Fair play in efficiency guarantees

Fuel efficiency is an important factor in supply agreements.

Purchase agreements for power plants supplying power, steam, water or other utilities to their offtaker typically include guarantees to ensure that the plant is operated efficiently and maintained diligently over the contract term. In particular when the fuel is provided by the offtaker, the efficiency guarantee must be evaluated continuously, and deviations from the contracted guarantees may lead to significant bonuses or penalties on top of the payments for the supplied products.

Why must fuel efficiency be corrected for the settlement of the purchase agreement?

Fuel efficiency varies with operating conditions, and such "natural" variations must of course not result in any commercial impact on the monthly bill to the offtaker. The correction of the fuel efficiency to a contractual reference state protects the supplier, because otherwise, if the plant was dispatched at low load or under disadvantageous ambient conditions and the contractual guarantees were based on 'normal operation', the supplier would be penalized without fault. Vice versa, the offtaker must be provided with a benchmark for efficiency guarantees that is valid under all operating conditions.

How much detail is needed in the correction procedure?

This depends on the complexity of the plant. For a simple plant configuration with only a few influencing parameters, a straight-forward equation with correction factors based on look-up tables or vendor curves may be sufficient. For a more complex plant with multiple possible combinations of the equipment and high interdependency of the generators, as for instance a gas turbine-based combined cycle plant, this approach however leads to erroneous results, since even a family of corrections curves cannot correctly represent all possible operating modes of such plant. (Note that this is different to a performance test, where the correction curves are applied to a single base load operating point). The use of a detailed thermodynamic model representing the entire power plant process – a so-called Fuel Demand Model (FDM) - has proven to be the best solution for calculating guaranteed fuel efficiency.

The Fuel Demand Model is the comprehensive benchmark for efficiency guarantees.

Because it is built on equipment-level performance characteristics that can be fine-tuned to exactly match vendor and contract guarantees, the Fuel Demand Model covers all possible combinations of equipment. Due to the use of a commercial-grade heat balance software (e.g. EBSILON®Professional), physically sound part-load corrections are applied, even if such information is not available from the con-tract or vendor data.

ENEXSA combines in-depth know how in Fuel Demand Models with long-term experience in IPP projects.

ENEXSA has a proven track record for providing Fuel Demand Models to large IPP, ISPP and IWPP projects in the Middle East and South-East Asia. As integral part of many of our plant settlement systems, Fuel Demand Models by ENEXSA are currently used in purchase agreements governing a total capacity of more than 21 GW of power, 5,000 t/h of steam and 3.5 Mio. m³/d of desalinated water.

If you need a proper Fuel Demand Model, please contact ENEXSA!

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