



Summer 2019 PJM Reliability Assessment

Pennsylvania Public Utility Commission
June, 2019

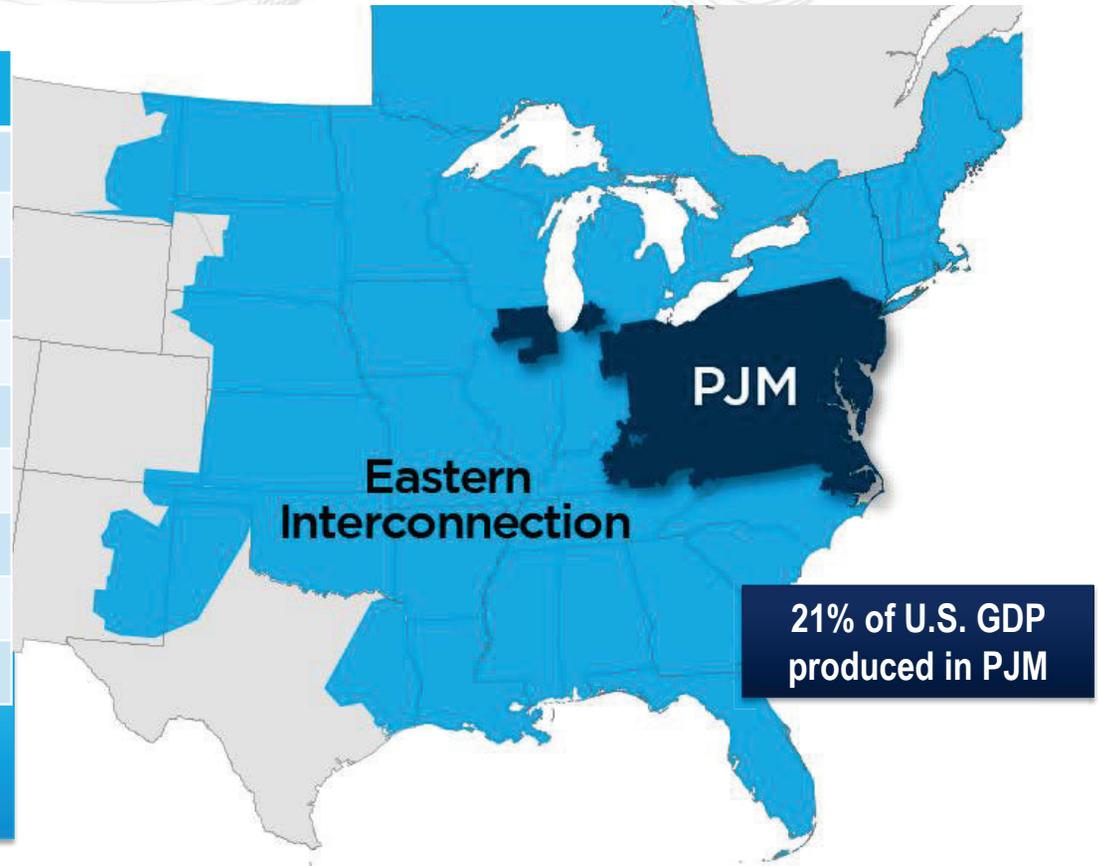


PJM as Part of the Eastern Interconnection

Key Statistics

Member companies	1,010+
Millions of people served	65
Peak load in megawatts	165,492
MW of generating capacity	180,086
Miles of transmission lines	84,236
2018 GWh of annual energy	806,546
Generation sources	1,379
Square miles of territory	369,089
States served	13 + DC

- 26% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection



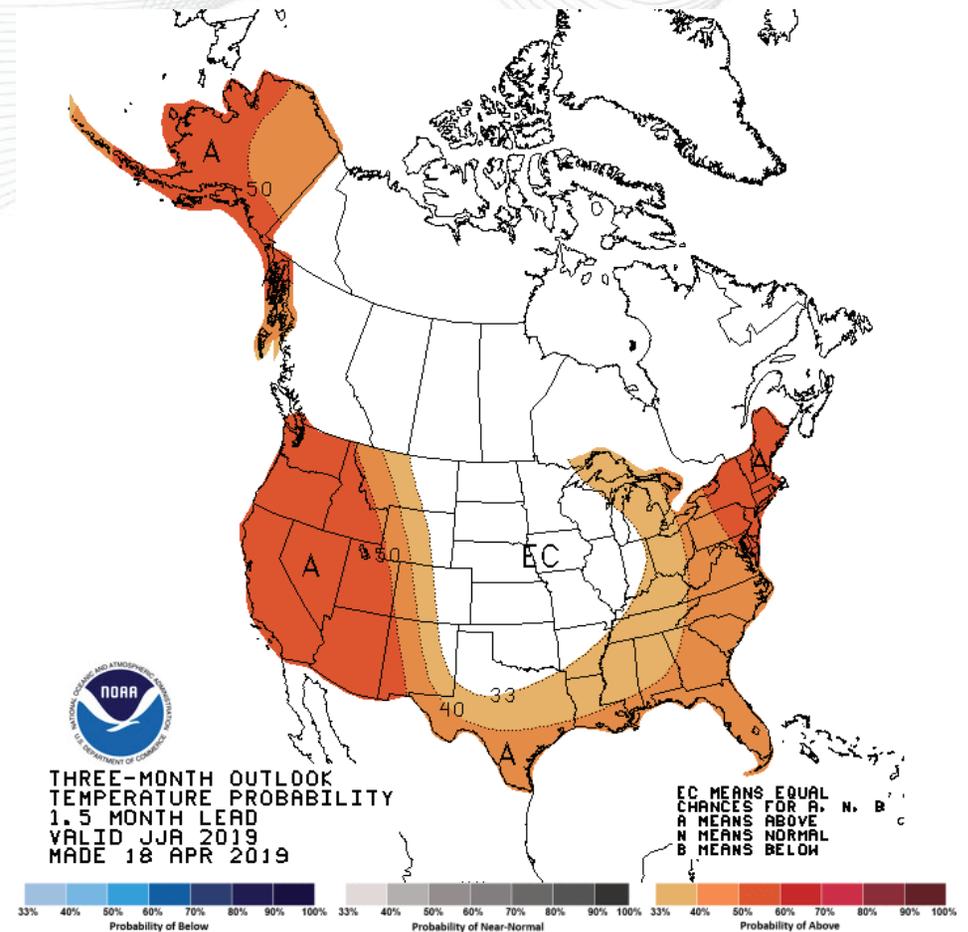
As of 1/2019



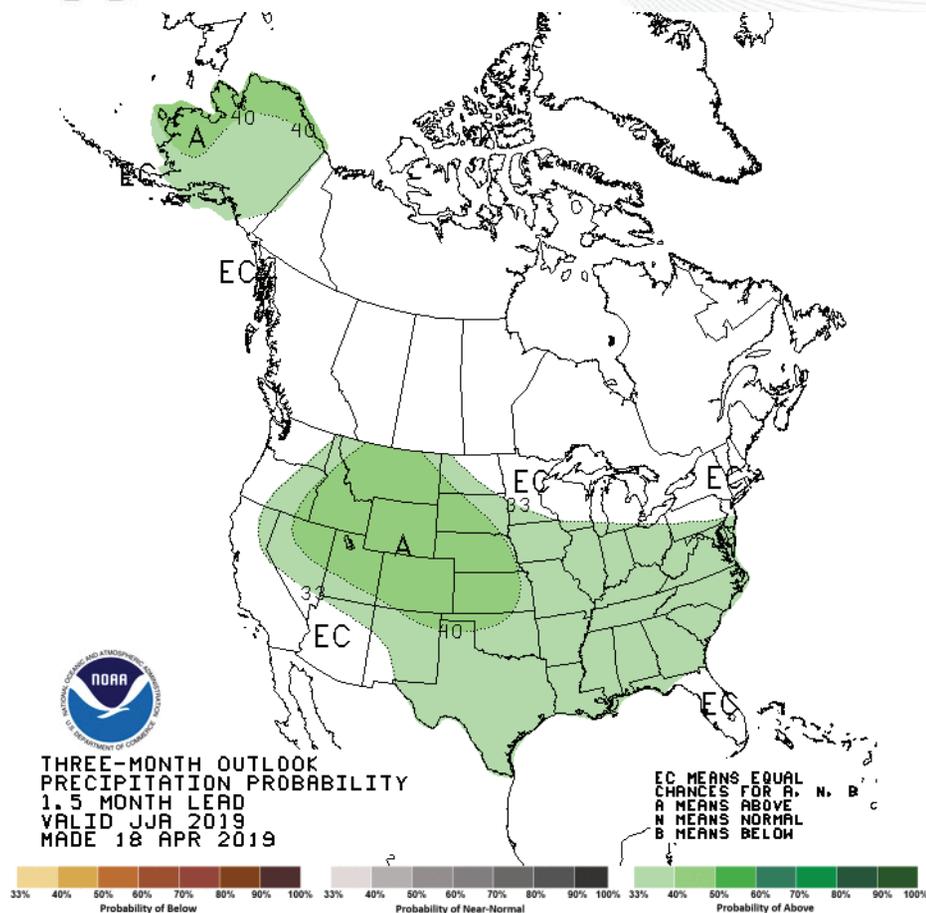
Current forecast suggests a higher probability of above average temperatures for the entire RTO.

There is a greater chance of above average temperatures in the eastern half of the RTO than in the west.

Summer Outlook – Temperature



Summer Outlook – Precipitation

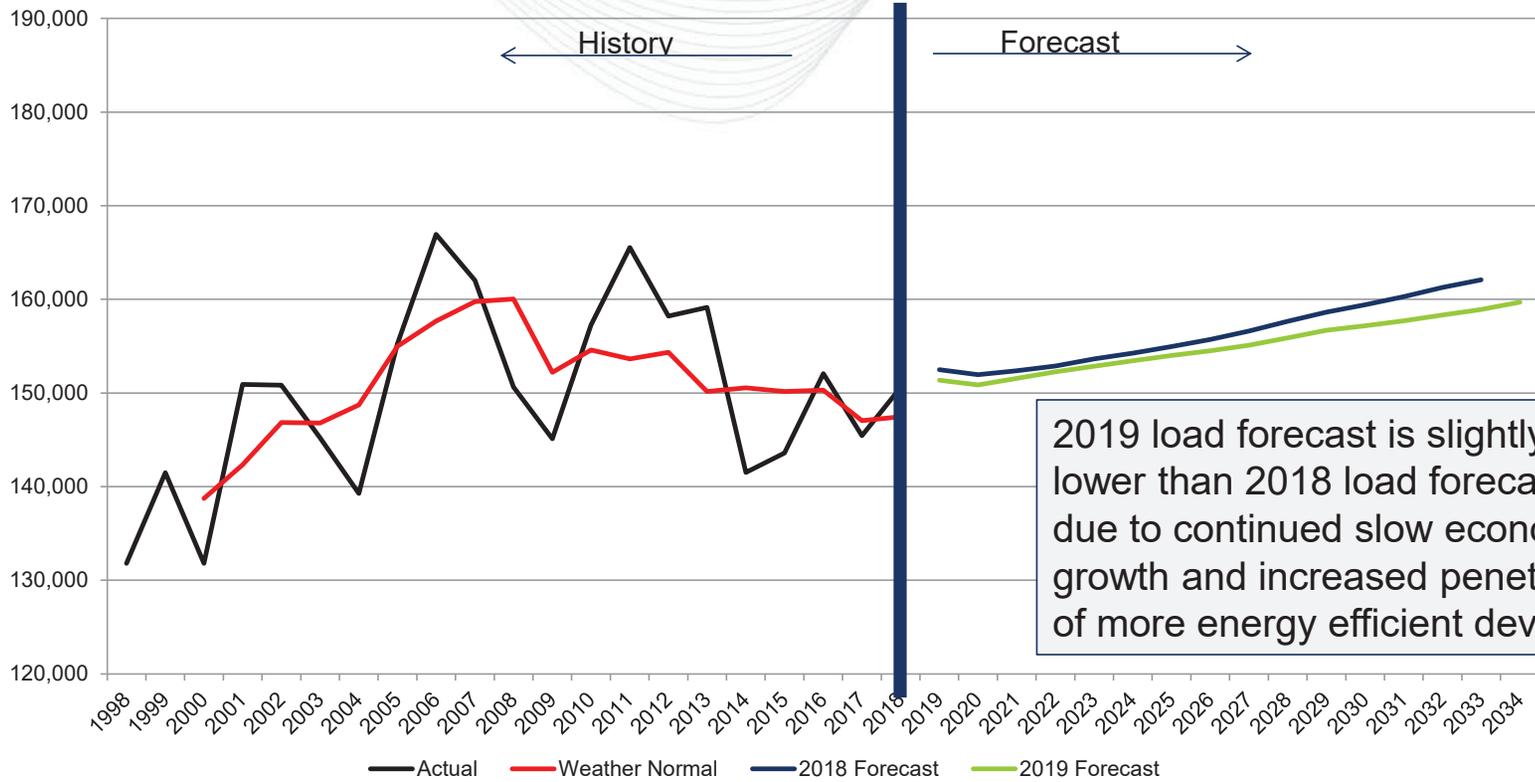


- Not expected to be as wet as last year in the East
 - July 2018 was record-breaking in PA
- Places that do see wet weather may see limited extreme heat



2018 vs. 2019 PJM Load Forecast

Summer Peak Demand For PJM RTO



2019 load forecast is slightly lower than 2018 load forecast due to continued slow economic growth and increased penetration of more energy efficient devices.



PJM Load and Capacity Comparison: 2018 vs. 2019

2018

Forecast Load (MW) Total	Demand Response (MW)	Forecast Load Less Demand Response (MW)	Installed Generation Capacity (MW)	Reserve Margin (MW)	Reserve Margin	Required Reserve Margin
152,108	7,994	144,114	184,010	39,896	27.7%	16.1%

2019

Forecast Load (MW) Total	Demand Response (MW)	Forecast Load Less Demand Response (MW)	Installed Generation Capacity (MW)	Reserve Margin (MW)	Reserve Margin	Required Reserve Margin
151,358 ↓	8,145 ↑	143,213 ↓	183,454 ↓	40,331 ↑	28.2% ↑	16.0% ↓

DR estimate is based on methodology used in RTEP and described in PJM Manual 19

2018 (Metered Peak Load: 150,530 MW on 8/28/18 at HE 17)



Glossary for Load and Capacity Summary Slide

Forecast Load – Expected peak demand, based on normal peak day weather (Total Internal Demand-TID)

Demand Response – Contractually interruptible load and other customer load willing to be interrupted at the direction of PJM. Compliance check is performed at end of summer.

Forecast Load Less Load Management – Expected peak demand after demand response has been implemented (Net Internal Demand-NID)

Installed Generation Capacity – The MW sum of two groups of generators: All generators in PJM that have capacity interconnection rights and are not committed to serve external load plus all external generators that cleared in RPM and are committed to serve PJM load

Reserve (MW) – Installed Generation Capacity minus Net Internal Demand

Reserve Margin (%) – Reserve expressed as a percent of Net Internal Demand

Required Reserve Margin (%) – PJM required planning reserve, as determined by the RPM process (Installed Reserve Margin-IRM)

The **Reserve Margin (%)** must exceed the **Required Reserve Margin (%)** to satisfy the reliability requirement.

- Historically about 7% of PJM capacity is “forced out” of service during the peak summer period
- Scheduled generator maintenance is coordinated to minimize peak period impacts
- Water levels are expected to be normal for hydro units



2019 Summer Capacity - Pennsylvania

- 8,000 MW of wind generation in the PJM markets
 - 1,376 MW in Pennsylvania
- 1,720 MW of solar-powered generation in the PJM markets
 - 20 MW in Pennsylvania
- 4,729 MW of solar-powered distributed generation in the PJM territory
 - 359 MW in Pennsylvania
- Change in Pennsylvania generation since June 1, 2018
 - 1,722 MW of generator deactivations
 - 2,975 MW of generator additions



Summer Preparedness

- Summer Seasonal Assessment
- Conduct emergency drills to ensure readiness
- System Operator Training
- Assess the weather outlook daily
- Review projected load and capacity
- Coordinate with neighboring systems to discuss the upcoming season conditions



50/50 Non-diversified Peak Load Base Case

PJM Non-diversified Load Forecast	157,338 MW
Preliminary RTO Net Interchange	1,300 MW** (Importing)
PJM RTO Installed Capacity	183,736 MW (preliminary as of 4/02/2019)
Discrete Generator Outages	12,172 MW

** 1,300 MW of net interchange is modeled in the OATF base case and accounted for in the total RTO installed capacity

PEAK LOAD ANALYSIS

- No reliability issues identified.
- 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.

- PJM expects to be able to reliably serve expected peak loads—peak loads are expected to be slightly higher this summer than in summer 2018.
- PJM generation (including firm external purchases) saw a net decrease of 556 MW between 2018 and 2019. The amount of demand response in PJM increased by 151 MW over the same period. The projected summer 2019 reserve margin of 28.2% exceeds the required reserve margin of 16.0%.
- The transmission system is expected to perform adequately based on applicable reliability criteria.