

Zero-emission ICL compressor helping Storengy achieve its performance and decarbonization goals

In Europe, industrial companies are obliged by environmental regulation to avoid or reduce their polluting emissions. Baker Hughes is committed to helping the oil and gas sector lower the carbon intensity of its value chain by electrifying operations, improving energy efficiency, and adopting low- or no-emission fuels. Our ICL integrated motor compressor and this project are excellent examples of that strategy in motion.

Challenge

Storengy's aquifer storage site in Gournay-sur-Aronde, France, uses three compressors driven by gas turbines to store low-calorific-value (LCV) natural gas. In 2022, the facility will start changing to high-calorific-value (HCV) natural gas as used throughout the France network. During the transition period, Storengy will provide gradually less LCV gas, so the volume flow will decrease until 2026 when the compressors will return to normal flow with 100% HCV gas.

To ensure a smooth transition and achieve its target for emissions reduction, Storengy wanted to replace one of Gournay's largest turbine-driven compressors with a more flexible alternative.

Solution

Storengy selected Baker Hughes' ICL technology powered by GE Power Conversion's 5.7 MW high-speed motor and MV7609 variable-frequency drive.

The centrifugal compressor is directly driven by the motor, with both arranged in a common pressurized casing. This unique architecture eliminates leakage and avoids, on average, 40,000 m³ of methane emissions per year.

The gearless drive and active-magnetic-bearing (AMB) shaft levitation combine to eliminate lubrication—saving 5,000 liters of oil every five years. The AMB also enables operation at very low speeds. Traditional compressors have an operating speed range 70–105%, whereas ICL's is 35–105% thus allowing the unit to operate at lower speed without recycling, nor wasting energy to laminate when operating low flow or low compression ratio. The variable-frequency drive (VFD) enables speed variation with top efficiencies over the entire range, which reduces power consumption. Thanks to this increased flexibility, Storengy can operate with both HCV and LCV gas without restaging the ICL.

The whole package is 40–60% smaller than conventional solutions. So, it will fit in the storage station's existing civil work and reuse existing piping process—further improving

the project's environmental footprint by avoiding the need for new concrete and piping.

The ICL system is also significantly quieter than conventional compressors.

Finally, ICL can handle hydrogen-natural gas mixtures, so it's ready for the energy transition and compliance with future requirements.

Benefits

The Gournay storage facility's new ICL integrated motor compressor has better driver efficiency across a wider speed range than the previous turbine-driven compressor.

Beyond process efficiency and performance, this project enables a strong step towards Storengy's decarbonization goals.

Even considering CO₂ emissions from electricity production, and in part thanks to the low-carbon nature of the French electrical network, ICL will reduce Storengy's CO₂ emissions at this site by up to 90%.

In the rest of Europe, replacing a gas-turbine-driven compressor with an ICL reduces CO₂ emission by 80% on average.

About GE Power Conversion

GE Power Conversion applies the science and systems of power conversion to help drive the electrification of the world's energy infrastructure by designing and delivering advanced motor, drive and control technologies that evolve today's industrial processes for a cleaner, more productive future. Serving specialized sectors such as energy, marine, oil and gas, renewable and industry, through customized solutions and advanced technologies, GE Power Conversion partners with customers to maximize efficiency.

