Combining planned, selective and prepared maintenance for optimal system availability

Retrofitting and Maintenance
Hitachi Energy Retrofit solutions
Keeping fit longer for less

Retrofitting is an optimal measure for upgrading older equipment in power transmission and distribution systems by integrating state-of-the-art components.

Our aim is to increase the availability and reliability of our customers’ plants by installing the latest components, in order to extend the operating time considerably, reduce operating costs, and reduce environmental pollution at the same time. Therefore, when conventional maintenance is no longer possible at a reasonable cost, many companies are beginning to rely increasingly on the retrofit solutions recommended by Hitachi Energy. These technical improvements make a significant contribution to ensuring that their plants can continue to operate economically. This ensures that their investments are retained, even after extended periods.

Hitachi Energy retrofitting has a clear goal: Maintaining a high level of availability and an elevated safety standard at minimum cost.

Reference project
The reason for the modernization measures of the approximately 30-year-old 110 kV switchgear, Type EBK-030, in a chemical park, were of an economic nature. The ever-increasing maintenance expenses and the increasingly difficult availability of spare parts as a consequence, led to this decision.

In addition to the maintenance and repair of individual components, the EBK-SW21 retrofit solution, which has proven itself in over 100 installations, was also used in the course of this modernization project. In addition, four EBK-HMB030 retrofit circuit breaker drives were also retrofitted.

These measures will ensure a high degree of availability and reliability of the supply in the long term.

Retrofitting allows modernization of an outdated switchgear at an affordable price, and it also significantly extends its service life.
Hitachi Energy Retrofit solutions

Partial discharge online monitoring (PDM)
- Detection of PD faults at an extremely early stage
- Data transmission in accordance with the IEC-61850 standard
- Retroactive installation while the switchgear remains in operation
- Determination of the actual state of the primary insulation
- Reduction of downtime due to faults and increased personal protection
- Determination of the need for maintenance

Retrofit solution for voltage transformers
- Replacement with a new voltage transformer
- Discharge-tested voltage transformer, in accordance with the latest IEC standard (IEC 60044-2)
- Improved insulation
- Reduced downtime
- Short-circuit-proof contacts

Retrofit solution for disconnectors and earthing switches
- Disconnectors
  - Preventive maintenance
  - Replacement of the DC-Operating mechanisms
  - Upgrading of the mechanical interlocking
  - Replacement of the rotary transmission
  - Replacement of the auxiliary switches and earthing switches
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Retrofit solution for cable terminations
- Retrofitting with new cable termination cap and dry-end caps
- Replacement in accordance with the current IEC standard

Circuit breaker retrofit
- One gas density monitor per gas compartment
- Aluminium-welded cabinet
- Increased operational reliability
- Integrated current transformer
- Metal rupture discs with moisture filters

Operating mechanism retrofit
- Increased maintenance intervals
- Considerable reduction of maintenance costs
- In case of oil leaks in the old actuator, reduction of life cycle costs
- Reduced risk of unexpected downtime

Modular Switchgear Monitoring (MSM)
- Stabilization of system operation
- Reliable real-time data transmission
- Modular SF6 gas monitoring
- Central data display

Retrofit solution for current transformers
- Replacement by a new current transformer
- Improved insulation
- Reduced risk of failure
- Existing contacts can be replaced by short-circuit-proof contacts

Retrofit solution for rupture discs
- Long-term assurance of gas quality
- Increased personal protection
- Improvement of SF6-humidity (dew point)
- Reduced risk of gas leakage
- Reduced SF6 emissions
- Positive contribution in terms of environmental protection
- Retrofitting of the old graphite rupture discs with new metal breaker discs with integrated moisture filter

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Maintenance

The best strategy for increasing system availability is an optimized combination of planned, selective and prepared maintenance.

Hitachi Energy is in a good position to assist you in developing a maintenance strategy for your facility. Preventive and condition-based maintenance increases reliability and minimizes the impact of faults, whereas, on the contrary, the impact of such faults is difficult to predict with corrective maintenance.

Reference project

In 2012, grid fluctuations led to thermal overloading of a voltage transformer in a 110 kV switchgear panel of the switchgear bay of a power supplier in the Philippines.

As a result, both the voltage transformer and the adjacent disconnecting and earthing switches were severely damaged and had to be replaced. Hitachi Energy then carried out a comprehensive fault analysis and proposed appropriate service solutions to the customer, which offered better protection for the systems and their components, using state-of-the-art technology. Only after the fault almost repeated itself in 2017, which would have led to an identical pattern of damage, did the customer recognize the need for action.

The maintenance and upgrading measures that were carried out have improved the condition of the plant, thereby forming the basis for safe and reliable continued operation of the plant for the next 20-30 years.