Combined Cycle Modeling

Problem / Opportunity Statement/Charge

Combined cycle units have a unique incremental heat input curve as a result of the different operating mode capabilities these units provide. Currently, combined cycles are modeled similarly to other unit types in PJM, but may not be the same in terms of physical parameters. Combined cycle units must be entered into eMKT as either a combustion turbine or steam unit. Due to different unit setups (various combustion turbine combinations, CT power augmentation methods, duct burners, etc.) and eMKT limitations, combined cycle units may be offered inconsistently by various participants.

Issue Source

The Market Monitoring Unit (MMU) originally brought this issue forward for consideration by the Cost Development Subcommittee (CDS). After review, it became clear that combined cycles modeling could result in modifications to the way in which participants offer bids and the way PJM dispatches least cost generation. This was beyond the scope and charter of the CDS which required the CDS to take this issue to the MRC for review and discussion.

Background

In 2005, PJM developed functionality to model combined cycle units in eMKT. This functionality was never used by participants. Currently, the functionality would need to be turned on and may not work with the current unit commitment program. Combined cycle plants using this model would have the ability to be modeled as single composite unit or as multiple individual units. Individual units within the combined cycle group can have individual physical components modeled and have individual unit constraints. Therefore, each combustion turbine (CTs) and each steam turbine (steam unit) within the combined cycle group can have its own start-up cost, minimum run time, minimum down time, offer curves, etc. Individual unit availability can also be assigned to each component in the combined cycle group that must be factored into the commitment process. Additionally, the current combined cycle model does not address units with duct burners or other power augmentation methods.

Stakeholder Group Assignment

Modifications to the way in which participants offer bids and the way PJM dispatches least cost generation should be addressed by a separate stakeholder group made up of subject matter experts experienced in operating combined cycle units.

Key Work Activities

1. Recommendations for changes to combined cycle unit modeling.
2. Develop Tariff and Manual changes as necessary based on the findings of item #1.

Expected Deliverables

Review and analysis of how PJM dispatches Combined Cycle Units with recommended changes to eMKT and the dispatch algorithm that allows participants to bid the unique operating modes of combined cycle units in a consistent manner into the day-ahead and real time energy markets.

Expected Overall Duration of Work

PJM expects this work effort can be accomplished within 12 months.

Decision-making Method

This issue shall use the Tier 1 decision-making method.