

## Operation and renewal services for SVCs

Power electronics solutions such as static var compensators (SVC) are critical for electrical grid and installations' stability, reliability and availability.

To properly address factors such as the aging of these solutions and deterioration and wear of parts or devices, operation services like maintenance check-ups and equipment diagnosis should be performed regularly together with remote monitoring and analysis.

These operation services may foresee risks of increasing failure rate according to electrical and environmental stress, opening the door to renewal services that will address the needs for life extension, technological enhancement, increasing the electrical ratings of the solutions and manage their obsolescence.

Renewal services for these solutions improve their reliability, add functionality, secure spare part availability and increase overall performance, bringing older systems closer to the functionality supplied by newer systems.

### Background

The SVC is located in Thailand and it is used in an electric arc furnace. The ratings are 22 kV, 50 Hz, 0/+85 Mvar. Original commissioning year was 2011.

The steel mill was planning to expand their production capacity by upgrading the EAF and secure the operation of an ageing SVC system.

### Operation services for SVCs

Static compensators like SVCs are designed to provide safe, efficient and reliable operation when properly serviced. But years of continued use and exposure to the elements can adversely affect the reliability of the system, which can result in unplanned outages and associated financial losses.

### Remote monitoring and analysis

The scope of the project was the implementation of a remote monitoring system. The challenges of the project were that the HMI and the control system were very old.

The project allowed that the SVC performance and status could be monitored remotely. The customer can get monthly reports including corrective maintenance recommendations. Also, it allows remote support capability from service provider location.

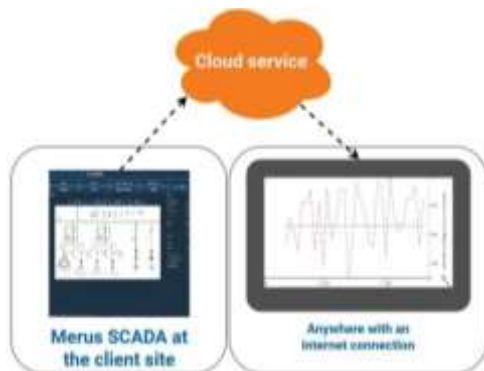


Fig. 1: Remote monitoring and analysis concept

### Renewal services for SVCs

A full set of renewal services can support the decision-making process of customers when extending assets

lifetime and increasing their availability. Most original SVC suppliers are not willing to deliver only part of an existing SVC scope. Thus, renewing an SVC (depending of the provider of the service) usually means replacing the whole system or at least several of the main components.

### Modernisation and extension

The scope of the project included the replacement of the control and protection system and capacity extension to 105 Mvar by installing a 5th harmonic filter of 20 Mvar. The challenges of the project were that the old control system was larger than the new one, so the cables were not long enough, and new cabling was needed. Also, the components of the passive part of the SVC were in poor condition.



Fig. 2: New SVC control & protection system

The results included extended capacity, modern user interface and remote monitoring capability. The whole scope of work was completed in 5 days.

The SVC performance after the renewal services was verified by means of power quality measurements. After analysing the records, it was learnt that the total furnace power was increased by a considerable 63% but the new SVC control system managed to keep the power quality parameters within acceptable limits. The power factor was corrected to unity and the flicker level was considerably lower than what was expected with the performance of the original control system. A statistical analysis of the flicker performance revealed that the recorded maximum flicker was more than 25% lower than predicted based on the performance of the original control system.

### Conclusions

Well planned operation and renewal services support customers' decision-making process when deciding on lifetime extension and performance improvement of critical systems in electrical installations like SVCs.

The benefits of comprehensive operation and renewal services for SVCs can be summarized as:

- Improvement of reliability, availability and performance of the SVC and the installation.
- Adaptation of the system to current needs and technologies.
- Higher return on investment.
- Remote monitoring and analysis capabilities can be added to the existing SVC.