



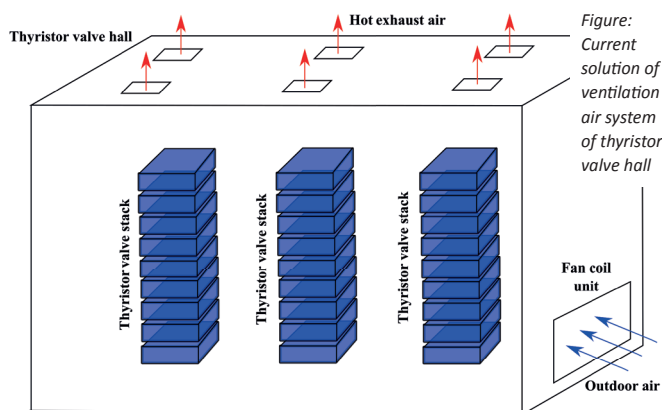
H-DisNet

CASE STUDY

MOYLE HVDC INTERCONNECTOR

WHAT ARE THE CHALLENGES FOR MOYLE?

High-voltage direct current (HVDC) interconnector stations are substations for long-distance transport of electricity. These stations (293.217 GW of power installed, under construction or planned worldwide) present heat losses (around 1%), particularly in transformers (50% of heat losses) and thyristor valves (30%). The project was based on the quantification of the heat sources available and evaluation of the best technologies for their recovery and use.



Temperature and humidity control is fundamental in thyristor valve halls to ensure the working of the HVDC station. Temperature in the hall must be kept lower than 40 °C to avoid overheating of the thyristor valves, which can result in malfunctioning and possible shutdown of the system. Relative humidity (RH) must be kept lower than 45% to avoid malfunctioning, increase of losses for corona effect and rusting. Currently a fan-coil unit is used for temperature and humidity control, which removes the moisture by cooling and condensation. The process is not energy efficient.

LIMIT VALUES FOR TEMPERATURE AND HUMIDITY IN THYRISTOR VALVE HALL:

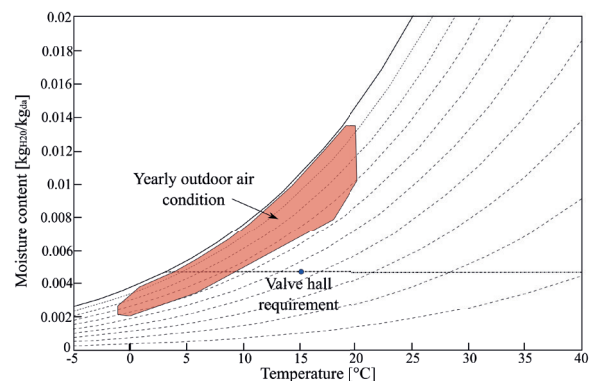
- Temperature lower than 40 °C (currently kept at 15 °C)
- Relative humidity lower than 45%
- Continuous flux of outdoor air is required

WHAT ARE THE MOYLE'S OBJECTIVES?

The main objective of the Moyle interconnector (two poles with transmission capacity of 250 MW each) heat recovery project is the recovery of waste heat for the air-conditioning of the thyristor valve hall. Once the heat available in thyristor valves and transformers was quantified, the use of heat recovery from the transformers' coolant fluid (temperature ranging between 55 and 85 °C) was considered the most promising approach to drive the H-DisNet technology.

IS THE H-DISNET TECHNOLOGY A SOLUTION?

The moisture removal ability of H-DisNet is attractive for the Moyle use case. Under the yearly outdoor air conditions, the moisture content is higher than the humidity threshold in the hall, meaning humidity removal is required most of the year to avoid malfunctioning. Only the hottest days of summer require additional sensible cooling that can be performed by electrical or evaporative cooling.



PAYBACK PERIOD:

- 8.7 years for retrofitting project
- 6.1 years for new project with electric chiller
- 5 years for new project with evaporative chiller

Given the heat available in HVDC stations and the worldwide use of the technology, use of the transformer's waste heat to drive H-DisNet technology in this newly designed project for a thyristor valve hall's air-conditioning system is considered promising. Better economic performance will be obtained in hotter and more humid climates.

CONTACT DETAILS

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