Qatar saw the optimization of gas usage for both water and power production as an opportunity to lower costs and preserve natural resources while providing improved services for its growing population.

The State of Qatar is currently undergoing a period of rapid growth, which is creating a need to expand and improve its essential electricity and water services. Although this growth could cause increased natural gas usage, Qatar saw it as an opportunity to protect its gas reserves with careful management and reducing consumption through technology upgrades and new, more efficient systems. To ensure it meets these goals, the government developed a National Vision to guide this expansion that stipulates that growth must be carefully planned to protect the environment and preserve Qatar’s natural resources.

Kahramaa (KM) is the sole buyer, seller and distributor of power and water in Qatar. It owns the electricity and water distribution networks, and manages the supply and demand balance for the country by forecasting demand, planning for future generation needs, and providing the necessary technical, contractual, and corporate support for new generation and desalination ventures. It also sets and maintains the transmission and distribution (T&D) grid code. KM holds long-term Power and Water Purchase Agreements (PWPA) with independent power producers and water producers (IWPPs). The natural gas used by the IWPPs for power and water generation is purchased from Qatar Petroleum, which has back-to-back Fuel Supply Agreements (FSAs) with the independent power and water producers.

As the main suppliers of electricity, water, and gas for Qatar, KM and Qatar Petroleum needed to find an economically and technologically feasible way to reduce the gas consumption...
from water and power generation. They realized they needed to implement more than one approach, including an analysis of their agreements with the power and water producers to see if restructuring could offer more savings, as well as other efficiency methods for the plants. This was especially important for the water sector, as Qatar’s water is supplied by desalination plants, which makes this essential service more energy-intensive than usual. Optimizing gas usage for both water and power production will serve the dual purpose of lowering costs and preserving natural resources.

KM commissioned DNV GL to identify long-term optimization strategies for the power and water sector. We assessed the operational practices, energy performance and scope for technical upgrades of Qatar’s production assets to identify ways to reduce gas consumption. One requirement for the study was that it would only consider the currently available gas reserves, using the assumption that this was the maximum amount of gas available for the sector.

We carried out scenario-based planning for the electricity and water sectors using the PLEXOS modeling tool. At the same time, we assessed the local distribution company’s (LDC) operations and proposed process improvements for both the gas and water sectors. This produced a cost/benefit analysis of the recommended measures for a variety of scenarios, depending upon which measures were implemented. The LDC review, asset review and PLEXOS modeling collectively concluded:

1) The assets are dispatched at loads not conductive to efficient gas consumption.
2) Take or Pay constraints should be removed from the dispatch solution.
3) The use of different gas prices in the FSAs is not conductive to efficient gas consumption.

These conclusions led to a series of recommendations for both the short- and long-term. One recommendation derived from our PLEXOS modeling was that implementation of additional energy sources would provide significant gas savings. The main change we suggested to optimize gas consumption in the short term was to improve the dispatch of assets using asset heat rate data as a primary indicator. The gas optimization strategy includes implementing new technologies to significantly reduce gas consumption, new energy resources, network upgrades to improve load flows and harmonizing gas prices.

With this study, Qatar now has a roadmap to optimize gas usage for the electricity and water sectors that is essential for the State to meet its National Vision to protect the environment and sustain its natural resources.

WHY DNV GL?

DNV GL combines a significant presence in the Middle East with its global knowledge and expertise to provide a range of services that respond to the unique challenges and opportunities facing the region. Our deep understanding of the region and ability to manage relationships amongst stakeholders establishes credibility in the solutions we provide for our clients. Learn how DNV GL is helping the energy industry in the Middle East to create a sustainable future with services tailored to meet the region’s specific needs at www.dnvgl.com/middleast.

Contact us at energyadvisory.energy@dnvgl.com to speak with one of our experts.

About DNV GL

Driven by its purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. DNV GL provides classification and technical assurance along with software and independent expert advisory services to the maritime, oil & gas and energy industries. It also provides certification services to customers across a wide range of industries. DNV GL, whose origins go back to 1864, operates globally in more than 100 countries with its 16,000 professionals dedicated to helping their customers make the world safer, smarter and greener.

In the Energy industry

In DNV GL we unite the strengths of DNV, KEMA, Garrad Hassan, and GL Renewables Certification. DNV GL’s 2,500 energy experts support customers around the globe in delivering a safe, reliable, efficient, and sustainable energy supply. We deliver world-renowned testing, certification and advisory services to the energy value chain including renewables and energy efficiency. Our expertise spans onshore and offshore wind power, solar, conventional generation, transmission and distribution, smart grids, and sustainable energy use, as well as energy markets and regulations. Our testing, certification and advisory services are delivered independent from each other.

Learn more at www.dnvgl.com/energy.

DNV KEMA is now DNV GL