Potential Energy Market Impacts of EPA’s Clean Power Plan
CTAEE/EI | Austin, TX

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Goal: assess the impacts of EPA’s proposal on the US energy system

**EPA Clean Power Plan (CPP) Proposal**
- Emissions rate targets
- Building blocks
- Compliance timeline

**National Energy Modeling System (NEMS)**
- Industry standard multi-sector energy system model
- Detailed data on US technology costs and performance, energy supply and demand, electric power markets, macroeconomic factors, etc.
- Solves for the least-cost pathway to meet a given policy goal

**National and Regional Results**
- RHG and CSIS analysis of outputs
- Emissions rate targets
- Building blocks
- Compliance timeline

RHG and CSIS interpretation of proposal
Scenarios

Reference Case: AEO2014 plus EPA’s proposed New Source Performance Standards (coal plants must meet emissions rate of 1,100 lbs./MWh).

Policy Scenarios: CPP represented as an emission rate-based tradable performance standard. Scenarios explore the impacts of two key decisions for CPP implementation: Multi-state Cooperation and Crediting of Demand-side Energy Efficiency

<table>
<thead>
<tr>
<th>Policy Scenarios</th>
<th>National Cooperation</th>
<th>Regional Fragmentation</th>
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<tbody>
<tr>
<td>No States Include EE in Plans</td>
<td>National w/o EE</td>
<td>Regional w/o EE</td>
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<tr>
<td>All States Include EE in Plans</td>
<td>National w/ EE</td>
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Sensitivity Scenarios: Explore the impacts of the CPP (National w/o EE scenario) under different natural gas futures:
- Low oil and gas resource
- High oil and gas resource
- High LNG Exports (9 bcf/day by 2020, 18 bcf/day by 2030)

Full Report: [http://csis.org/program/remaking-american-power](http://csis.org/program/remaking-american-power)
Fuel prices and power generation
USD per MMBTU delivered to power plants and billion kWh 3mma
Natural gas prices
2012 USD per MMBTU at Henry Hub
US electric power generation
Billion kWhs

REFERENCE

NATIONAL W/O EE

Source: EIA, Rhodium Group/CSIS
Electric generation change from reference
Billion kWs

Source: Rhodium Group/CSIS.
Electric capacity change from reference

GWs

Source: Rhodium Group/CSIS.
Change in electric power CO2 emissions
2020-2030 annual average

Source: Rhodium Group/CSOS
Consumer costs
Change from reference, 2020-2030 annual average

Electric Rates
- National w/o EE: 4.1%
- National w/ EE: 5.4%
- Regional w/o EE: 11.2%
- Regional w/ EE: 9.9%

Electricity Expenditures
- National w/o EE: 2.8%
- National w/ EE: 0.6%
- Regional w/o EE: 7.8%
- Regional w/ EE: 1.7%

Energy Expenditures
- National w/o EE: -2.4%
- National w/ EE: -1.4%
- Regional w/o EE: 0.2%
- Regional w/ EE: -0.7%

Source: Rhodium Group/CSIS. Electricity expenditures only include utility EE costs and do not reflect participant EE costs.
Natural gas demand and producer revenue, 2020-2030
Annual average change from reference

**Demand, BCF/DAY (RHS), % (LHS)**
- National w/o EE: 10.7%
- National w/ EE: 3.1%
- Regional w/o EE: 10.9%
- Regional w/ EE: 5.5%

**Producer Revenue, Billion 2012 USD (RHS), % (LHS)**
- National w/o EE: $32.0 billion, 20.1%
- National w/ EE: $5.9 billion, 3.7%
- Regional w/o EE: $34.5 billion, 22%
- Regional w/ EE: $10.0 billion, 6%
Coal demand and producer revenue, 2020-2030
Annual average change from reference

DEMAND, MILLION SHORT TONS (RHS), % (LHS)

-463
-299
-460
-366
-46.9%
-30.3%
-46.6%
-37.0%

PRODUCER REVENUE, BILLION 2012 USD (RHS), % (LHS)

-$20.6
-$13.9
-$18.7
-$15.0
-37.1%
-25.0%
-33.7%
-27.0%

National w/o EE
National w/EE
Regional w/o EE
Regional w/ EE
Alternative gas price futures
2012 USD per MMBTU at Henry Hub
Dispatch change under different gas futures

Average annual change in generation, National w/o EE scenario under AEO 2014 Reference and alternative scenarios, 2020-2030, billion kWhs

Source: Rhodium Group/CSIS.
Natural has price impacts of CPP
2012 USD per MMBTU, 2020-2030

Source: Rhodium Group/CSIS.
Census regions

Pacific

Mountain

West North Central

East North Central

Mid-Atlantic

New England

South Atlantic

West South Central

East South Central
Including upstream impacts changes the economic picture
Change in average annual production revenue and energy expenditures, billion 2012 USD, 2020-2030, national cooperation without EE

**PRODUCTION REVENUE**

**ENERGY EXPENDITURES**

Source: Rhodium Group/CSIS.
Two key questions states need to answer

**What do we want to do?**

**What do we want everyone else to do?**

Answers will depend on state:

- Generation and natural resource mix
- Existing energy and climate policies
- Power market structure and boundaries
- Assigned CPP emission rate goals
- Stakeholders
West South Central (AR, LA, OK, TX)
Change in average annual production revenue and consumer expenditures, 2012 billion USD, 2020-2030

- Large upside for natural gas that gets maximized if states do not credit EE
- Cooperation with other states dramatically lowers consumer costs
- Overall consumer impact of EE crediting in region is small compared to gains from cooperation

Source: Rhodium Group/CSIS. Electricity expenditures only include utility EE costs and do not reflect participant EE costs.
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