

LEAFLET

Great Northern Transmission Line, Minnesota, US

Enhancing clean hydropower transmission capability



Hitachi ABB Power Grids' power quality solution – one of the largest series capacitor banks in the world – ensures minimization of losses and reliability of cross-country transmission link between Canada and the US.

Customer profile and challenge

Connecting Winnipeg, Manitoba with Grand Rapids in Minnesota, Great Northern Transmission Line (GNTL) is a 500 kilovolt (kV) cross-country link between Canada and the US. Capable of transferring up to 800 megawatts (MW) of alternating current (AC) electricity, this transmission project currently delivers nearly 250 MW hydropower to Minnesota from Manitoba. This 'clean' energy will enable Minnesota Power, the state transmission utility, to shift rapidly towards an emission-free energy system and support its 'EnergyForward' strategy for transition to cleaner energy sources while meeting customer expectations for a reliable, stable, and affordable power.

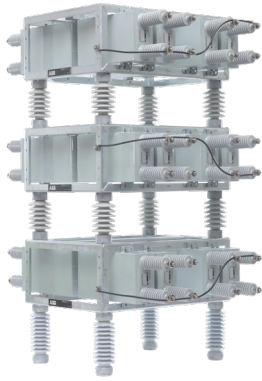
For such reliability and affordability, reducing transmission energy loss is a prime requirement. In AC networks, the inherent tendency of transmission line conductors to resist alternating current, i.e. 'reactance', is one of the main causes of this loss. Primarily, this results into reduction in capability of line to transfer power. Also, energy thus wasted gets converted into heat, causing additional wear to the transmission line and equipment like switchgear. Over long time, this can result into premature equipment failure and loss of revenues – for utility and subsequently, for its customers.

Solution:

Hitachi ABB Power Grids supplied its QBank open rack capacitor bank for GNTL. The solution, installed in series with the transmission line, acts as a 'mirrored' source of reactance. It offsets the inherent reactance of transmission line. This directly results into the reduction of net reactance of line and subsequently losses.

The series capacitor bank for GNTL, one of the largest in the world, thus minimizes transmission losses for the cross-country link, thereby facilitating reliable, efficient transfer of 'clean' hydropower from Manitoba to Minnesota. The solution also helps ensuring the quality of power, by regulating voltage profile across the entire 361 kilometers' length of the transmission line.

With its EnergyForward strategy, Minnesota Power aims to deliver 100% carbon-free energy to all its customers by 2050. By offering solutions to boost reliability of its clean energy transmission link, Hitachi ABB Power Grids reaffirms its commitment of enabling a stronger, smarter and greener grid.

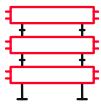
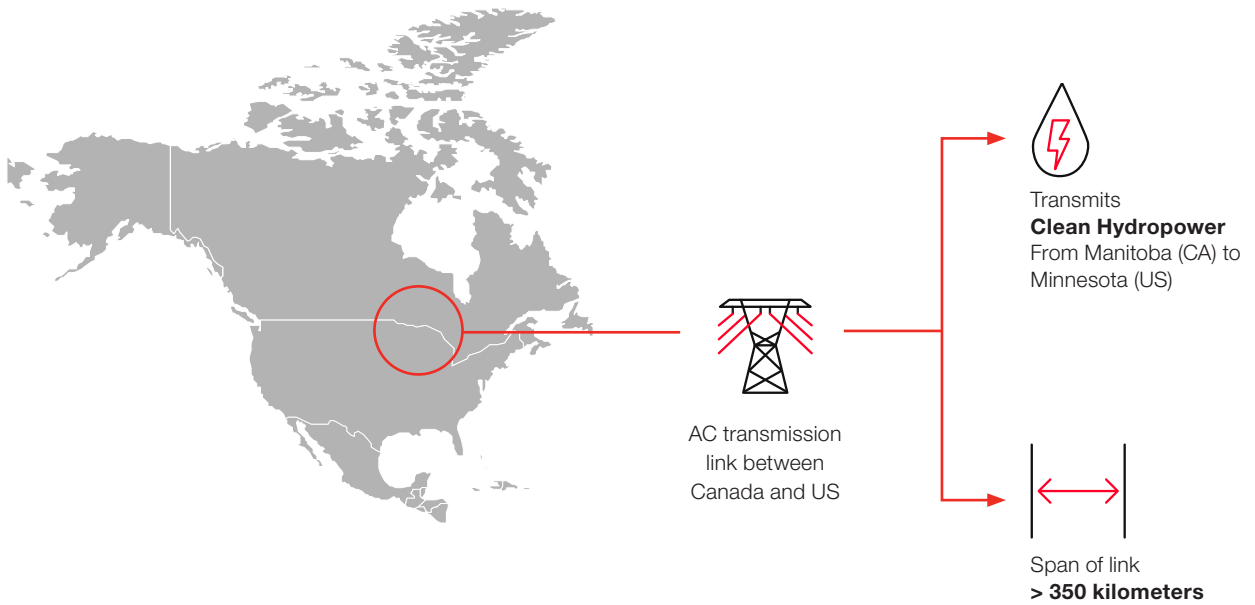


Technical data

Parameter	Value
Year of installation	2021
Type of product	Open rack capacitor bank QBank
Number of units	6 (Single phase banks)
Output capacity	6 x 240 Mvar
Voltage	120 kV (Bank) / 500 kV (System)
Frequency	60 Hz

QBank open rack capacitor bank for Great Northern Transmission Line, Minnesota, US

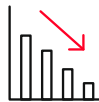
Open rack capacitor bank QBank enhancing clean hydropower transmission Capability for GNTL



Solution:
Series capacitor bank



Ensures reliability of line



Minimizes losses



Improves line voltage profile