



Hydro Generators

Hydropower, the most widely used form of renewable energy is one of the most cost effective sources of renewable electricity and also the most flexible – allowing a quick response to changing energy demands.

Although the dam itself requires little maintenance, the turbines and generators within the hydro electric power plant work hard and as with all electrical machines, maintenance of the generator is essential to ensure peak performance.

With over 100 years experience and specialist engineering expertise, Quartzelec is in a prime position to support the generators and associated electrical equipment within the world's hydro electric stations, from on-site service and repair to major rewinds and overhauls. Quartzelec's excellent design and engineering services will ensure that all requirements are fulfilled.

Key Capabilities

- Lifetime care and maintenance packages including long term service agreements (LTSA's) and life extension programmes (LEP's)
- Generator outage works
(basic annual inspections and diagnostic testing)
- Generator refurbishment, repairs and rewinds
- Generator upgrades
- Excitation system retrofit replacements
(analogue to digital, rotating to static, static to rotating)
- Support for all OEM manufactured equipment
- 24/7 support service

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Prior to any maintenance or refurbishment work, various initial inspections may be conducted, including analysis of the operational data from the power station log, visual inspections and application of specific diagnostic tests including performance tests, stator winding tests and stator core tests. Based on this, Quartzelec can provide a tailored scope, suggesting various maintenance and refurbishment solutions based on the priorities of the generator, associated electrical equipment and the requirements of the customer.

Maintenance

Hydro generators will have a specific duty and function within the production process. To avoid unnecessary downtime and unexpected failure, Quartzelec can assist in providing a range of maintenance solutions to help minimise costs and increase plant availability including maintenance support programs for hydro generators and associated equipment with both LTSA's and LEP's.

Refurbishment

In some cases, especially after many years of service, simple maintenance may no longer be sufficient for the efficient running of the generator and refurbishment of the unit may be required. In these instances, you can rely on Quartzelec to be on hand to investigate and advise on the best possible course of action. Some common areas of refurbishment include:

- The stator winding; a major component which is most likely to reach the end of its useful life first, since insulation deteriorates progressively when subjected to electrical stress and heat
- Stator cores; can suffer damage resulting from stator winding faults, necessitating a partial or even a complete re-core. This is an important factor in the decision to undertake a stator rewind, well in advance of such avoidable expense
- Field winding insulation; although relatively robust and not subjected to as high an electrical stress as stator windings, they are however, subjected to mechanical stress. This often causes connection fatigue resulting in the need to re-insulate field windings

Up-rating

In addition to maintenance and refurbishment, Quartzelec can assist and advise with generator up-rating. Hydro generators can be up-rated to increase power capability without the need for high cost civil works. Quartzelec will analyse relevant information concerning the availability of additional power available from the turbine, the mechanical design of the generator and how up-rating may affect other items of the installation, eg, excitation requirements. The results will then confirm whether it is technically feasible to continue.

LIFEVIEW®

Constantly monitoring the internal components of a hydro generator can identify defects and deterioration points within the machine, enabling scheduled works to take place before it becomes critical. Quartzelec has designed LIFEVIEW which can assist with this; an on-line condition monitoring system which enables continuous monitoring that can assist with planning maintenance. This works by installing a series of sensors on key components of the machine and using the advanced LIFEVIEW software to collate and analyse the data. LIFEVIEW is a key component in reducing the total cost of ownership over the lifetime of a machine and can improve generator availability, reliability and satisfy insurance requirements.