Electricity Sector Impacts of a Carbon Tax

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Fiscal Reform and Climate Protection:
Considering a U.S. Carbon Tax
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Washington, DC

Carbon Taxes and Electricity

Why focus on the electricity sector?

The electricity sector is …

- Responsible for roughly 40 percent of US CO_2 emissions
- Expected to yield 2/3 to ¾ of CO_2 emissions reductions under economy-wide carbon pricing

Carbon taxes could be transformative for the sector

- Will raise the cost of generation using fossil fuels, particularly coal
- Will provide incentives to invest in cleaner generation including renewables and carbon capture and storage
- Could have large effects on electricity price, particularly in certain regions
- Could reduce overall demand for electricity and provide incentives for energy efficiency

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What do we want to know?

How a carbon tax will affect…

- **CO_2 emissions from electricity generation**
- **Retirement of existing generators**
- **Investment in new generators**
- **The mix of fuels and technologies used to produce electricity in the future**
- **Electricity prices for the nation and by region**
- **Carbon tax revenues from the electricity sector**

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Scenarios

It's all relative…

Baseline

- Based on AEO 2010 reference case
- Includes state RPS policies and other air pollution policies

Carbon Tax (Tax)

- $25 (real) per ton of CO_2 from 2014 through 2030

Cap and Trade (CTP)

- Same level of cumulative CO_2 emissions reductions as Tax Scenario
- 100% auctioned allowances
- Allowances bankable so allowance price (tax) rises at rate of interest (8%)
- Think of CTP as a carbon tax that rises at the rate of interest

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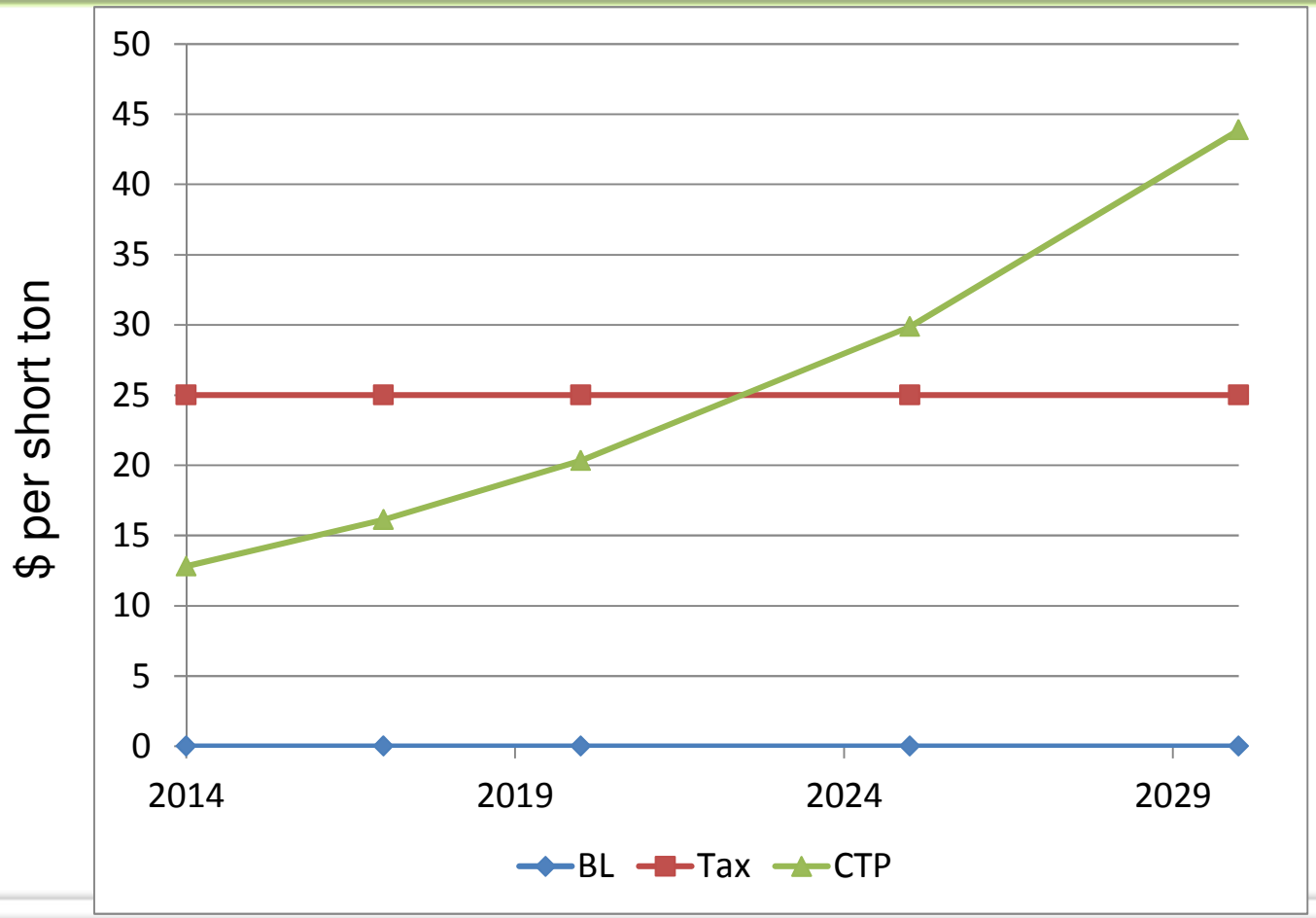
CO_2 Price



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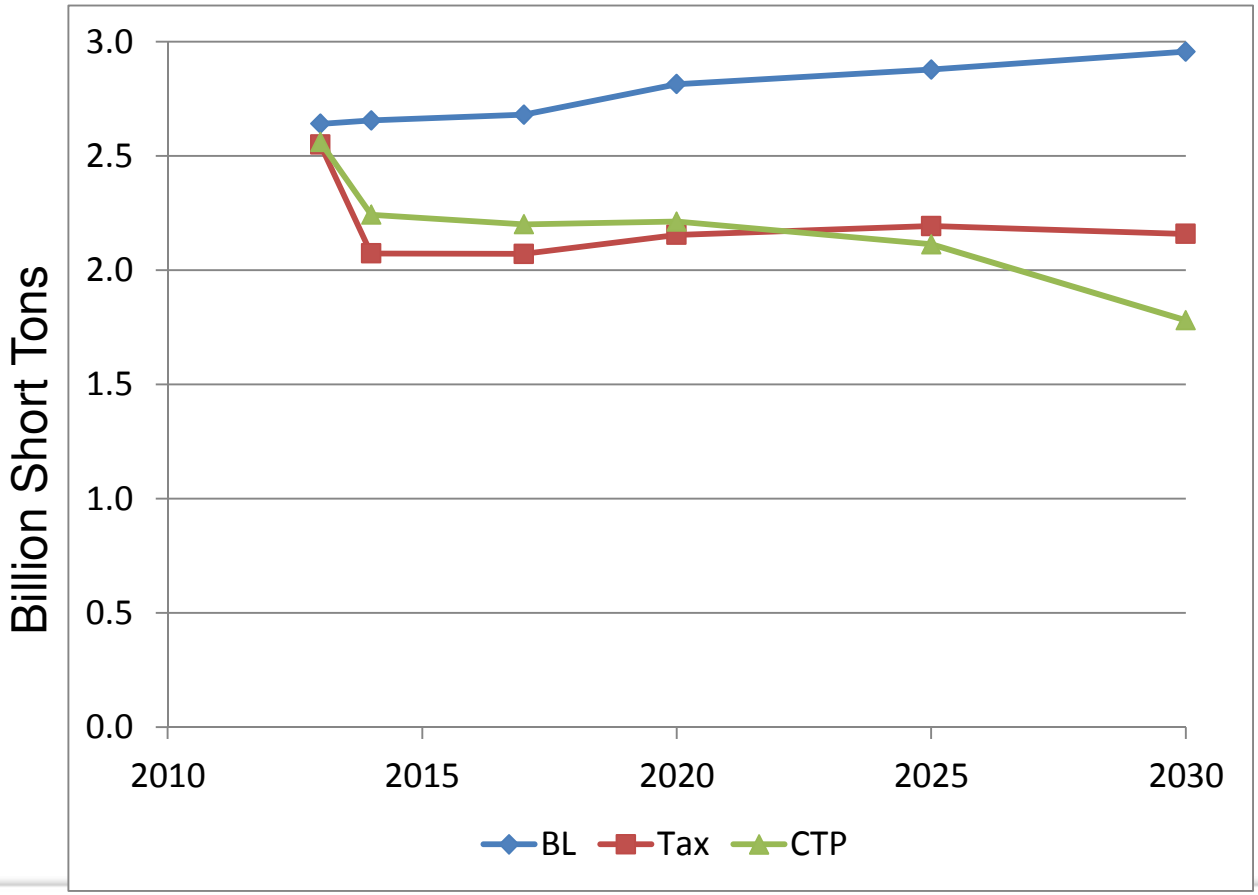
National Annual CO_2 Emissions

From the electricity sector



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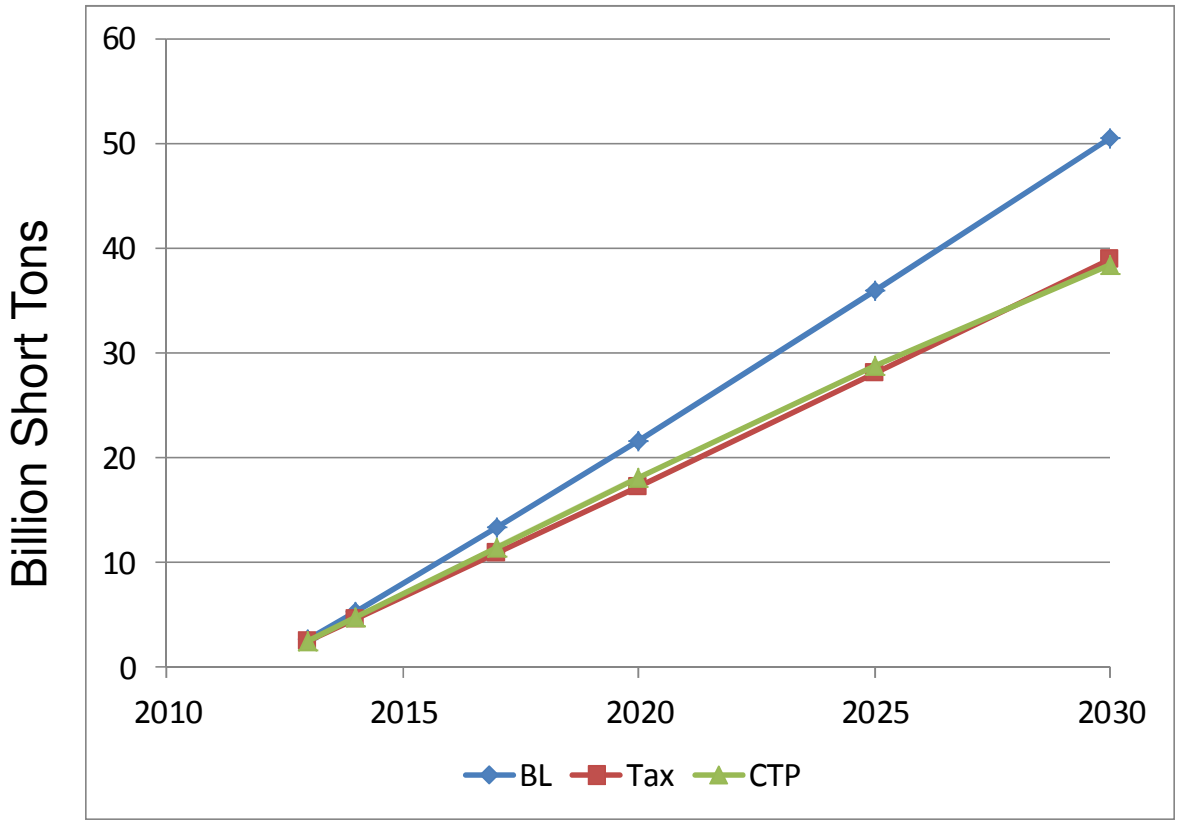
Cumulative CO_2 Emissions

From the electricity sector



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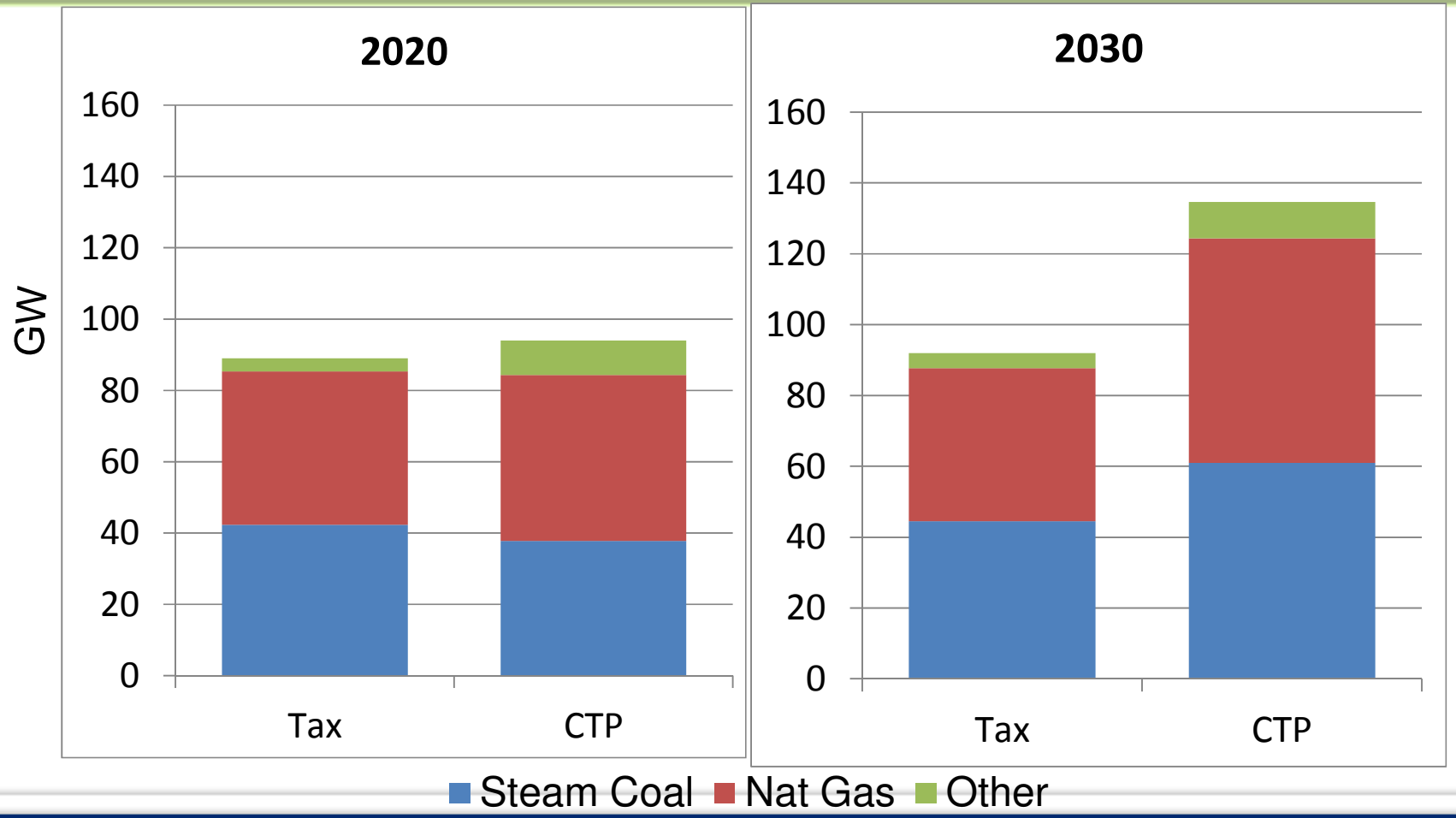
Cumulative Capacity Retirement

Relative to baseline scenario



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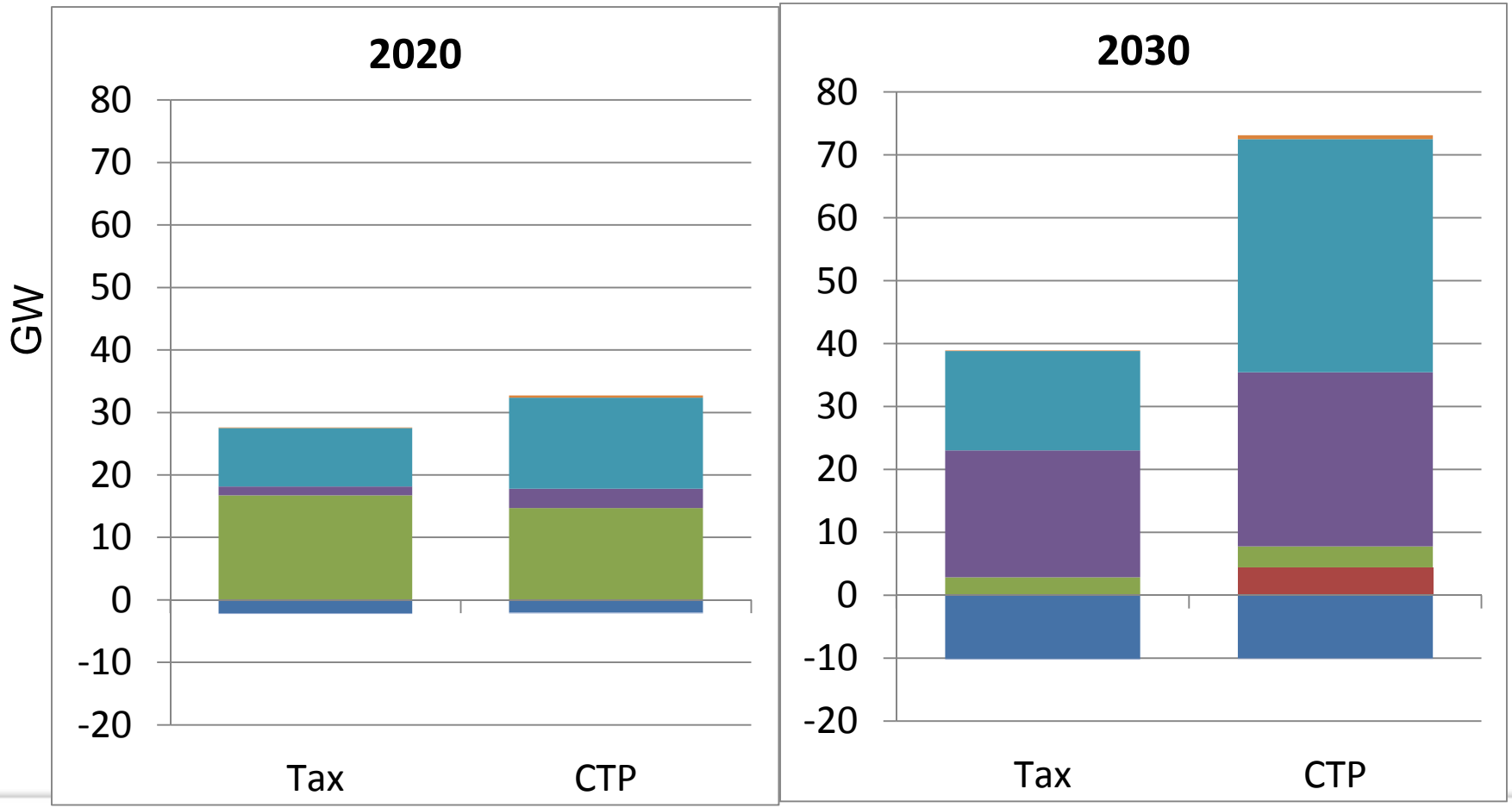
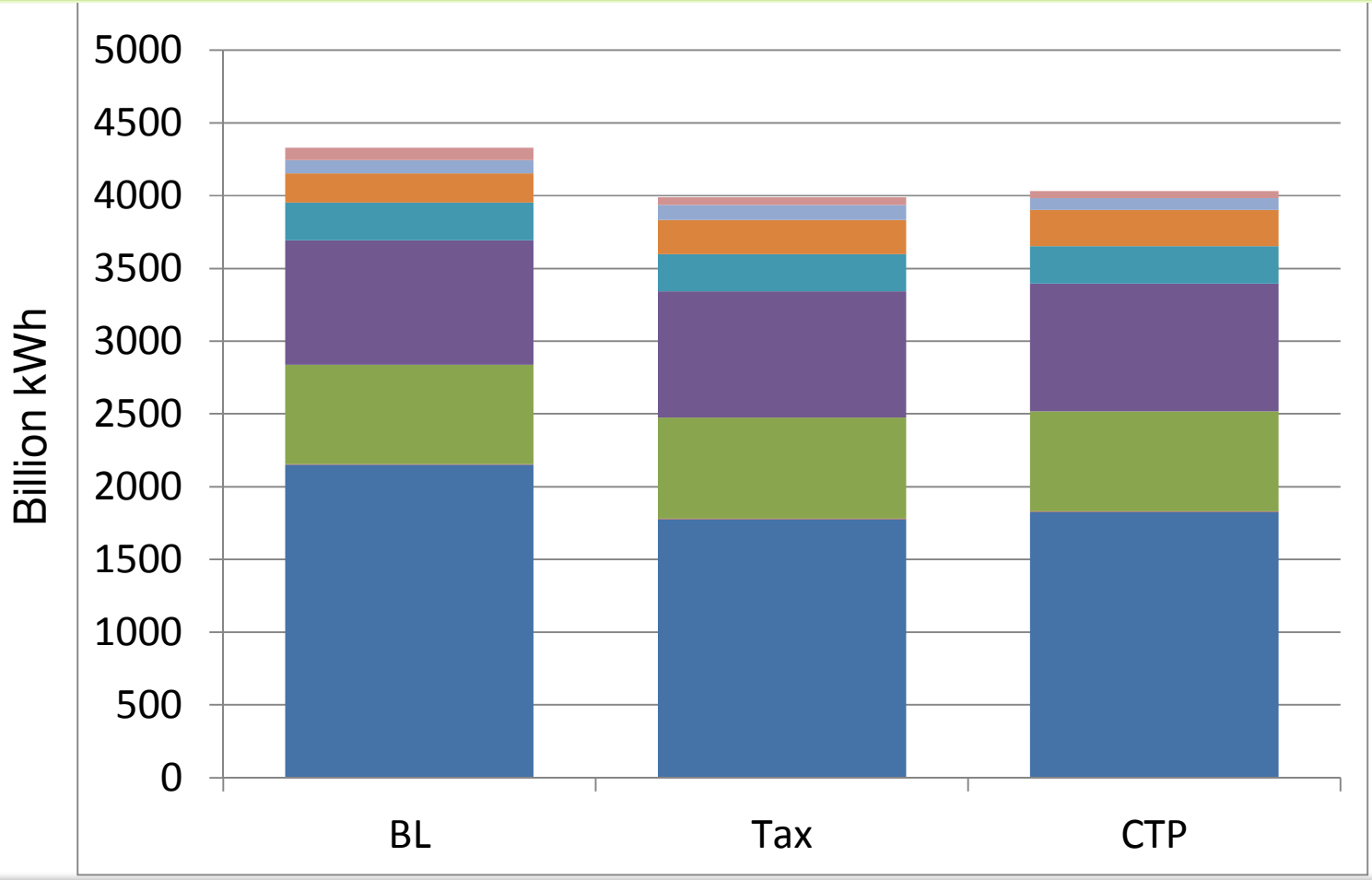
Cumulative Investment

Relative to baseline



Generation Mix

2020



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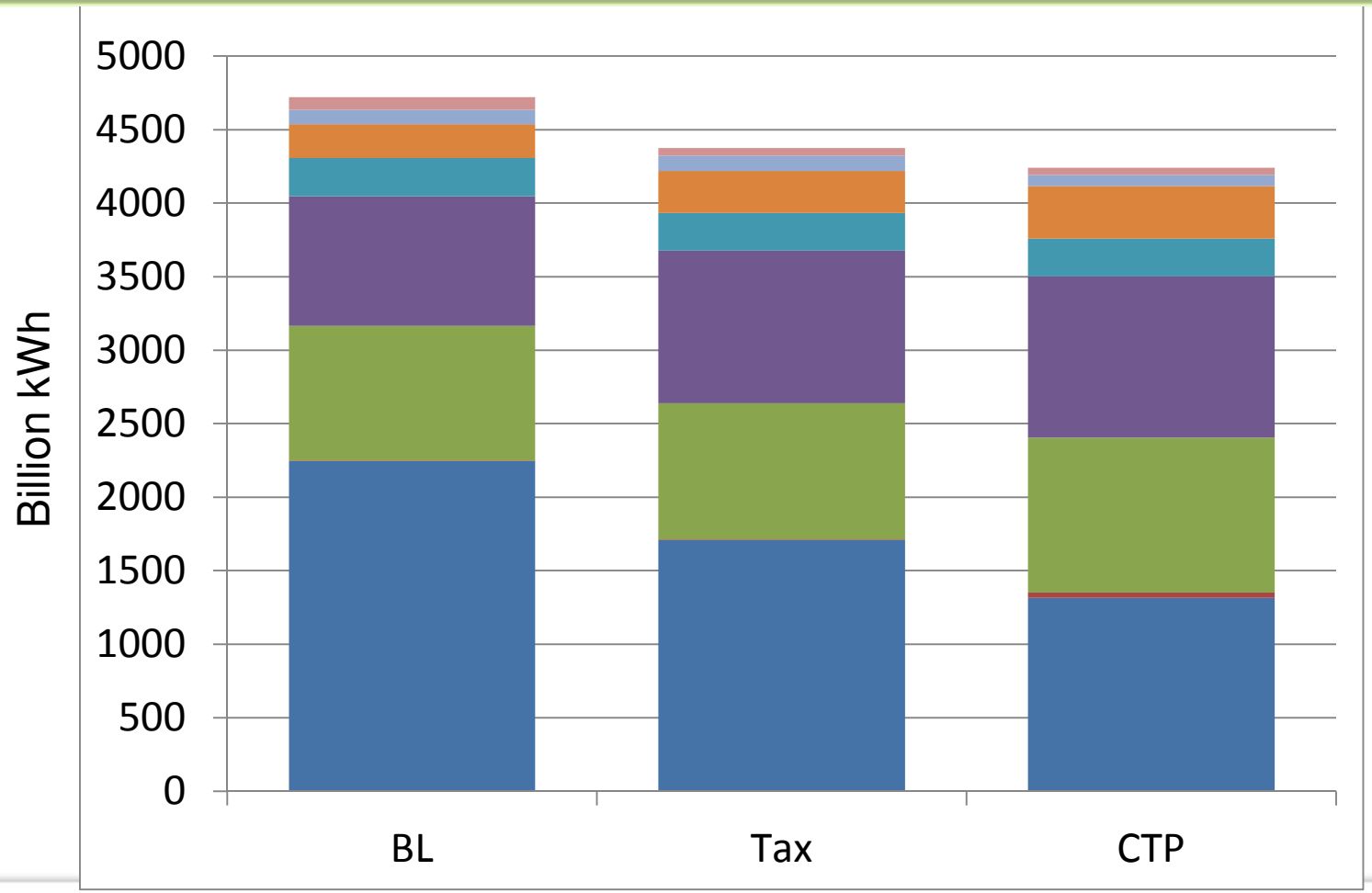
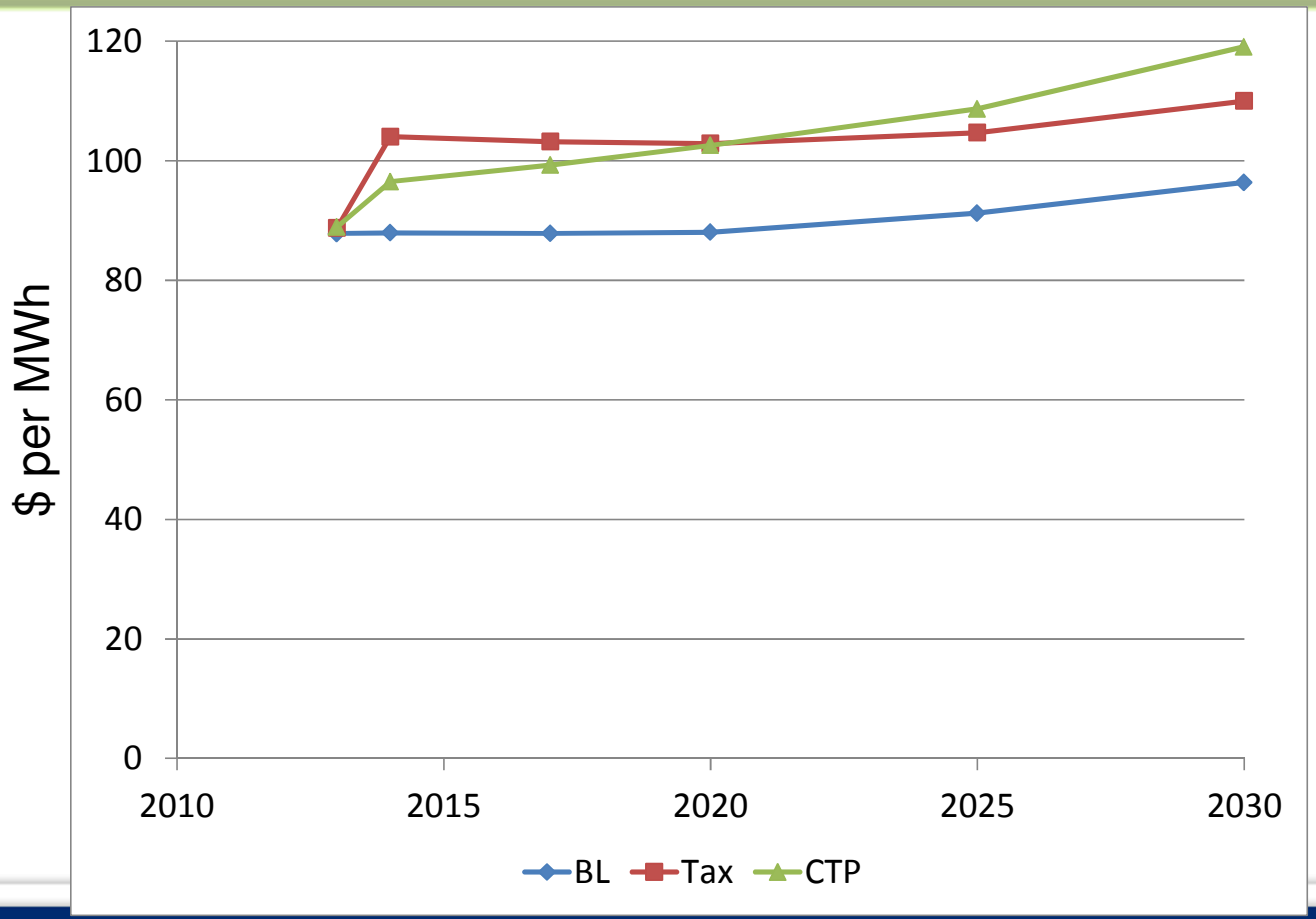
Generation Mix

2030



National Average Electricity Price



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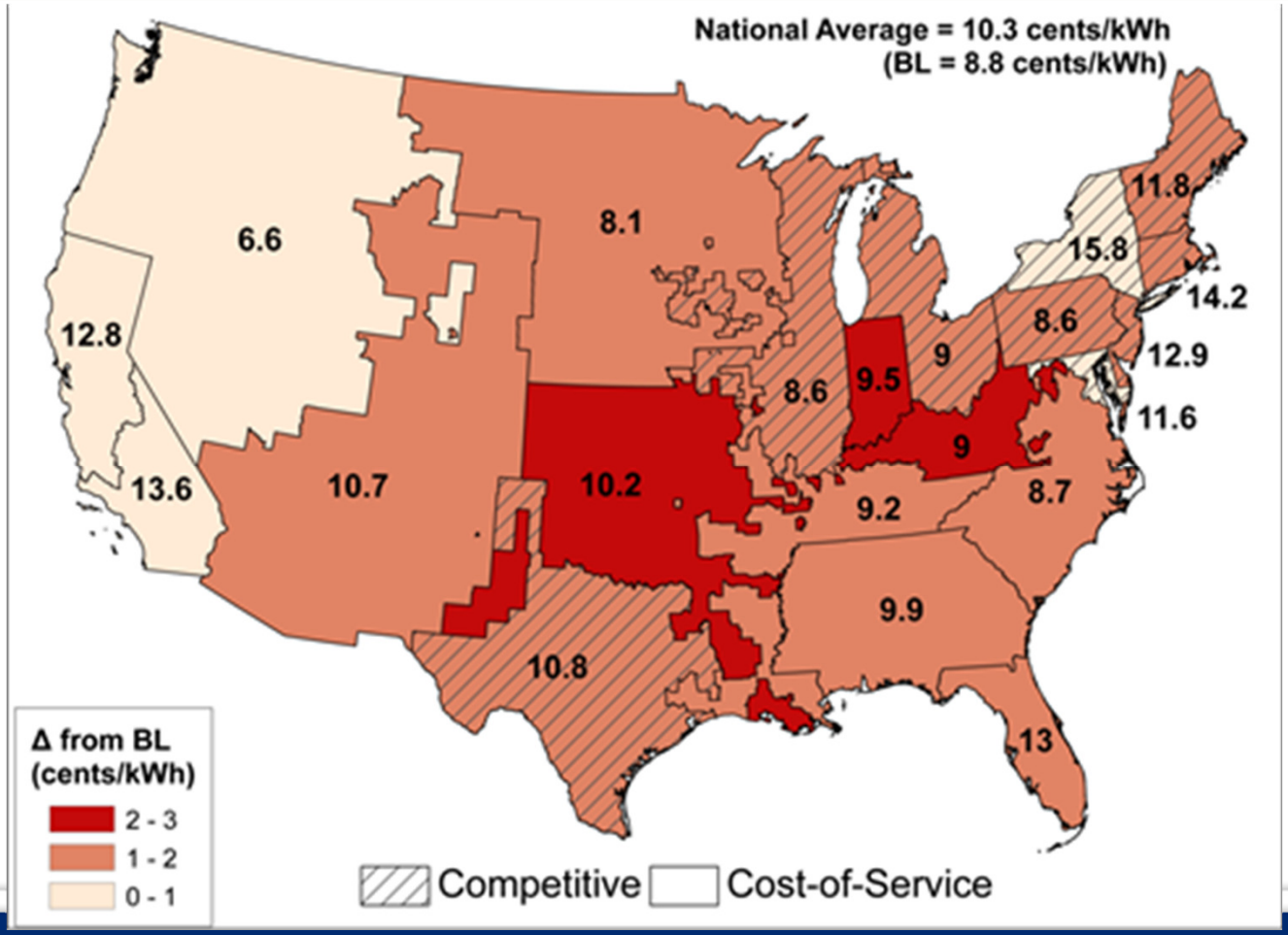
Regional Price Impacts: Tax

2020



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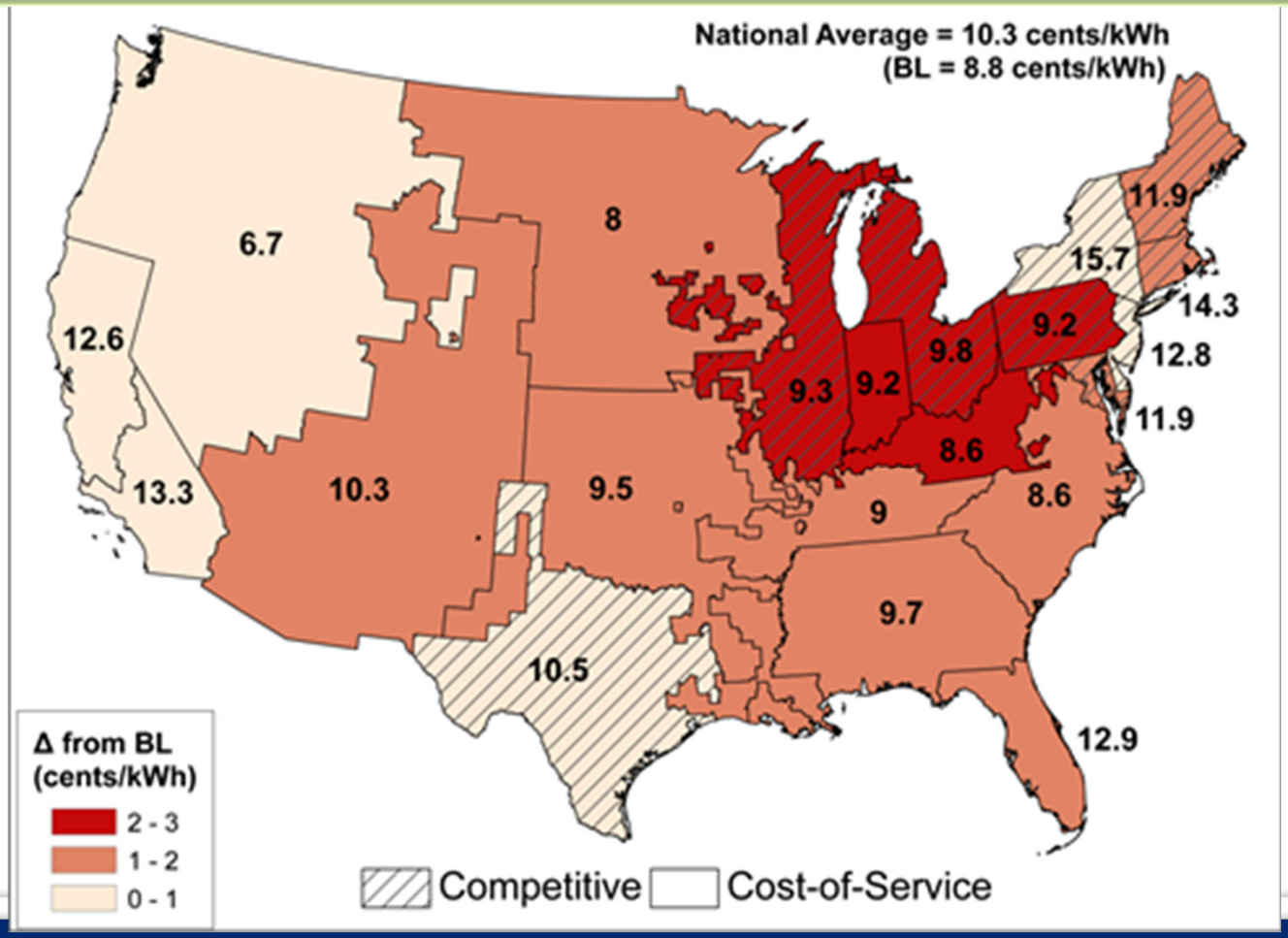
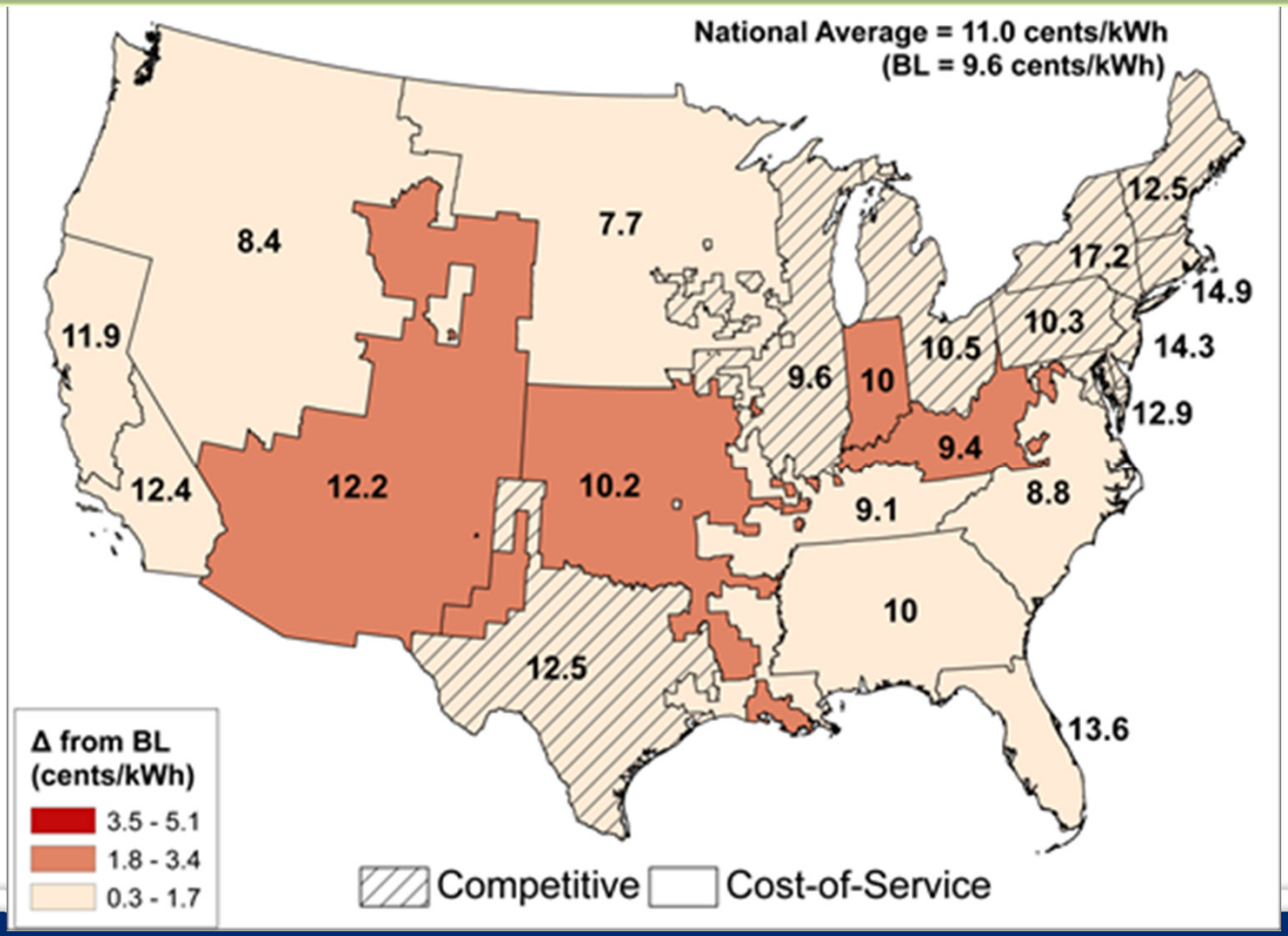
Regional Price Impacts: CTP

2020



Regional Price Impacts: Tax

2030



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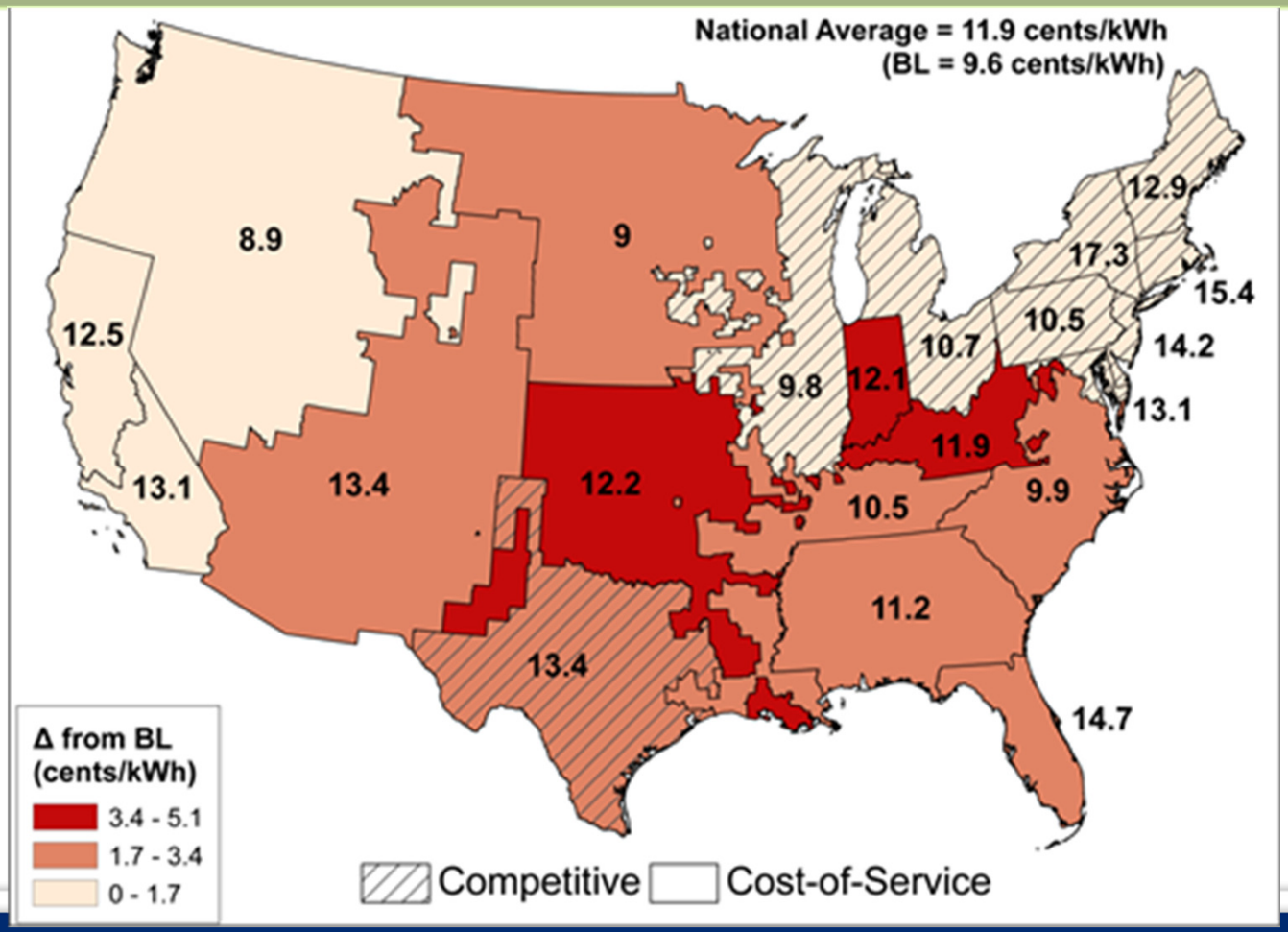
Regional Price Impacts: CTP

2030



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Government Revenues

Present discounted value

- Carbon tax scenario yields stream of tax revenue from 2014 – 2030 with PDV of $518 billion in 2014
- CTP yields stream of revenue with PDV of $496 billion in 2014.

Annual tax revenues

- Roughly $52 billion (Tax) and $50 billion (CTP) in annual revenue
- Equals roughly 14% of total baseline utility sector revenues in 2020.

This annual revenue is equal to approximately 5 percent of the budget deficit in FY2011.

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Carbon Tax versus Cap and Trade

Or flat tax versus escalating tax

- **Pass through of carbon tax in electricity prices**
  - higher under tax scenario in early years
  - higher under CTP scenario in later years
  - differs by region depending on utility regulation and composition of generation
- **Transformation of electricity generation**
  - More complete under CTP scenario
- **Reasons to prefer an escalating carbon tax to a flat tax**
  - Smaller initial price shock to consumers
  - Lower overall cost to economy

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Designing a Carbon Tax for Electricity

What else would we like to know?

Will state utility regulators allow tax cost pass through?

What happens if portion of tax revenues are used to ease electricity price shock in early years?

How would electricity focused tax affect demand for other sources of energy?

How would electricity focused tax affect economy-wide CO_2 emissions?

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Thank you.

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