Reykjavik energy storage for backup power

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Hydroelectric power is produced from moving water. Because the source of hydroelectric power is water, hydroelectric power plants are usually located on or near a water source. The volume of the water flow and the change in elevation (or fall) from one point to another determine the amount of available energy in moving water.

The plant was commissioned in five phases, from 2006 to 2011 and is owned and operated by Orkuveita Reykjav?kur. The Hellisheidi geothermal power plant is scheduled to achieve 133MWth by 2030.

A major carbon capture and storage (CCS) project, Orca, began operating at the Hellisheidi geothermal power plant site in September 2021. Claimed to be the world"s biggest direct air CCS plant, Orca utilises geothermal energy generated by the Hellisheidi facility to perform CCS operations.

Orkuveita Reykjavikur decided to build the geothermal power plant in 2002, based on the conclusions of research drilling that was completed in 2001. The first phase of the project included the installation of two high-pressure 45MW turbines and commenced production in 2006. A low-pressure steam turbine of 33MW capacity was added to the plant in 2007 as part of the second phase of development.

The third phase, commissioned in 2008, involved the installation of two more high-pressure turbines of 45MW capacity each. Steam from Skar?sm?rarfjall Mountain is used for the power generation of the third phase.

The geothermal plant started producing hot water in its fourth phase of development, which was completed in 2010. A hot water main pipeline for district heating purposes was also installed in this phase.

The Hellisheidi geothermal power plant was developed in an area of 13,000m? (139,930.8ft?) near Mount Hengill in the Hengill geothermal area, one of the largest high-temperature geothermal fields in Iceland, which covers an area of 110km?. Power is generated using a combination of six high-pressure turbines and one low-pressure steam turbine.

Hot fluid is extracted from 44 production wells, ranging from 1,000m to 2,200m. A total of 17 reinjection wells were also drilled. The extracted fluid passes through steam and mist separators. The separated hot steam propels the turbines for electricity generation. The plant uses about 500kg/s of geothermal steam at 180?C to produce electricity.

The electrical system of each generating unit of the power station comprises a 50MVA generator, 50MVA/220kV step-up transformer and 11/11 kV transformer for connection to the 11kV station service

system.

The reheated water is pumped to a 950m? capacity hot water storage tank at the plant site through a 1m-wide and 360m-long pipe. The hot water is further supplied to the city of Reykjav?k through a 19.5km-long pre-insulated underground pipeline with a diameter of 0.9m to 1m.