DIGITAL SOLUTIONS

SYNERGI™ ELECTRIC

Distribution planning and analysis for the electric grid
Synergi Electric is engineering simulation and analysis software for power distribution systems. It helps a team of power distribution engineers at a utility plan, investigate, and operate their system. It is an intuitive engineering environment for working with feeders, networks, and substations and is built around detailed models of real-world facilities, customer loads, protective devices and reliability information.

**Advanced modelling solution**
Power distribution companies are facing ever increasing challenges to provide safe, reliable and cost-effective energy solutions. Regulations, distributed generation, new technologies and extreme weather events necessitate advanced modelling solutions such as Synergi Electric. Power engineers require software systems that are flexible, comprehensive and tightly integrated to the corporate asset databases. Synergi Electric provides you with the intelligence you need to make decisions that drive business performance, safety and reliability, while mitigating risk.

**Key benefits of Synergi Electric**
- A complete framework of power analysis tools in a single model and user interface
- Multi-year analysis reporting provides engineers an efficient view for short range and long range planning
- Time series analysis has been added to address the variabilities in load and generation on high penetration PV circuits
- Python scripting builds script routines to automate analysis
- Data handling in Synergi Electric is efficient and open, leveraging structured query language for importing external data sources
- COM Solver provides a programming platform to support client-specific analysis applications and automate planning and operations analysis functions
- Publish model results to the web, DXF, GIS, MS Excel, SharePoint or a dashboard

Synergi Electric has a wide variety of tools and engineering applications operating off a single model and database. With Synergi Electric you can better understand the performance of your system through different perspectives and analysis results in various functional areas.

**Planning**
Synergi Electric incorporates a full suite of analysis tools to help you deal with planning projects. Its customer class modelling and weather modelling are a solid basis for diurnal or daily load modelling. Demand levels, voltages, loading, and spare capacity can be evaluated each hour of every day over 12 months or 10 years.

Synergi Electric analyses determine if the distribution system will adequately meet the utility’s design and operation criteria. This is an essential aid to short- and long-term planning efforts.

**Renewables**
Models for PV and wind generation are easy to set up. Load-flow, fault analysis, and time-series analysis evaluate the impact of these generators. Weather conditions can be simulated with Synergi Electric or loaded from recorded second-by-second readings. Synergi Electric also models large battery energy storage systems and a variety of control models.

**System Protection**
The Synergi Electric - Protection Coordination module includes an advanced modelling environment for over-current protective devices and allows engineers to quickly evaluate and manage the extensive and complex protection schemes for hundreds or thousands of distribution feeders. Arc flash hazard analysis is also incorporated into the Protection Coordination module.

Load growth, customer behaviour, switching configurations and
changing facilities are all a part of the environment in Synergi Electric and important to protection studies. The Synergi Electric coordination evaluation engine is based on an expert system and a detailed set of over 80 user-defined rules and margins.

Fault location analysis assists you in quickly troubleshooting outages by accurately predicting the location of fault events and momentary outages. Fault location can be performed manually or automated with python scripting or our Electric Solver.

Reliability Analysis
Reliability metrics are indicators of the value that customers realize through their utility service and are a key concern for power distribution engineers.

Outage events are brought into Synergi Electric where they are correlated and used to calculate the performance indices of the base system. You can see root causes of reliability problems, the impact of new or relocated reclosers and switches and evaluate mitigation strategies like tree trimming or animal guards.

The Synergi Electric reliability simulation is run on the same model and data as all other simulations. While making changes to protection, switching, and loading you can evaluate the impact of your proposed changes on reliability.

Optional modular Synergi Electric add-ons
- **Protection Coordination** – check coordination, TCC, fault location analysis, fault sequence analysis, Arc flash hazard analysis
- **Reliability** – root cause analysis, mitigation and alternate schemes can be performed to determine the impacts of outage events and to reduce durations and momentaries
- **Switching and Contingency** - Optimal Switching, N-X contingency studies
- **Forecaster** – manage load agents in a multi-year environment for long range planning studies
- **Customer Management** - import customer billing records, perform transformer load management and detailed load modelling incorporating customer class curves
- **Power Quality** - harmonic load flow analysis of loads and capacitors
- **Cable Ampacity** - perform ampacity studies and graphical duct bank modelling to determine the effects of heat related to duct composition and configuration. Results are integrated directly into the Synergi Electric load flow program.
- **Publisher** – easily export Synergi Electric models to popular tools for viewing and editing such as AutoCAD, HTML, SVG
- **Motorstart** - perform an analysis of the impact of multiple motors starting with dynamic charting for motor speed, motor terminal voltage, and kW/kVar
- **Middlelink Electric** – provides a data import scheme to load data directly from GIS or other asset data repositories either by SQL queries or by a published text file
- **Solver** – programming interface for Synergi Electric, can be leveraged for advanced custom solutions and reporting
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DNV GL is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. Operating in more than 100 countries, our professionals are dedicated to helping customers in the maritime, oil & gas, power and renewables and other industries to make the world safer, smarter and greener.

Digital Solutions
DNV GL is a world-leading provider of digital solutions for managing risk and improving safety and asset performance for ships, pipelines, processing plants, offshore structures, electric grids, smart cities and more. Our open industry platform Veracity, cyber security and software solutions support business-critical activities across many industries, including maritime, energy and healthcare.