

Engineering Advisory Services

Power Systems Studies



A well-designed power system is the backbone of all industrial and utility facilities. An ABB Power System Study provides customers with the information necessary to upgrade and maintain their power delivery infrastructure. The results focus on reducing operating costs, improving efficiency, increasing reliability and improving system maintainability.

ABB engineering experts specialize in:

- Utility
- Automotive
- Metals
- Pulp & Paper
- Oil & Gas
- Chemical
- Cement
- Power Grid
- Data Center & Critical Power
- Health-Care
- Renewable
- Food & Beverage
- Water/Waste Water
- Commercial

Industry expertise

Power systems engineering is one of the oldest and most fundamental services provided by ABB. Our power system engineers have unprecedented expertise gained from over 100 years of working with a wide range of customers and utilizing pioneering techniques.

ABB engineers have direct access to ABB product design teams who maintain expertise in the intricate details of power system equipment.

Delivering value

- Increase operating reliability
- Evaluate impact of adding new equipment
- Reduce operating costs
- Optimize system upgrades
- Identify source of failures

Short circuit study

Your country's electric code may require that power system components must have ratings for withstanding or interrupting the maximum possible short circuit currents imposed by the power system. ABB short circuit studies can provide information to help determine if the interrupting capacities of the power system's components are applied correctly. The short circuit study calculates the short circuit at designated locations within the power delivery infrastructure. This data may be utilized to evaluate equipment ratings and may serve as the basis for subsequent protective device coordination study and an arc flash hazard analysis.

Load flow and power factor study

Utilizing proven mathematical models, ABB's load flow study determines how the electrical system will perform during normal and emergency operating conditions, providing the information needed to:

- Optimize circuit usage
- Develop practical voltage profiles
- Minimize kW and kVar losses
- Develop equipment specification guidelines
- Identify transformer tap settings

Additionally, the power factor study calculates the reactive load compensation required to improve voltage level, increase system capacity, and maintain a specific power factor.

Consider ABB's load flow study for the following:

- Facilitating conceptual design
- Identifying corrective actions when components are overloaded or voltage performance is inadequate
- Determining the power factor correction to increase system capacity and lower utility bills
- Determining the operational impact of potential contingencies

Arc flash hazard analysis

ABB's comprehensive arc flash hazard analysis is designed to help comply with recognized industry standards and practices against dangers associated with the release of energy caused by an electrical arc. Key elements of an arc flash hazard analysis are:

- Determining the required level of arc-rated personal protective equipment (PPE) necessary for work involving energized equipment
- Communicating PPE and safe approach distances to exposed energized equipment through an effective warning label system

Protective device coordination study

You can help ensure ongoing, reliable operation during a fault by periodically evaluating the protective devices in your power system. The goal of a protective device coordination study is to help ensure that protective device settings have been optimized to best satisfy the competing goals of system protection and system, while minimizing the impact to the power system. A protective device coordination study also may include recommendations for revisions of the types of protective devices for improved protection.

Harmonic analysis

Harmonic analysis has become more important due to the application of AC & DC adjustable speed drives, converters, and other equipment that produce harmonic distortions. These non-linear loads generate harmonic currents that interact with system impedances. These interactions may result in equipment malfunction and/or damage to the power system. An ABB harmonic study analyzes the system and recommends corrective measures, which include the design of filters or traps to absorb harmonic currents generated by non-linear loads.

Conceptual design study

The purpose of a conceptual design study is to develop a roadmap for building and maintaining an

optimum power system that serves present and future plant operating needs. Conceptual design studies often include a comprehensive review of the existing system with a clear understanding of future requirements.

A key component of a conceptual design study is the ability of the engineer to understand existing conditions, future needs, and equipment and system capabilities. A combination of load flow, motor starting, short circuit, protective device coordination, and stability study techniques will be employed to complete the design study.

Motor starting study

The motor starting study analyzes the motor, the motor load, and the connected power system through the range of operation. Recommendations on motor starting methods are provided.

Impact load study

An impact load study can model the system to determine whether the impact load may be added to the existing system without causing detrimental operating effects due to voltage and frequency fluctuations.

Power system automation study

As an extension of a conceptual design, protective device coordination, and load and power factor studies, the power system automation study focuses on developing solutions to operating issues in existing or planned power systems. It recommends electronic and control technologies that provide productivity enhancing solutions.

Diagnostic study

A diagnostic study provides an engineering review to determine the root cause of power system failure. The power systems studies that Electrification Services offers are tailored to meet the needs of the individual facility and customer. Each study involves the collection of data and information. ABB employs the most advanced tools, processes, and procedures to obtain information. The end result is a formal, comprehensive report outlining study findings and recommended actions.

Contact us

For more information, call toll free at +1 888 434 7378 or visit electrification.us.abb.com/services.