NATIONAL ASSOCIATION OF
Manufacturers

**Ross Eisenberg**

*Vice President*
*Energy and Resources*

March 13, 2013

The Honorable Steve Scalise
Vice Chairman, Energy and Power Subcommittee
Energy and Commerce Committee
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Scalise:

The National Association of Manufacturers (NAM), the nation's largest industrial trade association representing over 12,000 small, medium and large manufacturers in every industrial sector and in all 50 states, appreciates the leadership role you have taken in the ongoing debate over a carbon tax. To assist your efforts, enclosed is an economic study performed for the NAM by NERA Economic Consulting that measures the potential impacts of a carbon tax on the U.S. economy. NERA modeled both a $20 per ton carbon tax increasing at 4 percent and a stricter tax designed to achieve 80 percent reductions in domestic carbon dioxide ($CO_2$) emissions. In both scenarios, a carbon tax was bad for the economy and would have a negative effect on jobs, energy costs and industrial output.

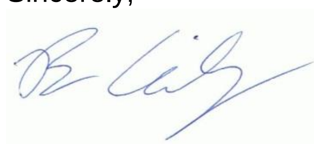
NERA concluded that the increased costs of coal, natural gas and petroleum products due to a carbon tax would ripple through the economy, resulting in higher production costs, less spending on non-energy goods, fewer jobs and slower economic growth. Nationally, a carbon tax designed to reduce $CO_2$ levels by 80 percent could place tens of millions of jobs at risk and raise gasoline prices by over $10 a gallon, natural gas prices by almost $60 per MMBtu, and residential electricity prices by over 40 percent. NERA also found that a carbon tax would have a negative impact on manufacturing output. In energy-intensive sectors manufacturing output could drop by as much as 15.0 percent and in non-energy-intensive sectors by as much as 7.7 percent. The overall impact on jobs would be substantial, with a loss of worker income equivalent to between 1.3 million and 1.5 million jobs in 2013 and between 3.8 million and 21 million by 2053.

The NAM's member companies continue to develop and implement measures that use energy more efficiently, utilize alternative sources of energy, and develop new technologies leading to fewer GHG emissions. Through innovation, manufacturers have led a quantum shift in energy production in this country that, along with the potential to create millions of new jobs, will help lead to a sustainable future for generations to come.

As the enclosed study by NERA concludes, a carbon tax would have a net negative effect on consumption, investment and jobs, resulting in lower federal revenues from taxes on capital and labor. Any revenue raised by a carbon tax—under both carbon tax cases—would be far outweighed by the negative impacts to the overall economy.

Provided below is a link to the NAM's website where the results of our carbon tax study can be viewed as well as more detailed state-level impact reports. Thank you again for your leadership; we look forward to working with you on this and other key manufacturing issues.

Sincerely,



Ross Eisenberg
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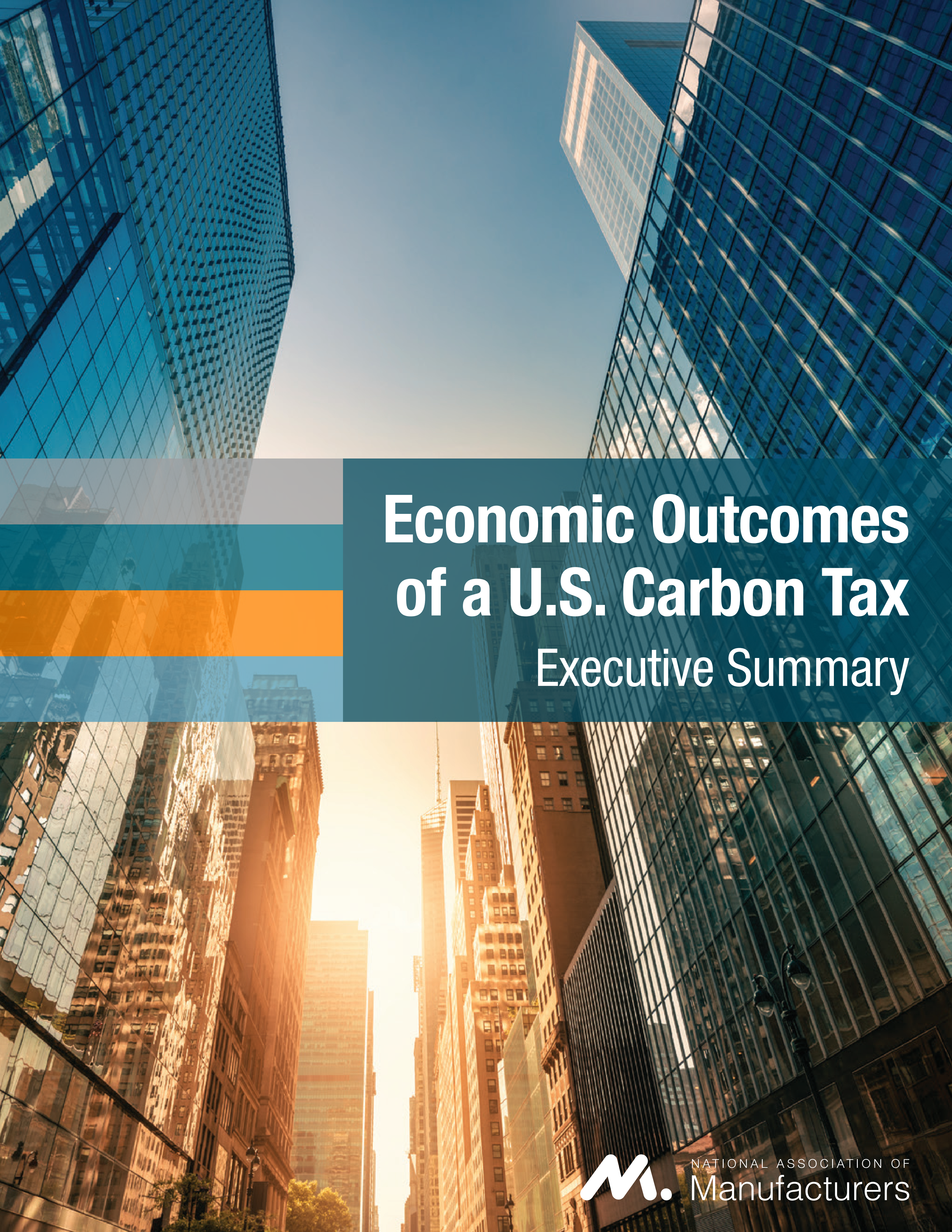
Enclosure
NAM Carbon Study (http://www.nam.org/Issues/Energy-and-Climate/Carbon-Tax.aspx)



# Economic Outcomes of a U.S. Carbon Tax

## Executive Summary

National Association of Manufacturers

# Economic Outcomes of a U.S. Carbon Tax

## Executive Summary

# [ Overview ]

During the ongoing debate on how to address our nation's fiscal challenges, some have suggested that imposing a carbon tax would improve the U.S. economy at the same time it reduces carbon emissions. A new study released by the National Association of Manufacturers (NAM), *Economic Outcomes of a U.S. Carbon Tax,*[1] models two carbon tax cases (a $20/ton case and an 80 percent reduction case) across 2013–2053 and concludes that the net effects on the U.S. economy would be negative. Specific findings based on these two carbon tax cases include the following:

- Any revenue raised by a carbon tax—under both carbon tax cases—would be far outweighed by the negative impacts to the overall economy.
- A carbon tax would have a net negative effect on consumption, investment and jobs, resulting in lower federal revenues from taxes on capital and labor.
- Factoring in lost revenue from reduced economic activity, the *net* revenue from a carbon tax available for deficit/debt reduction and lower tax rates is relatively small.
- The increased costs of coal, natural gas and petroleum products due to a carbon tax would ripple through the economy and result in higher production costs and less spending on non-energy goods.
- A carbon tax would lead to lower real wage rates because companies would have higher costs and lower labor productivity. Over time, workers' incomes could decline relative to baseline levels by as much as 8.5 percent in the 80 percent reduction case.
- The negative impact of a carbon tax on total manufacturing output would be significant, with output from energy-intensive manufacturing sectors dropping as much as 15.0 percent and output from non-energy-intensive manufacturing sectors dropping as much as 7.7 percent.

1 Using an economy-wide, computable general equilibrium model (NERA Economic Consulting's $N_{ew}$ERA Model), the study includes estimates of the effects of a carbon tax in two major areas: the U.S. economy (which includes economic activity measured by gross domestic product (GDP), personal income and various measures of effects on workers) and emissions and energy (which includes carbon dioxide ($CO_2$) emissions at the national, regional and sector levels, and outcomes in energy markets, such as electricity, natural gas, coal and oil). The study reports national and regional results. The $N_{ew}$ERA Model combines a detailed plant-specific representation of the electric sector and the related coal sector with representation of the rest of the sectors of the economy. The model is designed to assess, on an integrated basis, the effects of major policies on electricity markets, other energy markets and the overall economy. The output includes potential reductions in $CO_2$ emissions within U.S. borders.

# Setting the Stage

## What Is a Carbon Tax?

A carbon tax is a tax imposed on $CO_2$ and possibly other greenhouse gas emissions.[2] $CO_2$ emissions are due largely to the combustion of fossil fuels in electricity production, transportation, heating and various industrial and commercial processes. To reduce the administrative difficulties of monitoring $CO_2$ emissions and collecting the tax, the easiest method is to impose the tax "upstream" on producers of fossil fuels—including coal, natural gas and various petroleum products—rather than "downstream" on the emitters themselves. Thus, a carbon tax would increase the prices of fossil fuels, leading to increases in costs to consumers and businesses, as well as other economic impacts.

## Two Different Carbon Tax Cases

The report focuses on the economic and energy impacts of two different carbon tax cases, including the impacts on different industry sectors and regions of the United States:

**$20/Ton Case:** A carbon tax that begins at $20/metric ton of $CO_2$ in 2013 and increases at 4 percent per year.[3] While this case is similar to policies discussed in recent reports by the Congressional Research Service and The Brookings Institution[4] and carbon tax levels modeled by other researchers,[5] the analysis uses a different assumption for recycling the tax revenue (i.e., debt/deficit and tax rate reduction). It fails to achieve even half of the emissions reductions targeted by previous legislative proposals.

**80 Percent Reduction Case:** Tracks the $20/ton scenario until 2018, when carbon emissions are set on a trajectory toward an 80 percent reduction in carbon emissions by 2053, with a maximum tax rate set at $1,000/metric ton. Unlike the $20/ton proposal, the 80 percent reduction case would reduce carbon emissions to meet the commitments discussed in international negotiations and embedded in prior congressional legislative proposals for national cap-and-trade programs.[6]

Figure 1 compares carbon tax rates in the two cases.

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2 The term "greenhouse gas" commonly includes $CO_2$, methane ($CH_4$), nitrous oxide ($N_2O$) and fluorinated gases (hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride). Prior legislative proposals to limit greenhouse gas emissions have generally included these gases and attributed "$CO_2$ equivalent" values to them.

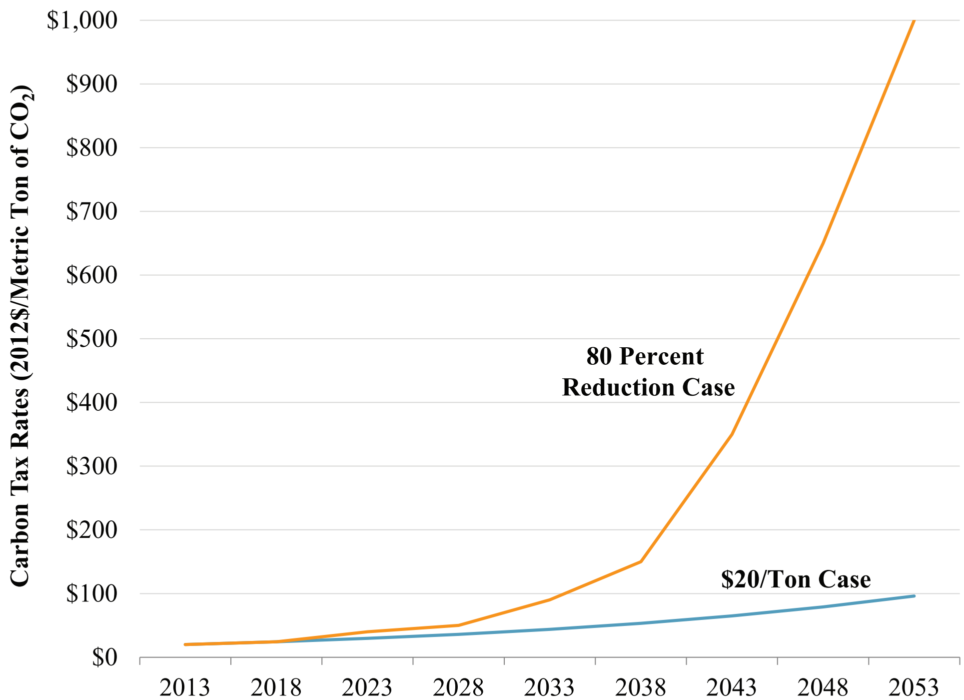
3 All values in this report are in 2012 dollars unless otherwise noted.

4 Ramseur, J.L., J.A. Leggett and M.F. Sherlock, *Carbon Tax: Deficit Reduction and Other Considerations*, Congressional Research Service report for Congress #7-5700, September 17, 2012; Muro, M., and J. Rothwell, "Cut to Invest: Institute a Modest Carbon Tax to Reduce Carbon Emissions, Finance Clean Energy Technology Development, Cut Taxes, and Reduce the Deficit," *Remaking Federalism/Renewing the Economy #7*, The Brookings Institution, November 13, 2012.

5 Rausch, S., and J. Reilly, *Carbon Tax Revenue and the Budget Deficit: A Win-Win-Win Solution?* MIT Joint Program on the Science and Policy of Global Change, Report #228, August 2012; McKibbin, W., A. Morris, P. Wilcoxen and Y. Cai, *The Potential Role of a Carbon Tax in U.S. Fiscal Reform*, Climate and Energy Economics Discussion Paper, The Brookings Institution, July 24, 2012.

6 E.g., the Waxman-Markey Bill (H.R. 2454), which passed the House in June 2009, would require greenhouse gas emissions reductions of 83 percent relative to 2005. Waxman-Markey and other similar proposals allow for international offsets so the reductions in carbon emissions in the United States would be well below the 83 percent overall reduction (depending on the cost and availability of such offsets). Another difference between the 80 percent reduction case and cap-and-trade bills like Waxman-Markey is that those bills had provisions for the banking of allowances.

*Figure 1: Carbon Tax Rates (2012$/Metric Ton of $CO_2$) in the Two Carbon Tax Cases*




## Recycling Revenue

The net revenue[7] collected from the carbon tax in both cases is used to reduce the federal debt/deficit and personal income tax rates (but not below 2012 tax rates). The baseline assumes the continuation of individual tax rates and spending programs at 2012 levels, with the added assumption that the federal debt never exceeds 100 percent of GDP. Once debt does reach 100 percent, individual tax rates revert back to their pre-2001 levels. Thus, the higher personal income tax rates come into effect starting in 2023 in the baseline.

A carbon tax would have a net negative effect on consumption, investment and labor market decisions, resulting in lower federal revenue from taxes on capital and labor. As a result, even with a high tax on carbon, the *net* revenue from a carbon tax would be significantly less than the projected carbon tax proceeds themselves. This is because existing tax revenue would fall due to lessened economic activity. In the $20/ton case, the amount of tax revenue reductions ranges from $43 billion in 2013 to $145 billion in 2053. In the 80 percent reduction case, the loss in federal revenue rises to $910 billion by 2053.

7 Total new revenue from the carbon tax minus federal revenue lost from the negative effects of the carbon tax on economic activity.

# [ Impact of a Carbon Tax ]

## Effects on the U.S. Economy and Households

Based on the report, the net aggregate effects of the two carbon tax cases on the U.S. economy and households would be negative.

Figure 2 illustrates the net effects on the overall economy as measured by GDP and household consumption. Under the $20/ton case, GDP would be reduced by about 0.5 percent ($97 billion) in 2023. Over time, the negative impact of the 80 percent reduction case on GDP is substantially greater, reducing GDP growth by 3.6 percent (almost $1.4 trillion) by 2053.

*Figure 2: Macroeconomic Impacts of Carbon Tax Cases*

| | Present Value | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|---|
| ***Baseline*** | | | | | | |
| GDP (Billions, 2012$) | $396,400 | $14,940 | $19,400 | $24,680 | $31,280 | $38,120 |
| ***$20/Ton Case*** | | | | | | |
| GDP (% Change from Baseline) | -0.5% | -0.4% | -0.5% | -0.5% | -0.5% | -0.6% |
| Change in Average Consumption per Household[8] | -$310 | -$20 | -$340 | -$350 | -$440 | -$440 |
| ***80 Percent Reduction Case*** | | | | | | |
| GDP (% Change from Baseline) | -1.2% | -0.4% | -0.5% | -1.0% | -2.5% | -3.6% |
| Change in Average Consumption per Household | -$920 | -$80 | -$690 | -$860 | -$1,510 | -$2,680 |

Note: Present value calculated using a 5 percent real discount rate, which is the rate used in the model.

The predicted change in average consumption per household from the two carbon tax cases is also negative and is substantial in the later years under an 80 percent reduction case. Note that the results reflect market responses to the carbon tax (i.e., changes in consumer behavior in response to higher costs associated with a carbon tax). Thus, individuals would not purchase the same goods and services as in the baseline, but would substitute other items that become a lower cost due to the carbon tax. This modeling aspect lowers the impacts on household consumption below what they would have been if the baseline consumption mix of goods and services were assumed to be purchased.

In a $20/ton case, average household consumption would be reduced by about $350 in 2033 and by about $440 in 2053, with a present value reduction over the period 2013–2053 of $310 per household. Under the 80 percent reduction case, the average household consumption declines by about $860 per household in 2033 and by almost $2,700 per household in 2053, with a present value reduction of $920 per household over the entire period.

8 These changes in consumption are relative to an average baseline household consumption of $94,000. Note that average household consumption is significantly larger than the more commonly reported figure of median household consumption because of the impact of very high income households. Also, average U.S. household consumption presently exceeds average household income due to household debt.

## Effects on Wages and Employment

Similarly, a carbon tax would lead to lower real wage rates because companies would have higher costs and lower labor productivity. Figure 3 focuses on several dimensions of projected impacts of a carbon tax on workers' income. Lower real wage rates directly reduce workers' incomes even if workers continue to work the same number of hours. At the same time, lower wage rates decrease workers' willingness to work as many hours, leading to reduced labor force participation. With fewer hours worked, total labor income declines by a greater percentage than does the wage rate. These are the net effects on labor in aggregate and include the positive benefits of increased labor demand in sectors providing energy and other goods and services that have low carbon intensity.

*Figure 3: Labor Impacts of Carbon Tax Cases*[9]

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Baseline Job Equivalents* (Thousands)*** | 138,700 | 153,100 | 168,100 | 183,600 | 201,000 |
| ***$20/Ton Case*** | | | | | |
| Wage Rate (% Change from Baseline) | -0.8% | -1.0% | -0.9% | -1.1% | -1.2% |
| Labor Income (% Change from Baseline) | -1.0% | -1.1% | -1.1% | -1.2% | -1.4% |
| Job Equivalents (Change from Baseline, Thousands) | -1,510 | -2,290 | -2,520 | -3,210 | -3,770 |
| ***80 Percent Reduction Case*** | | | | | |
| Wage Rate (% Change from Baseline) | -0.6% | -1.2% | -1.7% | -4.3% | -7.2% |
| Labor Income (% Change from Baseline) | -0.8% | -1.3% | -1.9% | -5.1% | -8.3% |
| Job Equivalents (Change from Baseline, Thousands) | -1,260 | -2,750 | -4,430 | -11,860 | -20,670 |

* Total job equivalents equals total labor income change divided by the average annual income per job. This does not represent a projection of the number of workers who may need to change jobs and/or be unemployed, as some or all of the lost labor could be spread across workers who remain employed. The model used in this study makes assumptions about economic decisions based on expected future tax levels. Thus, in the early years, despite the tax being set at the same level in both scenarios, the economic impacts are different as the expectations of future tax levels are different.

The impacts on labor income in both carbon tax scenarios are substantial, particularly in the 80 percent reduction case in the later years. For the $20/ton case, labor income declines relative to baseline levels by about 1 percent throughout the period, resulting in job-equivalent losses that range from about 1.5 million job equivalents in 2013 to about 3.8 million job equivalents in 2053. Under the 80 percent reduction case, decreases in labor income relative to baseline levels range from about 1 percent in the early years to 8.3 percent by the end of the period, resulting in losses of job equivalents relative to baseline levels ranging from about 1.3 million job equivalents in 2013 to almost 21 million job equivalents by 2053.

9 The total reduction in labor income is spread over many workers, most of whom may be able to continue to work, but its dollar magnitude can be placed in context by estimating the equivalent number of average jobs that such labor payments would fund under baseline wage rates. To state the labor income changes in terms of such job equivalents in Figure 3, the reduction in labor income is divided by the annual baseline income from the average job. The loss of one job equivalent may be manifested as a combination of fewer people working and less income per worker. However, this measure allows us to express employment-related impacts in terms of an equivalent number of employees earning the average prevailing wage.

## Effects on $CO_2$ Emissions and Energy Markets

As illustrated in Figure 4, in the $20/ton case, $CO_2$ emissions would be reduced by about 1,800 million metric tons by 2053, a 31 percent reduction relative to 2005 emissions levels and far short of the 80 percent reduction targeted by previous climate legislative proposals. The 80 percent reduction case would, by design, result in substantially greater emissions reductions. By 2053, the carbon tax would reduce $CO_2$ emissions by about 70 percent relative to 2005 emissions.[10]

*Figure 4: $CO_2$ Emissions and Reductions of Carbon Tax Cases (Million Metric Tons of $CO_2$)*

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Baseline*** | | | | | |
| $CO_2$ Emissions | 5,450 | 5,530 | 5,650 | 5,790 | 5,890 |
| ***$20/Ton Case*** | | | | | |
| $CO_2$ Emissions | 5,210 | 4,670 | 4,590 | 4,640 | 4,110 |
| % Reduction from Baseline | 4% | 16% | 19% | 20% | 30% |
| % Reduction from 2005 | 13% | 22% | 23% | 23% | 31% |
| ***80 Percent Reduction Case*** | | | | | |
| $CO_2$ Emissions | 5,210 | 4,400 | 3,610 | 2,590 | 1,760 |
| % Reduction from Baseline | 4% | 20% | 36% | 55% | 70% |
| % Reduction from 2005 | 13% | 27% | 40% | 57% | 71% |

*Figure 5: Energy Prices of Carbon Tax Cases (Prices Including Carbon Tax)*

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Baseline Prices ($/MMBtu for Coal/Natural Gas, $/Gallon for Gasoline, ¢/kWh for Electricity)*** | | | | | |
| Average Minemouth Coal Price | $1.61 | $1.79 | $2.01 | $2.06 | $1.76 |
| Wellhead Natural Gas Price | $3.78 | $4.85 | $6.09 | $8.42 | $10.49 |
| Gasoline Price | $3.51 | $4.07 | $4.31 | $5.02 | $5.51 |
| U.S. Residential-Delivered Electricity Price | 12.0¢ | 13.7¢ | 14.3¢ | 16.0¢ | 17.1¢ |
| ***$20/Ton Case ($/MMBtu for Coal/Natural Gas, $/Gallon for Gasoline, ¢/kWh for Electricity)*** | | | | | |
| Average Minemouth Coal Price | $3.39 | $4.34 | $5.84 | $7.84 | $10.61 |
| Wellhead Natural Gas Price | $5.43 | $6.43 | $8.46 | $11.69 | $15.14 |
| Gasoline Price | $3.72 | $4.37 | $4.74 | $5.64 | $6.43 |
| U.S. Residential-Delivered Electricity Price | 13.4¢ | 15.4¢ | 16.7¢ | 19.3¢ | 20.5¢ |
| ***80 Percent Reduction Case ($/MMBtu for Coal/Natural Gas, $/Gallon for Gasoline, ¢/kWh for Electricity)*** | | | | | |
| Average Minemouth Coal Price | $3.34 | $5.35 | $9.84 | $34.47 | $95.38 |
| Wellhead Natural Gas Price | $5.42 | $7.21 | $11.28 | $25.77 | $62.66 |
| Gasoline Price | $3.74 | $4.43 | $5.06 | $8.03 | $14.57 |
| U.S. Residential-Delivered Electricity Price | 13.5¢ | 16.2¢ | 18.6¢ | 25.9¢ | 24.3¢ |

Note: MMBtu stands for million metric British thermal units, and kWh is the symbol for kilowatt hours.

10 Although this case represents a sequence of carbon tax rates selected to place the U.S. economy on a path toward 80 percent reduction by 2053, the decision to cap the carbon tax rate at $1,000/ton causes it to fall short of the precise 80 percent reduction mark in the last few years of the modeled time period.

Figure 5 shows the energy prices (inclusive of the carbon tax) projected under the two carbon tax cases and for the baseline. The price changes reflect both the effect of the carbon tax (which increases fossil fuel prices by an amount determined by the carbon content of the fuel and the level of the carbon price) and the effect of market adjustments, as fossil fuel users adjust to alternative sources in light of higher-priced fuels. Residential-delivered electricity prices increase as a result of the increased costs for fossil fuels due to the carbon tax.

Figure 6 shows the projected impacts on the electricity sector in terms of coal-fired, electricity-generating unit retirements and overall electricity demand. As expected, the imposition of a carbon tax increases the quantity of coal unit retirements, with higher tax rates leading to greater retirement levels. Even the $20/ton case is projected to cause three times the amount of coal retirements in the near term compared to the baseline. The anticipated higher carbon taxes in later years motivate the near-term retirements of the coal units (and further near-term capital investments to keep such plants operational become uneconomical). However, relatively low forecasted natural gas prices exacerbate the extent of the coal unit retirements. Under the $20/ton case, electricity demand declines about 11 percent below the baseline in 2033 and about 12 percent in 2053. In contrast, the 80 percent reduction case causes electricity demand to drop by 17 percent in 2033 and around 25 percent afterward relative to the baseline.

*Figure 6: Electricity Sector Impacts of Carbon Tax Cases*

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Baseline*** | | | | | |
| Coal Retirements (GW) | 4 | 36 | 37 | 39 | 39 |
| U.S. Electricity Demand (TWh) | 3,990 | 4,280 | 4,640 | 4,990 | 5,380 |
| ***$20/Ton Case*** | | | | | |
| Coal Retirements (GW) | 5 | 108 | 112 | 119 | 160 |
| U.S. Electricity Demand (TWh) | 3,890 | 3,960 | 4,150 | 4,370 | 4,740 |
| % Change (Relative to Baseline) | -2.4% | -7.7% | -11.0% | -12.0% | -12.0% |
| ***80 Percent Reduction Case*** | | | | | |
| Coal Retirements (GW) | 5 | 141 | 213 | 295 | 295 |
| U.S. Electricity Demand (TWh) | 3,890 | 3,830 | 3,840 | 3,590 | 4,020 |
| % Change (Relative to Baseline) | -2.4% | -11.0% | -17.0% | -28.0% | -25.0% |

Note: GW stands for gigawatt, and TWh is the symbol for terawatt hours.

## Varying Impact on Different Sectors of the Economy

A carbon tax would also have a varying impact on different sectors of the economy. The study looks at changes in sector output, reflecting changes in the quantity of output and in the prices/value of output in both the energy and non-energy sectors of the economy.

Figure 7 shows the estimated changes in energy sector output. Coal has the highest carbon content among primary fossil fuels. Consequently, the value of output declines most dramatically in the coal sector. The refined petroleum products sector also sees a large decline in output relative to the baseline. This is attributable to higher gasoline prices (because of the carbon tax adder), which lead to declines in vehicle miles travelled and increases in miles per gallon of the personal transportation fleet. There is also an increasing use of lower carbon alternative fuels, which reduce demand for conventional gasoline and diesel.

In contrast, the natural gas sector experiences both increases and decreases. In the near term, natural gas output gains at the expense of coal under both scenarios. Eventually, however, in the 80 percent reduction case, natural gas becomes too expensive for the electricity sector, leading to declines. Natural gas usage increases again in the much longer term when it is used in the rising production of lower carbon transportation fuel alternatives. Note that domestic crude oil output does not change substantially because prices are set in global markets. Because imports represent the crude oil that is supplied at the margin, the reduction in refined petroleum output is reflected in reduced crude imports.

*Figure 7: Energy Sector Output (Percentage Change from Baseline)*

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Coal*** | | | | | |
| $20/Ton Case | -16.0% | -44.0% | -45.0% | -40.0% | -55.0% |
| 80 Percent Reduction Case | -17.0% | -54.0% | -87.0% | -98.0% | -99.0% |
| ***Crude Oil*** | | | | | |
| $20/Ton Case | 0.5% | -0.2% | 0.1% | -0.1% | -0.1% |
| 80 Percent Reduction Case | 0.8% | -1.2% | -3.9% | -9.6% | -12.0% |
| ***Natural Gas*** | | | | | |
| $20/Ton Case | 3.1% | 0.8% | 1.8% | -1.7% | -5.0% |
| 80 Percent Reduction Case | 3.1% | 4.8% | 9.4% | -18.0% | -6.5% |
| ***Refined Petroleum Products*** | | | | | |
| $20/Ton Case | -0.6% | -2.5% | -6.4% | -9.0% | -11.0% |
| 80 Percent Reduction Case | -0.6% | -4.4% | -9.9% | -22.0% | -63.0% |

As illustrated in Figure 8, the negative impact of a carbon tax on manufacturing output would be significant, with output from energy-intensive manufacturing sectors dropping as much as 15.0 percent and output from non-energy-intensive manufacturing sectors dropping as much as 7.7 percent.

*Figure 8: Non-Energy Sector Output (Percentage Change from Baseline)*

| | 2013 | 2023 | 2033 | 2043 | 2053 |
|---|---|---|---|---|---|
| ***Agriculture*** | | | | | |
| $20/Ton Case | -0.6% | -1.4% | -1.3% | -1.6% | -1.8% |
| 80 Percent Reduction Case | -0.3% | -1.1% | -1.8% | -5.8% | -9.7% |
| ***Commercial Services*** | | | | | |
| $20/Ton Case | -0.1% | -0.4% | -0.4% | -0.5% | -0.5% |
| 80 Percent Reduction Case | -0.1% | -0.5% | -0.7% | -1.6% | -2.7% |
| ***Transportation Services (Excluding Personal Transportation)*** | | | | | |
| $20/Ton Case | -0.3% | -0.8% | -0.8% | -1.0% | -1.1% |
| 80 Percent Reduction Case | -0.2% | -0.9% | -1.4% | -3.6% | -5.9% |
| ***Energy-Intensive Manufacturing*** | | | | | |
| $20/Ton Case | -0.4% | -2.2% | -2.2% | -2.6% | -2.7% |
| 80 Percent Reduction Case | -0.2% | -2.2% | -3.4% | -8.4% | -15.0% |
| ***Non-Energy-Intensive Manufacturing*** | | | | | |
| $20/Ton Case | -0.7% | -1.0% | -0.9% | -1.1% | -1.3% |
| 80 Percent Reduction Case | -0.3% | -0.5% | -1.0% | -4.6% | -7.7% |

# [ Conclusion ]

The carbon tax cases modeled in this study would have net negative effects on consumption, investment and overall economic activity. Moreover, taking into account the lost revenue from less economic activity, the *net* revenue from a carbon tax available for deficit/debt reduction and lower tax rates is relatively small.

At the same time, the increased costs of coal, natural gas and petroleum products due to a carbon tax would ripple through the economy and result in higher production costs and less spending on non-energy goods. For workers, a carbon tax would lead to lower real wage rates because companies would have higher costs and lower labor productivity. Over time, workers' incomes could decline relative to baseline levels by as much as 8.5 percent.

For manufacturers, the net negative impact of a carbon tax on manufacturing output would be significant. Relative to baseline levels, output from energy-intensive manufacturing sectors could decline as much as 15.0 percent, and output from non-energy-intensive manufacturing sectors could decrease as much as 7.7 percent.

Overall, the net impact of a carbon tax would be negative, as the adverse effects of the imposition of such a tax would outweigh any benefits, including the reduction of the deficit/debt and lower personal income tax rates.

www.nam.org