APRIL 2010

HVDC INTER-ISLAND LINK POLE 3 PROJECT

Keeping the energy flowing

TRANSPOWER

Transpower is increasing the capacity of the high voltage direct current (HVDC) inter-island link that connects Haywards substation in the North Island and Benmore substation in the South Island.

The HVDC link enables the transportation of power between the North and South Islands and consists of two separate circuits with major converter systems at each end. These converter systems are called Pole 1 and Pole 2. They convert electricity from alternating current (AC), which runs through most transmission lines in New Zealand to direct current (DC), and then back again to AC at the receiving end. DC is used over the HVDC link because it is more effective for transporting power over long distances.

A new Pole – Pole 3 – will replace the 45-year old Pole 1 equipment at both substations with state of the art thyristor valve units. The HVDC Pole 3 project, worth up to $672 million, will be completed in two stages resulting in an increase in the capacity of the overall HVDC link to 1000 MW from 2012 and 1200 MW from 2014.

Facts and figures

- Total estimated cost $672 million
- Capacity increased to 1000 MW in 2012
- Capacity increased to 1200 MW in 2014
- Total length of HVDC transmission line 567km
- Length of HVDC submarine cable 40km
- HVDC first commissioned 1965
- Weight of new transformers 230 tonnes each without oil, 330 with oil

Pole 3 timeline

KEY ACTIVITIES	2010				2011				2012				2014
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Civil works	Jan		Aug										
Construction of buildings		May					July						
Primary plant installed							July	Dec					
Pole 1 fully decommissioned and equipment removed								Oct		Apr			
Testing								Dec		Apr			
Pole 3 commissioned (1000 MW bi-pole capacity)										Apr			
Statcom commissioned (1200 MW bi-pole capacity)													Jan

Construction of Pole 3

Civil work

Extensive civil work including seismic strengthening works is being carried out at the Haywards substation to prepare the site for construction of the buildings and equipment for Pole 3. Site clearing, the establishment of a new platform for a new switchyard and construction of access roads are also included in the civil work, which is being carried out between January and August 2010.

In comparison, only minor civil work is required at the Benmore substation to prepare the site for construction of the buildings and equipment for Pole 3. This is because the substation at Benmore is on comparatively flat land and has adequate space available for the Pole 3 works.

Construction of foundations and excavation for the switchyard gantries comprises most of the civil work needed at Benmore.

Construction of buildings

From May 2010 to July 2011, the valve hall and control room buildings will be constructed at both Haywards and Benmore Substations. Three thyristor valves that weigh 17 tonnes each will be suspended from the ceiling of the 19 metre high valve hall.

The control room houses the cabinets and control systems that automate the operation of Pole 3.

Installation of primary plant

Primary plant consists of the major pieces of equipment that are needed to convert AC to DC and back again. This includes the thyristor valves - housed in the valve hall - and converter transformers that are outside the valve hall and weigh 330 tonnes each when filled with oil. Six metre long bushings transfer electricity between the transformer and the valve.

The primary plant will be installed between July and December 2011, ready for testing to begin in December and full operation in April 2012.

Pole 1 will be fully decommissioned in October 2011, followed by the commissioning of a statcom in January 2014 that will help regulate the voltage of the AC network in the Wellington region and lift the north flow transfer capability of the bi-pole link to 1200 MW.

Construction of switchyards

The existing AC switchyards at Haywards and Benmore will be expanded and a new AC switchyard will be constructed at Haywards.

For more information on the HVDC inter-island link Pole 3 project, please call 0800 33 88 66 or visit www.gridnewzealand.co.nz

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