The Economic Performance of Fusion Power Plant on Future Deregulated Electricity Market by S. Takeda et al.

This study pioneered a vital new area for the economic assessment of fusion power plants: the economic performance of the plants on deregulated electricity markets.

- Conventional metrics such as Levelised Cost of Electricity (LCOE) may not represent the market value of power plants on future deregulated electricity markets.
- The operation of future fusion power plants has to be discussed in terms of how to maximize the monetary value of the plant through the deregulated market mechanisms.

A simplified deregulated electricity market model, the Simplified PJM Model, was constructed.

The results show that:

1. The economic performance of fusion power plant has higher sensitivity to the unplanned outage frequency (including plasma disruption) on deregulated electricity market;

2. The unplanned outage frequency target should be lowered to 0.3 times/year on deregulated market to achieve economic rationality of future fusion power plants.

Fig. 2 Net Present Value of Fusion Power Plant on Deregulated Electricity Market vs. Conventional Market.