Analysis of the Clean Energy Standard Act of 2012

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http://www.rff.org/RFF/Documents/RFF-DP-12-20.pdf

RESOURCES FOR THE FUTURE

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Policy Context for a Clean Energy Standard

Energy policy debate in Washington has focused on climate to varying degrees for past decade.

Several proposals for CO_2 cap-and-trade in the early 2000s, then Waxman-Markey passed the House in 2009.

Focus has shifted to EPA regulations of CO_2 emissions and policies to encourage clean technologies.

For electricity, clean energy standards have had some support in Congress.

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What is a Clean Energy Standard?

- Minimum percentage of electricity from clean sources.
  - Minimum grows over time
  - Clean Energy Credits used for compliance
  - Credits are tradable and could be bankable

- Clean Energy Standard similar to renewable portfolio standard in concept but includes more technologies:
  - Nuclear and Hydro
  - Fossil with CCS (partial credit)
  - Natural gas (less partial credit)

- Earlier proposals:
  - Clean Energy Standard Act of 2010 (Graham D-SC)
  - Obama Administration(2011 State of the Union)

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Literature about CES Policy Design

- Palmer, Sweeney and Allaire (2011)
  - Compares technology-based CES to other carbon policies
- Paul, Palmer and Woerman (2011)
  - Focus on regional effects and effects of technology assumptions under Obama Administration-like proposal (80% CES)
- Mignone et al (2012)
  - Focus on treatment of existing units under Administration-like proposal (80% CES)
- Aldy (2011)
  - Looks at emissions based approach to crediting with price cap on credits
- Krupnick and Parry (2011)
  - Looks at relative efficiency of CES with feebate versus cap and trade without revenue recycling
- EIA (2011, 2012)
  - Analyze different vintages of S 2146 proposal

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The Clean Energy Standard Act of 2012 (S 2146)

- Obligation
  - Applies to all non exempt retail utilities
  - 24% in 2015; 84% in 2035
- Qualified Technologies and Credits
  - renewable, natural gas, hydro, nuclear (post 1991)
  - Crediting rate is 1 – ((CO_2/MWh)/0.82)
  - No negative credits
- Credits fully tradable and bankable
- Alternate Compliance Payment (ACP)
  - $30 per MWh in 2015 rising at 5% real per year
  - Caps clean energy credit price
- Policy Exemptions
  - Small utilities (SUE) (< 2 M MWh in 2015, < 1 M MWh 2025 on)
  - Electricity sales from older hydro and nuclear units

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Questions about CES Policy Design and Performance

- How does the CES affect emissions, electricity prices and composition of supply?
- How does the ACP affect emissions reductions from the CES policy and the cost of the policy to consumers?
- How does the SUE affect the performance of the CES?
- How does the CES compare to a carbon tax?

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Haiku Model and Baseline Scenarios

Haiku electricity market model

- Calibrated to AEO 2011
- Covers only electricity sector in contiguous 48 states
- Endogenous capacity investment and retirement, dispatch, electricity demand, fuel prices.
- http://www.rff.org/RFF/Documents/RFF-Rpt-Haiku.v2.0.pdf
- All prices are in 2009 $.
- Modeling horizon is 2035.

Baseline scenarios

- AEO11
- Low Gas Supply (AEO09)
- MATS (AEO11 with MATS)

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Policy Scenarios Modeled

- Clean Energy Standard Scenarios
  - *CES* – Central case (S2146)
  - *CES w/o ACP*
  - *CES w/o SUE*
  - *CES w/o ACP or SUE*
  - *CES w/o Nuke/Hydro Excluded*
  - *CES w/Low Gas Supply*
  - *CES w/MATS*

- Carbon Tax Scenario
  - Tax begins in 2015 and grows 5% real per year
  - Tax rate is chosen to yield same cumulative CO_2 emissions reductions as *CES* central case.

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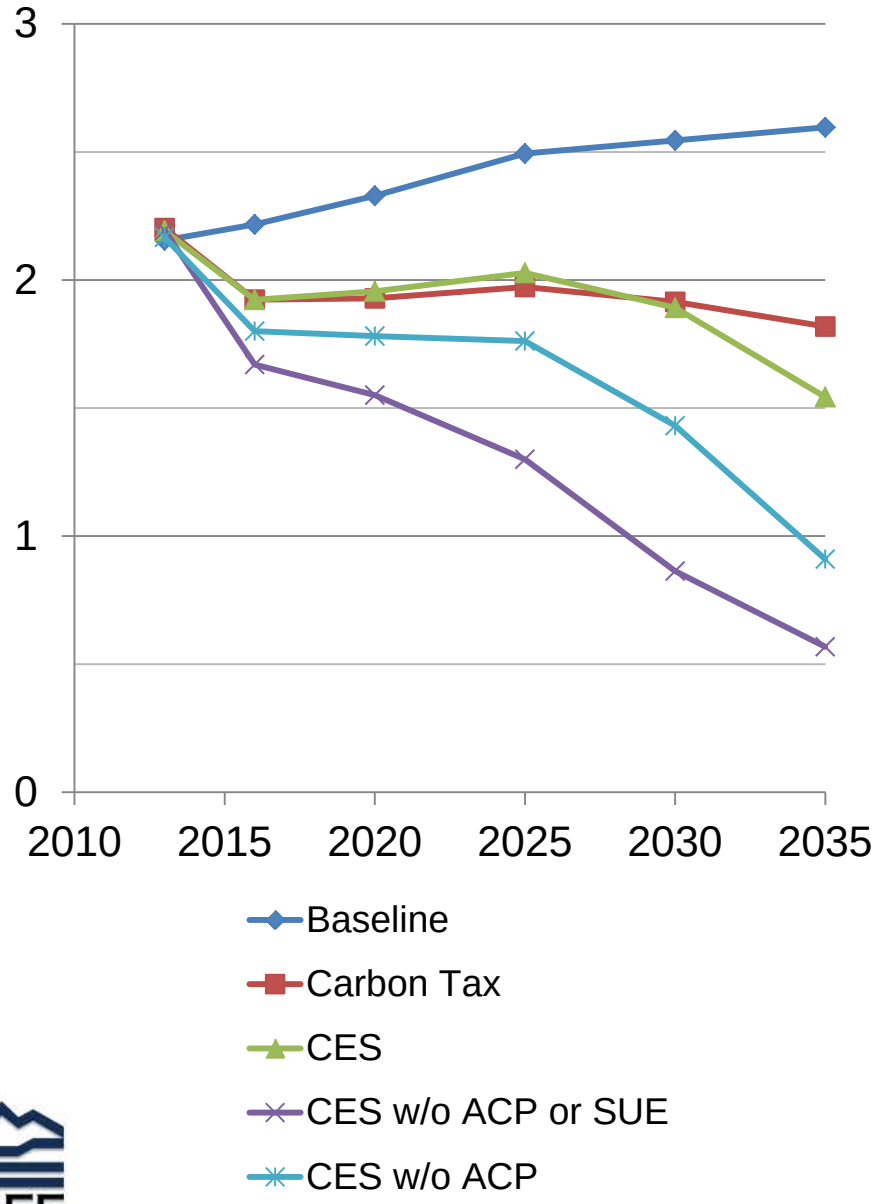
National Electricity Sector CO_2 Emissions (billion tons)



- *CES*
  - cumulative reduction: 21% of *Baseline*
  - 2035 reduction: 27% of U.S. pledge to U.N. process, from only electricity sector
- *CES w/o ACP*
  - cumulative reduction: 33% of *BL*
  - 2035 reduction: 41% of U.N.
- *CES w/o ACP or SUE*
  - cumulative reduction: 46% of *BL*
  - 2035 reduction: 49% of U.N.
- *CES w/o SUE, CES w/o Nuke/Hydro Excluded*
  - emissions trajectory ≈ *CES*

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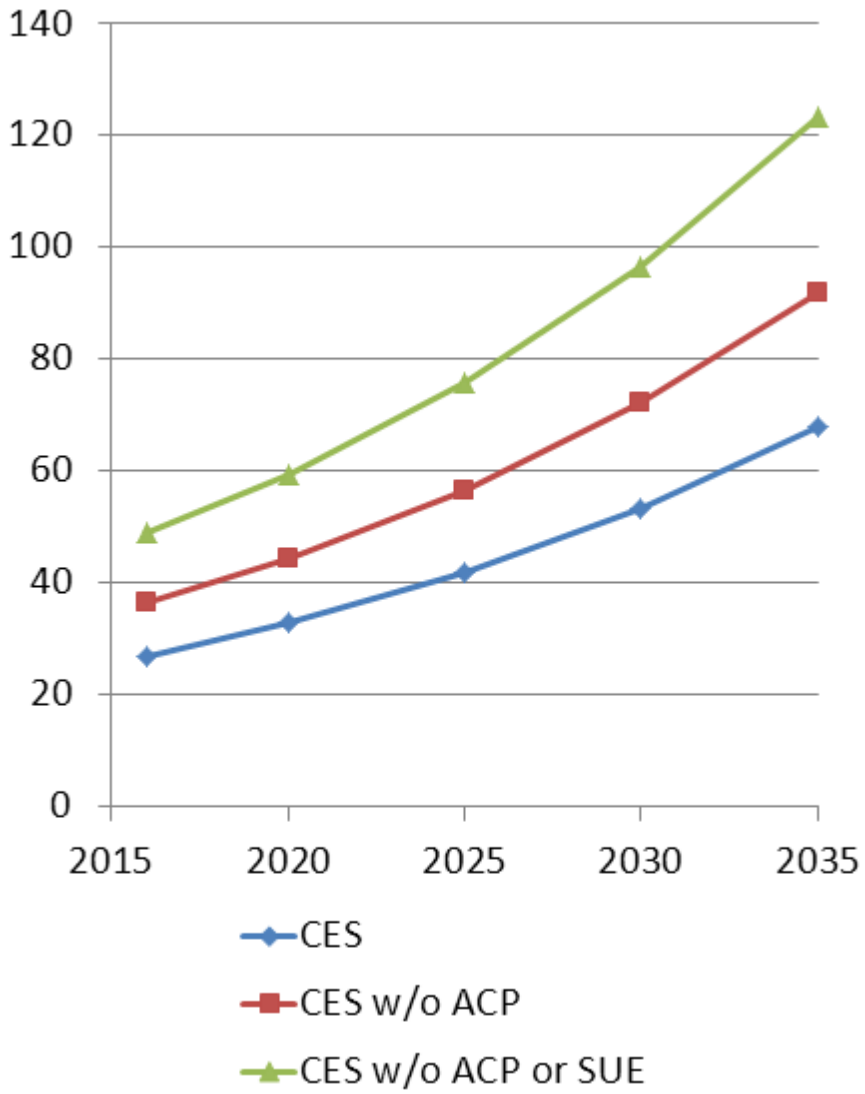
Clean Energy Credit Prices ($ / MWh)



- *CES*
  - ACP binds and equals credit price.
- *CES w/o ACP*
  - credit price 35% higher than ACP
  - credit price path reflects banking.
- *CES w/o ACP or SUE*
  - credit price 80% higher than ACP
- *CES w/o SUE,*
  CES w/o Nuke/Hydro Excluded
  - credit price = *CES*

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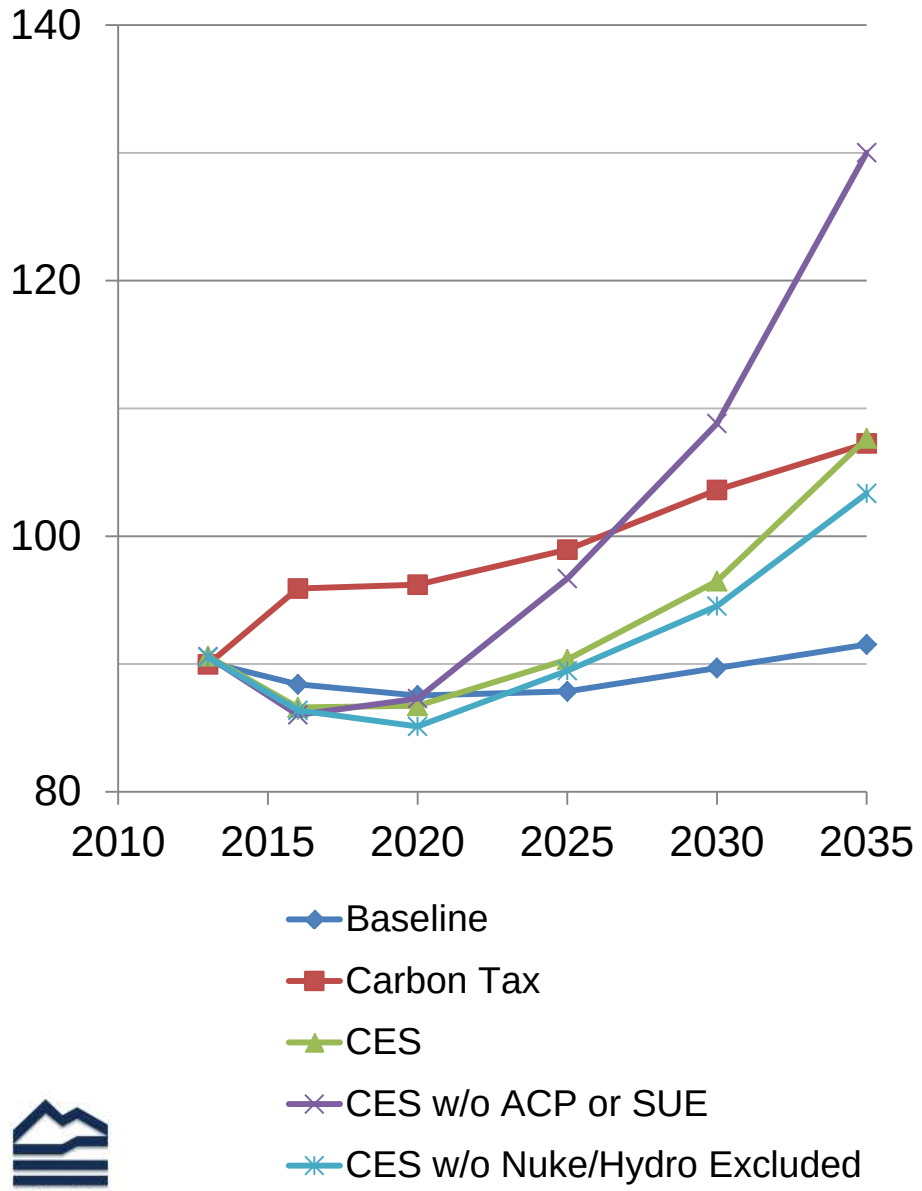
National Average Retail Electricity Prices ($/MWh)



- *CES*
  - little effect for first decade
  - 17% increase in 2035 from *BL*
- *CES w/o ACP or SUE*
  - 41% increase in 2035 from *BL*
  - 20% increase in 2035 from *CES*
- *CES w/o Nuke/Hydro Exclude*
  - 13% increase in 2035 from *BL*
- ACP & SUE are super additive because SUE has no credit price effect when ACP is binding.
  - *CES w/o ACP*: 3% > *CES* in 2035
  - *CES w/o SUE*: 6% > *CES* in 2035

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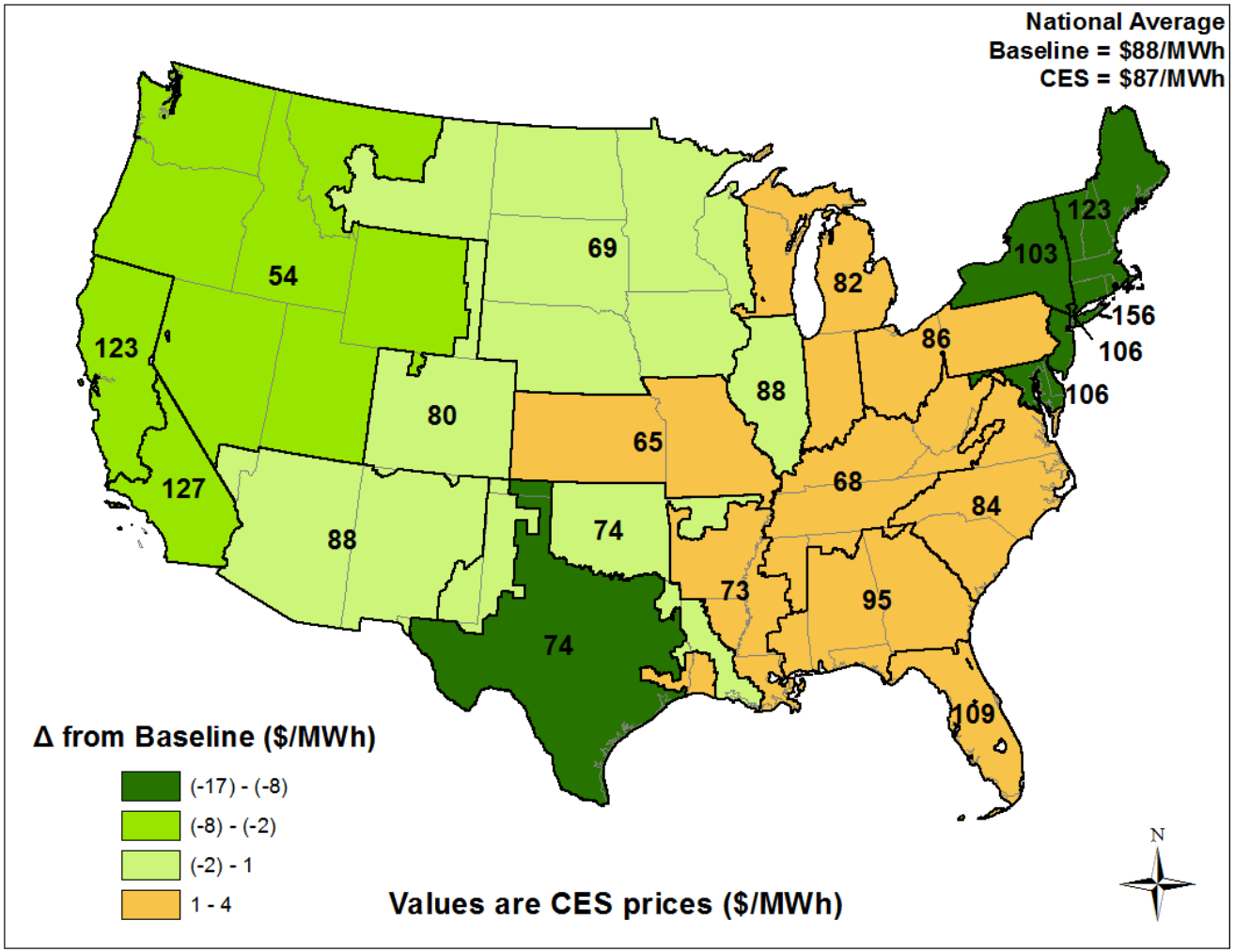
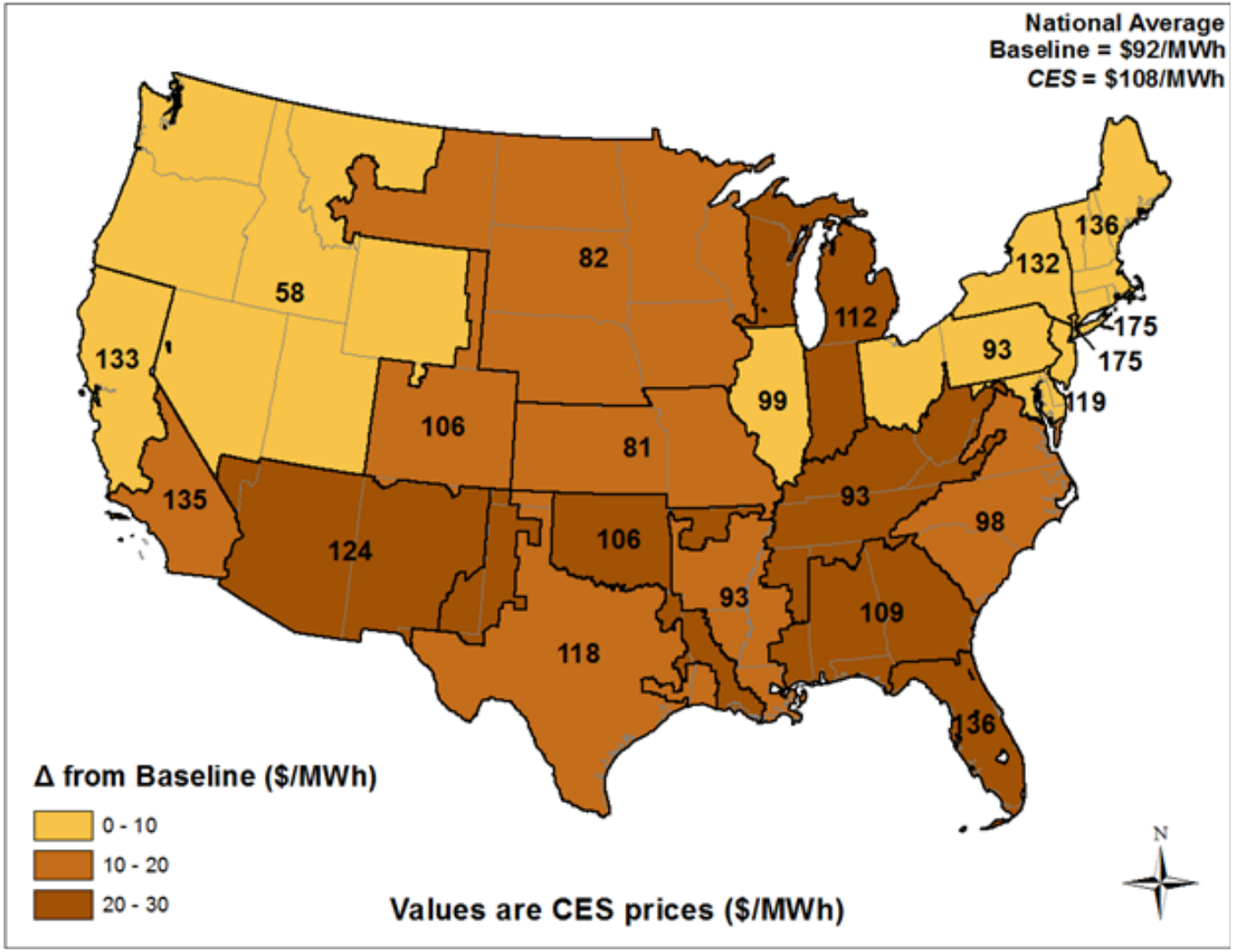
Regional Electricity Prices Effects of CES in 2020 ($/MWh)

No effect on national average price masks regional differences.



Regional Electricity Prices Effects of CES in 2035 ($/MWh)

CES causes prices to increase everywhere in 2035.
Price impact is mix of generation mix effect and SUE effect.



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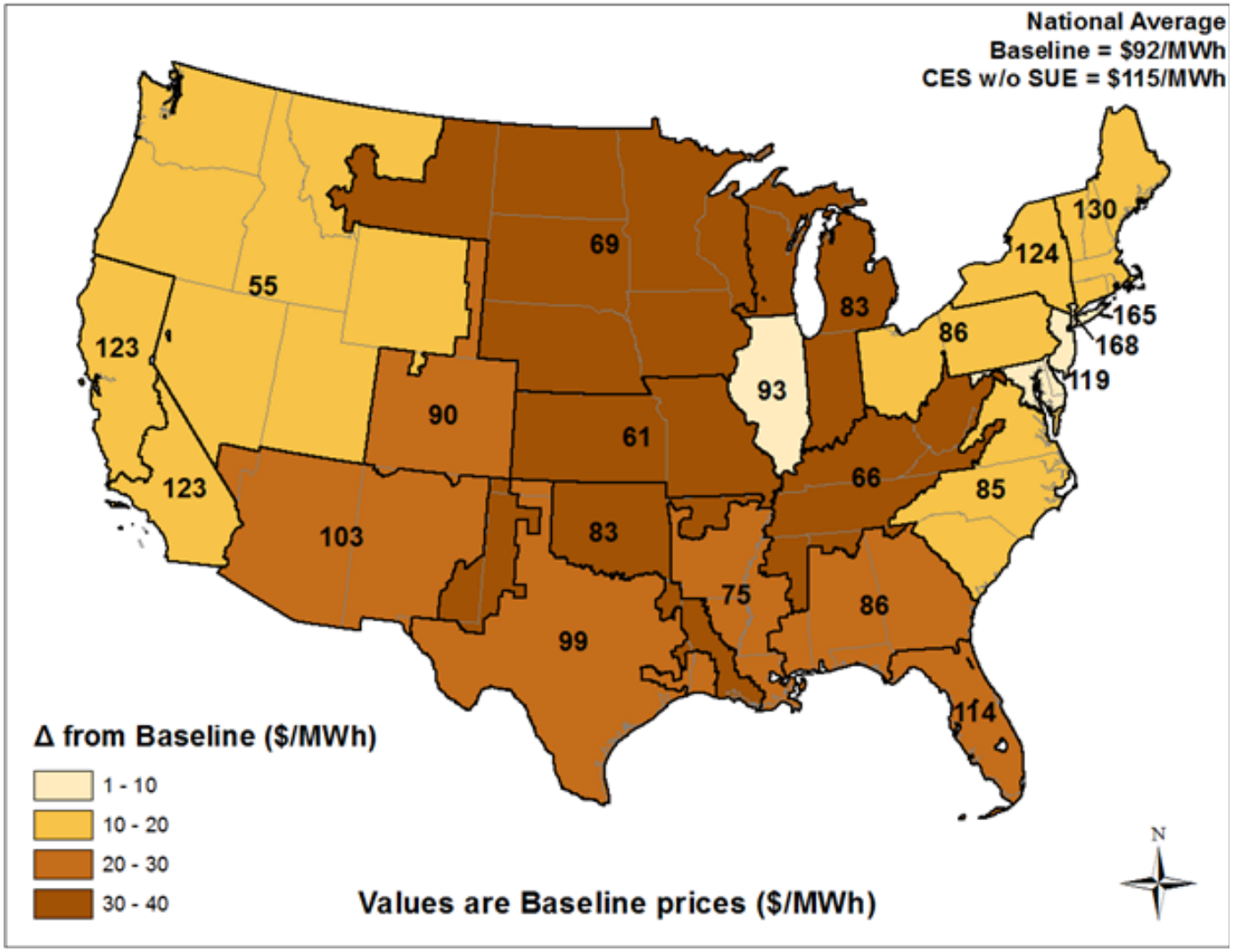
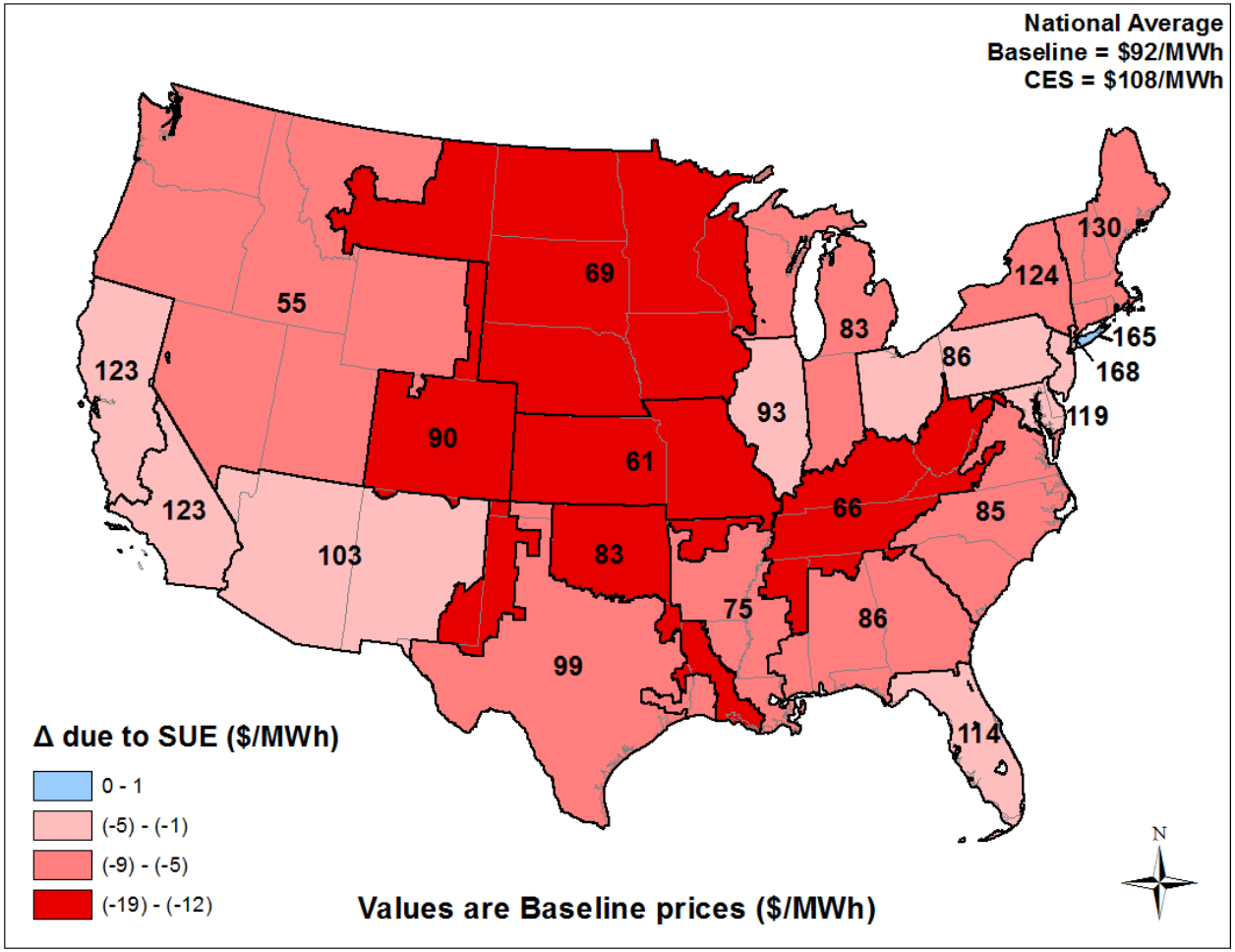
Regional Electricity Prices Effects of CES w/o SUE in 2035 ($/MWh)

CES alone has bigger national and regional price effects.



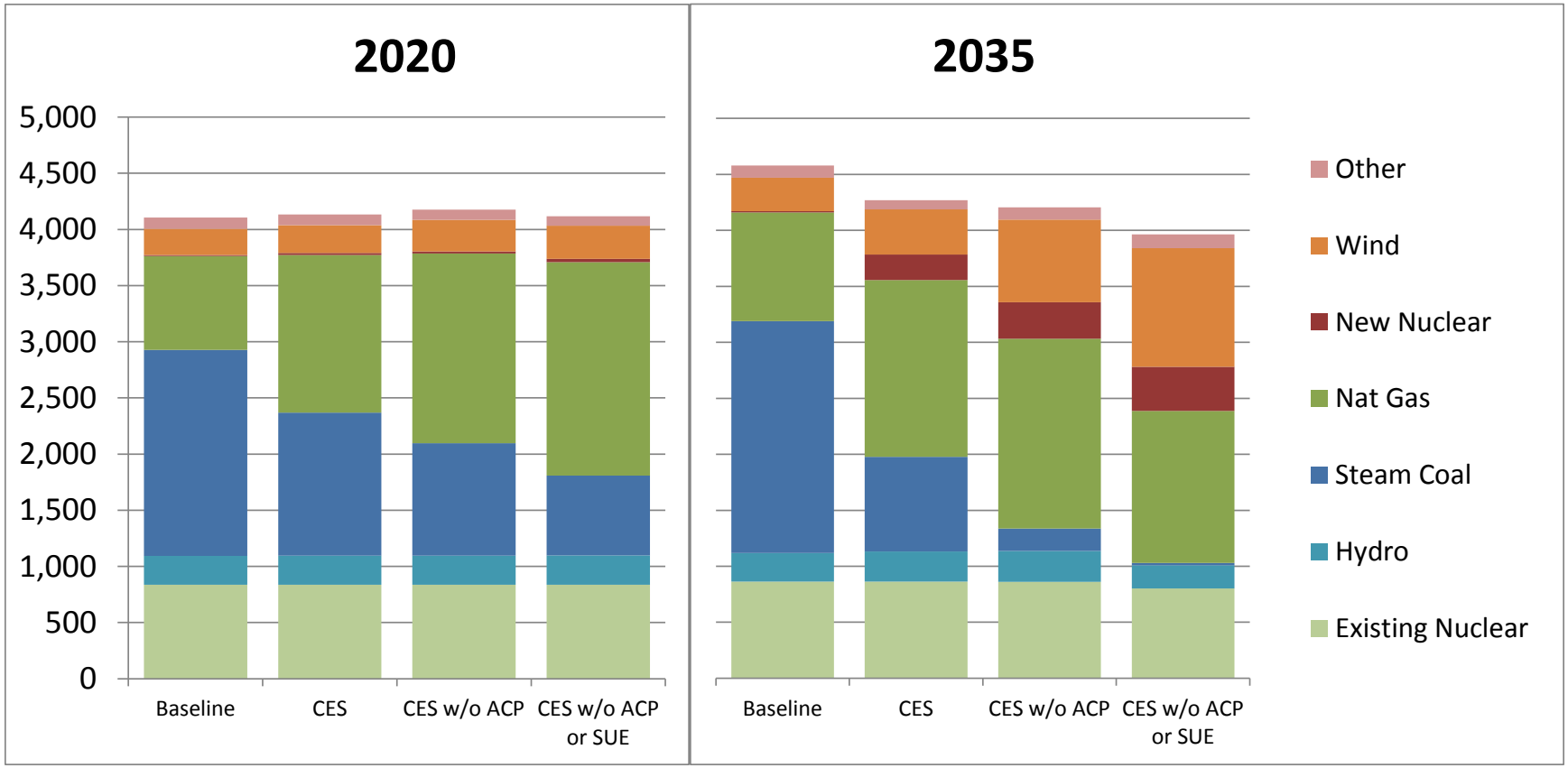
Regional Electricity Prices Effects of SUE in 2035 ($/MWh)

SUE tends to lower prices more in regions with largest CES impacts, tempering the tendency for CES to equalize prices across regions.



Effect of CES Features on National Generation Mix (TWh)

Removing ACP and SUE increases role for clean energy.
In 2035 high price of credits w/o ACP or SUE squeezes both coal and total electricity demand.



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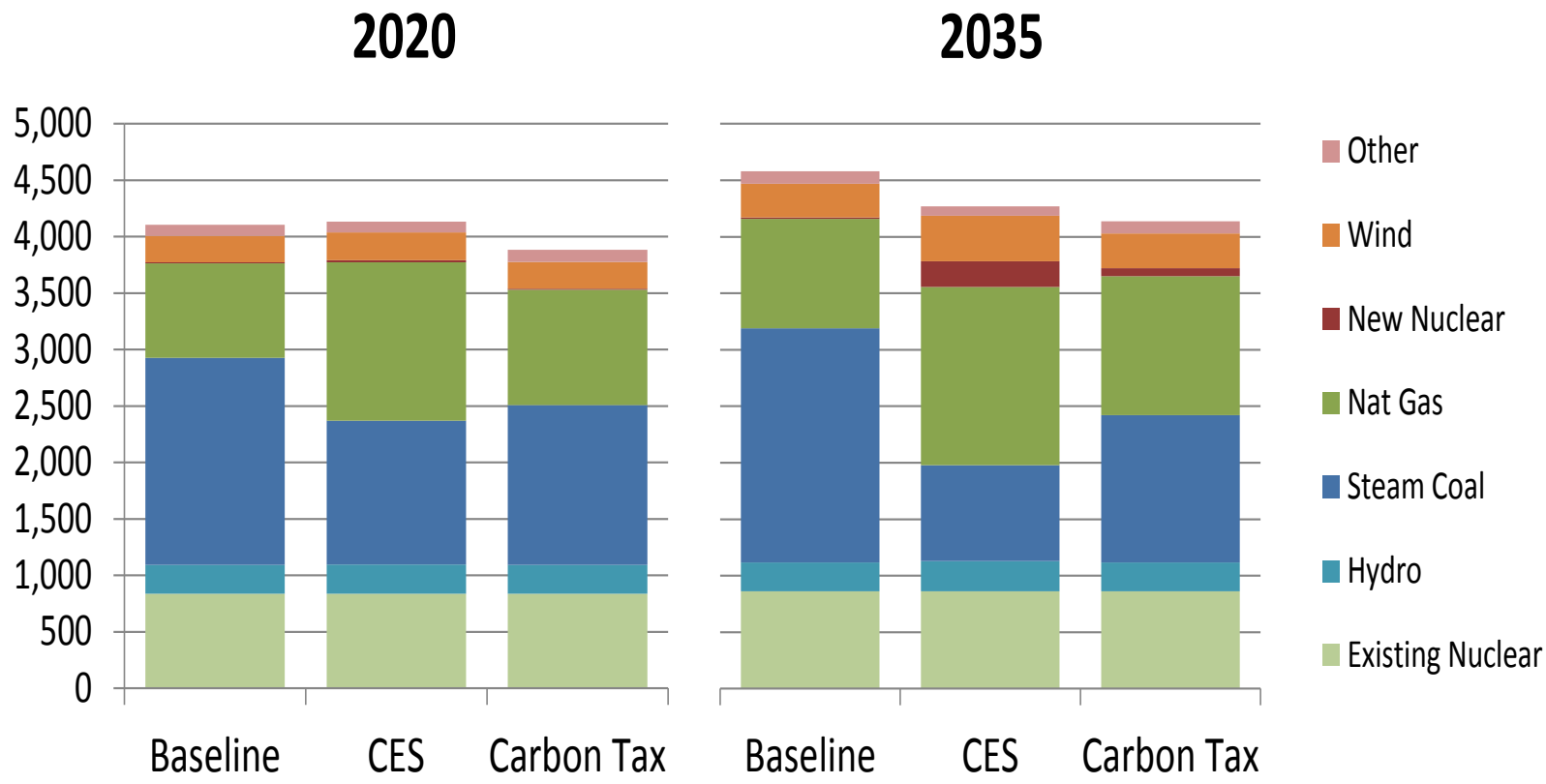
CES versus Carbon Tax: National Generation Mix (TWh)

Coal is hit harder by a CES than by a comparable carbon tax.
Clean technologies do better with CES than with carbon tax.



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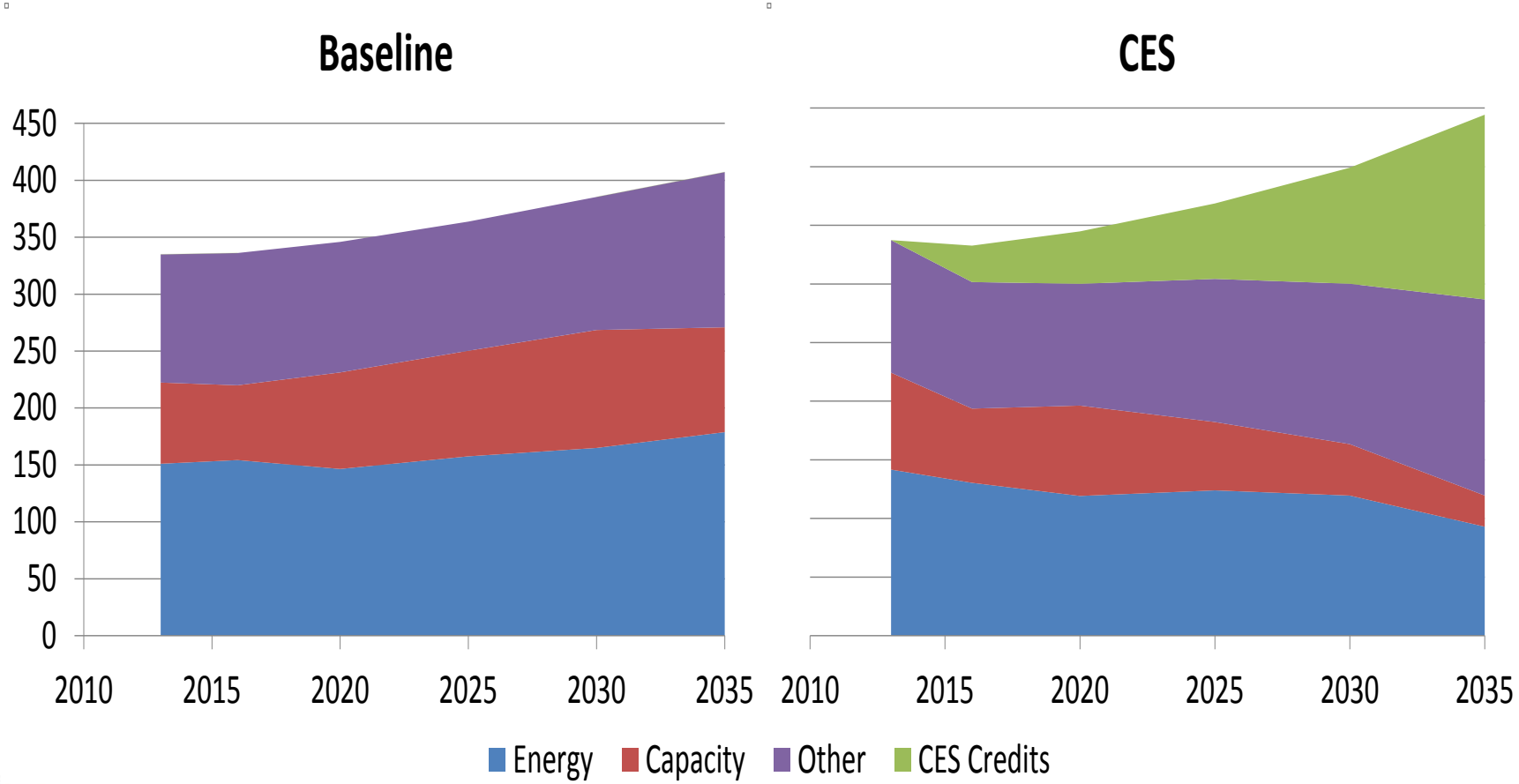
Composition of Electricity Sector Revenue

CES will substantially depress wholesale electricity prices and revenue. *CES* credit revenue component will make up the difference.



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Conclusions

The Bingaman CES substantially reduces CO_2 emissions and increases share of electricity produced by cleaner sources.

The CES will increase electricity prices in the long-run, but initial price impacts will be small and even negative in some parts of the country.

Effects of the policy depend on features such as the ACP and SUE.

The ACP is binding and will constrain the environmental effectiveness of the policy while mitigating its price impacts.

The SUE benefits a small fraction of electricity consumers and creates a large difference in electricity price between exempt and included utilities.

By 2035 roughly 36 percent of electricity sector revenues will come from sale of credits and the fraction of revenues from energy sales will be substantially diminished.

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