



Electrical solution for gas storage

Variable-Speed Drive System brings greater flexibility to gas storage
Chémery Storage Station, France

The challenge

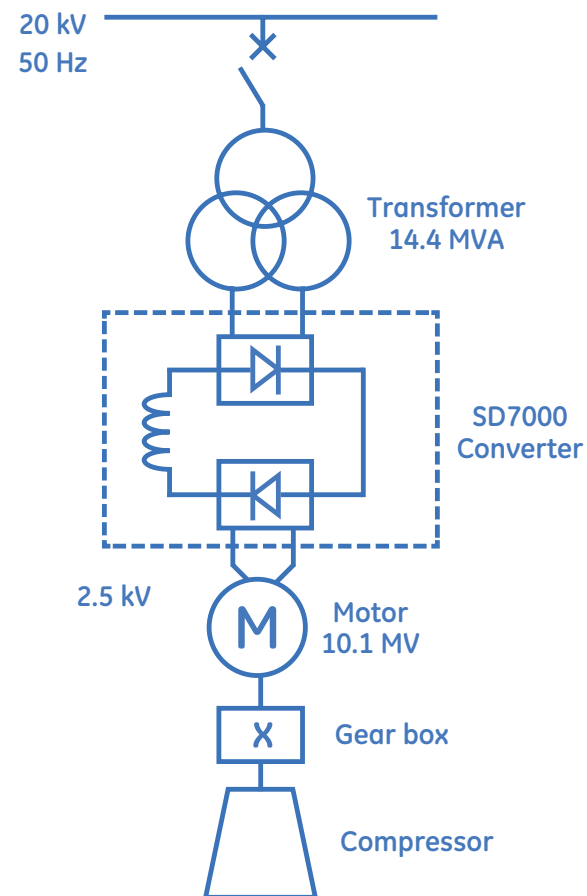
Gas consumption in France is irregular through the course of a year, and as such the efficient storage of gas is essential to meet demand. The most economical way to build up safety reserves is to store gas in natural underground reservoirs as an alternative to gas liquefaction. Located 200 km south west of Paris, the Chémery gas storage site is the largest such underground facility in Europe with a capacity of 7 billion m³ serving Paris, Nantes, Lyon, and the South of France. Gaz de France identified two compression

groups that required revamping as part of a plan to modernize the Chémery gas station to increase capacity and lower emissions. Both a mechanical drive solution for one compression group (based on a gas turbine) and an electrical solution for the second compression group were selected.

In October 2003 GE's Power Conversion business was chosen by Gaz de France to supply a Variable-Speed Drive System for the second group, involving a 2-stage compressor which operates in series at 143 bar for gas injection, and in parallel at 85 bar for gas racking, with a gas distribution network at 72 bar.



imagination at work



Our solution

GE's electrical solution is based on Variable-Speed Drive System (VSIDS) including:

- 14.4 MVA transformer
- Harmonic filters
- Load Commuted Inverter (LCI) SD7000
- Water-cooling units
- 10.1 MW synchronous motor 1,700 rpm

From the 20 kV power grid, a 14.4 MVA transformer supplies a 10.1 MW synchronous motor through a load commuted inverter SD7000. The 4-pole electric motor running at 1,700 rpm drives the compressor that controls the gas injection and retrieval. With the motor's range of speed from 65% up to 105%, a gear box raises the speed up to 14,649 rpm.

GE

The benefits

SD7000 proven technology

Power Conversion's electrical solution enables continuous operation during the peak summer months, with no halting of equipment. The solution ensures high reliability, no mechanical stress and efficient repairs, to give excellent availability and satisfaction of operation.

Our solution is based on the SD7000 Variable-Speed Drive System which enables the speed of a synchronous motor to be smoothly controlled, up to 100 MW. Based on synchronous motor and thyristor technology, it ideally meets all requirements to drive compressors including:

- High torque throughout the speed range
- Constant torque capability
- Good dynamic performance and fast response to load changes

Harmonic filters improve power factor

Based on extensive experience, Power Conversion provided suitable harmonic filters for the power grid, to ensure reduced harmonics disturbance, whilst improving the power factor of the whole grid.

Power electronics for maximum flexibility

At the heart of the SD7000's control system is the fully digital PEC controller, a very advanced power electronics controller featuring vector control. The PEC controller also uses programmable gate-array logic for maximum flexibility and standardization throughout the product range. In addition, it provides full history recording and status monitoring for quick and simple fault diagnosis.





Environment friendly

An electrical solution saves energy, thereby reducing associated CO2 emissions and minimizing the impact on the environment, thus meeting stringent requirements related to sustainable development and environmental protection.

Meeting compressor requirements

- High overall efficiency (> 98.5%)
- High availability and reliability
- High network disturbance robustness
- High starting torque and throughout the speed range
- No upper limit of power
- Four quadrant operation
- Reduced installation time and costs

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