The Economic, Fiscal, and Emissions Impact of a Revenue-Neutral Carbon Tax

Prepared for the Alliance for Market Solutions

Thursday, September 27, 2018

Presented To:

Table of contents

Executive summary

Overview

- The Alliance for Market Solutions ("AMS") engaged FTI Consulting ("FTI") to estimate the effects of implementing a revenue-neutral carbon tax and reform measures for the U.S. and the 50 states (including D.C.)
- The proposed measure would implement a $20 per metric ton carbon tax at the point of first extraction or importation, then increase the tax by 5% per year in real terms through 2028
- Revenues from this tax would fund the following fiscal measures:
  - Rebates for energy-intensive, trade-exposed ("EITE") industries
  - An extension of the individual tax cuts under the Tax Cuts and Jobs Act of 2017 ("TCJA") from 2026 through 2028, which would include lower marginal rates, a higher standard deduction, and an expanded child care tax credit
  - An extension of various expiring provisions through 2028
  - Delaying the implementation of three taxes under the Affordable Care Act ("ACA") between 2020 and 2028, including the "Cadillac tax" on health insurance plans, the medical device tax, and the provider fee
  - Undo the net income investment tax credit under the ACA
- These tax and tax reform measures have a revenue-neutral fiscal impact

Methodology

FTI used three models and integrated them together for this analysis:

1. **PLEXOS** – a model of the U.S. electric power sector, including electricity generation and plant additions and retirements
2. **CTAM** – emissions from non-power sources (transportation, heating, etc.)
3. **REMI** – a dynamic economic model with 51-regions

Findings

Fiscal impacts

- The carbon tax generates roughly $1 trillion from 2019 through 2028
- The policy design would provide rebates totaling approximately $98 billion to EITE industries, such as chemicals and primary metals
- The net revenues and tax reform measures then equal one another

Economic impacts

- The U.S. economy, as measured by indicators such as employment and gross domestic product ("GDP"), would be slightly smaller from 2019 to 2025 and slightly larger from 2026 to 2028 because of the tax cuts
  - Only in one year (2027) does the impact to employment exceed ±1%
  - The impact is more positive in the later years than in the early years because the policy design "banks" revenues until after 2025 to fund the extension of the TCJA individual provisions after 2025
- States with wind, solar, and gas resources and/or citizens paying a large amount of federal taxes would benefit most, while states with coal resources or without such taxpayers would experience negative impacts

Emissions and power sector impacts

RESULT	REDUCTION	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2019-2028
Total	Absolute	257	414	511	620	701	769	912	999	1,052	1,136	7,371
Total	Percentage	5%	8%	10%	12%	14%	15%	18%	20%	21%	23%	13%
Non-Power	Absolute	38	72	111	153	198	248	302	359	421	487	2,389
Non-Power	Percentage	1%	2%	3%	4%	6%	7%	9%	11%	12%	14%	6%
Power	Absolute	219	342	400	467	503	521	610	640	631	649	4,982
Power	Percentage	13%	21%	25%	29%	32%	33%	39%	41%	41%	43%	28%

- The carbon tax embedded in coal, natural gas, and petroleum prices incentivizes the use of more carbon-efficient generation as follows:
  - 94 gigawatts of incremental wind and solar plants would come online
  - 55 gigawatts of new natural gas plants would come online
  - 9 gigawatts of old gas plants would retire
  - 47 gigawatts of older coal and fuel oil plants would retire

Presentation overview

Presentation outline and background

Presentation Outline

1. **Executive summary**
2. **Presentation overview**
   a. FTI Consulting
   b. Economic Impacts Group
3. **Policy Design**
   a. Carbon Tax
   b. Tax Reform
4. **Methodology and Approach**
   a. PLEXOS
   b. CTAM
   c. REMI
   d. Integration and Assumptions
5. **Results and Main Findings**
   a. Fiscal
   b. Economic
   c. Emissions
6. **Technical Appendix**

Presentation Background

AMS engaged FTI and its Economic Impacts Group ("EIG") to assess the economic, fiscal, and emissions impact of a revenue-neutral carbon tax on the U.S. economy, federal budget, and emissions using a combination of economic models. This presentation summarizes this carbon tax policy, our methodology and approach for conducting the analysis, and our main results/findings.

The analysis and findings expressed herein are those of the authors and not necessarily the views of FTI, its management, its subsidiaries, its affiliates, or its other professionals. The authors would like to thank Venki Venkateshwara, Mitch DeRubis, Jerry Li, Jack Tunstall, and Michael Nagle for their contributions to this project.

Study Authors

Scott Nystrom, (515) 290-6990, Scott.Nystrom@fticonsulting.com
Katie O'Hare, (571) 830-1060, Katie.O'Hare@fticonsulting.com
Ken Ditzel, (703) 966-1954, Ken.Ditzel@fticonsulting.com

FTI

FTI is a global business advisory firm that provides multidisciplinary solutions to complex challenges and opportunities.

United by a culture of urgency, our professionals are organized around the globe to provide critical assistance wherever and whenever needed.

GLOBAL REACH

With over 4,600 employees and offices in 28 countries on six continents, our breadth and depth extends across every major social, political, and economic hub across the globe.

EXPERIENCED PROFESSIONALS

We are trusted advisors with diverse expertise and exceptional credentials serving clients globally.

DEEP INDUSTRY EXPERTISE

We combine unparalleled expertise and industry knowledge to address critical challenges for clients. Key expert areas include:

- Aerospace and Defense
- Chemicals
- Construction
- Energy & Utilities
- Financial Institutions & Insurance
- Manufacturing & Industrials
- Retail & Consumer Products
- Transportation

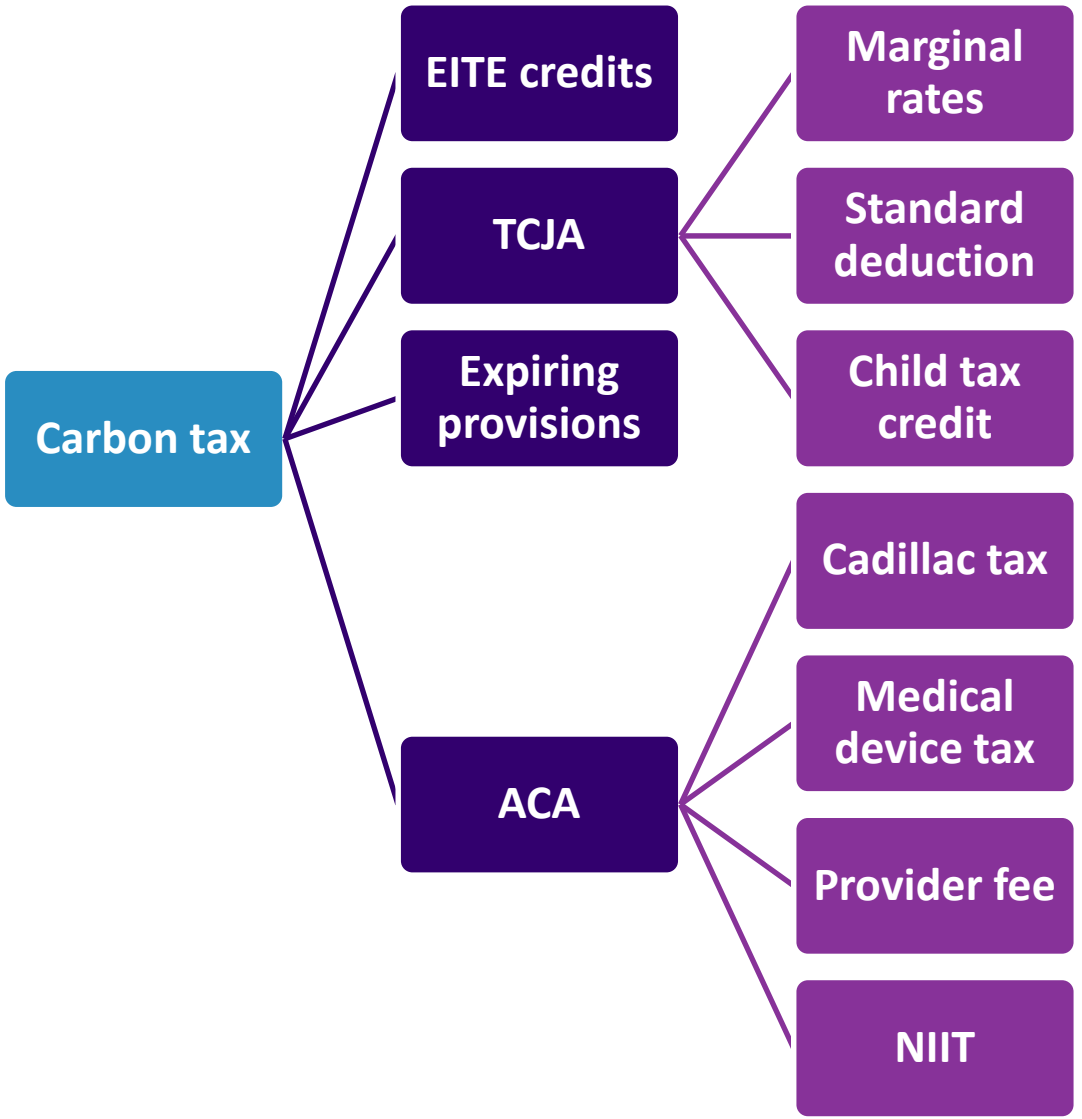
FCN Publicly traded – NYSE	$1.81 BLN Equity market capitalization
1982 Year founded	80 Different disciplines
4,600+ Employees	700+ Industry specialists
440+ Senior Managing Directors	77 Offices in 28 countries
2 Nobel Laureates	53 53 of Global 100 corporations are clients
8 of 10 Advisor 8 of the world's top 10 bank holding companies	96 Advisor to 96 of the world's top 100 law firms

EIG provides tailored analyses meeting the depth, breathe, and timeline requirements of the particular client

	1 Quick Response	2 Client/Third-Party Branded Policy Research	3 FTI Policy Reports
Description	■ Provide quick responses to current, active topics via websites, social media, emails, and other media ▪ Proactive responses explaining the costs and benefits of policies ▪ Reactive responses to undermine criticisms	■ Provide economic data and analysis within a third-party report format that explains and supports a client position ▪ Industry contribution ▪ County, state, regional, and national economic impact ▪ Forecasting for planning	■ Conduct an independent study under FTI branding on the impact of a policy of industry ▪ Highly robust ▪ Able to withstand public examination and scrutiny ▪ May involve testimony in front of a court
Examples	■ White paper on the potential end of the Mortgage Interest Deduction ■ U.S. Chamber of Commerce "U.S. Energy" factoid series ■ Response to anti-pipeline contingent's regulatory filings on the Mountain Valley Pipeline	■ State-by-state economic contribution of the foodservice distribution industry ■ U.S. Chamber of Commerce's Energy Accountability Series on proposed energy policies of presidential candidates ■ EQT's annual report on corporate responsibility	■ Proposed federal Infrastructure bill's potential impact on the wood products industry ■ Fiscal impact study on Oregon's proposed cap-and-trade program ■ White paper on the continuing U.S. manufacturing renaissance ■ Economic impact of steel tariffs and ongoing trade war
Timeline	■ One Day – One Week	■ 3 – 4 weeks	■ > 1 month

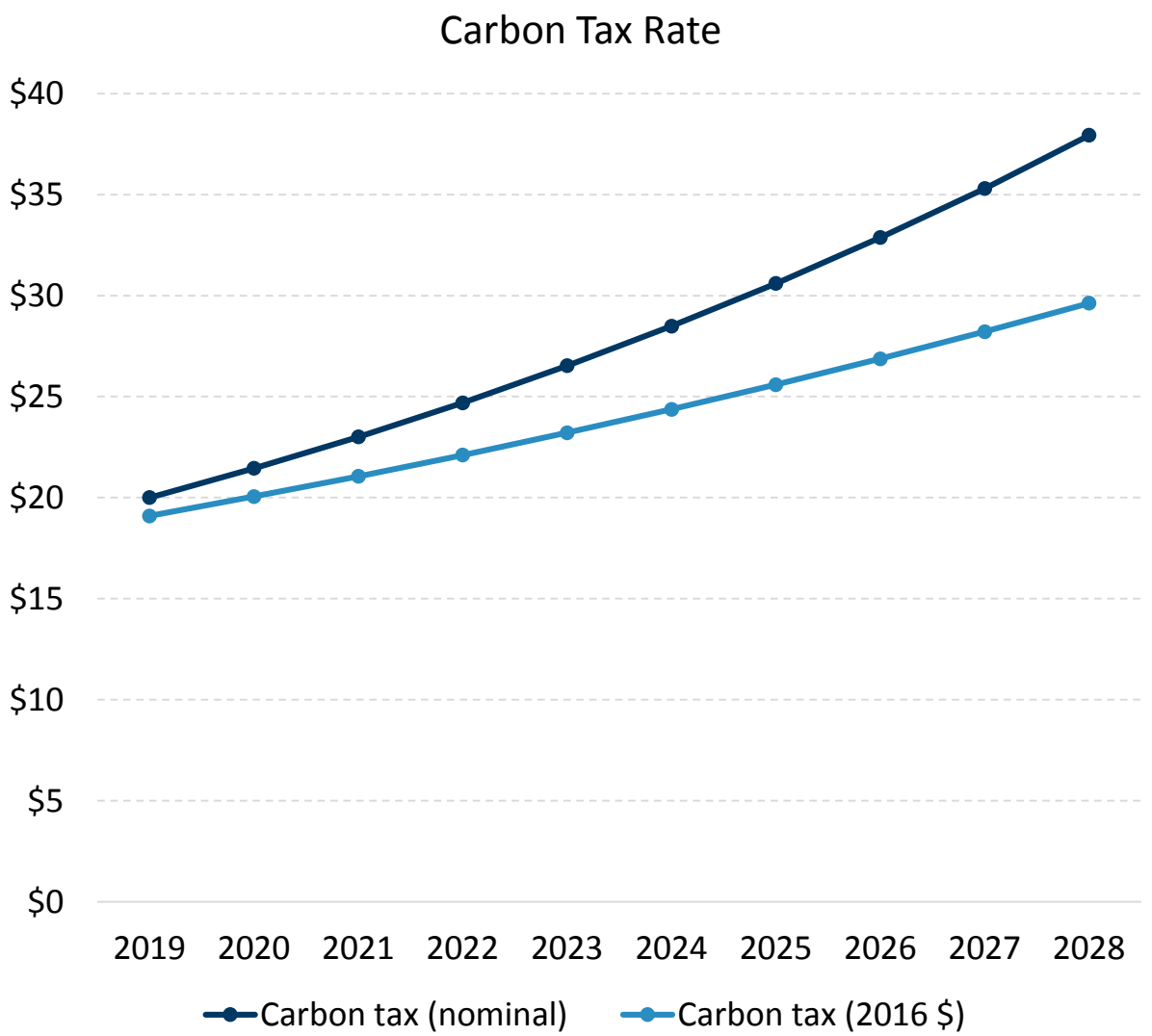
Policy design

The flowchart below summarizes the policy design under analysis, including the tax reform measures



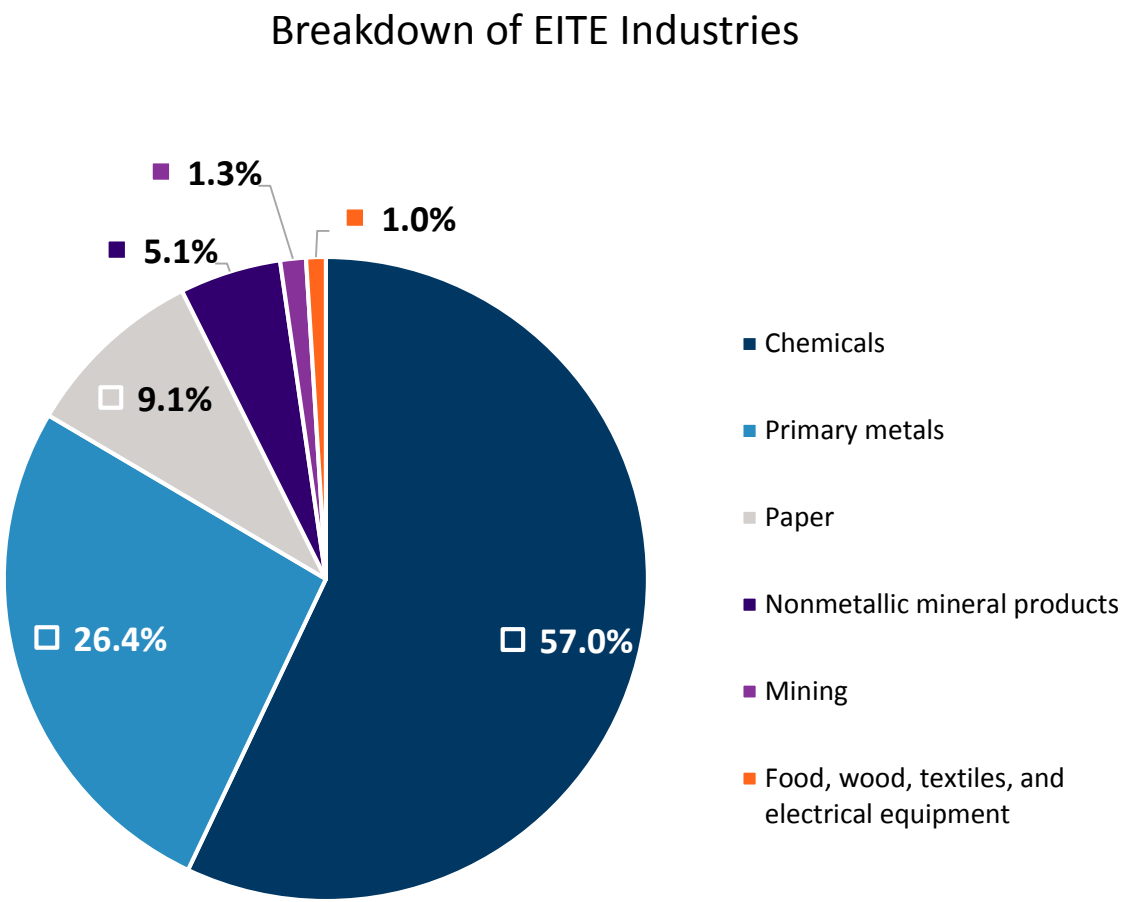
- The lite blue box on the left is the carbon tax, which begins in 2019 and runs through the end of our modeling here in 2028
  - Includes rebates for EITE manufacturing industries
- Revenues from the carbon tax go towards either extending tax cuts or delaying other tax hikes
  - Expiring provisions for individuals and families under the TCJA, including lower marginal tax rates, a higher standard deduction, and an expanded child care tax credit
  - Various expiring provisions
  - Three planned and one existing tax increase under the ACA
- **The net effect of the carbon tax policy considered here is revenue-neutral over the ten-year study period (2019 through 2028)**

We considered a carbon tax starting at $20 per metric ton in 2019 and escalating 5% per year in real terms



- We evaluate a carbon tax that begins at $20 per metric ton of carbon dioxide in 2019
  - The tax Increases over time at 5% per year in real terms
  - By 2028, the tax would reach $37.93 per ton in nominal dollars and $29.62 per ton in real dollars (2016 prices)
- We apply the tax at the point of extraction or import, which allows for several features:
  - The most straightforward tracking of taxes
  - The fewest legal entities involved in implementing the tax
  - Fuel suppliers to pass the cost of the tax down to consumers

A portion of tax revenues would return to manufacturers to aid with competitiveness and emissions leakages



- The policy design would include some tax rebates or credits to EITE manufacturers for the purpose of:
  - Helping U.S. industries, and particularly heavy and bulk manufacturers, maintain international competitiveness
  - Discouraging the relocation of emissions overseas
- For this study, we defined EITE industries using federal standards and allocated rebates based on industry size and emissions
  - Chemical manufacturers, primary metals, paper, and nonmetallic mineral products, which includes such commodities as concrete, would receive the majority of the EITE rebates or credits
  - The remainder of the EITE rebates would go to other manufacturing subsectors

The policy design would extend numerous expiring provisions through 2028, all of which fall into two categories

Extension of certain expiring TCJA provisions

- The TCJA allows most individuals and families to pay less in taxes
- TCJA lowers marginal income tax rates and increases the standard deduction and child care tax credit
- Congress set most of the TCJA individual and family provisions to expire in 2025 to comply with rules under reconciliation regarding the maximum amount allowable added to the federal deficit
- **The policy design here extends the TCJA's individual provisions through 2028 using revenues from the carbon tax to balance the cost against the federal budget**

Expiring provisions extended through 2028

- Congress routinely delays the sunsetting of a few dozen "expiring provisions" each year
- These are tax reductions or tax credits that would expire without Congressional action
- These credits are diverse and are often tied to policy objectives:
  - *Tax credits for educational expenses and the hiring of disadvantage minorities*
  - *Tax credits to help consumers service personal debts*
  - *Modified depreciation schedules on specific types of capital investments*
  - *Energy-related tax credits for development and energy efficiency*
  - *Delays on implementing certain excise and import taxes*
- **The policy design here would extend all expiring provisions through 2028 using revenues from the carbon tax to balance the cost against the federal budget**

The policy design also delays three taxes and undoes a tax currently operating under the ACA's provisions

(1.) Cadillac Tax

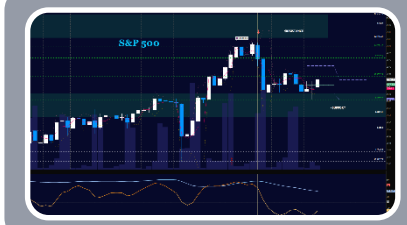
- Taxes low-deductible, high-cost health insurance plans
- Currently scheduled to take effect on January 1, 2023

(2.) Medical Device Tax

- 2.3% excise tax on device manufacturers and/or importers
- Currently scheduled to take effect on January 1, 2020

(3.) Provider Fee

- An annual feel on health insurance companies to raise revenues
- Currently scheduled to take effect on January 1, 2020



(4.) Net Investment Income Tax ("NIIT")

- Currently in effect, the NIIT collects a 3.8% tax on certain net investment income for individuals, estates, and trusts

Methodology and approach

PLEXOS models the electric power sector, including security-constrained dispatch, additions, and retirements

Inputs

New and Existing Units / Retrofits

- Capital costs
- Variable and fixed O&M
- Efficiencies
- De-rates and uprates
- Availability
- Intermittency generation limits
- Dual-fuel capability
- Regional and national capacity expansion limitations

Fuel

- Gas and coal prices
- Gas infrastructure costs

Demand

- Peak growth
- Energy growth
- Demand side management and efficiency options

Environmental Regulations

- Existing and future

PLEXOS Model

The PLEXOS model is an integrated model that optimizes economic generation dispatch, unit commitment, and optimal power flow over a single interval as short as 1-minute to daily, weekly, annual and multi-annual periods. In addition, it is run typically in stochastic (probabilistic) fashion. PLEXOS also offers ancillary services analysis, hydroelectric capacity modeling, and natural gas infrastructure.

Generation

Transmission

Expansion Planning

Hydro Modeling

Ancillary Services

Emissions

Gas Model

Financial

Outputs

Regional Capacity Changes

- New builds by type
- Retirements
- Retrofits

Generator performance

- Existing and new gen by type
- Energy and capacity revenue
- Fuel consumption
- Capacity factors
- Emissions
- Cash flows

Market Prices by Region and Node

- Energy and capacity
- Renewable energy credits
- NOx, SO_2, and CO_2 allowances

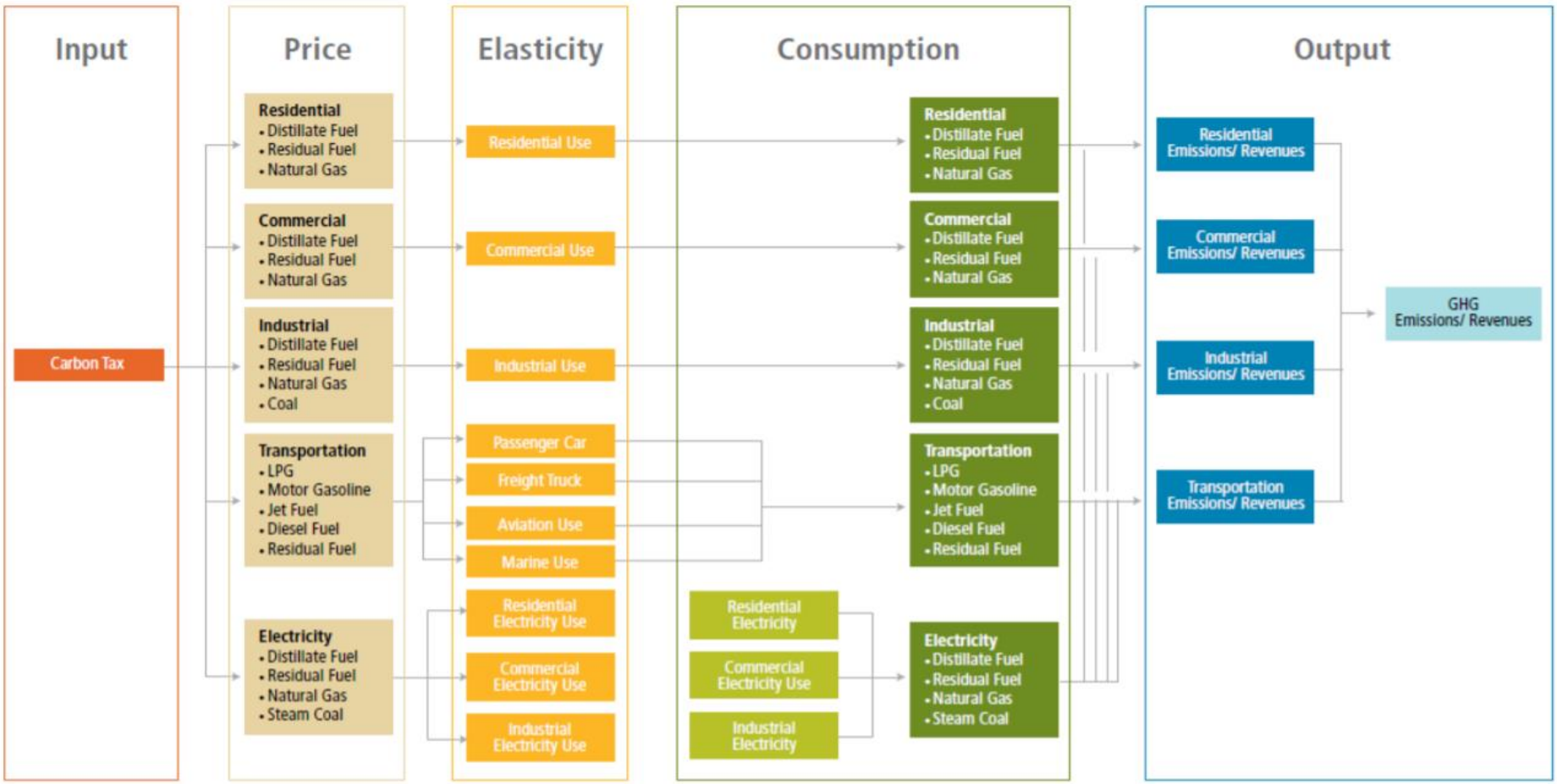
Fuel demand

- Gas, fuel oil, and coal

Infrastructure

- Electrical and gas transmission flows and constraints
- Expansion

CTAM is based on Annual Energy Outlook ("AEO") and models changing energy demand through price elasticity



REMI is a comprehensive macroeconomic model that assesses the long-term impacts of policy changes

- REMI PI+ generates year-by-year estimates of the total regional effects of policy
  - A wide range of variables allows the user to represent the policy, while the explicit structure in the model helps the user to interpret economic and demographic effects
  - Economic development, infrastructure, healthcare, fiscal policy, energy, etc.

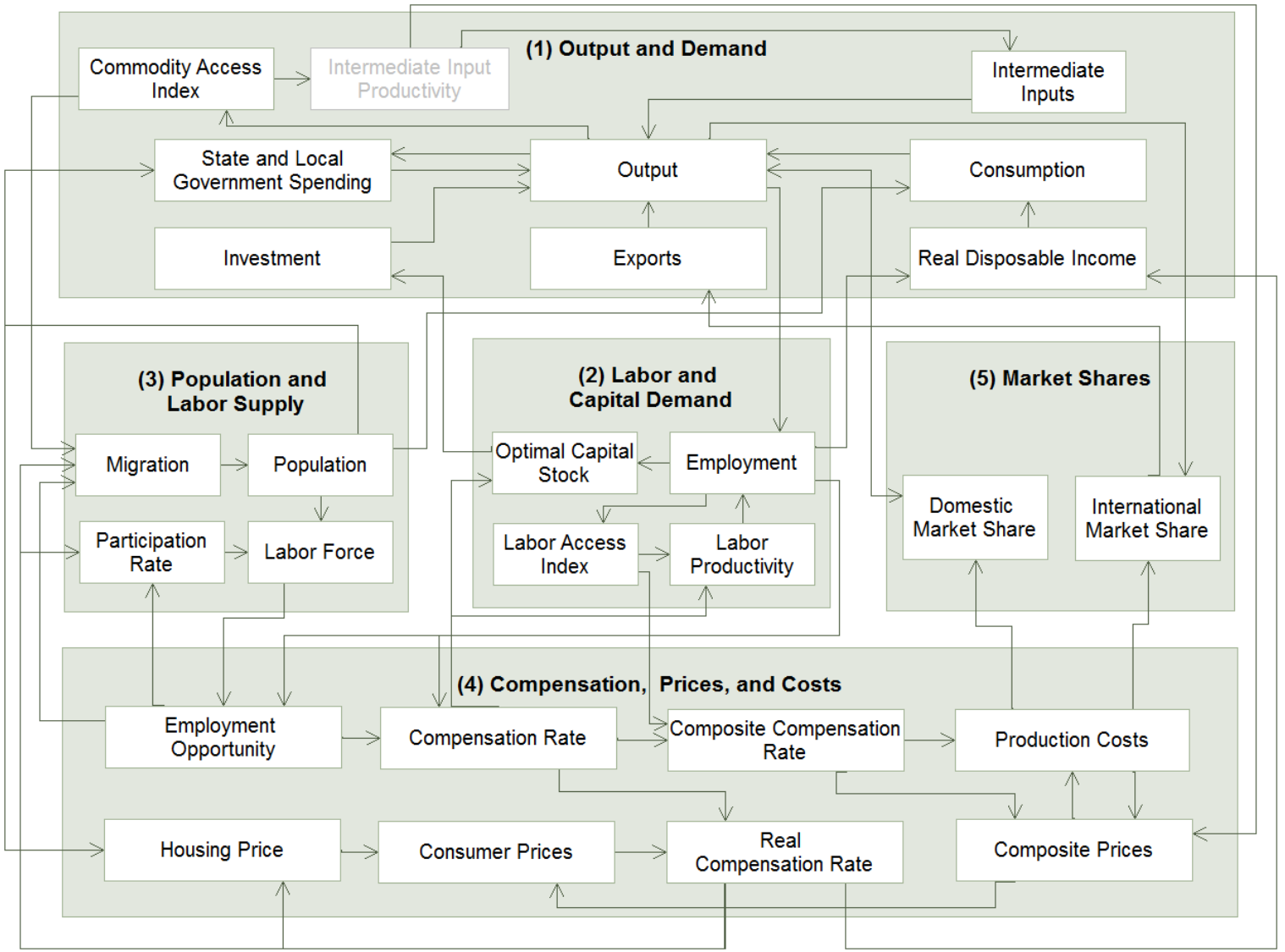
- The model is calibrated to many sub-national areas for analysis and forecasting, and is available in single and multi-area configurations, where each calibrated area (or region) has economic and demographic variables

- REMI PI+ is used by government agencies (including most U.S. state governments), consulting firms, nonprofit institutions, and universities

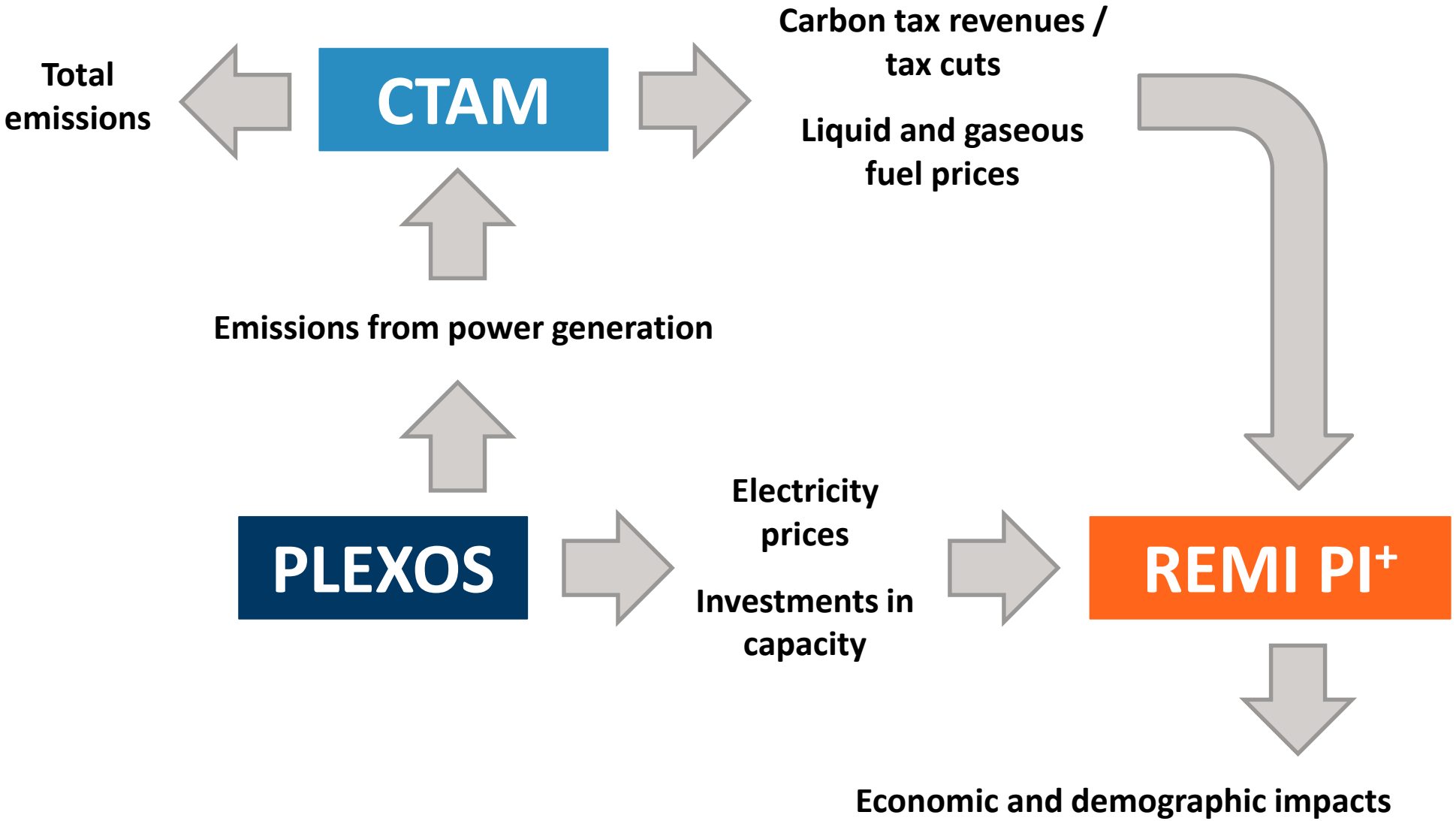
- REMI PI+ can answer a wide range of questions related to:
  - Economic impact analysis
  - Regional forecasting
  - Policies and programs to enhance economic development or infrastructure
  - Federal, state, and local tax changes

- Its major outputs include:
  - Employment
  - GDP
  - Real disposable personal income ("RDPI")
  - Tax revenues
  - Demand and output by industry
  - Demographics (e.g., migration)
  - International exports (e.g., responding to market conditions and domestic and foreign import costs)

REMI models the macroeconomy at the state level, including labor markets and industry competitiveness



We **integrated** these three models by incorporating each model's outputs into the other models as appropriate

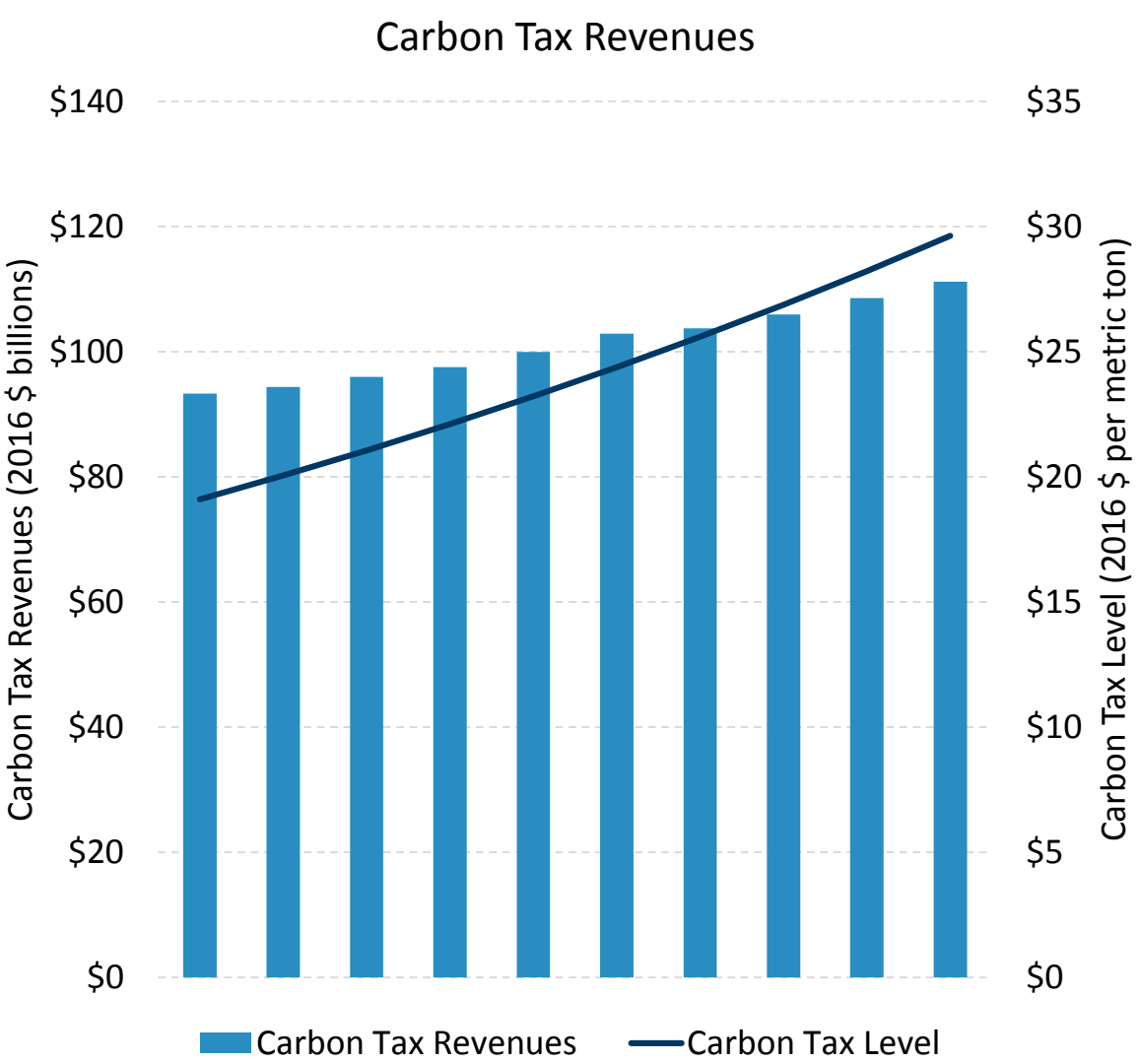


The following is a summary list of major assumptions about related policies and modeling inputs

- **Existing law/no other changes** – While modeling the carbon tax and fiscal reform, we assumed no other policy changes in the U.S. at the state or federal level, such as a state modifying its renewable portfolio standard ("RPS") or federal changes in the Corporate Average Fleet Economy regulations.
- **AB32 and RGGI auction prices** – We assumed the carbon tax causes the auction prices in California under AB32 and in the Northeast and Mid-Atlantic for RGGI to fall to their price floors from 2019 forward until the end of the analysis.
- **JCT scores** – We used Joint Committee on Taxation ("JCT") estimates of the fiscal value of the tax measures discussed above, such as extending the implementation of the Cadillac tax through 2028, to calculate the policy's fiscal impact.
- **REMI Standard National Control and Standard Regional Controls** – For regional economic data, we used REMI control forecasts. REMI derives its calibration data from public sources, such as the Bureau of Economic Analysis, Bureau of Labor Statistics, state demographers, and the U.S. Census Bureau.
- **REMI Price Index Data** – All inputs and results are in 2016 dollars. Where necessary, we converted inputs and results to 2016 dollars using price index data from the REMI Standard National Control.
- **REMI Elasticities** – REMI has default price elasticities, which we also used in CTAM for consistency to calculate the effect that higher energy prices would have on demand for energy from fossil fuels through the study period.
- **REMI CGE Settings** – We did not modify any of the REMI computable general equilibrium ("CGE") model settings.
- **Distributional analysis** – We examined the distribution between states and industries but not income strata.
- **AEO 2018 Reference Case** – Produced by the Energy Information Administration ("EIA"), the AEO 2018 Reference Case provided long-term projections of energy consumption and prices for CTAM and natural gas prices for PLEXOS. We constructed our Base Case using data from the AEO 2018 Reference Case.
- **Electric vehicles** – We assumed the carbon tax would not substantially accelerate the AEO 2018 Reference Case's projection for electric vehicle adoption, which is 7% of new sales in 2025, enough to significantly influence gasoline demand or electricity load through 2028 and the end of our study period.
- **Regional and state emissions** – We used regional energy consumption data from the AEO 2018 Reference Case to produce state level data in combination with data from the EIA's State Energy Data System ("SEDS"). We used the SEDS data to map EIA regional forecasts down to the state level.
- **Emissions factors** – The Environmental Protection Agency ("EPA") provides the carbon emissions factors for various sources, including stationary (e.g., power plants) and mobile (e.g., cars and trucks) sources, which we used as inputs in CTAM to convert energy demand into carbon dioxide emissions.
- **ABB's Ventyx Velocity Suite** – We obtained information on electrical power generators and load through Ventyx.
- **Capital costs** – We used the EIA report entitled *Capital Cost Estimates for Utility Scale Electricity Generating Plants* from November 2016 to inform the capital cost of new plants as an input into PLEXOS.

Results and main findings

Revenues from the carbon tax would rise over the decade, though not as quickly as the tax rate rises



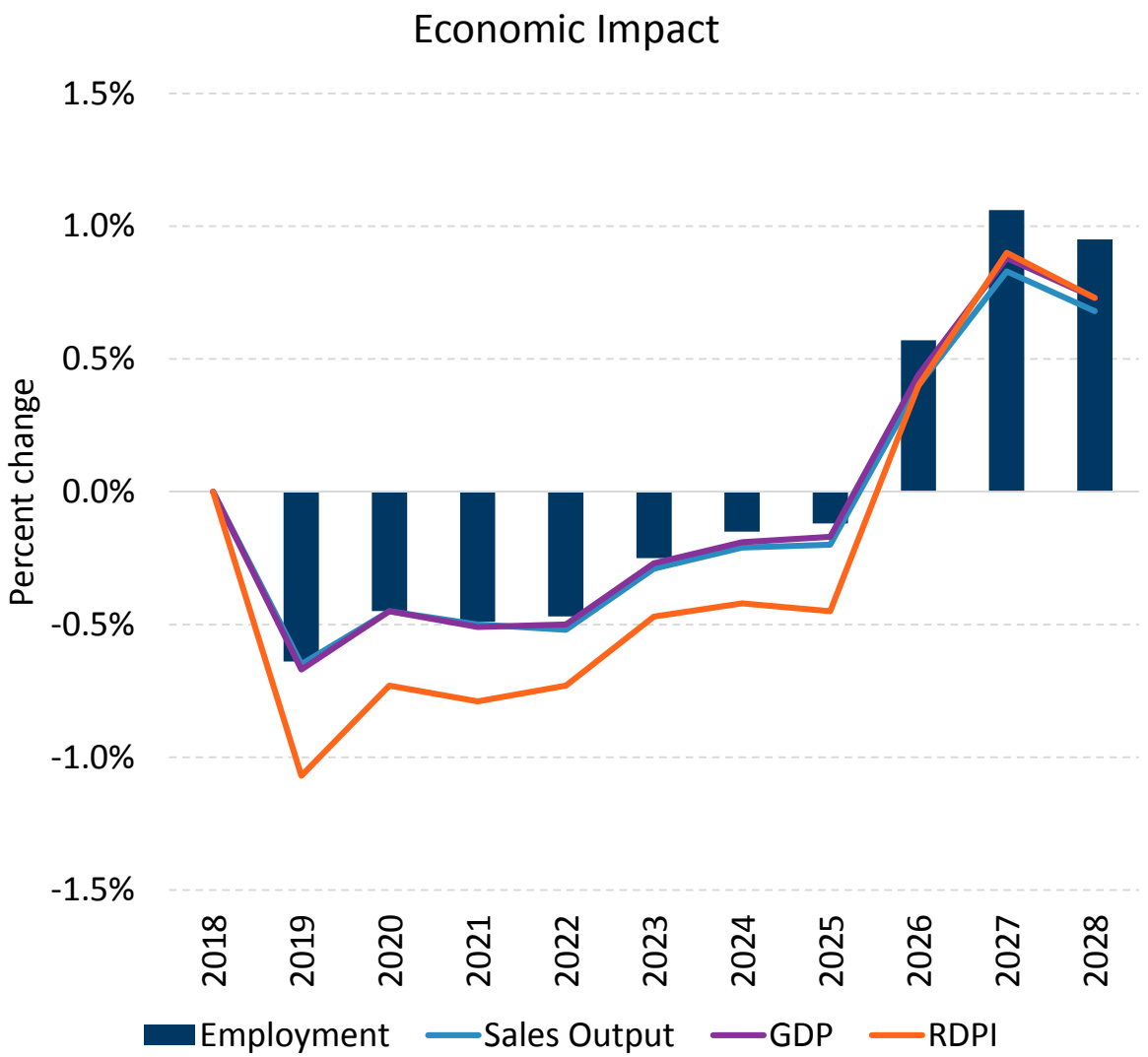
- The chart to the left shows the revenues from the carbon tax and the carbon tax rate
- As a reminder, the carbon tax begins at $20 per metric ton in 2019 and grows 5% per year in real terms through 2028
- In 2019, annual revenues from the carbon tax total around $93 billion and, by 2028, annual revenues would rise to around $111 billion
  - Revenues increase more slowly than does the tax rate
  - This implies that the carbon tax is inelastic across all sectors of the U.S. economy
- Revenues over the decade total roughly $1 trillion

The table below lays out the projected fiscal impact of carbon taxes, EITE rebates, and tax reform measures

CATEGORY	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2019-2028
Carbon tax revenue	$93	$94	$96	$98	$100	$103	$104	$106	$109	$111	$1,013
EITE credits	($9)	($9)	($9)	($9)	($10)	($10)	($10)	($10)	($11)	($11)	($98)
Net revenues	$85	$85	$87	$88	$90	$93	$94	$95	$98	$100	$915
Extend TCJA tax cuts	-	-	-	-	-	-	-	($95)	($155)	($159)	($410)
Expiring provisions	($12)	($12)	($13)	($13)	($14)	($14)	($15)	($15)	($15)	($15)	($137)
Delay ACA taxes	($15)	($31)	($32)	($33)	($43)	($46)	($50)	($42)	($42)	($42)	($378)
Tax reform total	($27)	($43)	($45)	($46)	($57)	($61)	($64)	($152)	($212)	($217)	($924)
Net fiscal impact	$57	$42	$42	$42	$33	$32	$29	($57)	($114)	($116)	($9)

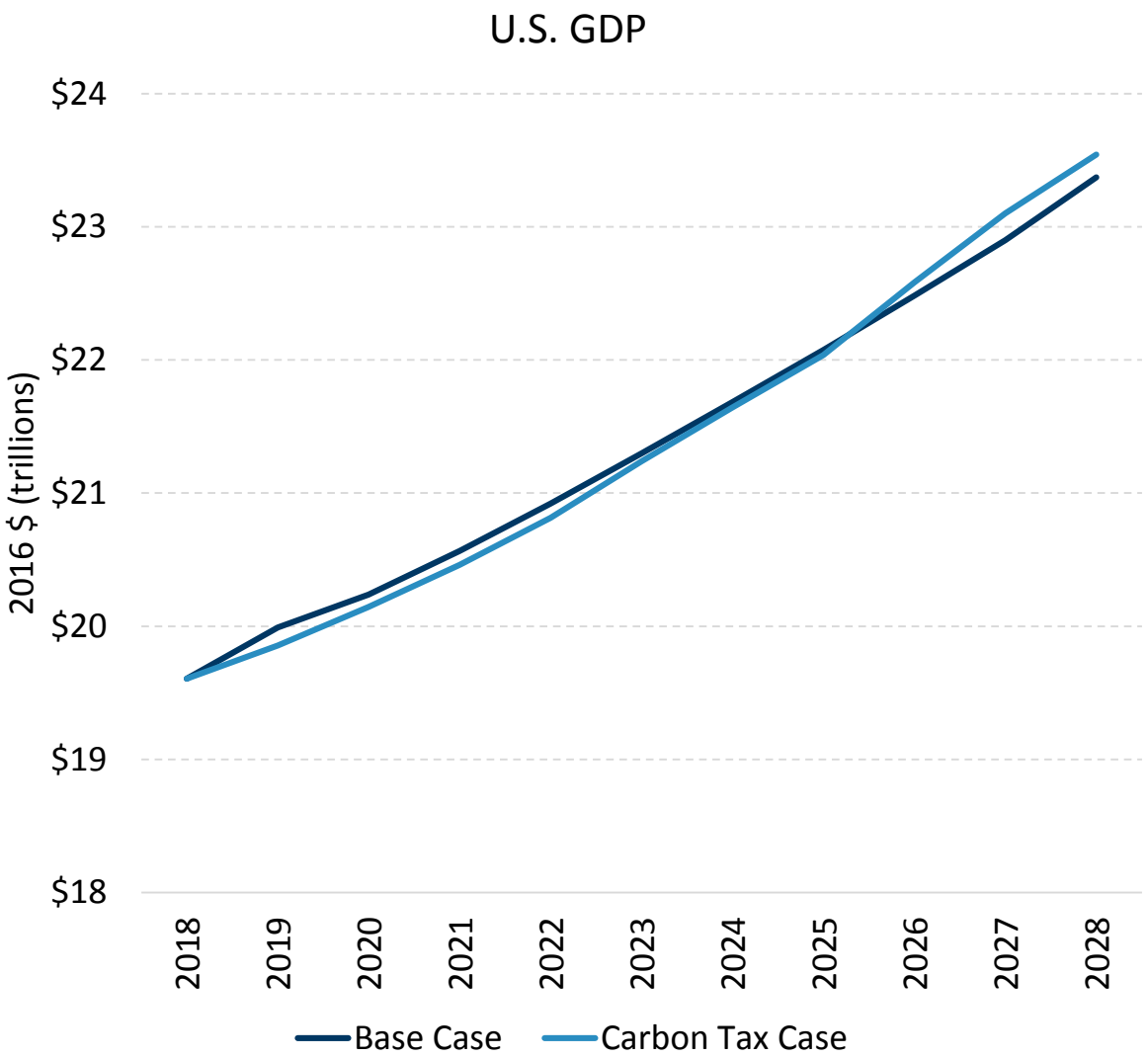
2016 $ billions

The economic impact is always close to neutral, though with a more positive impact in the late 2020s



- Initially, as the last slide shows, the impact to the U.S. economy would be negative because the policy design "banks" revenue in the policy's beginning years
  - In other words, the policy design would bring more revenue into the budget than it releases in tax cuts in earlier years
  - This shrinks the economy compared to the status quo/baseline forecast
- From 2026 to 2028, the policy uses the "banked" revenues to fund the extension of the TCJA tax cuts for individuals and families, which results in a positive economic impact in those years for all four economic metrics
- The economic impact is always close to zero, with only one year (2027) experiencing an impact >1% for total employment

The REMI projection of U.S. economic growth remains positive for the carbon tax scenario and without it



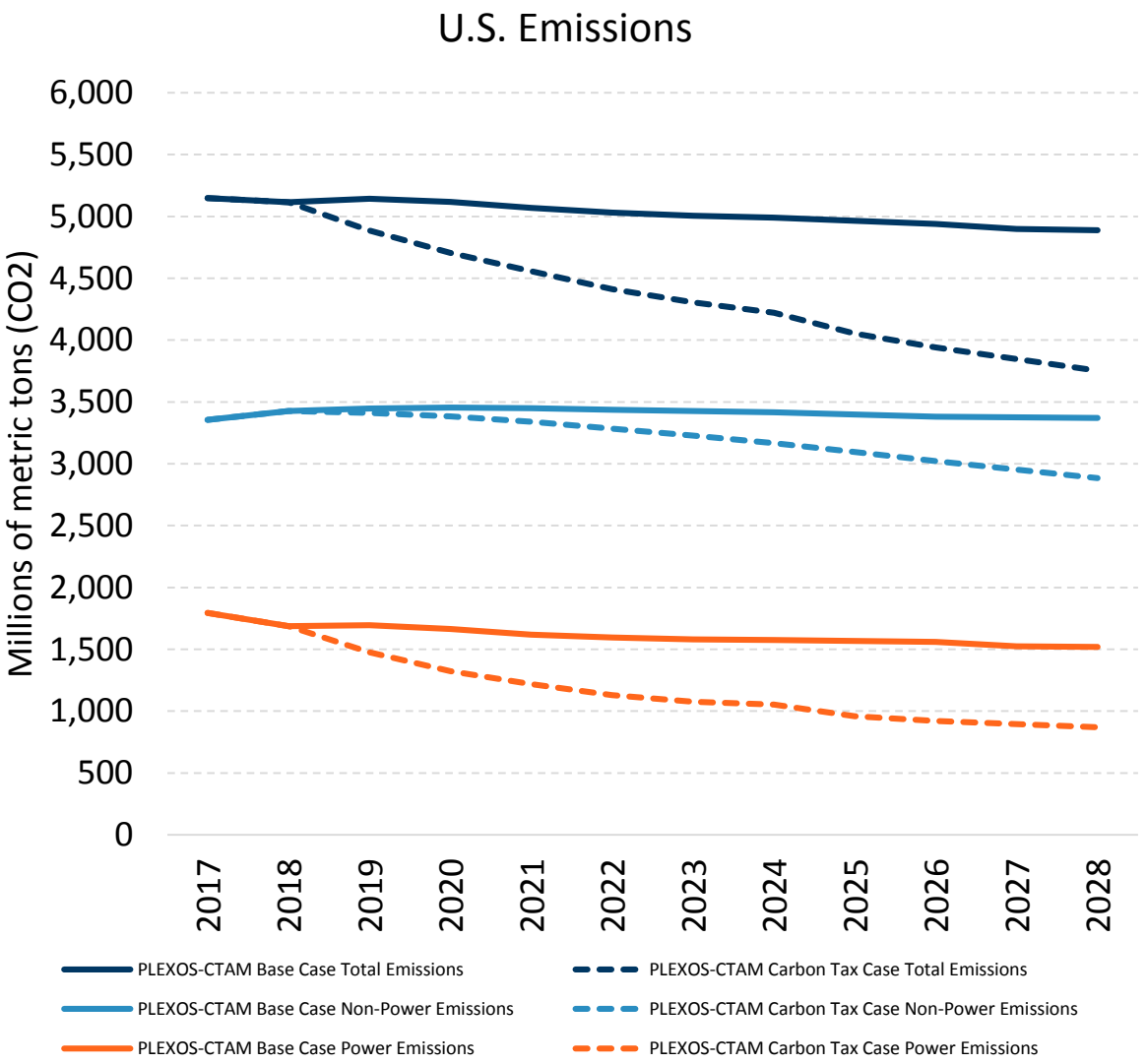
- The chart to the left shows U.S. GDP between 2018 and 2028 under two scenarios:
  - The "Carbon Tax Case," which represents the revenue-neutral carbon tax and reform analyzed as part of this study
  - The "Base Case," which represents the economy without these changes (or the status quo/control)
- In both cases, U.S. GDP would grow from roughly $19.5 trillion in 2018 to over $23.0 trillion by 2028
  - GDP under the Base Case exceeds that under the Carbon Tax Case from 2019 and 2025
  - GDP under the Carbon Tax Case exceeds that of the Base Case from 2026 and 2028
- The change in GDP between the two cases over ten years is equivalent to two days' worth of output

Building on this point, the table below shows the average or aggregate economic impact over ten years

RESULT	CALCULATION	BASE CASE	CARBON TAX CASE	DIFFERENCE	PERCENTAGE
Employment	Average	200.09 million	200.10 million	+10,000	<0.01%
Sales Output	Aggregate	$371.404	$371.158	-$0.246	-0.07%
GDP	Aggregate	$215.525	$215.424	-$0.100	-0.05%
RDPI	Aggregate	$165.511	$165.122	-$0.389	-0.23%

2016 $ trillions

Emissions would fall under the carbon tax, and fall more quickly from power than from non-power sources

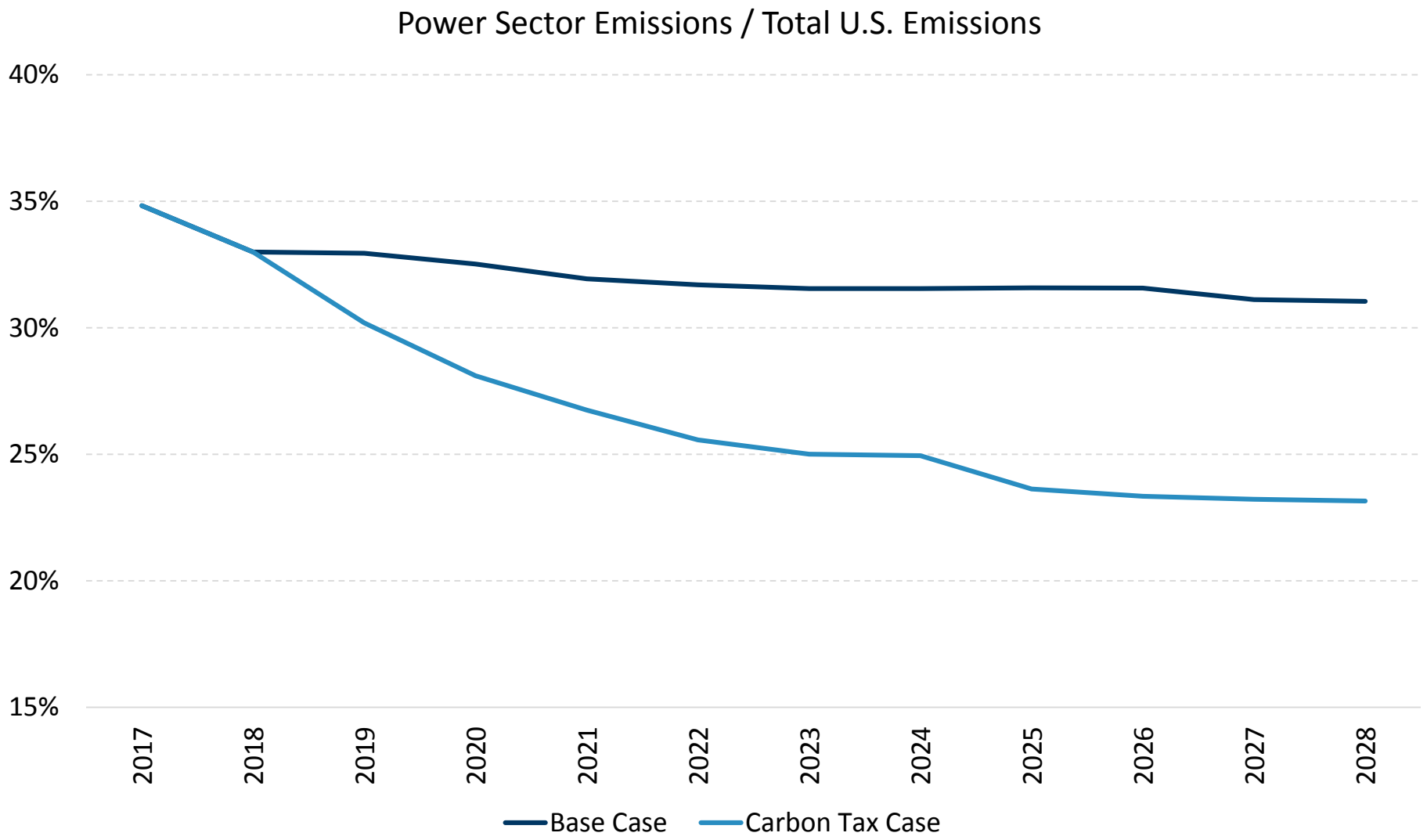


- In the Base Case from CTAM (for non-power emissions) and PLEXOS (from the power sector), emissions are consistent around 5 billion metric tons per year
- Versus the Base Case, in 2028, emissions in the Carbon Tax Case fall by 1.25 billion metric tons
  - Non-power emissions decline to under 3 billion metric tons
  - Power emissions decline to under 1 billion metric tons
- The power sector tends to be the more elastic than the non-power sector because:
  - Fossil fuel consumption is often paired with nondurable goods, such as cars or houses, that can take decades to depreciate
  - The carbon intensity of electricity can decline faster because generators can utilize a range of different technologies

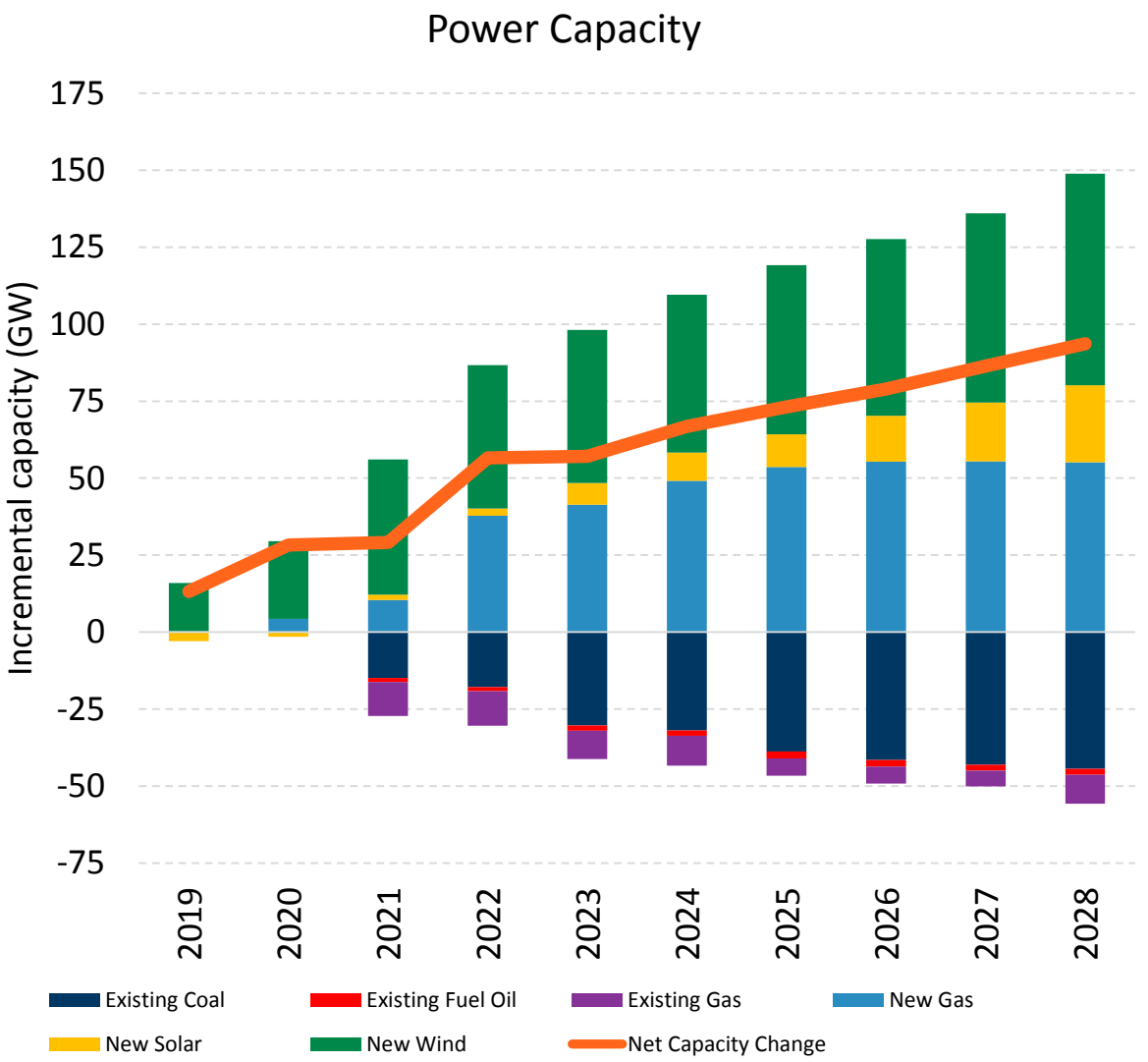
Projected emissions from 2019 through 2028 – cumulative emissions would fall by 7.3 billion metric tons

RESULT	CASE	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2019-2028
Total	Base	5,142	5,119	5,069	5,032	5,007	4,990	4,966	4,941	4,899	4,890	55,168
Total	Carbon Tax	4,886	4,705	4,558	4,412	4,305	4,220	4,054	3,942	3,848	3,753	47,809
Total	Difference	-257	-414	-511	-620	-701	-769	-912	-999	-1,052	-1,136	-7,371
Total	Percentage	-5%	-8%	-10%	-12%	-14%	-15%	-18%	-20%	-21%	-23%	-13%
Non-Power	Base	3,448	3,454	3,450	3,437	3,427	3,415	3,398	3,381	3,375	3,372	37,584
Non-Power	Carbon Tax	3,410	3,383	3,339	3,284	3,229	3,167	3,096	3,022	2,954	2,884	35,198
Non-Power	Difference	-38	-72	-111	-153	-198	-248	-302	-359	-421	-487	-2,389
Non-Power	Percentage	-1%	-2%	-3%	-4%	-6%	-7%	-9%	-11%	-12%	-14%	-6%
Power	Base	1,694	1,665	1,619	1,595	1,579	1,574	1,568	1,560	1,524	1,518	17,584
Power	Carbon Tax	1,475	1,322	1,219	1,128	1,076	1,053	958	920	894	869	12,612
Power	Difference	-219	-342	-400	-467	-503	-521	-610	-640	-631	-649	-4,982
Power	Percentage	-13%	-21%	-25%	-29%	-32%	-33%	-39%	-41%	-41%	-43%	-28%

The Carbon Tax Case would reduce power sector emissions to less than 25% of total U.S. emissions by 2025

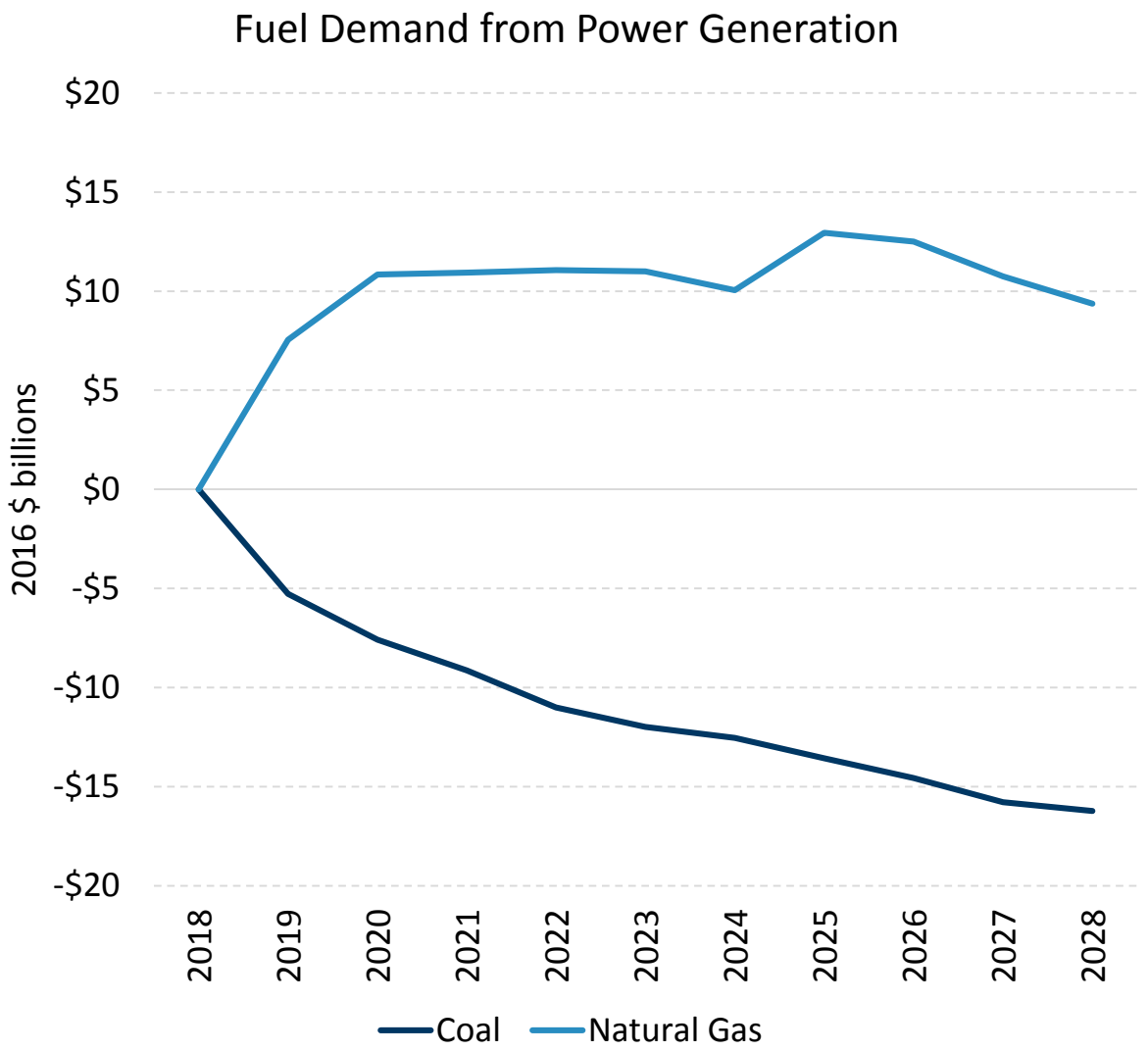


The power sector would add new gas, wind, and solar while accelerating the retirements of older fossil fuel plants



- The power sector responds to price signals in PLEXOS, which include the taxes embedded in coal, gas, and oil prices in two ways:
  - Short-term dispatch (day-to-day)
  - Long-term capacity (additions and retirements of existing units)
- The carbon tax would increase the cost of generating electricity using fossil fuel inputs for fuel, as well as:
  - Hasten the economic retirement of carbon-intensive units
  - Incentivize investments in low- or no-carbon technologies, such as new natural gas-combined cycle plants, wind, and solar
- PLEXOS forecasts the following changes in the power sector:
  - 94 gigawatts (“GW”) of new wind and solar capacity
  - 55 GW of new gas plants
  - 56 GW of retirements for older coal, gas, and oil units

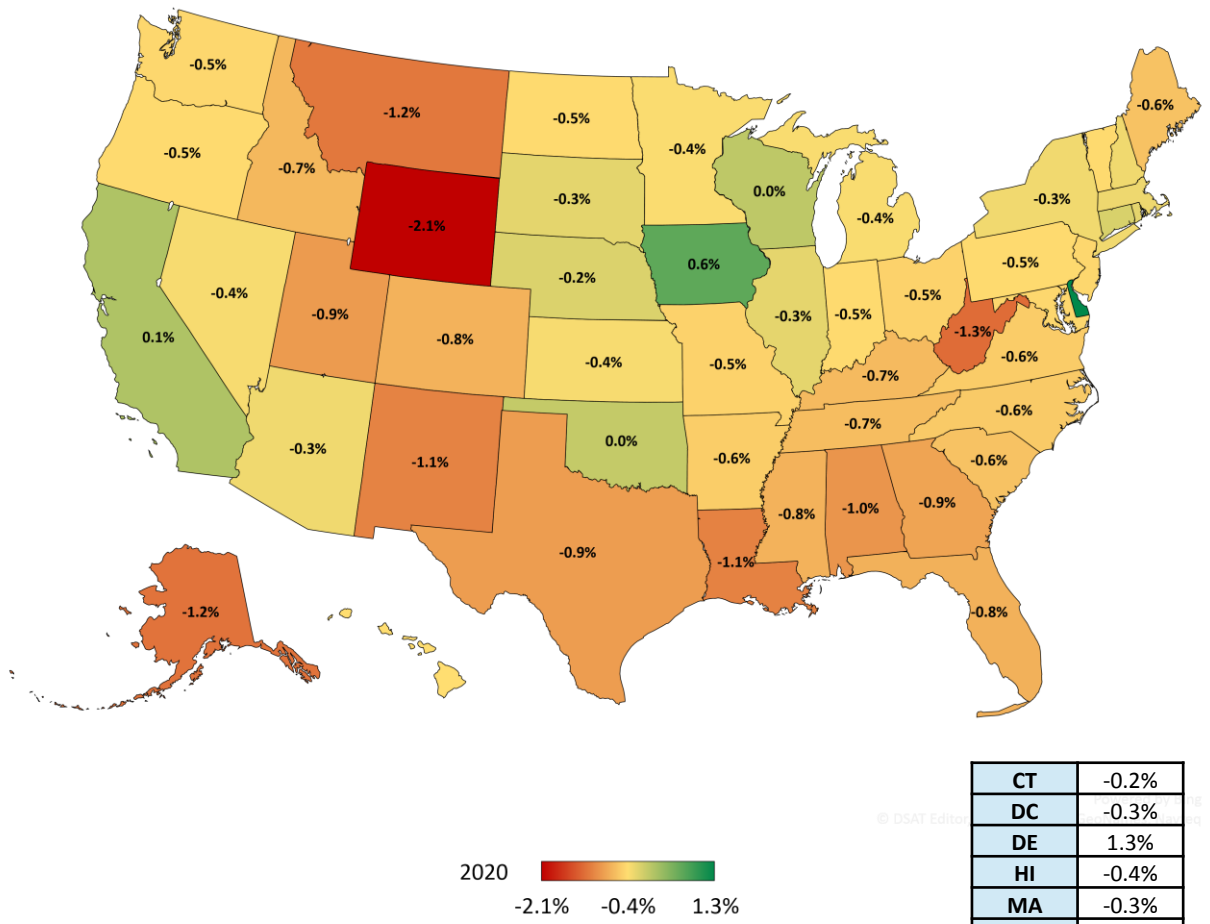
As the power sector evolves, demand for natural gas would increase while demand for coal would decrease



- According to PLEXOS, the U.S. power sector would add a net of 46 GW of natural gas plants:
  - 55 GW of new gas plants
  - 9 GW of older gas plants retired
- These new gas plants would serve as base load and intermediate load as a replacement for retiring coal plants, oil plants, and older, less efficient natural gas plants
  - The change in capacity would change fuel demand from the power sector
  - This results in lower demand for coal and higher demand for natural gas shown
- Largest producing states:
  - Coal = Wyoming, West Virginia, Kentucky, Pennsylvania, Illinois, Montana, and Texas
  - Natural gas = Texas, Pennsylvania, Oklahoma, Louisiana, Ohio, Colorado, and West Virginia

The map below shows the impact to state-by-state GDP for 2020 shortly after the beginning of the policy design

State-by-State GDP (2020)



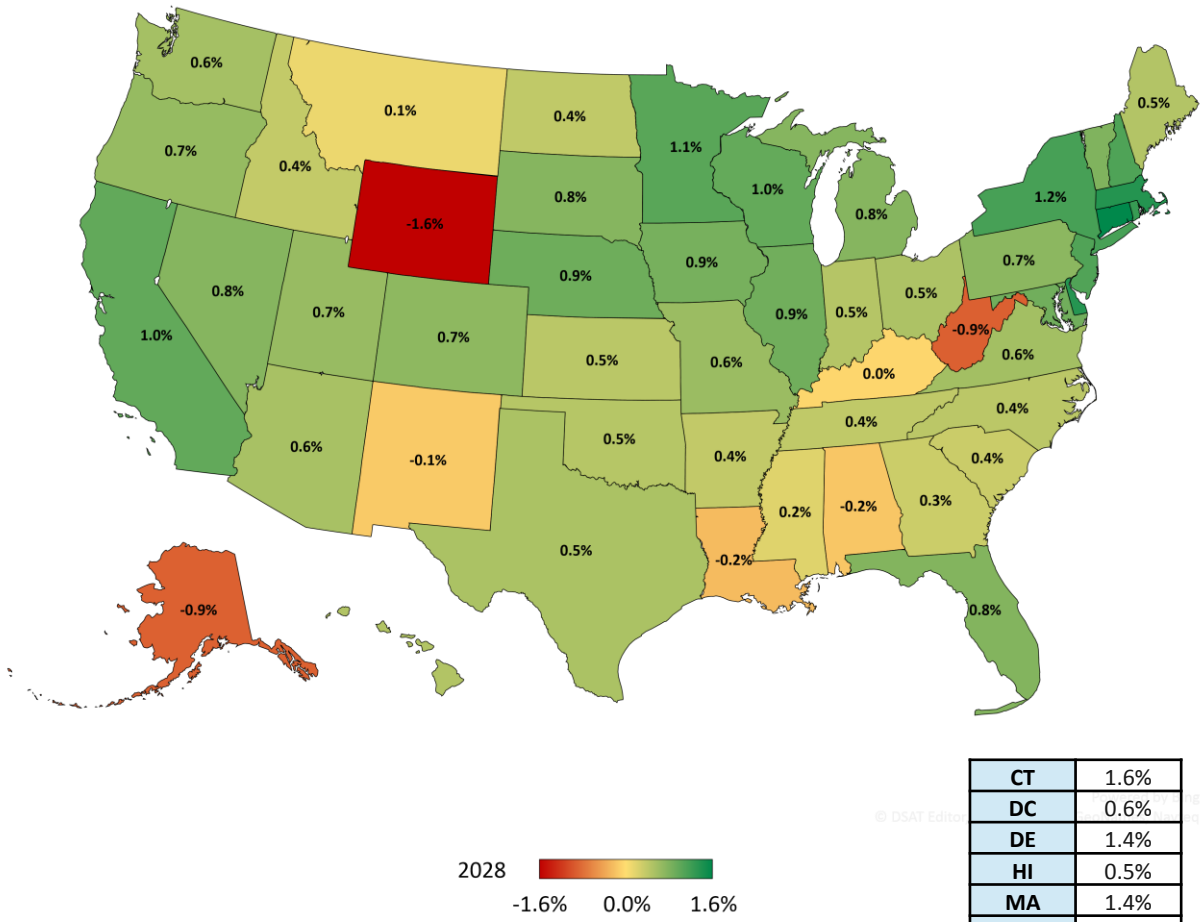
CT	-0.2%
DC	-0.3%
DE	1.3%
HI	-0.4%
MA	-0.3%
MD	-0.5%
NH	-0.3%
NJ	-0.5%
RI	-0.3%
VT	-0.5%

- In 2020, three factors dominate the economic impact from the policy design under analysis:
  - Capital investments in the power generating sector
  - Fuel demand for electricity
  - Delaying tax cuts under the ACA overwise taking effect in 2020
- States with renewable energy resources or are a hub for the insurance or healthcare sectors would experience the most positive impacts to GDP, including:
  - Iowa (and the Midwest)
  - Delaware and Connecticut
- States with significant coal sectors, such as Wyoming and West Virginia, would have the most negative impact to GDP

FTI CONSULTING

By 2028, once the TCJA extensions are active, GDP would increase in most states (with a few exceptions)

State-by-State GDP (2028)



2028

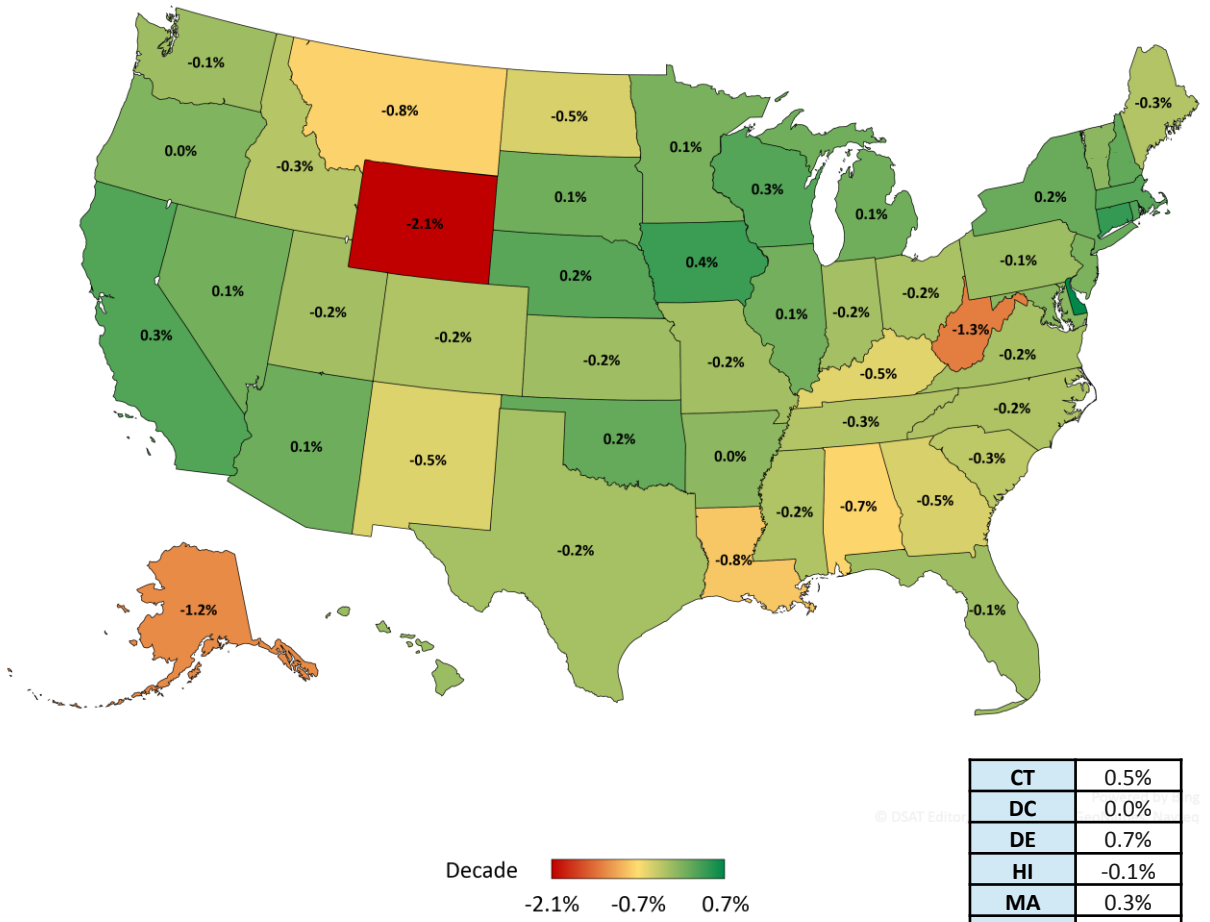
-1.6% 0.0% 1.6%

CT	1.6%
DC	0.6%
DE	1.4%
HI	0.5%
MA	1.4%
MD	0.9%
NH	1.1%
NJ	1.1%
RI	1.3%
VT	0.8%

- As discussed, the most significant part of the policy – the extension of the TCJA provisions – does not begin until after 2025
- Thus, the positive economic impact of the carbon tax policy occurs at the end of the analysis
- Seven states would experience a negative impact to GDP
  - Wyoming and West Virginia would have the worst impacts because of their adversely-impacted coal sectors
  - Many energy-intensive states, such as Texas and Oklahoma, would have a positive impact because of their large natural gas extraction sectors
  - All states would benefit from tax cuts to some degree

The map shows the cumulative impact to state GDP through the analysis period from 2019 through 2028

State-by-State GDP (annual average, 2019-2028)



CT	0.5%
DC	0.0%
DE	0.7%
HI	-0.1%
MA	0.3%
MD	0.0%
NH	0.2%
NJ	0.0%
RI	0.3%
VT	0.0%

- Over half (30) of the states would experience an impact between ±0.25% of GDP
  - Only three states (Alaska, West Virginia, and Wyoming) would experience an impact of less than -1% because of reduced demand for coal and petroleum
  - In contrast, states across the Northeast, Great Plains, and West Coast would experience a neutral to positive impact on GDP due to increased renewable resource development and the benefit of the TCJA extensions for American households
- Every state has its own unique mixture of taxpayers, industries, and their own energy sectors:
  - Oklahoma, for instance, has significant fossil resources
  - Much of them are gas, however, and Oklahoma also has a large quantity of wind resources

FTI CONSULTING

Technical appendix

EXPERTS WITH **IMPACT™**