

ABB excites Hydro Tasmania power stations

Excitation systems UNITROL® 6000 facilitate renewable energy production across multiple sites

Several ABB-branded excitation systems are now being used across a number of hydro power stations in Tasmania. The customer, Hydro Tasmania, is the largest producer of renewable energy in Australia, and runs its headquarters out of Hobart.



Hydro Tasmania power station working with UNITROL® 6000

Long-standing relationship

Hydro Tasmania operates multiple power stations across the state, where it uses a combination of water and wind power to harness natural energy. Hydro Tasmania is owned by the Tasmanian Government, and has been operating in Australia for the past 100 years. The company employs around 1,100 people across its numerous operations, and has assets worth an impressive \$5 billion.

Hydro Tasmania has huge infrastructure requirements in order to generate energy, and these systems rely on top-quality technology. The company's assets are extremely important to the day-to-day storing and delivering of water to its turbines, and therefore must be maintained and refurbished on an ongoing basis. To ensure they remain fit-for-purpose, and able to deliver safe and reliable energy, Hydro Tasmania makes an ongoing investment in these assets.

Hydro Tasmania has a long-standing partnership with ABB, for the supply and maintenance of power and automation technology across its various operations. ABB has delivered a number of products for Hydro Tasmania's numerous power stations over the years, including excitation systems, transformers and protection relays.

When Hydro Tasmania required replacement of a number of legacy excitation systems at various locations, the company once again called on the expertise of ABB and its Power Conversion Local Business Unit. The company had been running out of spare parts for its existing excitation systems, and therefore required the delivery and installation of eleven new excitation systems to take its operations into the future.

Multi-faceted project

ABB was called-on to provide a total of eleven UNITROL® 6000 Static Excitation Systems (SES), along with ten excitation transformers. These were distributed across seven Hydro Tasmania locations in sets, with each SES delivered with a transformer – except for at one location.

The Mersey-Forth catchment's Fisher and Cethana power stations in the north-west of Tasmania each received one SES and transformer. The Derwent catchment's Liapootah and Wayatinah power stations in central Tasmania each received three SES and transformer packages, while Cluny and Repulse each received one SES/transformer package. The Reece power station on the Pieman River development on the west coast received two SES units, but only one of these was required to be fitted reusing the existing transformer. This brings the total of UNITROL® 6000 to 17 units installed within Hydro Tasmania's generating fleet.

How it works

Excitation is the process by which a magnetic field is generated by means of an electric current. The excitation system provides a reliable supply of electricity, so that the field coils within a large generator can produce excitation (i.e. a magnetic field).

The ABB SES works by regulating the terminal voltage and the reactive power flow of the synchronous machine by direct control of the field current, using thyristors converters. The excitation current goes to the generator rotor through brushes. The excitation current in this case comes directly from the excitation converter.

Alternating current (AC) is created when a conductive material such as copper wire passes through a magnetic field. A rotor (i.e. part of the crank shaft) features copper coils wrapped around an iron core. When voltage passes through the rotor coils, it creates a magnetic field.

Customer benefits

According to ABB's Sales Engineer Pedro Lopez, the local service capability of ABB's Local Engineering Centre (LEC) was crucial in the timely completion of this multi-faceted project.

"ABB's Local Engineering Centre (LEC) is in close geographic proximity, within the same time zone to the customer," said Lopez. "Technical support is also provided by phone, and together with the proximity of the LEC, this results in a short lead-time for repairs."

ABB was able to provide the special communication protocol that Hydro Tasmania required. This protocol enables communication between the control stations and substations via a standard TCP/IP network. The TCP protocol is used for connection-oriented secure data transmission. "ABB has provided the excitation systems with network connection capability, so they can be monitored and operated remotely from Hydro Tasmania's office in Hobart," said Lopez.

"The remote diagnostics capability allows Hydro Tasmania to monitor the condition of the excitation systems in order to do any initial troubleshooting if required without being required to travel to site," said Adam Grabek from Hydro Tasmania.

According to Lopez, the technology ABB provided was also proven in a number of instances, meaning both ABB and Hydro Tasmania were confident of the successful outcome.

"ABB provided equipment network compliance to National Electricity Rules (NER). ABB's technologies are already proven to be compliant to NER, and this assures a reliable connection to the grid," he said.

Further, standardisation of the units provided the customer with a reliable and repeatable solution across their multiple sites.

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Front view of Excitation System unit UNITROL® 6000 Light