EPA's Clean Power Plan Proposal: A Summary of Key Results from PJM's Economic Analysis

National Association of State Utility Consumer Advocates

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PJM as Part of the Eastern Interconnection

**KEY STATISTICS**

- Member companies: 925+
- People Served: 61 Million
- Peak load in megawatts: 165,492
- MWs of generating capacity: 183,604
- Miles of transmission lines: 62,556
- 2014 GWh of annual energy: 797,461
- Generation sources: 1,376
- Square miles of territory: 243,417
- States served: 13 + DC

21% of U.S. GDP produced in PJM
Caveats and Cautions…Qualitative Observations are Key

Assess, but not forecast potential energy market and reliability impacts based on

- Generation entry/exit assumptions
- Fuel Price Assumptions

While

- Maintaining neutrality on environmental policy
- And providing an independent source of information on policy implications

Actual results will depend upon several variables, including:

- The final EPA rule
- How states choose to implement the rule
- Actual Economic Conditions
Mass-Based Program CO₂ Emissions Targets

PJM Regional Mass-Based CO₂ Emissions Targets

**Mass Target = Target Rate x (2012 Covered Sources MWh + 2012 Renewables + Nuclear, at-risk)**

*2012 baseline emissions include emissions from units that have already announced deactivations

- **2012 Baseline**: 442 Tons (Millions)
- **Interim 2020-2029 Mass Targets**: 357 Tons (Millions)
- **Modeled Targets**: 387, 354, 327 Tons (Millions) for 2020, 2025, and 2029 respectively.

Existing Source Targets by Year
Interim Compliance (2020-2029) Period
EPA Emissions Reductions by State

Total CO₂ From PJM Planned Deactivations and Fuel Conversions
50 Million Tons

*DC does not have a compliance obligation. The portion of Tennessee in PJM does not have any sources covered by the proposed rule.
## 2020-2029 Scenario Summary

<table>
<thead>
<tr>
<th>Driver</th>
<th>Achieve State RPS and EPA EE Targets</th>
<th>Lower Growth in Renewables and EE</th>
<th>Limited New 111(b) NGCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewables Modeled</td>
<td>89 – 104 GWh (Thousands)</td>
<td>47 - 74 GWh (Thousands)</td>
<td>47 - 74 GWh (Thousands)</td>
</tr>
<tr>
<td>111(b) NGCC</td>
<td>14.5 GW</td>
<td>14.5 GW</td>
<td>2.8 - 14.5 GW</td>
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<tr>
<td>Nuclear</td>
<td>33.4 GW</td>
<td>33.4 GW</td>
<td>33.4 GW</td>
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<tr>
<td>Natural Gas Price*</td>
<td>5.25 - 8.35 $/MMBtu</td>
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</tr>
<tr>
<td>Energy Efficiency Modeled</td>
<td>26 - 86 GWh (Thousands)</td>
<td>7.9 – 13.6 GWh (Thousands)</td>
<td>7.9 – 13.6 GWh (Thousands)</td>
</tr>
</tbody>
</table>

*Natural gas price forecast in nominal dollars. Coal prices not shown as each coal unit has a unique delivery and commodity charge.
Change in Zero Emitting Resource Assumptions Between 2020 and 2029

### Renewable Energy Sensitivity (MWh)
- 2020: 88,785
- 2025: 102,707
- 2029: 104,414

### Energy Efficiency Sensitivity (MWh)
- 2020: 26,347
- 2025: 64,987
- 2029: 86,382

**Key Assumptions:**
- Achieve State RPS and EPA EE Targets
- Lower Renewable and EE Growth
- Limited New 111(b) Resource Entry

**Footnotes:**
- Thousands
- PJM Transmission Planning (RTEP)
- www.pjm.com
Generation Investment Location doesn’t always Match the Emissions Displacement Location

*Data based on OPSI 2a (Achieve State RPS and EPA EE targets) versus PJM 4 (Lower Growth in Renewables and EE) Scenario in 2020

*www.pjm.com*
CO₂ Prices for Regional and State Compliance
Studied in 2020

CO₂ ($/Ton)

- $20
- $18
- $16
- $14
- $12
- $10
- $8
- $6
- $4
- $2
- $0

Coal Generation as % 2012 State Load
(198% to 0%)
2020 State-by-State Compliance = More CO₂ Constraints
>> More At-Risk Generation*

Achieve State RPS and EPA EE Targets
Lower Renewable and EE Growth
Limited New 111(b) NGCC

*Unit determined at-risk when its Revenue Requirement is greater than 0.5 Net Cost of New Entry for a Combustion Turbine
Lower CO₂ Targets + Less Zero-Emitting Resources = Higher CO₂ Prices

*By 2029 all FSA and ISA units are modeled to satisfy reserve margin requirements. Limited New NGCC entry sensitivity only applies to 2020 and 2025.
Lower CO\textsubscript{2} Limits + Less Zero-Emitting Resources = More At-Risk Generation

- Lower CO\textsubscript{2} Limits
- Less Zero-Emitting Resources
- More At-Risk Generation

Graph showing:
- CO\textsubscript{2} Emissions Target
- Limited New 111(b) NGCC
- Lower Renewable and EE Growth
- Achieve State RPS and EPA EE Targets
Next Steps

• Reliability analysis of at-risk generating units
• Continue to advocate for a reliability safety valve
• Educate on economic and reliability implications of CPP policy decisions
• Subsequent to EPA’s final rule:
  – Update analysis for select scenarios
  – Respond to state requests for analysis
Appendix: In-State Emissions Displacement Rates

Displacement Rate (lb/MWh) = \frac{\text{Change in Emissions (lbs)}}{\text{Change in In-State Gas & Coal (MWh)}}
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Displacement Rate (lb /MWh) = \frac{\text{Change in Emissions (lbs)}}{\text{Change in In-State RE and EE (MWh)}}