
Substation Assessment service

Make informed decisions on aging substation equipment.



Substation performance deteriorates and its reliability declines after 30-40 years of operation. This can cause unplanned downtime due to incoming power issues and potential product loss due to power outages.

With the challenges of aging installed bases in substations, limited operation and maintenance (O&M) budgets, and limited maintenance or service staff, the need to make smart decisions about extending or retiring a substation in your plant becomes more critical.

We understand food and beverage manufacturers' needs to balance risk versus cost effectiveness. As the substation life cycle nears or reaches its design limits, you need to decide on its future. ABB's Substation Assessment service uses our LifeStretch™ methodology to help you make well-informed choices regarding your assets.

If you want to maximize reliability while optimizing your food and beverage plant investment, talk to us.

Why do you need this service?

We understand that no one knows your own assets better than you do. That's why the Substation LifeStretch methodology includes a collaborative process that lets you develop an optimal substation life extension solution. This process helps you make a fully informed investment decision because it enables you to:

- Include your operational and maintenance experience in the analysis
- Understand the risk associated with each substation component
- Be actively involved in the definition of the risk mitigation alternatives
- Design customized criteria to compare the risk mitigation alternatives
- Develop a solid comparative analysis that enables you to quantify and draw your own conclusions

Whereas traditional condition-based maintenance (CBM) prioritizes only by condition, LifeStretch uses reliability-centered maintenance (RCM) that takes both condition and asset importance into account.

As an example, we considered the optimal investment solution on a 40-year-old 132 kV substation. We developed and evaluated options for replacing existing circuit breakers, including full replacement of circuit breakers or partial refurbishment and/or replacement of just the operating mechanisms and interrupters in all the circuit breakers. We factored in all costs of operations, maintenance, service disruption and failure, plus capital costs.

The lowest lifetime cost option was to replace the existing circuit breakers with new state-of-the-art dead tank circuit breakers and retain the existing disconnect switches. This lowest lifetime cost was in spite of this option having the second highest initial investment.

What happens during an assessment?

Before initiating the risk analysis of the installation, we will collect all the relevant information that will allow us to assess the substation's current condition. The preliminary information collected is used to prepare the substation model. It includes substation configuration and component information, such as the single line diagram, list of components and maintenance program.

The risk assessment involves a detailed visual inspection of all the components and subsystems that influence substation performance:

- Transformers and tap changers
- High voltage equipment, such as circuit breakers, disconnecting switches, instrument transformers

- and surge arresters
- Medium voltage switchgear
- Protection and control systems
- Station auxiliary equipment
- Infrastructure, such as steel structures, foundations, fencing and grounding
- Health and safety considerations
- Environmental factors

This process enables ABB to develop a comprehensive overview of the substation risk based on the analysis of the operation and maintenance documentation, thorough condition assessment and detailed reliability analysis.

The assessment focuses on three workshops: project kick-off, technical evaluation and project conclusion. The information and guidance gathered at these meetings will direct our experts through phases for information gathering, defining and analyzing alternatives, and drawing conclusions. No production stoppage is needed to complete the assessment, as all equipment is visually assessed. The full analysis and reporting process takes five to ten weeks.

What happens next?

The outcome of the Substation Assessment is a solid comparative analysis that allows you to decide what the most practical investment choice is for you. You will also have the ability to spread the planned improvements over several years to work within available budgets. A comprehensive technical report presents a comparison of the data and the conclusions of the study to assist your decision-making process.

Taking into consideration the asset's current status and substation reliability analysis, the ABB team will define the potential technical solutions focused on mitigating the identified risk and fulfilling your specific requirements. The importance of each substation component is determined by how its failure would impact overall substation reliability. The calculated risk for each substation component then depends on its assessed condition and importance.

The solutions will address various tangible and intangible objectives, such as:

- Outage frequency and duration
- Mean time between failure (MTBF)
- Initial capital investment
- Operation and maintenance cost
- Cost of power interruption
- Life cycle cost for a defined period of time
- Health and safety
- Environmental impact, aesthetics, flexibility, etc.

Along with the specific requirements, the review of alternative solutions also considers:

- Existing condition of the substation components
- Current and required level of reliability
- Technology of the existing installation and proposed alternative solutions [air insulated switchgear (AIS)/gas insulated switchgear (GIS)/ hybrid]
- Introduction of new technology to improve efficiency, reduce O&M costs and lower risk (where applicable)
- Operation and maintenance aspects such as related outage duration and maintenance costs
- Existing installation and proposed solution footprint
- Integration of control and protection systems

The final decision is made only after completing the reliability and economic analysis of the proposed substation alternatives. Once the investment choice is decided, ABB will propose an action plan based on the LifeStretch team's conclusions.

If you're ready to optimize your substation investment while reducing the risk of poor product quality or lost product due to power failure, talk to us about your own Substation Assessment.