Commercial Probability

A significant portion of all queued generation requests – over 85 percent – ultimately withdraws from the interconnection process and does not reach commercial operation. Generally, projects in the early stages of development – Feasibility or Impact study, for example – experience a high withdrawal rate. On the other hand, projects with executed Interconnection Service Agreements (ISAs) are much more likely to reach commercial operation.

In light of this, commercial probabilities based on historical data back to PJM's 'T' Queue are developed for queued generation requests that are Active, Under Construction or Suspended. Only data from Queue T and beyond is used to ensure that only projects that have submitted interconnection requests *after RPM's inception* are included.

- *Active* refers to all the generation requests that are not yet under construction and that do not have an executed Interconnection Service Agreement (ISA). Active requests can be in one of the following interconnection process stages: Feasibility Study, System Impact Study, or Facilities Study.

- *Under Construction (UC)* status in the TI Planning database can only be assigned to projects that have executed an ISA or WMPA. This does not necessarily mean actual physical construction – "moving dirt" – has begun.

- *Suspended* queued projects are retained for the estimate because, from an RTEP interconnection process perspective, they are not officially withdrawn. PJM Open Access Transmission Tariff (OATT) provisions regarding Interconnection Construction Service Agreement (CSA) execution permit an interconnection customer to suspend ICSA attachment facility and network facility construction obligations for a cumulative period of up to three years. This means that the generating facility itself will not be online at the in-service date originally identified by the developer. PJM assesses each suspension notification for its impact on network upgrade requirements. If PJM's assessment identifies either reliability issues or customers who are materially harmed, the suspension period for the network facility is limited to one year. As part of developing a commercial probability estimating process, PJM did not find that projects for which

suspension notifications have been issued are significantly more likely to withdraw from the interconnection request.

Queued project MW size is adjusted by commercial probabilities based on queue stage, fuel type, location (state), size and type of project (new or uprate). Applying this adjustment provides a more accurate look at the amount of generation that might actually reach commercial operation. PJM must re-examine commercial probabilities every year so that new data on projects that have achieved in-service status or have withdrawn from the queue is rolled into commercial probability estimation.

Statistical Methodology to estimate Commercial Probability

To assess the predictive power of factors such as queue stage, fuel type, state, size and type of project (new or uprate), PJM employs logistic regression. Logistic regression is a statistical tool similar to linear regression that can be applied to problems where the outcome (dependent variable) is binary. This tool is suitable to estimate commercial probabilities since an interconnection request either reaches in-service status or is withdrawn. Results from applying logistic regression have shown that a model including queue stage, fuel type, state, size and type of project (new or uprate) best fits the interconnection queue historical data. Commercial probabilities derived with logistic regression models are currently used in PJM's Installed Reserve Margin (IRM) Study and for projected reserve margin graphs.

PJM performs commercial probability analysis annually because new projects are withdrawn or reach in-service status throughout the year. This annual update increases the amount of data used to calculate logistic regression models. The model that best fits the historical data may change over time.

Commercial probability estimates address the following factors:

- *Queue Stage*: Feasibility, Impact, Facilities, ISA/WMPA.

- *Fuel Type*: Natural Gas, Coal, Nuclear, Biomass, Hydro, Methane, Oil, Solar, and Wind. Other fuel types that are not significantly represented in the Interconnection Queue's historical data were grouped in the category 'Other.'

- *Location/State*: NJ, PA, VA, MD, OH, DE, IL, IN, NC, and WV. Other states that are not significantly represented in the Interconnection Queue's historical data were grouped in the category 'Other.'

- *Size*: MW of capacity to be supplied by the interconnection queue if it reaches commercial operation.

- *Type of Project*: new unit or uprate to an existing unit.

The commercial probability model is based on historical data for projects that have either achieved in-service status or have withdrawn from PJM's interconnection queue. The model is then used to calculate commercial probabilities for those projects that have not yet achieved resolution – active, under construction, or suspended. As a result, the calculated commercial probabilities for these projects implicitly assume that historical market and regulatory dynamics that have influenced the interconnection queue in the past will continue to influence it in a similar manner in the future.