2014 / 2015
Winter Readiness

System Operating Subcommittee
September 24, 2014
## 2014 / 2015 Projected Capacity and Peak Load

<table>
<thead>
<tr>
<th>RTO</th>
<th>MW</th>
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<tbody>
<tr>
<td><strong>2014 / 2015 Unrestricted Load Forecast</strong>*</td>
<td>133,510</td>
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<tr>
<td><strong>2014 Total Installed Capacity (ICAP)</strong></td>
<td>183,013</td>
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*50/50 PJM Coincident Peak Load. Unrestricted means Demand Response was not subtracted
**ICAP, includes generation internal to PJM (internal RPM / FRR and other internal iron in the ground), external imports to PJM, and Annual DR as of 12/01/2014*
Existing Installed Capacity (MW) by Fuel Type (12/01/2014)

Nuclear: 33,214 MW, (18%)
Coal: 72,354 MW, (40%)
Natural Gas: 55,489 (30%)
Petroleum: 10,167 MW (6%)
Renewables (Wind, Solar, Hydro): 9,348 MW (5%)
Other: 2,376 (1%)

Source: PJM
Winter Upgrades Expected
In addition to the base case winter analysis (OATF study) the following sensitivities will be run:

- 90/10 Load Forecast (142,550 MW)
- Higher outage amounts (41,000 MW)
- Gas pipeline contingencies based on EIPC studies

Sensitivity study results should be finalized by November 2014.
Cold Weather Recommendations from Winter 2014
### Pre-Winter 2014 / 2015 Considerations

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Cold Weather Resource Capability Testing and Preparation Checklist</strong></td>
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<tr>
<td>Gas Unit Commitment coordination in real-time operations to include clarity in dispatcher communications, sharing of updated unit parameters (e.g. notification times, dual fuel capability and availability, fuel inventories, resource limitations), commitment of long lead-time units</td>
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<td>Reduction in uplift via improved scheduling practices and modeling.</td>
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<td>Improvements to setting the caps on Cost-based and Price-based offers</td>
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<td>Improved data sharing and coordination with the gas industry</td>
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<td>Energy and Reserve pricing improvements to more appropriately reflect real-time operations.</td>
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<td>Improvements in interregional coordination to improve situational awareness during emergencies.</td>
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<td>Improvements in emergency procedures – Voltage Reduction data and procedures and Emergency Energy bid procedures</td>
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Winter Testing (new)

• Test
  – Exclude units such as nuclear, wind and hydro.
  – Narrow scope to units that have not run in 8 weeks on primary or backup fuel or switching capability based on experience.
  – PJM provides list to unit owners
  – Resource owners "nominate" units to test by Nov. 15th for December test. (With dates / times, etc. for units owner is willing to exercise cost capped)
  – PJM notifies owners in advance that a unit will run at or above economic min for a minimum run time requirement (PJM will schedule to minimize uplift for reliability)
  – Unit performance will be tracked and analyzed against historical GADS data to gauge the effectiveness of testing

• Checklist
  – Sign-off on review of checklist (by GO, not per unit)
  – Checklist (by OC or asset owner) submitted to PJM by mid-Dec (list of units required / checklist optional)
Timeline of Winter Testing Exercise

- Prior to November 1\textsuperscript{st}, PJM will compile a list of generator eligible
- By November 10\textsuperscript{th}, PJM will provide the list to the generation resource owner’s representative
- By November 20\textsuperscript{th}, the generation resource owner will provide a list of units they would like to exercise
- Within the month of December, PJM will notify the generation resource owner by 1000 hours EPT the day prior that they have been selected.
**Dual Fuel Capability** (Yes/No) – Indication whether or not the unit can switch its operation between two (or more) different fuels. Can be defined at the unit level (Default = No)

**Dual Fuel Availability** (Yes/No) – Can be defined at the schedule level (Default = No)
- If Yes, identify schedule to be used for fuel swap

**Time to Transition** (Minutes) – Amount of time in minutes to transition from one fuel type to another (Default = 0)

**MW output during Fuel Transition** – MW output where unit must operate to facilitate fuel transition (Default = 0)

**Fuel Policy:** Provide PJM / MMU with fuel policy for the units.
**Operational Restrictions** (0 - ?) – Indication of number of operational restrictions the unit may have. Can be defined at the unit level (Default = 0)

**Operational Restriction Type** – Dropdown list of the type of restriction(s) (e.g. emissions, de-mineralization of water process). Can be defined at the unit level (Default = 0)

**Deterioration Rate** (MWs & Time Frame) – Rate at which the operational restriction(s) is impacting the output of the unit in terms of MW and timeframe (e.g. hr, day, week, month)
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GO

Ensure eMKT data is accurate for period of hot/cold weather alert
- Notification time
- Schedule data
- Unit status
- Limits

Prepare unit and fuel requirements based on verbal commitment

1. Use long lead tool to select needed long lead generation
2. Commit units for specific time - give general run schedule or min run time
3. Commit units based on reliability, flexibility, cost
4. Communicate time, cost-based schedule, run schedule to GO

Log and communicate verbal commitments to DA Market operator for inclusion in appropriate DA market (ERPIV)

Bring unit online based on prior verbal commitment

PJM

Issue hot/cold weather alert for specific time period

Prior to DA

Real time
Gas/Electric Informational Alignment

- PJM Natural Gas Generation Database
- Interstate Pipeline Electronic Bulletin Board Flow Data
- Day-Ahead and Real-Time Markets Supply Analysis
- Interstate Pipeline Electronic Bulletin Board Critical Notices
- PJM Operations Alerted to Generation Outage
<table>
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<th>PJM Studies, Data Requests &amp; Drills</th>
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<tbody>
<tr>
<td>PJM Operations Assessment Task Force (OATF) Winter Operating Study (Nov. 2014)</td>
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<tr>
<td>PJM Emergency Procedures Drill (Nov. 17, 2014)</td>
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<td>Fuel Inventory Survey (Nov. 2014)</td>
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<tr>
<td>ReliabilityFirst Winter Assessment (Nov. 2014)</td>
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<tr>
<td>Joint MISO/PJM/NPCC Operations Coordination Meeting (Nov. 12, 2014)</td>
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<tr>
<td>SERC Operating Committee / VACAR Pre-winter coordination Meetings (Oct. 2014)</td>
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<td>NYISO / PJM Winter Coordination meeting (October 23, 2014)</td>
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<tr>
<td>Joint INGAA – Inter-RTO Council Meeting (Sept. 3, 2014)</td>
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<tr>
<td>Pennsylvania Independent Oil &amp; Gas Association (PIOGA) Pipeline and Gas Market Development Committee (Sept. 8, 2014)</td>
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<tr>
<td>PJM Winter gas preparation meeting (October)</td>
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