

Predicting GT performance under all conditions

When analysing plant performance or developing new projects, it is important to correctly predict GT performance under a wide variety of operating conditions.

During the past decades, gas turbines have proven to be a reliable and efficient technology with short implementation cycle from concept to start-up, and with a wide variety of applications covering stand-by peaking, combined cycle power generation, industrial power and steam, and district heating/cooling. Due to their fast ramp rates and wide load ranges, gas turbines can effectively fill the gap in case of demand fluctuations or intermittent generation from renewables. In the current transition of the power industry, gas turbines have also been identified as the bridging technology from the fossil era to a sustainable future, because their traditional fuel natural gas is less CO₂-intensive in general, and it may be replaced by hydrogen or other carbon-free gases which are currently investigated

as options for mid- and long-term storage of renewable energy.

Fuel and operating flexibility are great advantages, but they are also difficult to understand and predict.

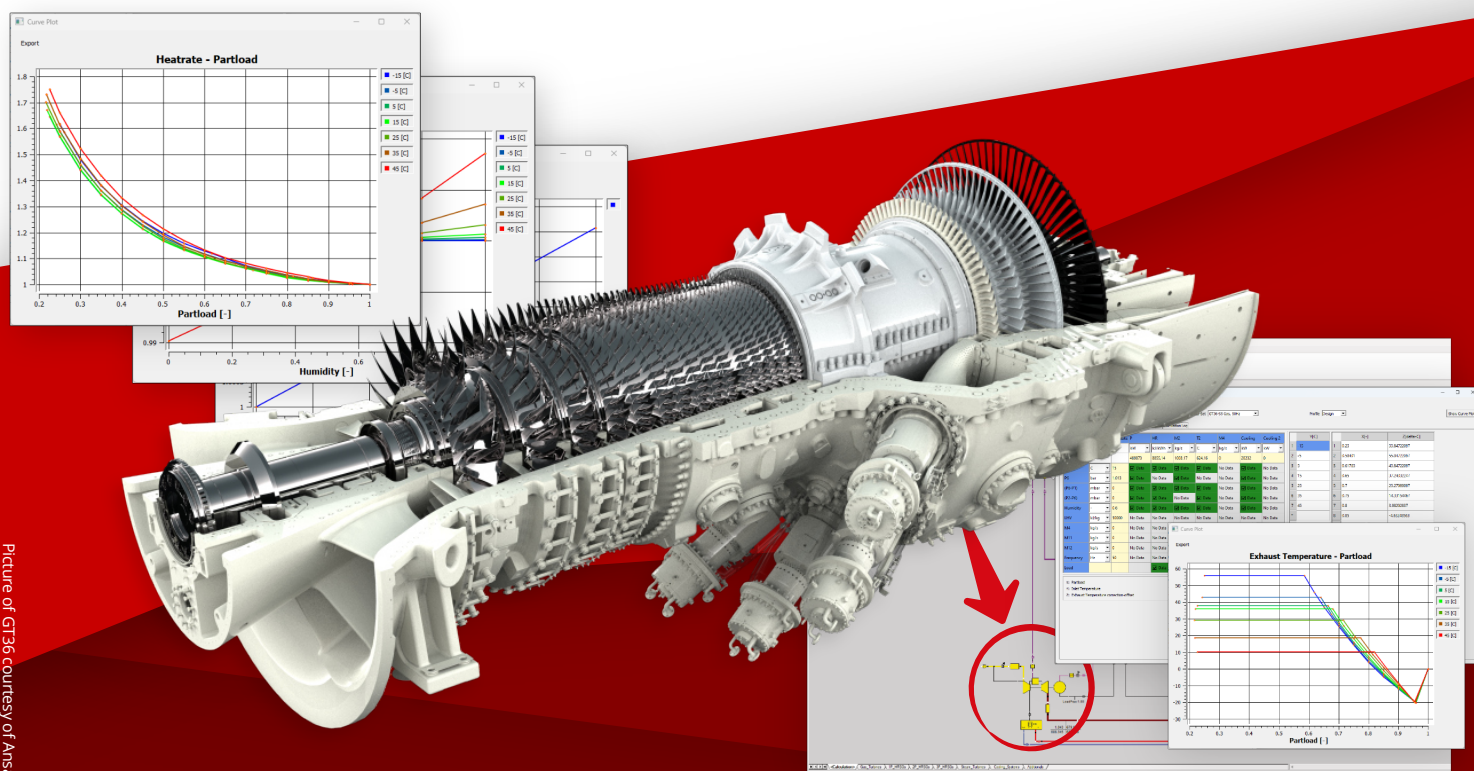
Modern GT control systems apply a variety of measures to maximise efficiency while mitigating excessive pollutant emissions and unnecessary wear on materials, so that power output, heat rate, exhaust flow and temperature as well as available cooling duties become complex functions of many parameters. In addition, technologies such as wet compression which boosts output in hot ambient have been introduced, which adds further complexity to the modelling. When burning high fractions of hydrogen, its significantly different flame dynamics require specific control measures that also affect overall performance and likewise occurs when burning other non-standard fuels such as blast furnace gases.

If you can't know the inside, you must go with the outside.

Since technical details and individual control philosophies are not disclosed by the OEM and much too complex to reverse-engineer, the only reasonable approach is the 'black box' and to describe the performance characteristics of a gas turbine with a specific fuel with a comprehensive set of correction curves. ENEXSA's Gas Turbine Library add-on for EBSILON®Professional contains detailed data sets derived from OEM simulation tools or vendor-supplied information.

- up to 76 individual correction curves including part load performance,
- editable and adjustable to project specific data or test results,
- fully integrated into the EBSILON heat balance software
- currently including more than a thousand data sets from all major OEM.

If you want to learn more about the Gas Turbine Library for EBSILON, please contact ENEXSA!



Picture of GT36 courtesy of Ansaldo Energia

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