

REDUCING SPINNING RESERVE WITH BESS

Solution Note

Outcome-based Approach Reduces Fuel Costs and Lowers Emissions

Introduction

In today's difficult business environment, it is imperative for industrial companies to reduce operating expenses while implementing measures to meet strict greenhouse gas (GHG) emissions standards. They must also mitigate risks to their critical electric power sources.

For many companies, key business drivers include:

- Minimizing the consumption of fossil fuels
- Meeting corporate sustainability goals
- Increasing the utilization of renewables

The availability and reliability of electric power sources is an important issue for every company. This includes concerns about trips limiting site power capacity, which can result in expensive restarting procedures and/or the inability to meet contractual obligations. Many operations run multiple gas turbines (GTs) to cater to a load when this requirement can easily be met with a single turbine.

By minimizing gas consumption, businesses can reduce their operating costs and lower their carbon emissions. Corporate goals for sustainability are taking on greater importance as organizations strive to extend their green energy initiatives.

Overview

Organizations such as oil & gas and mining, steel and cement with multi-site operations are often under increasing cost and environmental pressures. Gas turbines convert fuel energy into electric power via electric generators or mechanical power. Fuel costs can account for up to four-fifths of total running costs for this equipment.



At industrial operating sites, companies are faced with the increased cost of fuel for power generation while trying to maintain reliable energy assets and minimize maintenance requirements.

FEATURES & BENEFITS

- Reduced consumption of fossil fuels for power generation
- Lower cost to deliver fuel to remote operating sites
- Decreased output of GHG emissions
- Improved compliance with industry environmental standards
- Improved reliability of critical energy assets
- Lower equipment maintenance and repair costs
- Enhanced power system redundancy and availability
- Improved overall GT operating efficiency

Many facilities are inherently energy-intensive, with on-site power requirements ranging up to several hundred megawatts for larger and more complex operations. For the most part, they burn diesel or gas, powering diesel engines or gas turbines for their power needs.

The specific objectives for these companies include:

- Reducing self-consumption of fuel
- Minimizing carbon footprint
- Improving power factor
- Reducing maintenance expenses
- Increasing system reliability

In terms of remote site operation, companies are dealing with the increasing cost of fuel while they try to maintain reliable production and minimize asset maintenance requirements. The critical nature of these sites means operators typically run pairs of diesel engines or gas turbines to ensure system redundancy and reliability. In case one of the GTs trips, the other turbine can power the full load. This results in the power generating equipment operating at a much lower point on the efficiency curve—leading to higher fuel consumption and increased emissions. If the equipment is fitted with low-NOx burners, it needs to be operated above 50% capacity to be effective.

Site operators that are able to shut down one GT can save a significant amount of gas through lower “idling” consumption, or spinning reserve, while still meeting overall energy requirements and reducing GHG emissions.

Because remote industrial sites almost always run two gas turbines, they can realize important economic and environmental benefits by only running a single GT with a Battery Energy Storage Solution (BESS) backup to provide electrical power security. Every month that operating companies delay the decision to implement advanced BESS technology, they lose hundreds of thousands of dollars due to unnecessary fuel consumption costs.

BESS is becoming a mainstream technology with more than one gigawatt hour (GWh) of BESS delivered worldwide in various applications.

Honeywell’s Solution

Power interruptions can be very expensive due to production losses associated with restarting operations. It is crucial to have a reliable power

supply and that has traditionally been achieved at the expense of efficiency.

However, the latest innovations in BESS technology offer the same, if not more, reliable power with higher efficiency and lower emissions.



Figure 1: Site operators that are able to shut down one gas turbine can save a significant amount of fuel through lower “idling” consumption.

Honeywell’s Energy Storage Solutions help industrial organizations produce energy more efficiently, reliably and economically, while reducing the environmental impact and improving safety and regulatory compliance. Honeywell’s focus is on helping plant owners and operators make the most of new, smarter technologies and energy storage systems, and guiding them towards best practices for energy management.

Honeywell’s GT-BESS solution is designed to hybridize gas turbine operation through the use of an advanced battery energy storage system. Utilization of BESS technology helps reduce the need to bring additional non-renewable energy generators online, providing grid reliability while decreasing supply costs.

Honeywell understands the operating requirements of modern industrial sites and can size a BESS solution to meet the end-user’s specific needs. The offering includes:

- Full, turnkey battery energy storage solutions, including control systems to manage redundancy and asset control
- Expert analysis of site network and energy usage
- Development of feasibility studies looking at potential savings through the optimization of fuel consumption with BESS
- Preparation of front-end engineering design to enhance battery storage and energy management capabilities

Facilities like offshore platforms are inherently energy-intensive, with on-site power requirements ranging up to several hundred megawatts for larger and more complex platforms.

Honeywell provides maintenance and service contracts tailored to the customer's critical business KPIs.

With Honeywell's approach, a remote operating site can maintain redundancy as BESS operates in parallel with the GT as a hot standby. Should the operating turbine trip, the BESS seamlessly takes over the baseload to avoid any power disruption. The system enables restarting of the tripped GT or back-up power and then returns to the normal operating regime.



Figure 2: Industrial sites can maintain redundancy as the GT-BESS system operates in parallel with the gas turbine as a hot standby.

Honeywell's GT-BESS solution can provide the same level of availability and reliability as normal gas turbine operation without the fear of power disruption. It gives operators sufficient time to restart their tripped gas turbine, start another GT or start their back-up diesel gen sets. The BESS then goes back into hot standby mode. This solution eliminates the need for redundant turbines—and the associated high gas consumption rate—and functions much like a spinning reserve for electric power resources.

Experience has shown that running a single gas turbine leads to reduced fuel consumption and decreased emissions output.

The Honeywell GT-BESS solution also contributes to significantly reduced maintenance costs. By minimizing the need to operate a second, unneeded GT, and extending the life of a critical asset, plant operators can reduce their equipment service and repair costs by as much as 50%.*

Honeywell offers service contracts based on Key Performance Indicators (KPIs) for its GT-BESS installations. Typical outcome-based KPIs include gas consumption savings and power system availability.

*Assuming 4 gas turbines with 12.5 MW rating running at 40% load reduced to 2, with 1 running with BESS as backup

Customer Benefits

An effective energy storage operations platform makes it easier to anticipate and manage demand and energy generation in today's complex energy ecosystem. Honeywell's battery energy storage systems, software solutions and outcome-based performance guarantees help end-users optimize their operations and realize significant savings.

Site operators choosing the GT-BESS solution can benefit from:

- Honeywell's patented battery energy management technology and global expertise in modeling and support for industrial power needs
- Integration of the GT-BESS solution with existing Distributed Control Systems (DCSs) and power generation systems for automated operations and ongoing remote monitoring
- Integration with condition-based monitoring to extend the life of assets and optimize performance
- Integration of on-site service for monitoring, maintenance and cyber security
- Implementation of a warranty and service program

Honeywell's unique, modular battery technology also minimizes installation and commissioning time, making it ideal for quick deployment and a fast return on investment (ROI).

Deployment of the GT-BESS solution can provide up to \$100,000/month in cost savings for a typical installation. The ability to minimize gas turbine usage can reduce site energy costs by >50%.* Ultimately, a battery-based approach can reduce reliance on non-renewable sources of energy while providing greater resilience and reliability for the customer or energy storage system host. In addition, power factor improvements can provide important economic gains.

In some countries, industrial organizations can even take advantage of tax credits associated with capital projects and the implementation of an effective emissions reduction strategy.

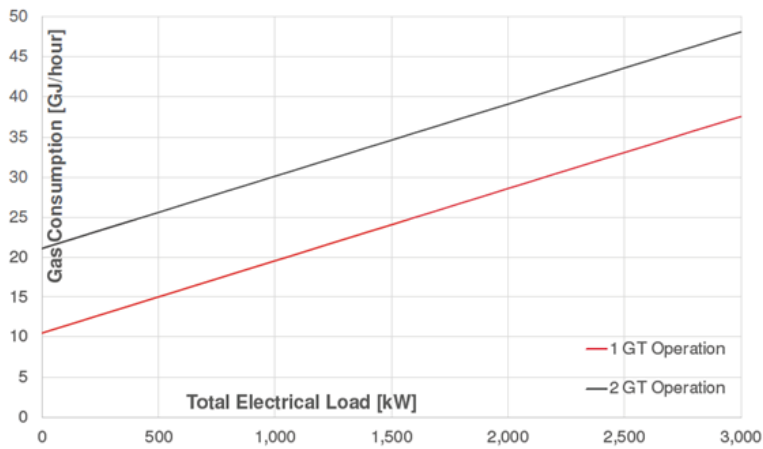


Figure 3: Industrial organizations can realize significant economic benefits by implementing advanced battery energy storage technology.

The following is a summary of the overall potential outcomes achievable with the Honeywell GT-BESS solution.*

Reduced Gas Consumption:

- 27% gas/cost savings due to non-spinning reserve in BESS

Lower Power Generation Costs:

- >50% reduction

Reduced Carbon Emissions:

- 27% less carbon emissions

Expedited Payback Period:

- <2 years (1.9 years due to fuel, maintenance and carbon reduction)

Improved Power Factor:

- Potential to run closer to unity with BESS injecting reactive power

Reduced Maintenance:

- 50% reduced maintenance costs

Increased System Reliability:

- Improved system reliability due to fewer common causes of failures

Why Honeywell?

Honeywell has established expertise in turning data into actionable insights and delivering advanced technology and services with AI/ML-based analytics to help companies more easily reach their performance and sustainability goals.

Honeywell's robust energy management system enables customers to actively address their power consumption needs while subsequently reducing energy costs, thus supporting a vision of a sustainable environment for future generations.

Honeywell provides contractual warranty and services supported by a reliable data strategy and infrastructure for customers with distributed assets. We focus on outcomes such as improved asset utilization, reduced operations & maintenance cost, increased efficiency, and reduced safety and compliance incidents.

Honeywell has installed over 5GW of traditional power generation and over 500MWh of energy storage deployments at over 50 sites - in over 100 countries. Whatever the project size, Honeywell leverages our renowned automation platform and cybersecurity solutions combined with the largest system installed base and nearly 50 years of global experience in control automation to guide you with smart technologies and energy management best practices. With a global team of supply chain, technology, and service experts, you can rely on us for reduced risk and improved performance.

With continuous innovation and seamless on-line migration to the latest release, some of Honeywell's greatest advances are the result of our commitment to helping customers continuously evolve while maintaining their current systems. We provide lifecycle investment protection by providing smooth migration paths to the latest control system technology when the time is right.

*Assuming 4 gas turbines with 12.5 MW rating running at 40% load reduced to 2, with 1 running with BESS as backup

For More Information

Learn more about Honeywell's GT-BESS Solution, visit [BESS Industrial Solutions](#) or contact your Honeywell Account Manager or System Integrator.

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