

CASE STUDY:

IMPROVED EFFICIENCY AND FLEXIBILITY CREATE ROADMAP TO THAILAND'S FUTURE.



TOMONI.
Performance Improvement
and Flexible Operation
TOMONI Edge Enabler
and IGV Optimization

PLANT DETAILS

- Gulf JP Nong Saeng Power Plant (GNS)
- Owned by Gulf JP Company Limited
- Saraburi, Thailand

EQUIPMENT NOTES

- 4 Mitsubishi Power M701F Gas Turbines
- 2 Mitsubishi Power Steam Turbines
- Mitsubishi Power DIASYS Netmation® Control Platform
- TOMONI Solutions Installed: 2019

CHALLENGE

Thailand's National Energy Policy Council approved Power Development Plan (PDP) 2018, which requires that power generation capacity be increased from 37,612 MW in 2014 to 70,336 MW in 2036 to meet forecast economic growth. At the same time, however, due to increasing air pollution and the depletion of domestic natural gas resources, PDP 2018 also directs power generation companies to improve fuel efficiency. Gulf JP Nong Saeng Power Plant (GNS), one of the biggest power providers in northern Bangkok, was challenged to not only improve efficiency in all operation modes, but also meet the flexibility demands of a dynamic power generation market.

SOLUTION



GNS worked with Mitsubishi Power to develop a plan to improve the plant's efficiency and flexibility. The team

decided to install the TOMONI Edge Enabler (MTEE), an edge solution used to manage software service applications. The TOMONI Edge Enabler gave the plant a very flexible way to implement the TOMONI IGV Optimization solution to improve fuel efficiency, especially during periods when the plant is running at partial load.

Through communication with the existing Netmation control system, IGV Optimization provides real-time optimization that closes the gas turbine inlet guide vanes to optimally control airflow at part loads, increasing exhaust temperature while reducing emissions. Pairing IGV Optimization with the TOMONI Edge Enabler, an operator receives guidance from advanced analytics and can engage or disengage the software, giving GNS the ability to obtain early validation of the economic benefits and utilize the fuel efficiency solution only when it provides benefits.

In addition to IGV Optimization, the TOMONI Edge Enabler can also manage a family of other software-based solutions, providing additional opportunities for increased output, efficiency and flexibility with selective validation and application of solutions as the power market evolves.

TOMONI[®] is a suite of intelligent solutions that accelerates decarbonization with power plant design, O&M and system knowledge, together with strong customer and partner collaborations. TOMONI leverages advanced controls, artificial intelligence and machine learning with multi-layered cybersecurity to make energy systems smarter, more profitable and ultimately more autonomous on the road to a sustainable future.

RESULT

After implementing the TOMONI Edge Enabler with IGV Optimization in June of 2019, GNS experienced a heat rate improvement of 0.67% at 450 MW load, 1.60% at 590 MW load and 0.34% at 770 MW load, and the unit performed well during both governor control mode and frequency response mode.



Gulf JP Nong Saeng Power Plant

“Since the rapid growth of renewable generation in Thailand, the Nong Saeng Power Plant has become one of the important generation sources to support the grid during output variations of these renewable generation sources. As a result, our plant is now dispatched regularly to operate at partial load. Originally optimized for full-load efficiency, we worked with Mitsubishi Power to find ways to operate more flexibly and efficiently at partial loads. The combination of the TOMONI Edge Enabler with IGV Optimization was matched to our need for cost-effective improvement in partial-load efficiency, to reduce our fuel costs. With the TOMONI Edge Enabler our operators can engage the IGV Optimization when it has the most economic benefit, and develop the criteria for future automatic operation.”

Mr. Tossapol Nounfun

Plant Manager, Gulf JP Nong Saeng Power Plant



■ Data Foundation & Enablers
■ O&M Optimization
■ Performance Improvement
■ Flexible Operations