

Project Profile: 1,100 MW Power Station Generation Storage Application



Project Facts

System Benefits:

- TIC contribution of additional 118 MW
- 10+% net output compared to base, ISO
- Neutralized heat rate

Ambient Design Conditions:

- 95°F (35°C) Dry Bulb
- 75°F (24°C) Wet Bulb

Hybrid Refrigeration System:

- Two (2) TAS F50, 11,000 TR (38,685 kWth), Multi-stage Centrifugal
- Dedicated Cooling Towers
- 1 x 7.6 mil gals Thermal Energy Storage (TES) Tank

Gas Turbine Information:

- (2) 2 x GE 207FA each

Project Challenge

The power station was experiencing only 87% of the rated output at 95°F (35°C). This output was decreasing significantly as temperatures rose. Unfortunately, this also occurred when demand was at its highest. This problem was not being addressed by the existing fogging system so the power station owner searched for a solution that would improve output for added summer capacity and create heat rate flexibility.

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The Solution

Various augmentation solutions were reviewed, including some offered by the gas turbine OEM. After reviewing the short- and long-term system benefits, TAS Energy's Generation Storage® solution, the combination of TAS Energy's patented Turbine Inlet Chilling (TIC) system and a Thermal Energy Storage (TES) tank, was chosen.

With TAS Energy's TIC solution, the power station was able to produce inlet air temperature of 50°F (10°C). This enabled the gas turbine to generate above its ISO rating. TAS Energy also designed and engineered the solution of a TES tank to provide the ability to pull electricity from the grid at night-time hours (and pricing) to chill the water and have it stored for use the following day during peak demand.

SuperPeak™ technology was also incorporated into the package as an optional capability. SuperPeak allows the gas turbine operator the ability to switch from partial TES discharge (chilled water coming from the TES tank and the chiller) to full discharge (chilled water coming from only the TES tank) quickly and reliably.

Project Results

- Reported a 10+% net additional output compared to initial conditions.
- Utilizing Generation Storage gave them the opportunity to recover high ambient performance loss. This resulted in much needed additional summer capacity as well as added peak plant flexibility.
- The objective was to control the inlet temperatures and this was achieved.
- SuperPeak technology allowed system flexibility, additional output ranging from 0.5 to 2% and decreased heat rate by 1 to 2% (as reported by the customer).

About TAS Energy

TAS Energy provides clean and highly efficient solutions through the design and manufacturing of modular energy conversion and cooling systems for the power generation industry; district, commercial and industrial process cooling; data center/mission critical; and the renewable energy sectors.

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