

Appendix A
Base Case Modeling Assumptions for
2011 PJM RRS

Parameter	2010 Study Modeling Assumptions	2011 Study Modeling Assumptions May X, 2011 letter to PC Approved at May XX, 2011 PC mtg.	Basis for Assumptions
Load Forecast			
Unrestricted Peak Load Forecast	163,093 MW (2014/15 DY)	166,506 MW (2015/16 DY)	Forecasted Load growth per 2011 PJM Load Forecast Report, using 50/50 normalized peak.
Historical Basis for Load Model	1998 - 2006	TBD	Will use the load model selection method approved at the July 15, 2009 PC meeting.
Forecast Error Factor (FEF)	Forecast Error held at 1 % for all delivery years.	Forecast Error held at 1 % for all delivery years.	Consistent with consensus gained through PJM stakeholder process.
Monthly Load Forecast Shape	Consistent with 2010 PJM Load Forecast Report and 2008 NERC ES&D report (World area).	Consistent with 2011 PJM Load Forecast Report and 2009 NERC ES&D report (World area).	Updated data.
Daily Load Forecast Shape	Standard Normal distribution and Expected Weekly Maximum (EWM) based on 5 daily peaks in week.	Standard Normal distribution and Expected Weekly Maximum (EWM) based on 5 daily peaks in week.	Consistent with consensus gained through PJM stakeholder process.
Capacity Forecast			
Generating Unit Capacities	Coordinated with eRPM databases, EIA-411 submission, and Generation Owner review.	Coordinated with eRPM databases, EIA-411 submission, and Generation Owner review.	New RPM Market structure required coordination to new database Schema. Consistency with other PJM reporting and systems.
New Units	Generation Interconnection Queues coordinated with September 2009 version of forecast reserve margin graph which uses commercial probability. See http://www.pjm.com/planning/resource-adequacy-planning/resource-reports-info.aspx .	Generation Interconnection Queues coordinated with May 2011 version of forecast reserve margin graph which uses commercial probability. See http://www.pjm.com/planning/resource-adequacy-planning/resource-reports-info.aspx .	Requirement using commercial probability for planned projects.
Wind Resources	Derived from hourly wind data over summer peak hours. Units can use a capacity factor of 13% or actual performance once historic data is available.	Derived from hourly wind data over summer peak hours. Units can use a capacity factor of 13% or actual performance once historic data is available.	Based on Manual 21 Appendix B for Intermittent Capacity Resources. 13% capacity factor based on PJM stakeholder process, February 22, 2008 Planning Committee, Agenda Item 9.

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Solar Resources	Derived from hourly solar data over summer peak hours. Units can use a capacity factor of 38% or actual performance once historic data is available.	Derived from hourly solar data over summer peak hours. Units can use a capacity factor of 38% or actual performance once historic data is available.	Based on Manual 21 Appendix B for Intermittent Capacity Resources. 38% capacity factor based on PJM stakeholder process, May 21, 2008 Planning Committee, Agenda Item 6.
Firm Purchases and Sales	Firm purchase and sales from and to external regions are reflected in the capacity model. External purchases reduce the World capacity and increase the PJM RTO capacity. External Sales reduce the PJM RTO capacity and increase the World capacity. This is consistent with EIA-411 Schedule 4 and reflected in RPM auctions.	Firm purchase and sales from and to external regions are reflected in the capacity model. External purchases reduce the World capacity and increase the PJM RTO capacity. External Sales reduce the PJM RTO capacity and increase the World capacity. This is consistent with EIA-411 Schedule 4 and reflected in RPM auctions.	Match EIA-411 submission and RPM auctions.
Retirements	Coordinated with PJM Operations, Transmission Planning models and PJM web site: http://www.pjm.com/planning/generation-retirements.aspx . Consistent with forecast reserve margin graph.	Coordinated with PJM Operations, Transmission Planning models and PJM web site: http://www.pjm.com/planning/generation-retirements.aspx . Consistent with forecast reserve margin graph.	Updated data available on PJM's web site, but model data frozen in May 2011.
Planned and Operating Treatment of Generation	<p>All generators that have been demonstrated to be deliverable will be modeled as PJM capacity resources in the PJM study area. External capacity resources will be modeled as internal to PJM if they meet the following requirements:</p> <ol style="list-style-type: none"> 1.Firm Transmission service to the PJM border 2.Firm ATC reservation into PJM 3.Letter of non-recallability from the native control zone <p>Assuming that these requirements are fully satisfied, the following comments apply:</p> <ul style="list-style-type: none"> •Only PJM's "owned" share of generation will be modeled in PJM. Any generation located within PJM that serves World load with a firm commitment will be modeled in the World. •Firm capacity purchases will be modeled as generation located within PJM. Firm capacity sales will be modeled by decreasing PJM generation by the full amount of the sale. •Non-firm sales and purchases will not be modeled. The general rule is that any generation that is recallable by another control area does not qualify as PJM capacity and therefore will not be modeled in the PJM Area. •Active generation projects in the PJM interconnection queues will be modeled in the PJM RTO after applying a suitable commercial probability. 	<p>All generators that have been demonstrated to be deliverable will be modeled as PJM capacity resources in the PJM study area. External capacity resources will be modeled as internal to PJM if they meet the following requirements:</p> <ol style="list-style-type: none"> 1.Firm Transmission service to the PJM border 2.Firm ATC reservation into PJM 3.Letter of non-recallability from the native control zone <p>Assuming that these requirements are fully satisfied, the following comments apply:</p> <ul style="list-style-type: none"> •Only PJM's "owned" share of generation will be modeled in PJM. Any generation located within PJM that serves World load with a firm commitment will be modeled in the World. •Firm capacity purchases will be modeled as generation located within PJM. Firm capacity sales will be modeled by decreasing PJM generation by the full amount of the sale. •Non-firm sales and purchases will not be modeled. The general rule is that any generation that is recallable by another control area does not qualify as PJM capacity and therefore will not be modeled in the PJM Area. •Active generation projects in the PJM interconnection queues will be modeled in the PJM RTO after applying a suitable commercial probability. 	Consistency with other PJM reporting and systems.

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Unit Operational Factors			
Forced and Partial Outage Rates	5-year (2005-09) GADS data. (Those units with less than five years data will use class average representative data.).	5-year (2006-10) GADS data. (Those units with less than five years data will use class average representative data.).	Most recent 5-year period. Use PJM RTO unit fleet to form class average values.
Planned Outages	Based on eGADS data, History of Planned Outage Factor for units.	Based on eGADS data, History of Planned Outage Factor for units.	Updated schedules.
Summer Planned Outage Maintenance	In review of recent Summer periods, no Planned outages have occurred.	In review of recent Summer periods, no Planned outages have occurred.	Review of historic 2005 to 2010 unit operational data for PJM RTO footprint.
Gas Turbines, Fossil, Hydro Nuclear Ambient Derate	Ambient Derate includes several categories of units. Based on additional assessments of operational data, for a wider time period, and discussion with Operations Staff the 2,500 MW out on planned outage over summer peak was determined to be the best value to use at this time.	Ambient Derate includes several categories of units. Based on additional assessments of operational data, for a wider time period, and discussion with Operations Staff the 2,500 MW out on planned outage over summer peak was determined to be the best value to use at this time.	Operational history and Operations Staff experience indicates unit derates during extreme ambient conditions. Additional assessments were not conclusive; identifying data granularity reporting issues that require additional efforts to derive any correlation between ambient conditions on unit performance.
Generator Performance	Peak period generator performance is consistent with year-round generator performance	Peak period generator performance is consistent with year-round generator performance.	Additional assessments were not conclusive to adjust the model. Assessments continue to quantify any change in the summer and non-summer unit performance or within the summer period (20 wks).
Class Average Statistics	PJM RTO fleet Class Average values. 73 categories based on unit type, size and primary fuel.	PJM RTO fleet Class Average values. 73 categories based on unit type, size and primary fuel.	PJM RTO values have a sufficient population of data for most of the categories. The values are more consistent with planning experience.
Uncommitted Resources	Behind the meter generation (BTMG) modeling: Per the June 28, 2004 PC meeting, BTMG may be treated as either a capacity resource or may be used to reduce the 5 CP (coincident peak) load. The choice of the modeling method is left to the owner of the BTMG resource.	Behind the meter generation (BTMG) modeling: Per the June 28, 2004 PC meeting, BTMG may be treated as either a capacity resource or may be used to reduce the 5 CP (coincident peak) load. The choice of the modeling method is left to the owner of the BTMG resource.	Consistency with other PJM reporting and systems.
Generation Owner Review	Web Application to review and sign-off of capacity model. Performed by Generation Owner representatives.	Web Application to review and sign-off of capacity model. Performed by Generation Owner representatives.	Annual review to insure data integrity of principal modeling parameters.
Load Management - (DR, ILR) and Energy Efficiency (EE)			
Load Management and Energy Efficiency	PJM RTO load management modeled per the January 2010 PJM Load Forecast Report (Table B8).	PJM RTO load management modeled per the January 2011 PJM Load Forecast Report (Table B8).	Model latest load management and energy efficiency data.

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Emergency Operating Procedures	IRM reported for Emergency Operating Procedures that include invoking load management but before invoking Voltage reductions.	IRM reported for Emergency Operating Procedures that include invoking load management but before invoking Voltage reductions.	Consistent reporting across historic values.
Transmission System			
Interface Limits	The Capacity Benefit Margin (CBM) is an input value used to reflect the amount of transmission import capability reserved to reduce the IRM. This value is 3,500 MW.	The Capacity Benefit Margin (CBM) is an input value used to reflect the amount of transmission import capability reserved to reduce the IRM. This value is 3,500 MW.	Reliability Assurance Agreement, Schedule 4, Capacity Benefit Margin definition.
New Transmission Capability	Consistent with PJM's RTEP as overseen by TEAC.	Consistent with PJM's RTEP as overseen by TEAC.	Consistent with PJM's RTEP as overseen by TEAC.
Modeling Systems			
Modeling Tools	PRISM Version 4.2	PRISM Version 4.4	Per recommendation by PJM Staff. Latest available version.
Modeling Tools	WKPKFQ Version 4.2	WKPKFQ Version 4.4	Per recommendation by PJM Staff. Latest available version.
Modeling Tools	Applications for Reliability Calculations (ARC) Version 4.2	ARC Version 4.4	Per recommendation by PJM Staff. Latest available version.
Modeling Tools	Multi-Area Reliability Simulation (MARS) Version 3.01	Multi-Area Reliability Simulation (MARS) Version 3.01	Per recommendation by PJM Staff and General Electric Staff. Latest available version.
Outside World Area Models	4 th year for new NERC region boundary reporting. Updated models for RFC, MRO-USA, NPCC (Ont, NY, NE), SERC (TVA, Entergy, Southern, VACAR) adjusted to fit into the old NERC region boundary definitions. Base Case world region include: NY, NE, MISO (East & Central), TVA and VACAR.	5 th year for new NERC region boundary reporting. Updated models for RFC, MRO-USA, NPCC (Ont, NY, NE), SERC (TVA, Entergy, Southern, VACAR) adjusted to fit into the old NERC region boundary definitions. Base Case world region include: NY, NE, MISO (East & Central), TVA and VACAR.	Updated per publicly available data and by coordination with other region's planning staffs.