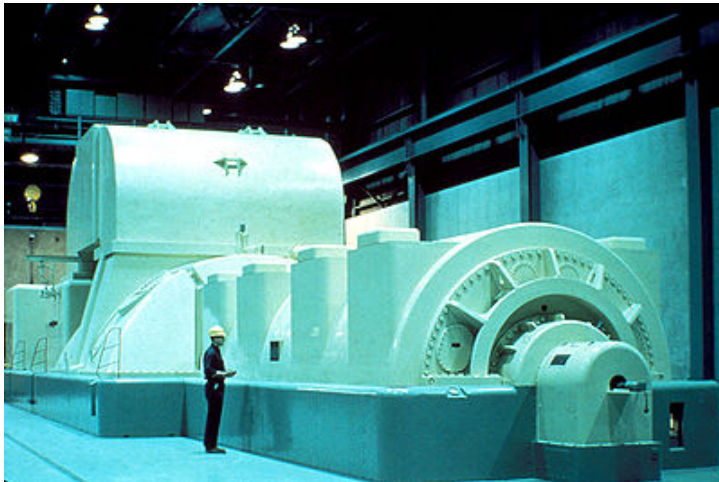
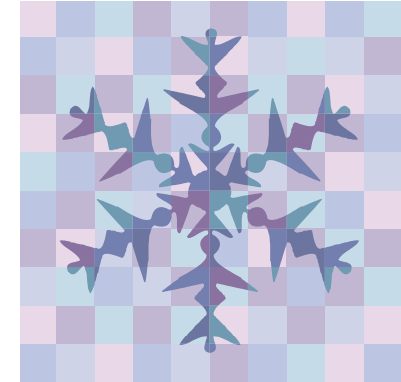
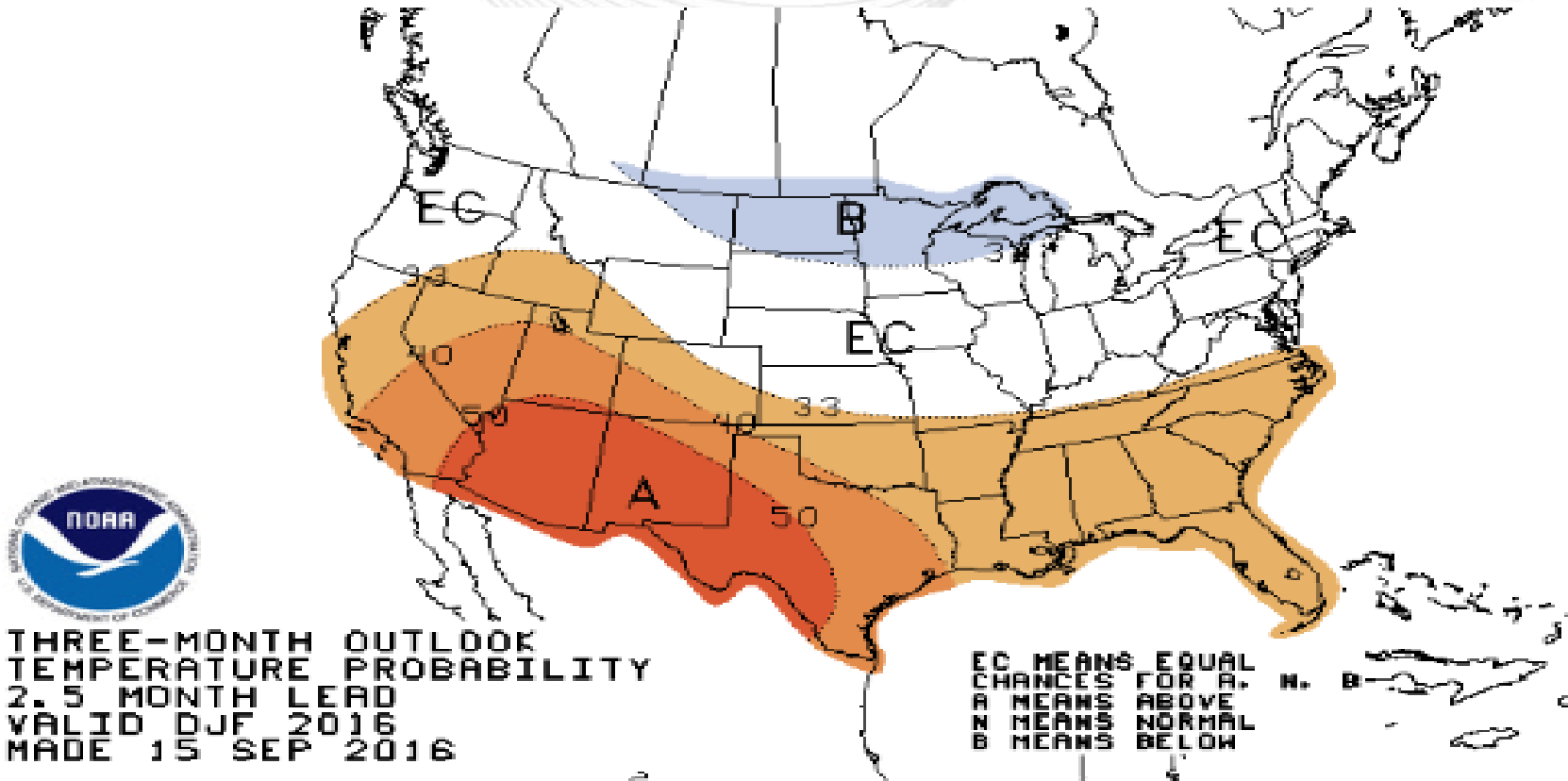




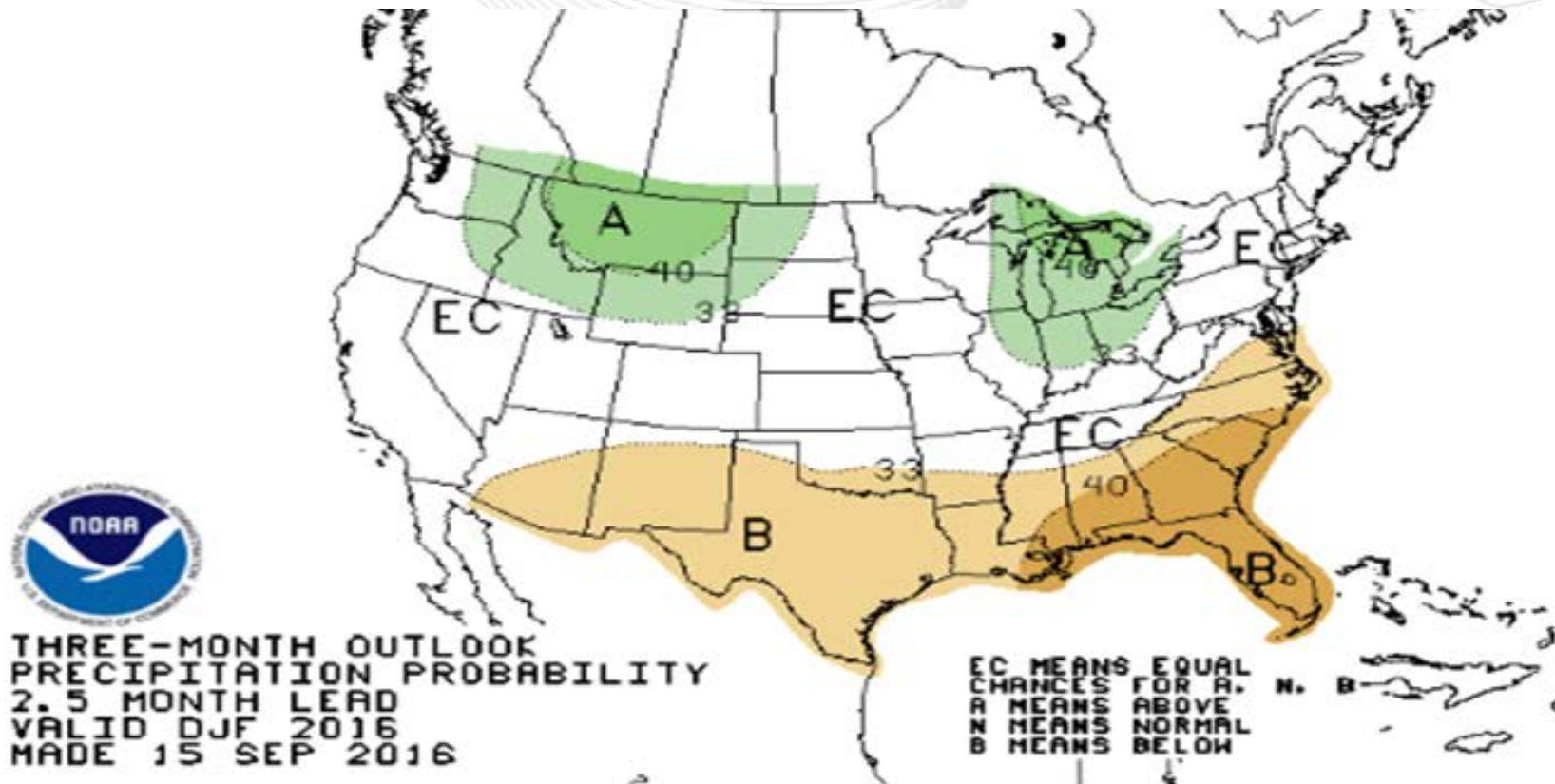
Winter Outlook 2016/2017

- Weather Outlook
- Capacity Outlook
- Transmission

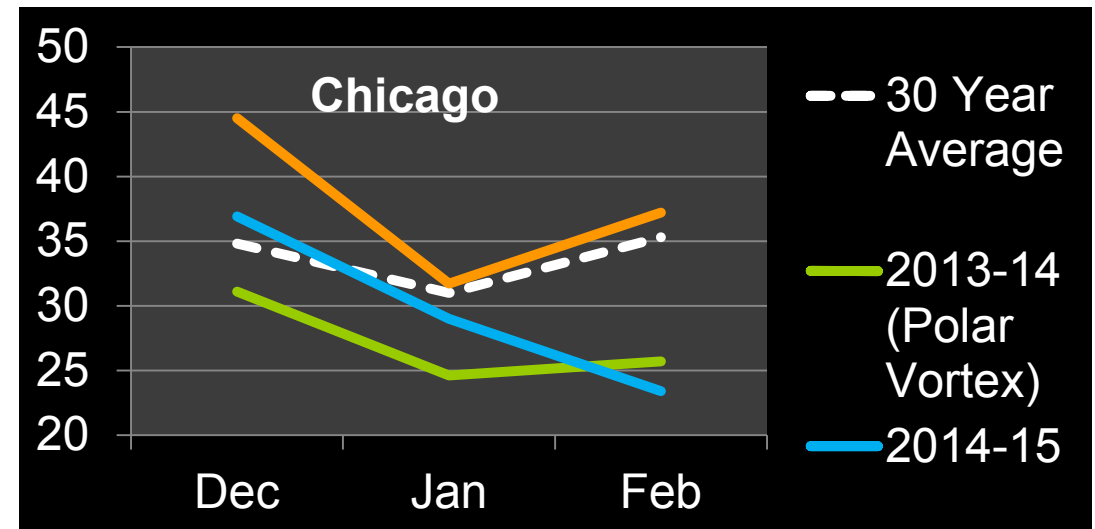
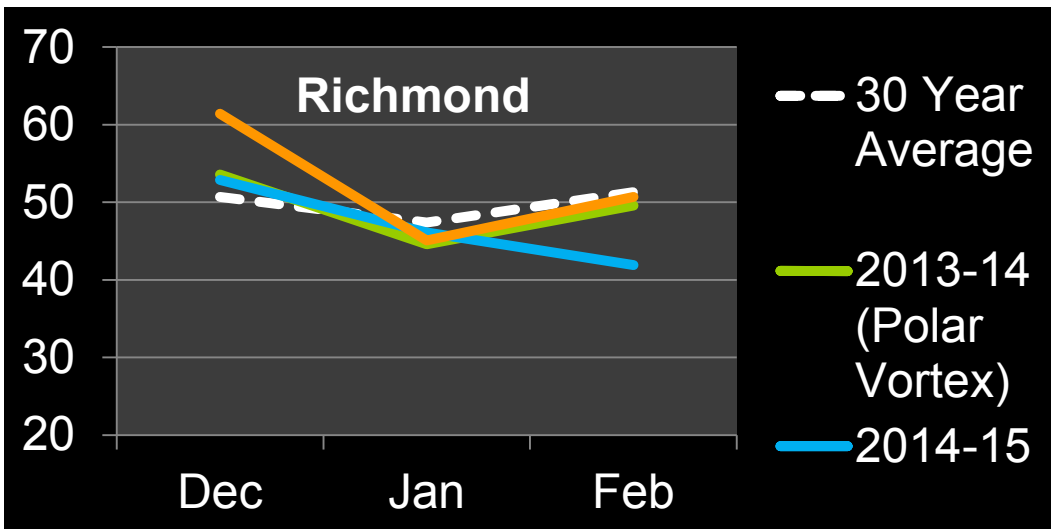
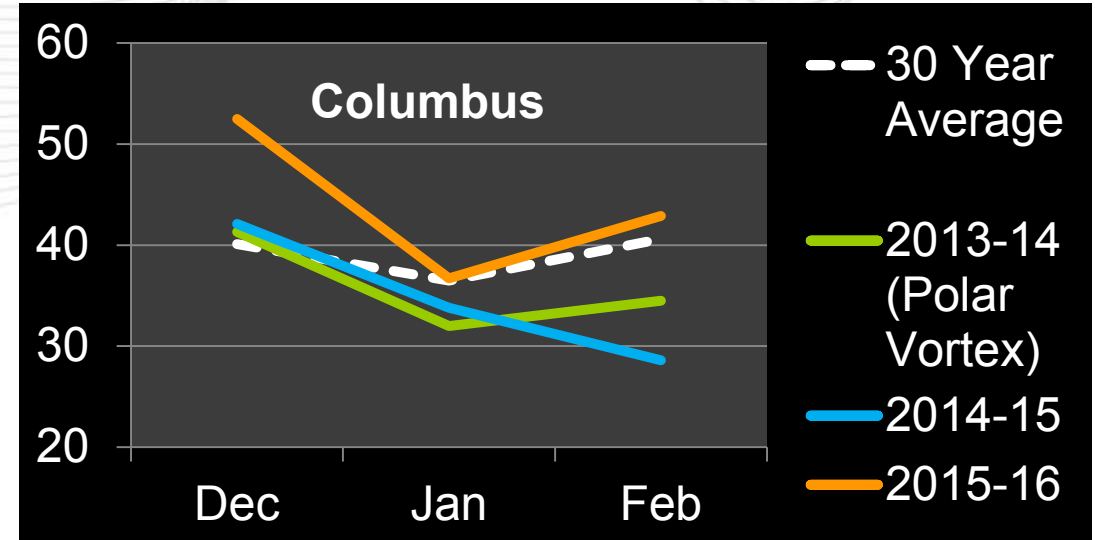
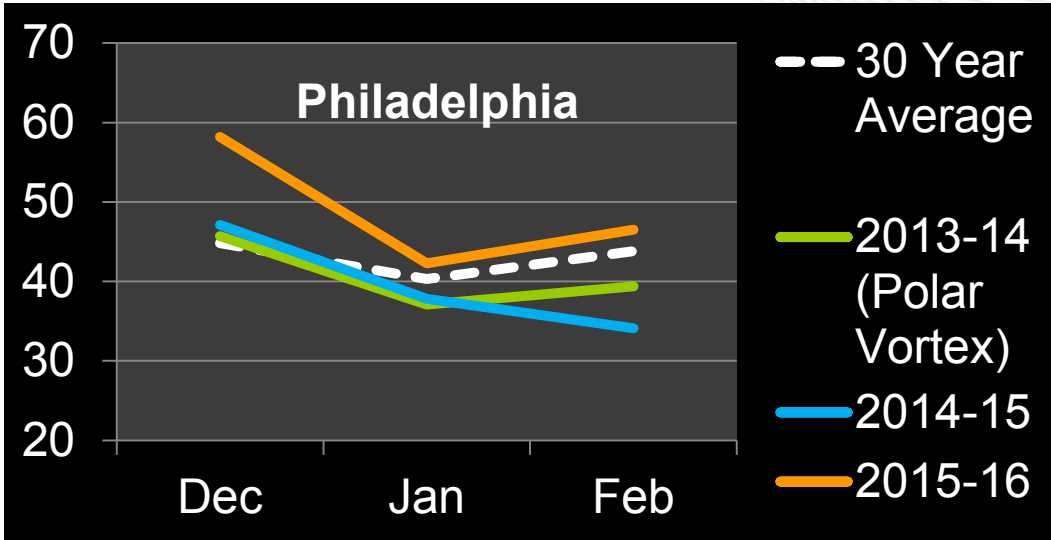




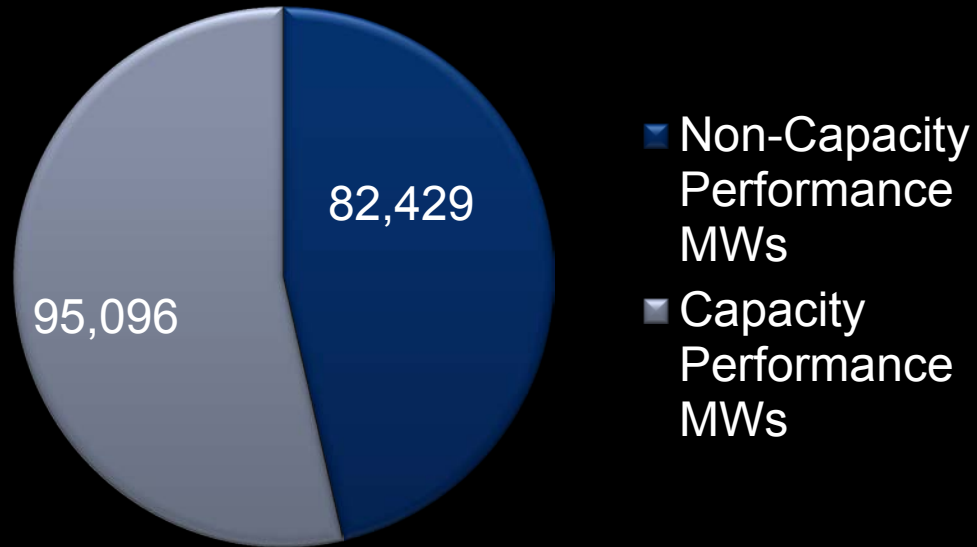
- Climate Prediction Center forecast for December 2016 - February 2017 indicate equal chance of above or below average temperatures for the PJM footprint (i.e. typical winter).



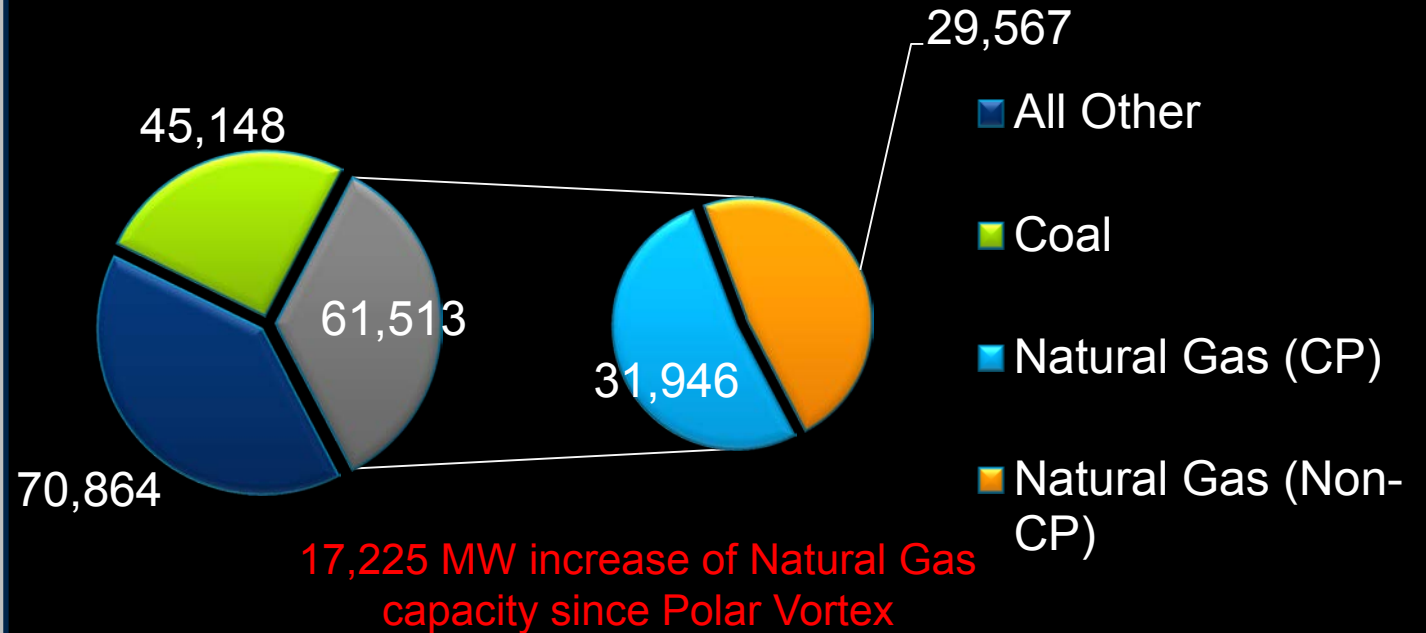
- Precipitation projected to be above average for the Great Lakes region and below average to the south.
 - Darker shading indicates a greater probability of higher than normal (A) or lower than normal (B) conditions.



PJM 2016/2017 Winter Capacity: 177,525 MW

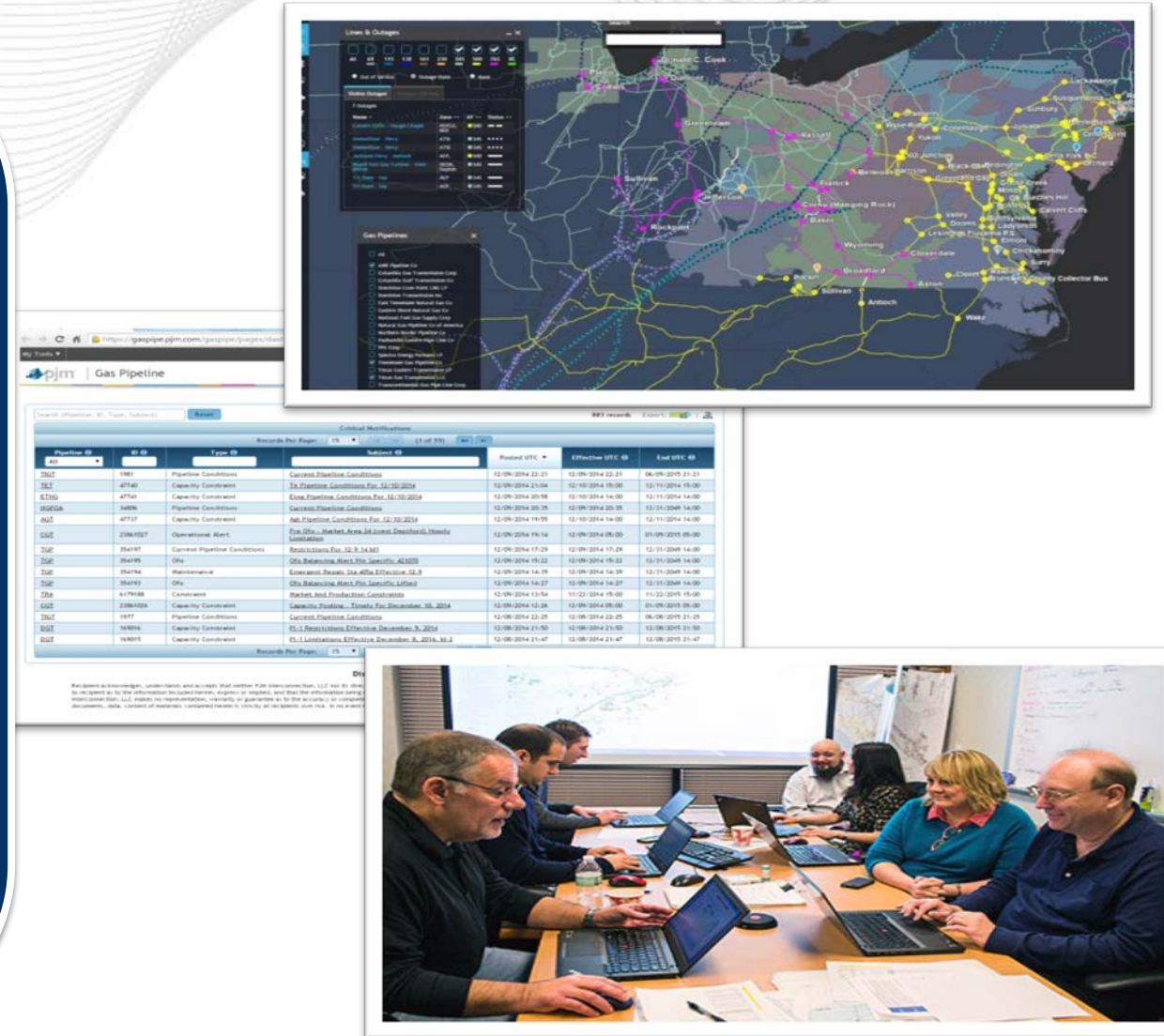


Fuel Mix & Natural Gas CP vs Non-CP

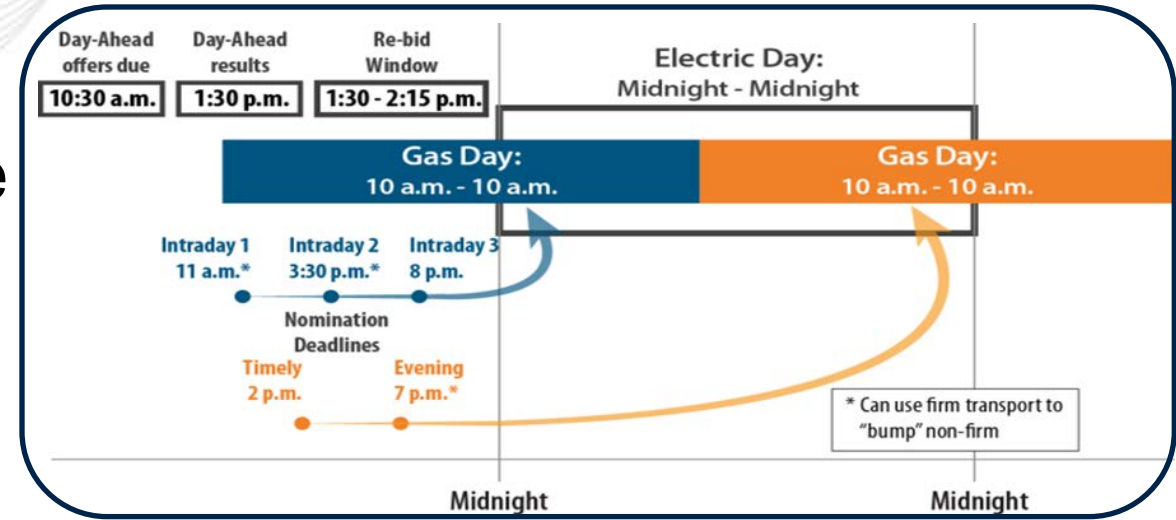


PJM team formed to:

- Analyze data gas delivery to units
- Provide operational info that allows operators to make better decisions:
 - Gen Owner outreach
 - Risk assessment and contingency planning (dual fuel vs single)
 - More accurate seasonal assessments (OATF)
- Improve coordination with pipelines and LDCs
- Develop tools to support processes



- Revised DA Market clearing time
 - DA Case posts by 13:30hrs.



- Generation Database (GenDB) Enhancements
 - More periodic tracking of Forced Outage rates and unit performance for follow up.

Winter OATF Case summary

Load Forecast	135,548 MW
RTO Net Interchange	Importing 5,175 MW (3,900 MW pseudo tied)
PJM RTO Installed Capacity	183,665 MW (177,525 MW RPM committed)
Studied Generator Outages	20,230 MW

- No reliability issues identified for base and N-1 analysis.
- Re-dispatch and switching required to control local thermal or voltage violations in some areas.
- All networked transmission voltage violations were controlled by capacitors. All other voltage violations were caused by radial load.

Sensitivity Study	Impact
External contingencies that could impact PJM reliability	No reliability concerns
N-1-1 Relay trip conditions	No cascading outage concerns identified <ul style="list-style-type: none"> • Majority of the overloads created by radial load, only controlling action is post-contingency load dump • All networked transmission overloads were controlled pre-contingency
Transfer Interface Analysis	No reliability concerns
BGE/PEPCO Import Capability	Thermal limit reached prior to a reactive limit this study season.
90/10 Load Forecast (139,147 MW- coincident peak load forecast)	No uncontrollable or unexpected issues observed at the elevated load levels.

- **Analyzed the following “worst case” contingency types:**
 - Loss of all Local Distribution Unit (LDC) generation
 - Gas Pipeline or Compressor Failure Contingencies
 - PJM gas pipeline contingencies that results in 1000 MW or more of generation loss.
 - All gas generation downstream of the gas contingency on the same gas infrastructure is lost, regardless of dual fuel status.
 - Temperature Threshold Gas Contingencies
 - At a pre-determined temperature threshold based on past conditions, all non-firm customers will be interrupted.
- **Results:**
 - All contingency scenarios solved without issue.

New Equipment Expected In-Service by 12/31/16

New Equipment Expected In-Service by 12/31/16

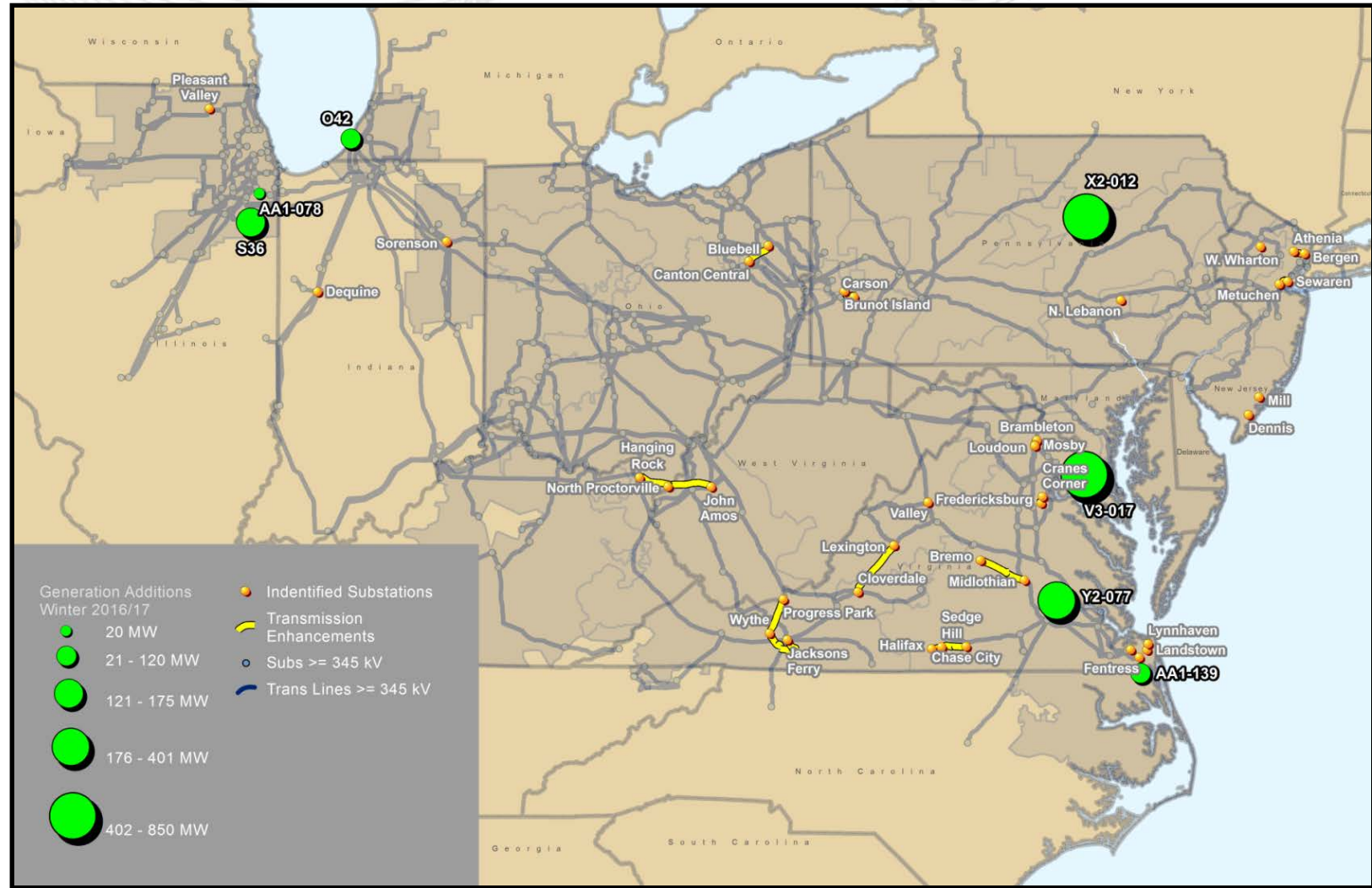
Highlights:

2,800MWs of additional generation

BGE : 2nd Graceton-Conastone 230 kV circuit by Dec 2016.

DOM : Rebuild Lexington-Dooms 500kV

Install new 230/115kV substation at Sedge Hill



- **AEP:**
 - Reconductored Cloverdale-Lexington 500 kV line, New 765/500 kV and 500/345 kV transformers at Cloverdale energized in October 2016 (with a 3rd transformer expected to be in Service May 2017).
 - Bath County thermal SPS retired
 - New 345/138kV XFs at Sporn, Kanawha River and Muskingum
- **ComEd:**
 - Reconductor Dixon-McGirr 138kV line

- **Reactors:**
 - 300 MVAR Dequine (AEP)
 - 300 MVAR Amos-North Proctorville line (AEP)
 - 50 MVAR Hinchmans Ave (PSE&G)
 - Four +/- 125MVAR STATCOMs at Landstown, Fentress, Chesapeake and Lynnhaven (Dominion)

PJM Studies, Data Requests & Drills

PJM Operations Assessment Task Force (OATF) Winter Operations Study (Nov. 2016)

Resource Winter Testing Exercise (Nov. 2016- Jan. 2017)

PJM Emergency Procedures Drill (Nov. 15, 2016)

Fuel Inventory Survey (Nov. 2016)

Generation owner Cold Weather Resource Preparedness Checklist (Dec. 15, 2016)

Reliability Coordinator Winter Preparation Meetings

PJM / DEP / VACAR (Dec. 12, 2016)

SERC Operating Committee / SERC RCS / VACAR (Oct. 10, 2016)

Reliability First (Nov. 17, 2016)

Joint MISO/PJM/NPCC (Nov. 3, 2016)

NYISO / PJM (Oct. 13, 2016)

TVA / PJM (Nov. 29, 2016)

Gas / Electric Coordination

Joint INGAA – Inter-RTO Council Meeting (Oct. 2016)

PJM Winter gas preparation meeting (December 2016)

Daily, Weekly, Monthly, and Seasonal Coordination with Pipelines in PJM footprint

LDC outreach and information sharing in progress

New 2016 OATF Sensitivity Studies