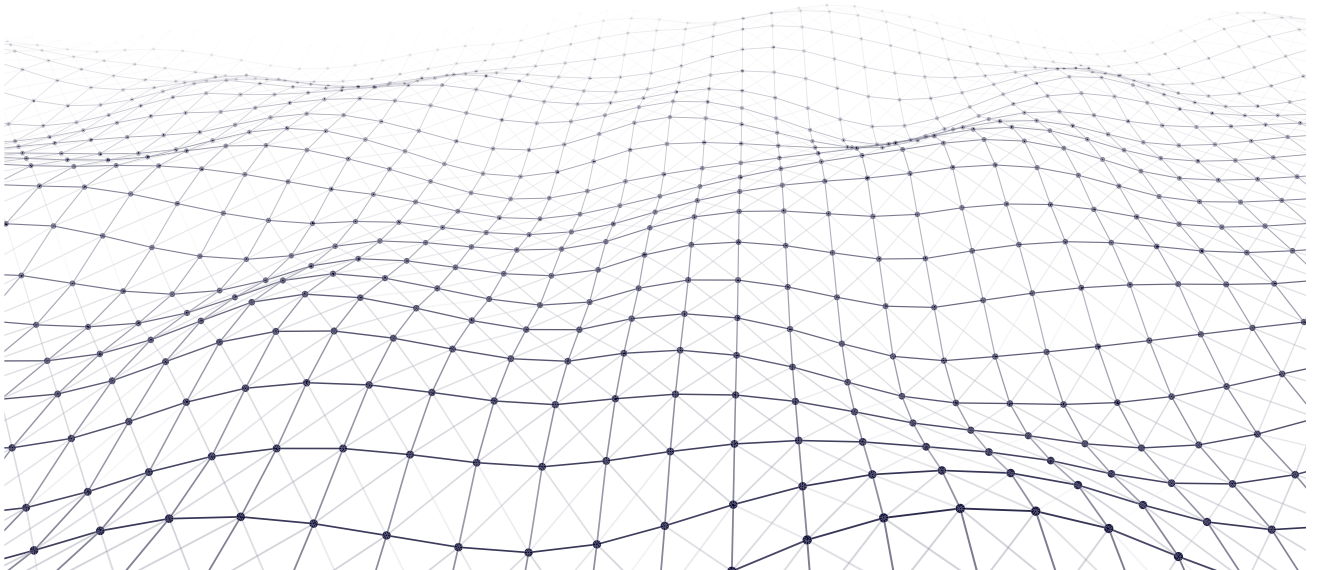
With customized, sustainable, secure and cost-effective solutions, we help you realize the benefits of next-gen infrastructure. Through detailed system analysis and grid planning, our utility clients receive the knowledge they need to confidently plan and manage their grid modernization upgrades.

Transmission Planning

- **Renewables Injection Studies:** Determine the approximate maximum injection capability of any prior queued interconnection requests (if any), and during various contingencies before exceeding the thermal limits of transmission lines and transformers.
- **Load Flow:** Determine optimal flow rates using industry-standard programs (i.e. PSSE or PSLF) to define voltage regulation, reactive regulation, and required equipment loadings based upon given generation, connectivity, line impedances, and load modeling whether AC or DC.
- **Short Circuit Analysis:** Understand the behavior of an electric power system during a fault condition by calculating fault currents and voltages at various points of the system, such as supporting structure, bus spacing and protective relaying systems.
- **Reactive Power Support and Compensation:** Reduce loss and enable the greater transfer of power with the addition of passive reactive support (capacitors) that also includes the use of active reactive support (SVCs, STATCOMs for the same reasons).
- **NERC Compliance:** Perform transmission planning studies to assess the reliability and adequacy of the system as required by NERC to identify potential issues such as overloads, voltage instability, and other broad limitations. System studies include TPL-001, EOP-005, and CIP-014.

Distribution Planning

- **Interconnection Impact Study:** Determine an interconnection's impact on the grid and how to mitigate costs with detailed load or fault analysis of plant siting and system alternatives using proficient automated tools.
- **Load Forecasting:** Optimize reliability and resiliency by forecasting main and feeder loads versus present capacity. Define variables such as time, weather, demand, energy, and other factors to observe possible performance or identify any system maintenance or upgrades.
- **BTM PV+ BESS integration:** Space, economic and interconnection assessments for behind-the-meter solar PV and battery energy storage developments.
- **DER Hosting Capacity:** Confidently plan for the maximum amount of distributed generation that can be accommodated in a feeder without exceeding voltage or thermal limits with a stochastic analysis.



Customer Interconnections

Black & Veatch supports the power infrastructure and grid interconnection needs for large power consumers like data centers and EV charging depots. We offer our utility clients insight to help you plan, interconnect and upgrade infrastructure and operations to accommodate the power demands of this growing utility customer base. Our services include determining grid capacity, forecasting power needs, grid interconnections, utility line extensions, power system upgrades, and on-site generation evaluations.

Grid Interconnections

- **Interconnection Application:** Manage the preparation, documentation and coordination between utilities, developers and end users needed to bring grid-connected DERs, renewable generation or high-powered facilities online.
- **Charging Infrastructure Planning:** Clearly understand the impact of new loads from electric vehicles and associated charging infrastructure on transmission and distribution systems. We assist in developing and supporting interconnection applications, conduct studies and modeling to identify system gaps and bottlenecks and implement the solutions needed to energize EV charging networks safely and reliably.
- **DER planning:** Simplify technology evaluation (e.g. solar PV, BESS, fuel cells, combined heat and power, and natural gas-fueled generation) and economic feasibility of DERs to identify implementation and ownership models that prioritize reliability, resiliency and customer retention.
- **Microgrid as a Service:** Optimize microgrid performance by studying microgrid operational modes, both islanding and grid-connected, impact of weather patterns, and intermittent renewables to ensure reliable and consistent power.
- **Electromagnetic Field Studies:** Two-dimensional and three-dimensional EMF analyses allow mapping of background fields and compliance with regulator limitations when new transmission line influences are added.
- **Power Quality Analysis and Mitigation:** Improve business continuity preparedness by protecting facilities and critical equipment from power quality fluctuations that can bring sensitive equipment off-line, interrupt business processes, and increase operations and maintenance.
- **NERC MOD-032:** Keep up with NERC's latest guidelines for existing or new PSS/E and PSLF models.
- **BESS Black Starting:** Conduct studies and analyses to make informed decisions on configuring and operation of BESS to enhance grid stability and optimize energy storage investments.

Operations

- **RI, TVI Interference Identification and Mitigation:** Improve system monitoring and analytics through radio and TV benchmarking, interference source identification, and improvement or verification of acceptable interference.

Other Services

We also conduct Electromagnetic Transient Studies in PSCAD to assess the system's response to sudden disturbances to optimize performance and design protective devices to mitigate impact from transient events on the grid. This includes Model Quality Testing, Insulation Coordination, TOV, LOV, Switching Studies, and TRV.

