

Clean Energy Standards and Electricity Markets

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A New Approach to Climate Policy

Carbon Cap and Trade is Dead (for now)

Alternative Policy “Chunks” include

§CAFE

§Energy efficiency in buildings

§Clean Air Act regulations for GHGs

§Renewable / Clean Energy Standards

What is a Renewable/Clean Energy Standard?

Require a minimum percentage of electricity supply from qualified technologies

Design parameters include

§Eligible technologies

- § Renewables (which ones?, carve outs?)
- § Beyond renewables (nuclear, CCS, NGCC; partial credit)
- § Energy efficiency?

§Compliance entity

§Coverage

- § Exclude small utilities?
- § Exclude existing hydro and nuclear?

§Targets and timetables

§Credit trading

§Banking and borrowing

§Alternate Compliance Payment (ACP)

- § Uses of ACP revenue

Existing Policies and Proposals

- 29 States and DC have RPS or CES policies
- Many proposals in recent Congresses
 - RPS in Waxman Markey
 - Bingaman RPS
 - Graham CES
 - Lugar CES
- Administration Proposal for CES
 - 80 percent Clean Energy by 2035
 - Includes existing nuclear and hydro
 - Partial credit for NGCC (.5) and gas/coal with CCS (.95/.9)
 - Lots of principles about equity and consumer protection
 - Specific design parameters TBD



What to expect from a CES

- How much does the CES policy reduce CO₂ emissions?
- What are the effects on the mix of generation technologies and fuels?
- How does the policy affect electricity prices?
 - The national picture
 - The regional details
- How are different regions affected by clean energy credit trading?

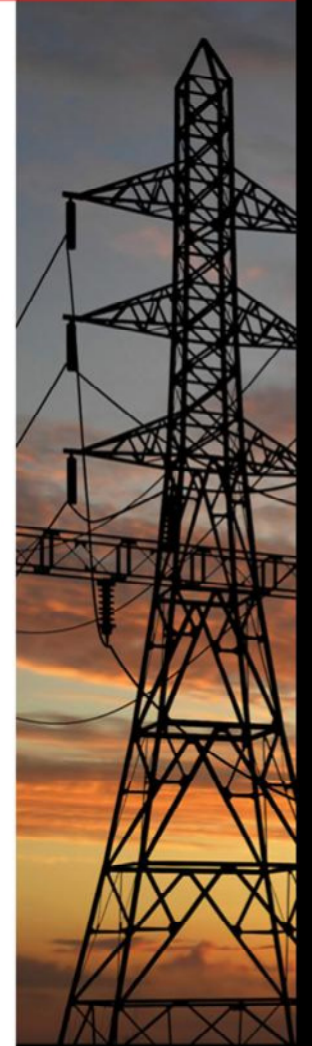


Policies Evaluated

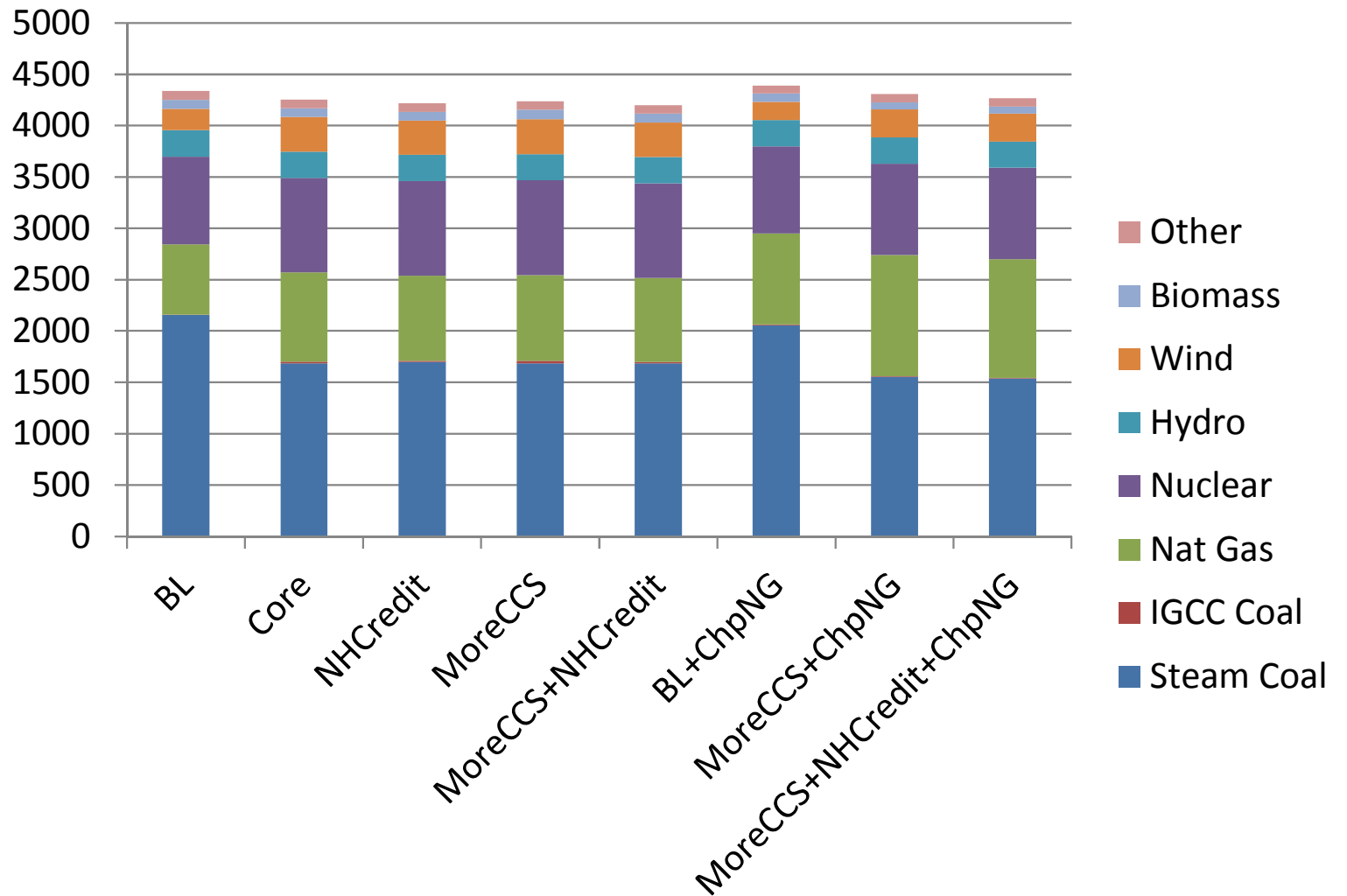
- Baseline
- Core CES (Core)
- Credit Existing Nuclear and Hydro (NHCredit)
- Cheap Natural Gas (ChpNG)
- Optimism for Nuclear and IGCC with CCS (MoreNuke/MoreCCS)
- Pessimism for Nuclear (LessNuke)

How much do CES policies reduce CO₂?

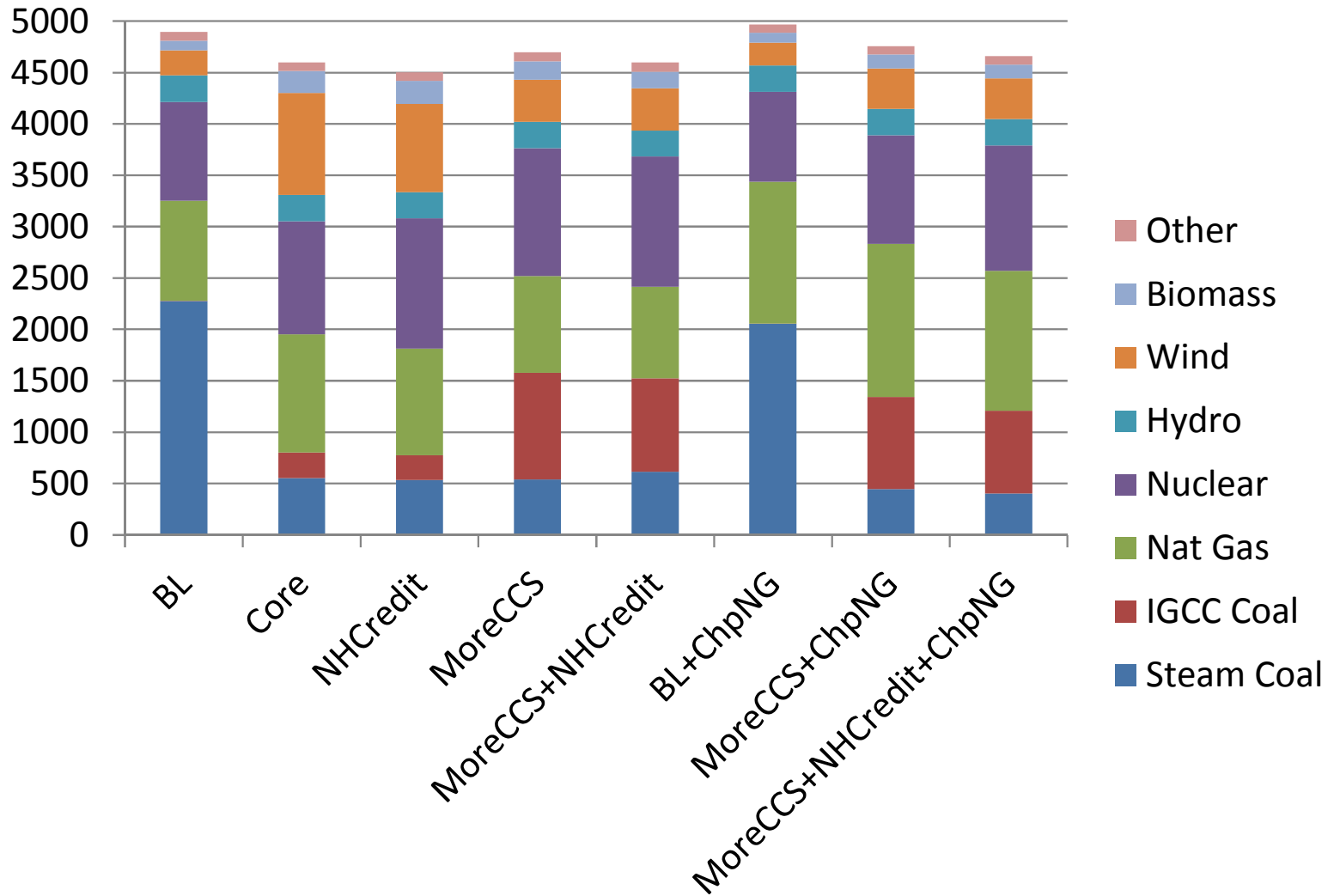
- These policies reduce cumulative CO₂ emissions from the electricity sector from 2013 to 2035 by 30%.
- By 2035 CO₂ emissions from electricity are roughly 60% or 1.7 billion tons below baseline levels.
- 1.7 billion tons is 41% of the 4.1 billion ton reduction necessary to be on track to meet international pledge for CO₂ reductions by 2050 (83% below 2005).



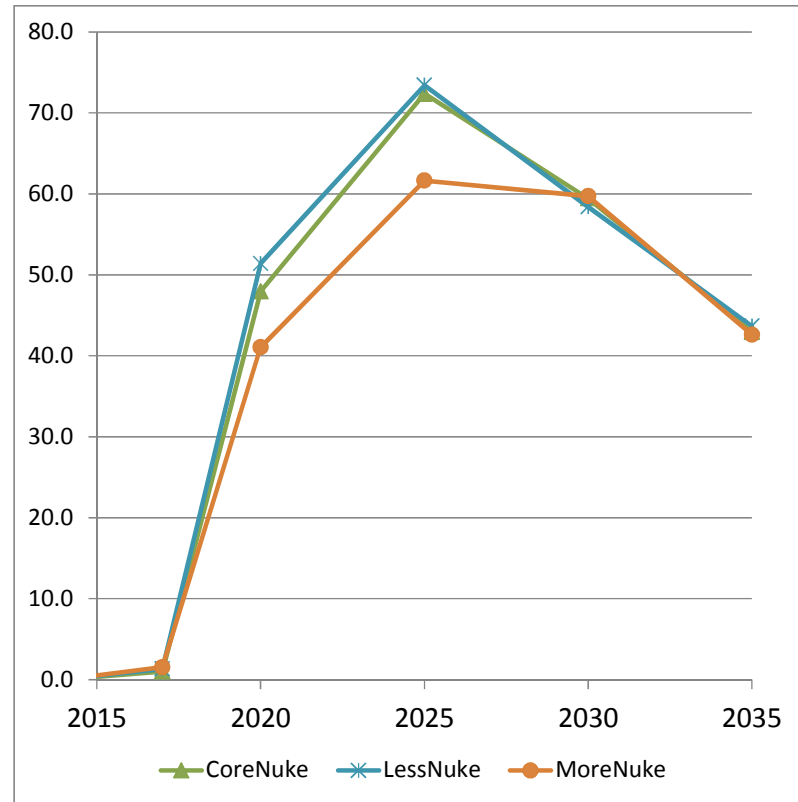
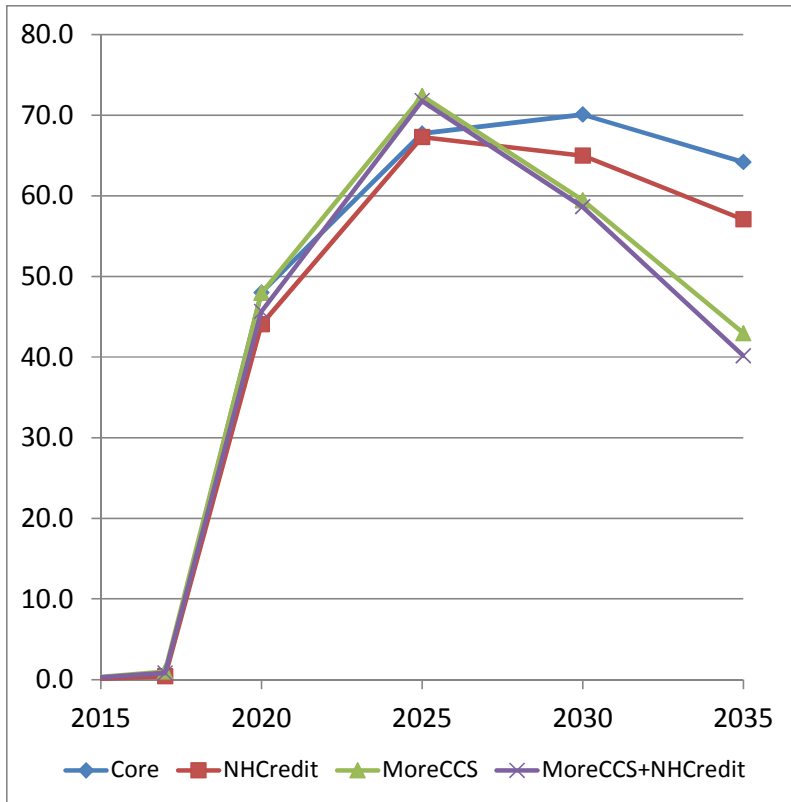
Generation Mix in 2020



Generation Mix in 2035



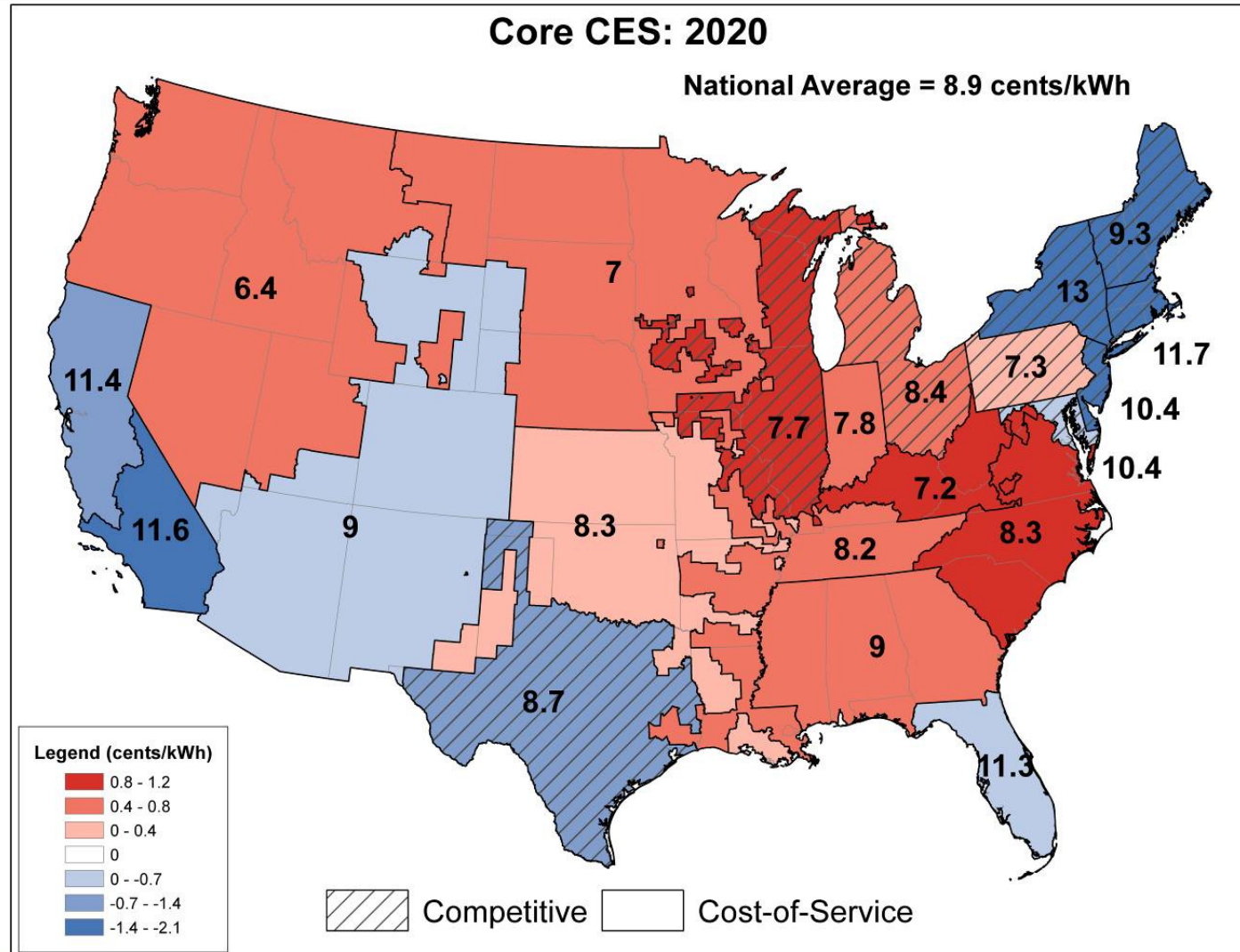
Clean Energy Credit Prices (\$/MWh)



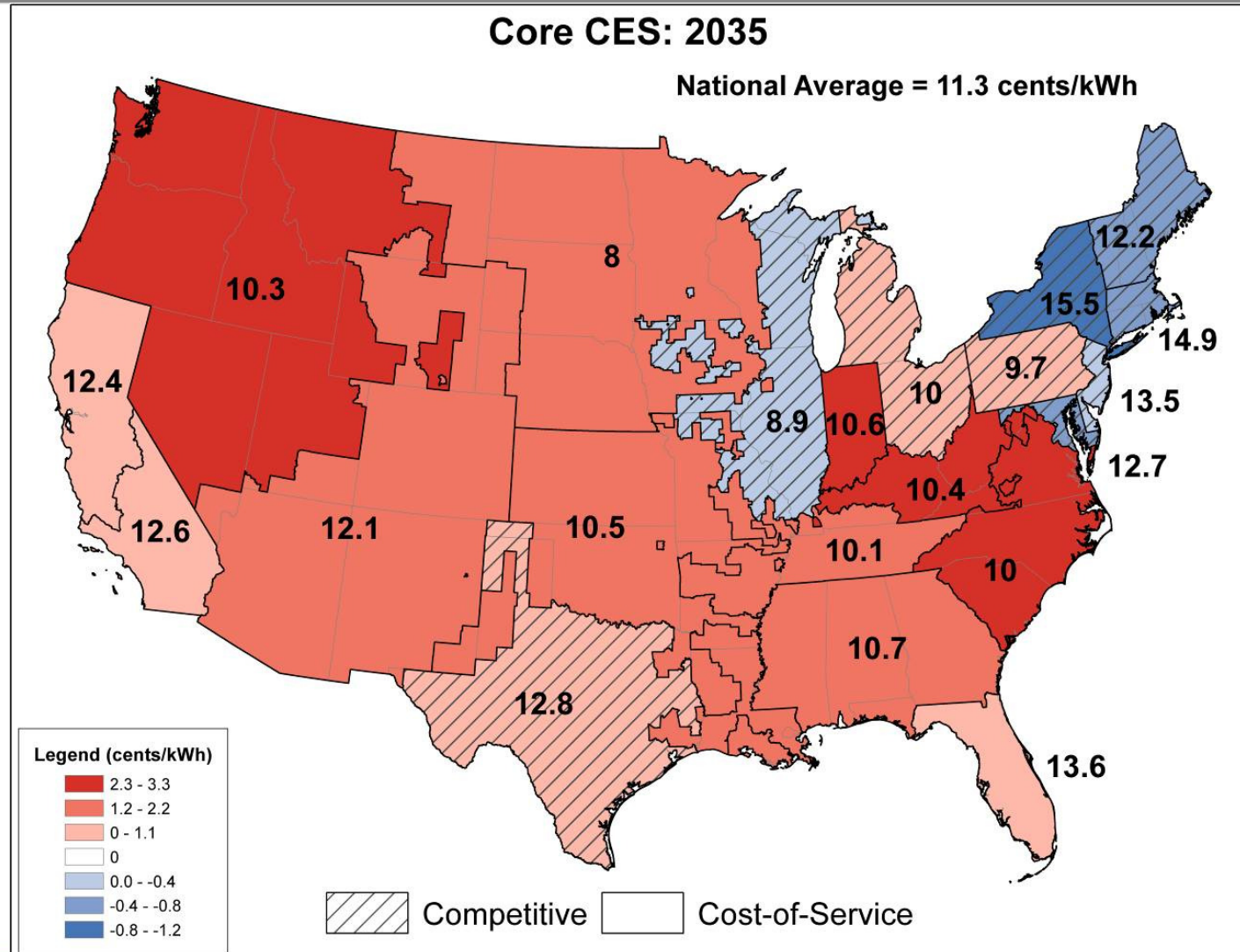
National Electricity Price Effects

- In the core scenario national average retail electricity price increases by 1.5% in 2020 and by 11% in 2035.
- Granting credits to existing wind and hydro leads to larger price increases due to need to hold more credits for each MWh sold.
 - Prices rise by 6.5% in 2020 and by 16% in 2035.
- These national average effects mask large differences across regions.

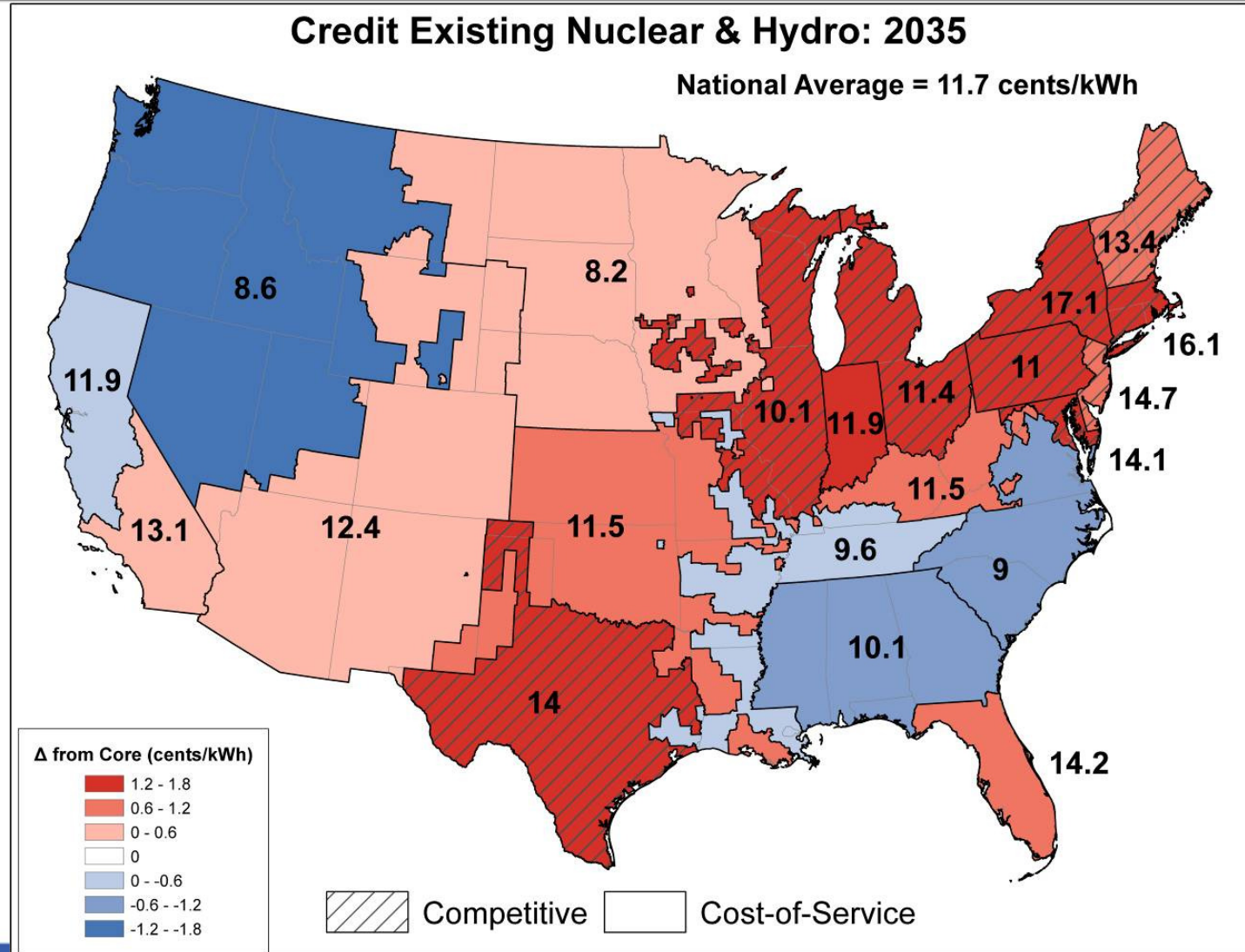
Regional Electricity Price Effects in 2020



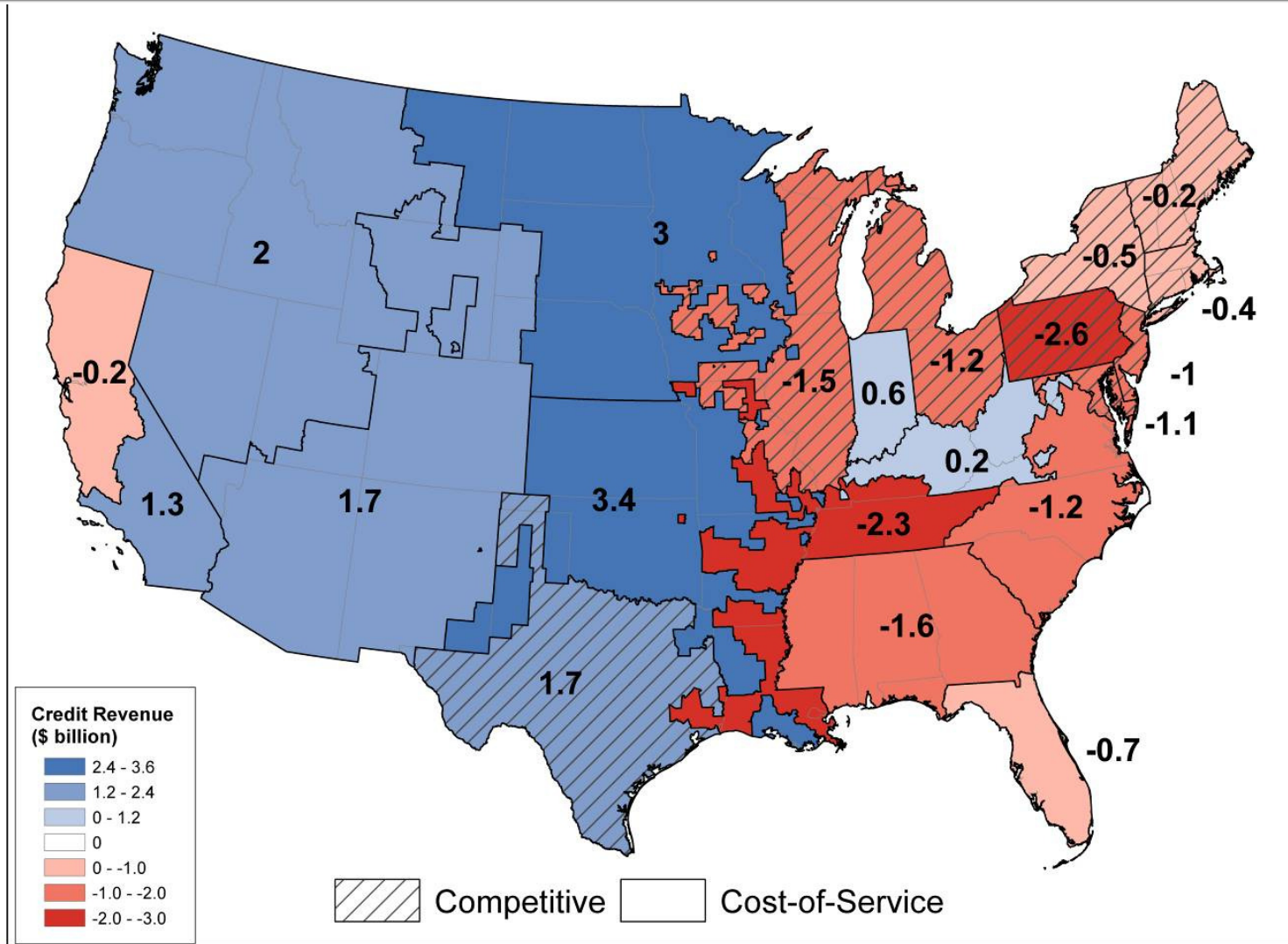
Regional Electricity Price Effects in 2035



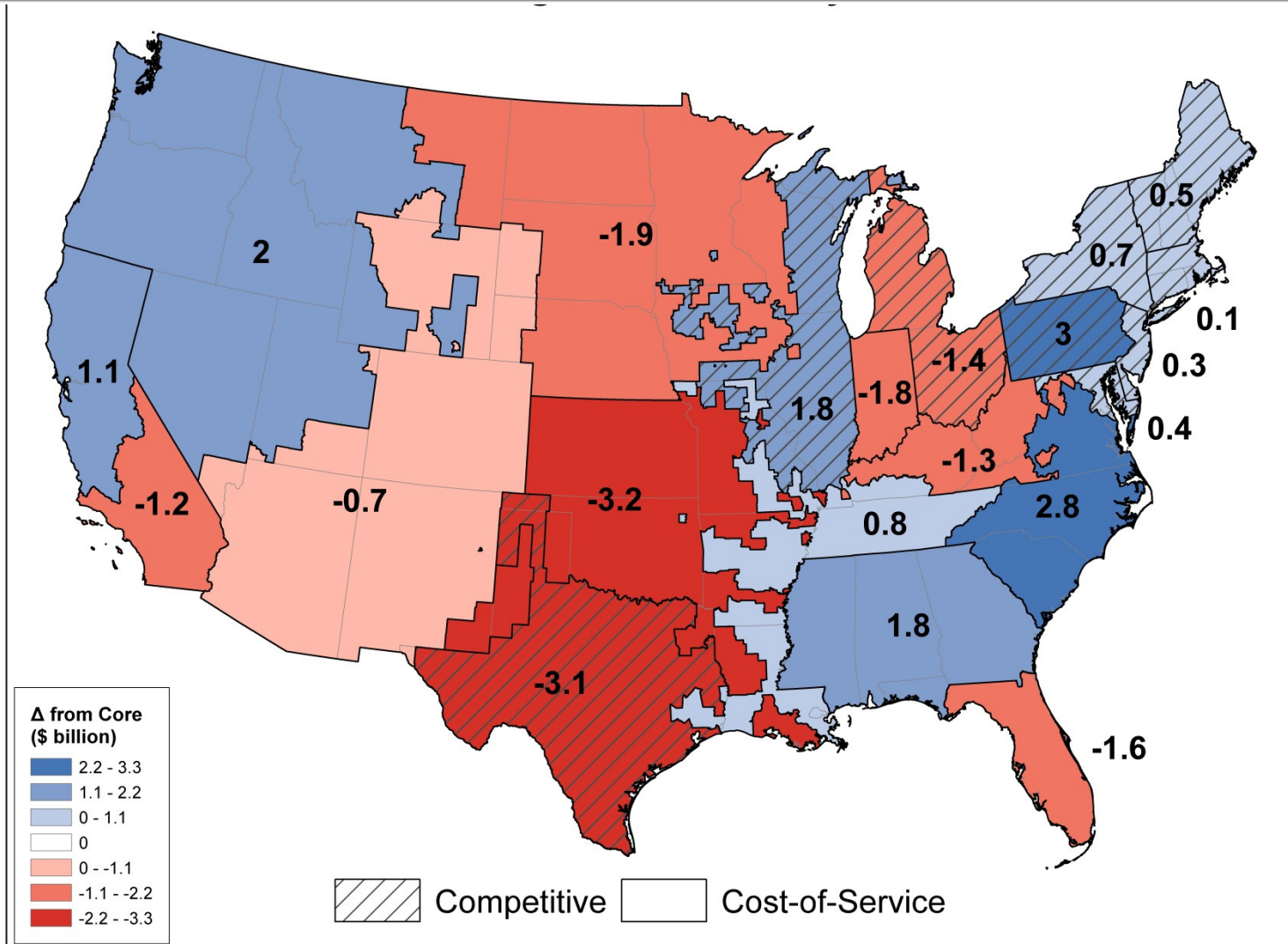
Effects of Crediting Existing Capacity on Prices in 2035



Net Credit Revenues in Core CES in 2035



Effect of Crediting Existing Capacity on Net Credit Revenues in 2035



Conclusions

- Cumulative CO₂ emissions fall by around 30% regardless of policy design or tech cost realization.
- REC prices are very low until 2020, and between about \$40 and \$80 thereafter.
- Gas will be the bridge to 2020.
 - For AEO 2010 assumptions about nuclear costs & gas supply, nuclear is the preferred technology after 2020.
 - If nuclear is constrained, then IGCC with CCS will be preferred.
 - If both are constrained, then wind is preferred (Core CES).
- National average prices will go up slightly under any form of CES and tech cost realization.
 - In general, regulated regions see higher prices.
 - Prices fall in some competitive regions.
 - The regions that have the lowest baseline prices will see the largest price increments from CES.
 - Crediting existing nuclear and hydro would tend to undo this outcome by generally benefitting the low price baseline regions at the expense of the high price baseline regions.
 - Crediting existing nuclear and hydro benefits shareholders at the expense of consumers.

