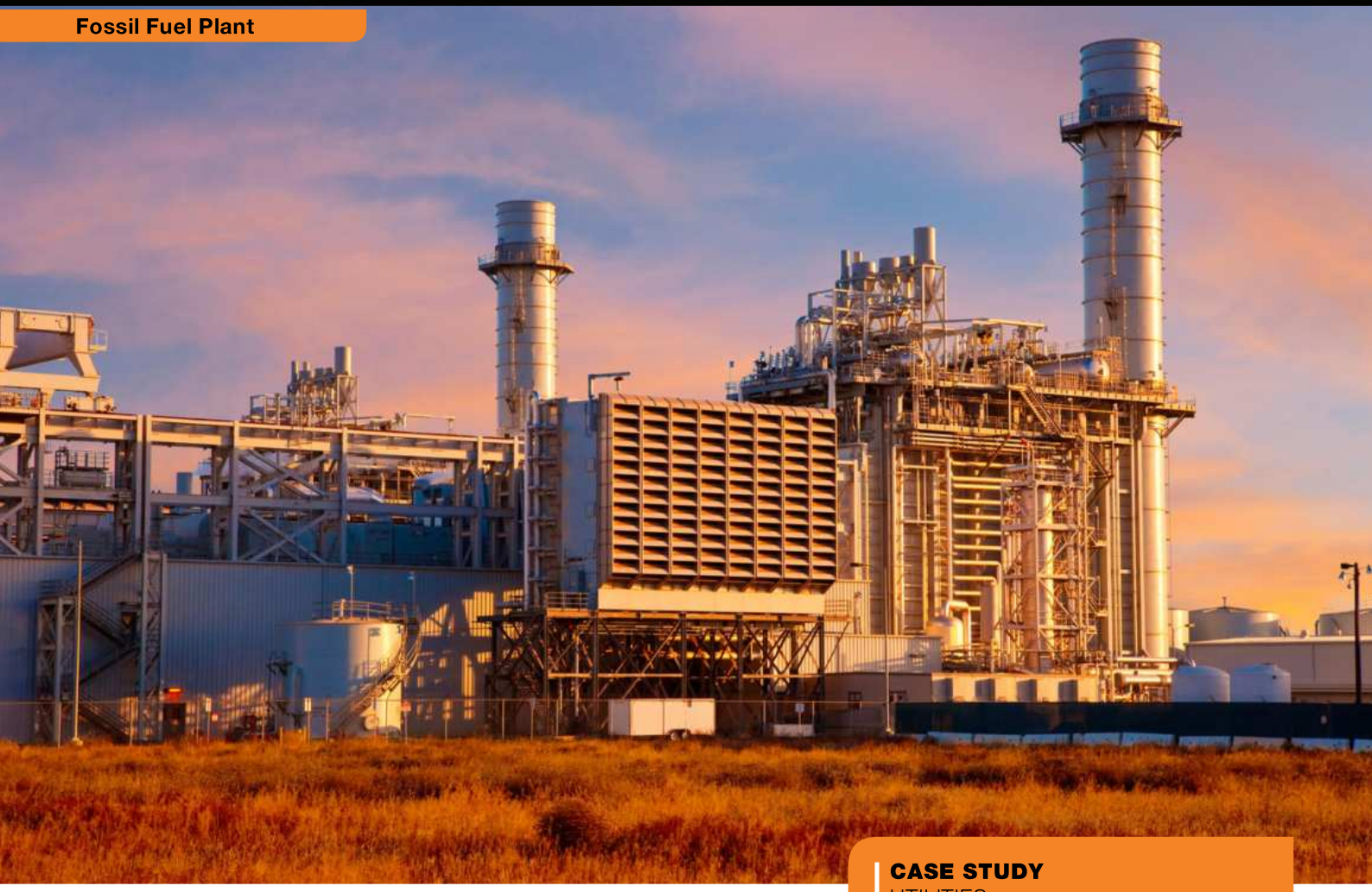
Turbine dehumidification saves time and money during fossil fuel plant maintenance outage

North America/U.S.

Fossil Fuel Plant



CASE STUDY
UTILITIES

Situation

When a major fossil fuel power plant in Texas prepared for a schedule plant outage, they also prepared for the heavy cost of protecting their turbines. For two to four weeks during the shutdown, the turbines and their stators and windings would be left wide open for maintenance, continuously exposed to the high heat, humidity and dust of Texas air.

Turbines can be massive, but they are also finely engineered and tooled machines that are vulnerable to environmental damage. Ferrous metals, such as iron and steel, as well as glass and ceramic components, are highly susceptible to both gross and microsocopic corrosion. Microscopic oxidation and corrosion cause damage, which can develop quickly and go undetected. Both gross and microscopic corrosion can cause millions of dollars of damage to the turbine and lay the plant up for months. So, protecting the turbine, stators and windings from humidity and moisture during maintenance is critical — and expensive.

For years, the standard practice was to blanket turbines with a continuous flow of nitrogen from external tanks or nitrogen generators. Nitrogen, inert and extremely dry, provides excellent protection. However, providing the volume of nitrogen required to blanket a large turbine for weeks on end is extremely expensive, and working around high concentrations of nitrogen requires safety precautions. Another alternative, coating the turbine and components with corrosion inhibitors or grease, is less effective and requires additional days of downtime for coating and cleanup. A team of Aggreko engineers and technicians working at the site proposed a new and potentially simpler, more efficient and cost-effective approach: dehumidify the air.

Aggreko solution

The concept came from Silicon Valley. The small components in light equipment like computers, smartphones and microchip manufacturing are extremely sensitive and easily destroyed by microscopic-level corrosion. The standard industry practice is to surround these delicate components with desiccant dehumidifiers to attract and remove moisture from manufacturing spaces. Aggreko engineers recognized that similar approach on a vastly larger scale could protect a turbine throughout its long period of exposure. Portable and readily available, Aggreko's dehumidification systems could provide affordable, full-time corrosion protection during turbine maintenance.

Aggreko proposed bringing in its 2,250 and 3,000 CFM desiccant dehumidifiers to attract and release moisture from high volumes of air surrounding the turbine, stators and windings, leaving exposed surfaces clean and dry while removing any residual moisture in the stators and windings.

The project presented several challenges. With hundreds of contractors working at the site, work space for the equipment was at a premium. The customer had installed elbows and plenums at the openings of the turbine inlet and outlet, so Aggreko engineers had to design custom-fit plenums for the dehumidifier outlets. Aggreko made augmented power available to ensure continuous operations and adequate available plant power.

The dehumidification protection technique was successful on multiple levels. The continuous high-volume dehumidification protected the exposed turbine, stators and windings from both moisture and dust, while removing residual moisture from components. The turbine maintenance was completed ahead of schedule, reducing downtime, and the new approach realized substantial cost savings.

Why was Aggreko chosen?

Aggreko had a master service agreement with the plant to provide temporary power and climate control support for multiple stages of plant maintenance.

Unlike other rental firms, Aggreko works with customers as mutual partners, so the Aggreko team was already on-site and working directly with plant management. The team met with the plant engineer and maintenance manager to discuss the air dehydration approach, which was approved, and then managed all aspects of system setup and operation. Aggreko has since implemented its turbine dehumidification process at multiple power plants.

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