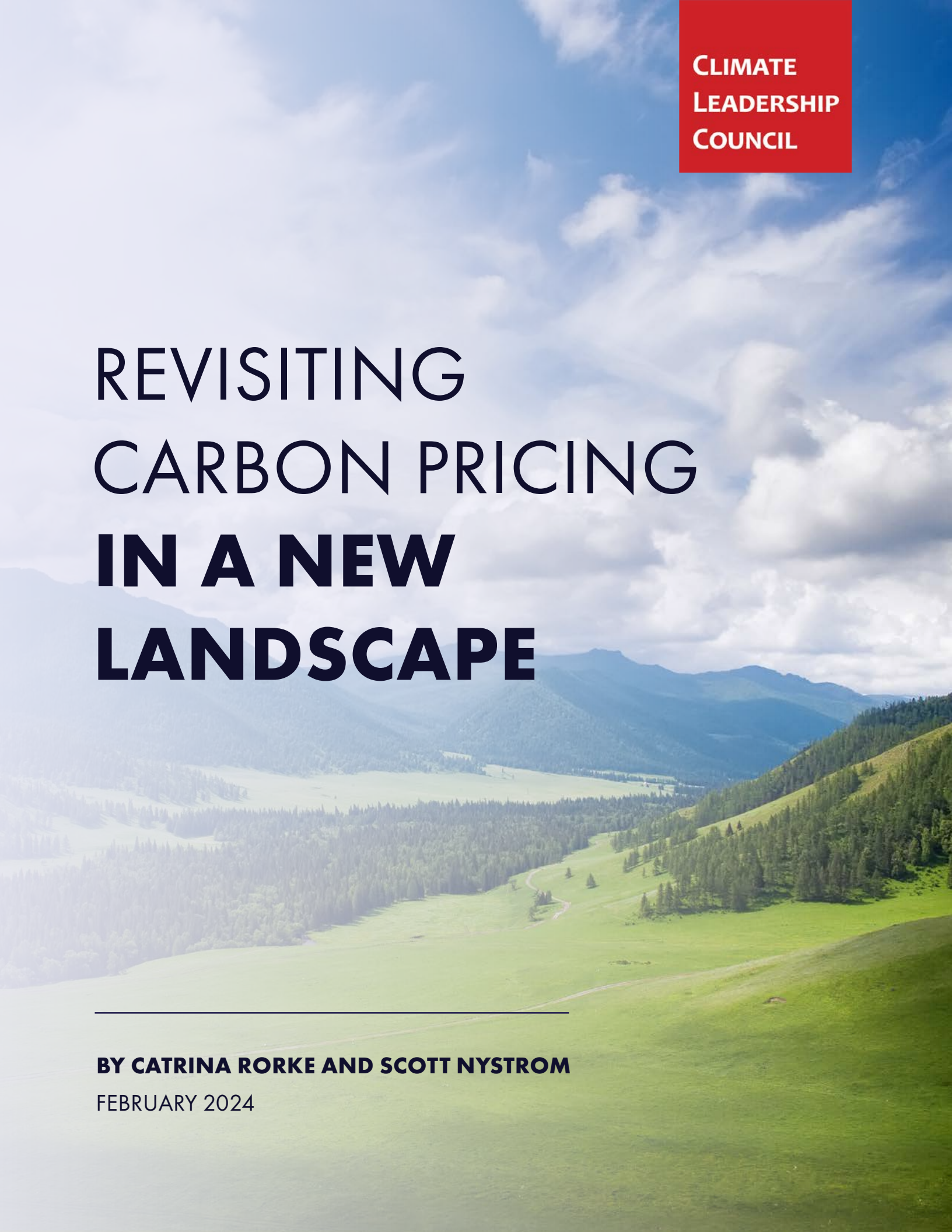


CLIMATE LEADERSHIP COUNCIL

REVISITING CARBON PRICING **IN A NEW LANDSCAPE**

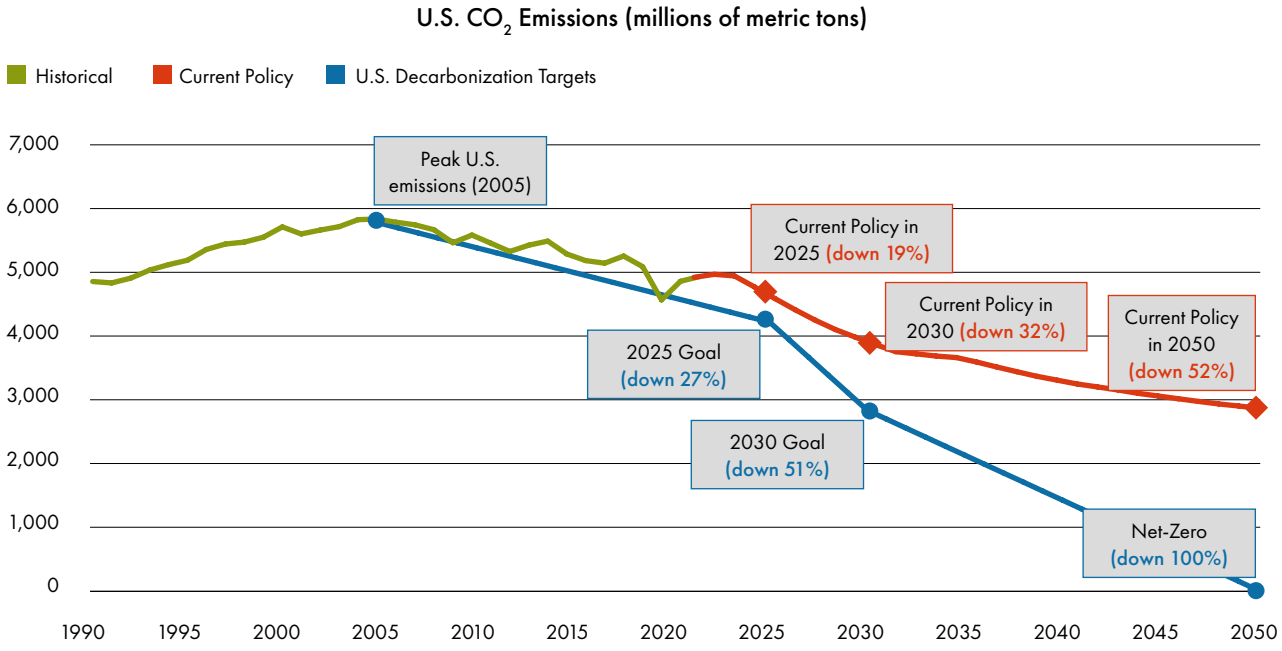
BY CATRINA RORKE AND SCOTT NYSTROM

FEBRUARY 2024

I. INTRODUCTION: ASSESSING PROGRESS TOWARD U.S. GREENHOUSE GAS REDUCTION TARGETS

Since 2020, a flurry of legislative action has transformed the domestic energy and climate outlook and committed hundreds of billions of dollars to decarbonization across the electric power, industrial, transportation, and building sectors. Reflecting this domestic ambition, the U.S. has deepened its decarbonization commitments: the Obama administration pledged to lower emissions roughly 27% below 2005 levels by 2025, and President Biden committed the U.S. to lower emissions to less than half of the 2005 peak by 2030 and to achieve net-zero emissions by midcentury.[1] New targets for U.S. emissions goals are due to our international partners in 2025.

FIGURE 1 – U.S. EMISSIONS REDUCTION TARGETS AND CURRENT POLICY



Recent federal legislation, including the Energy Act of 2020, the Infrastructure Investment and Jobs Act of 2021, the CHIPS and Science Act of 2022, and the Inflation Reduction Act of 2022, amounted to significant incentives for innovation and new technology deployment to accelerate the clean energy transition. Initial estimates suggested these bills would amount to over $500 billion in federal disbursements; more recent analyses push the estimate over the $1 trillion mark.[2] Paired with emerging regulatory efforts, the U.S. energy landscape is dramatically altered from previous decades.

Nevertheless, the U.S. is not on track to meet its reduction targets. The U.S. has so far cut emissions only about 20% from 2005.[3] With the package of legislation from the last four years taken into account, we expect emissions to fall 32% below 2005 levels by 2030 and 52% below by 2050. As Figure 1 demonstrates, these projected emissions underperform against stated U.S. emissions reduction targets.

A sober assessment of U.S. emissions reduction targets reveals that achieving the near-, medium-, or long-term goals will be exceptionally difficult under any potential scenario. However, there are additional policies available to increase by a significant degree the rate of domestic emissions reduction possible and bring the U.S. considerably closer to its goals.

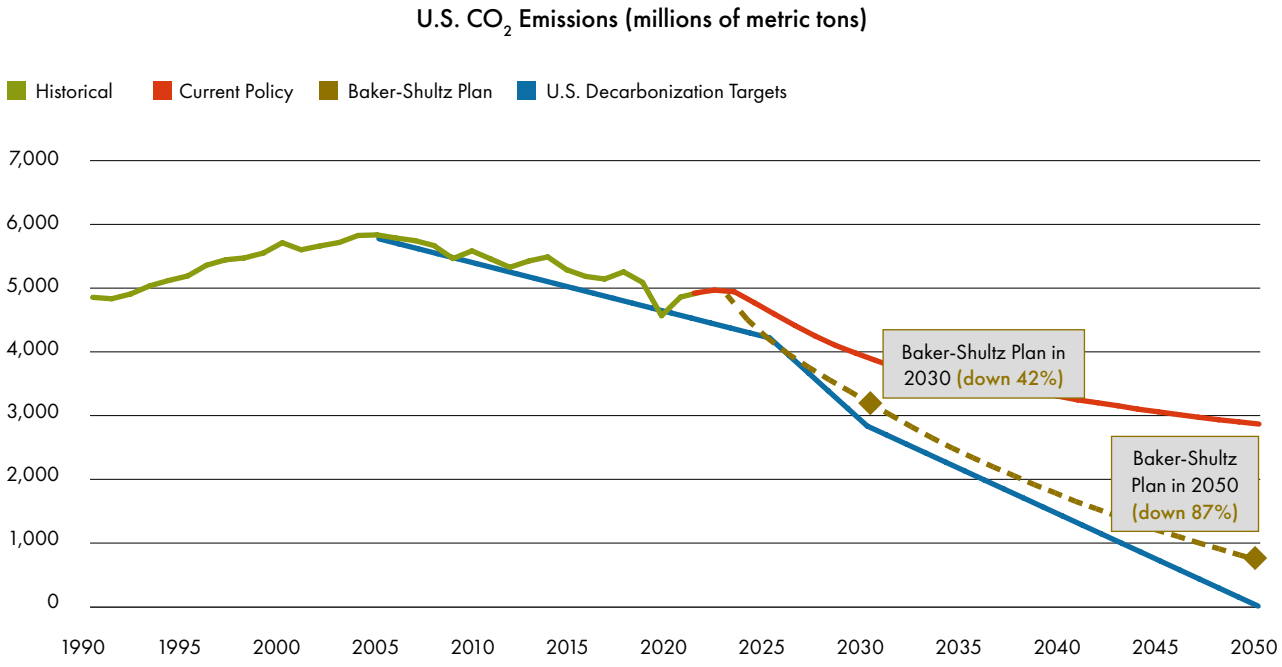
HOW A CARBON PRICE EFFICIENTLY ACCELERATES U.S. EMISSIONS REDUCTION

The Baker-Shultz Carbon Dividends Plan would introduce a carbon price at $40/ton CO2 (2017$) rising at 5% over inflation each year on energy and industrial process emissions across the economy.[4] Introducing a carbon fee according to this design would substantially speed greenhouse gas emissions reduction, accelerate the emergence of new technologies, increase technology deployment, stimulate efficiency improvements, and support innovation throughout the economy.

This analysis relies on the Climate Leadership Council's Emissions, Revenues, and Technology ("CERT") model to examine how a carbon price would contribute to emissions reduction in the new U.S. policy environment.[5] CERT is a technology deployment model that examines future U.S. energy and economic trends, including the supply and demand of liquid and gaseous fuels, electricity, technology deployment across the economy and energy sector, federal revenues, and climate policies changing the pathway for decarbonization for the U.S. through the midcentury.[6]

As Figure 2 shows, a carbon fee would more than double anticipated emissions reduction compared to 2025 in 2050 and put the U.S. economy on a similar trajectory to nearly meet its declared greenhouse gas targets. The U.S. could achieve a 42% emissions reduction from 2005 peak levels by 2030 (versus a 51% emissions reduction pledge) and an 87% reduction below 2005 levels by 2050 (versus a net-zero pledge). No other policy option can bring the U.S. as close to the stated targets as a price on carbon.

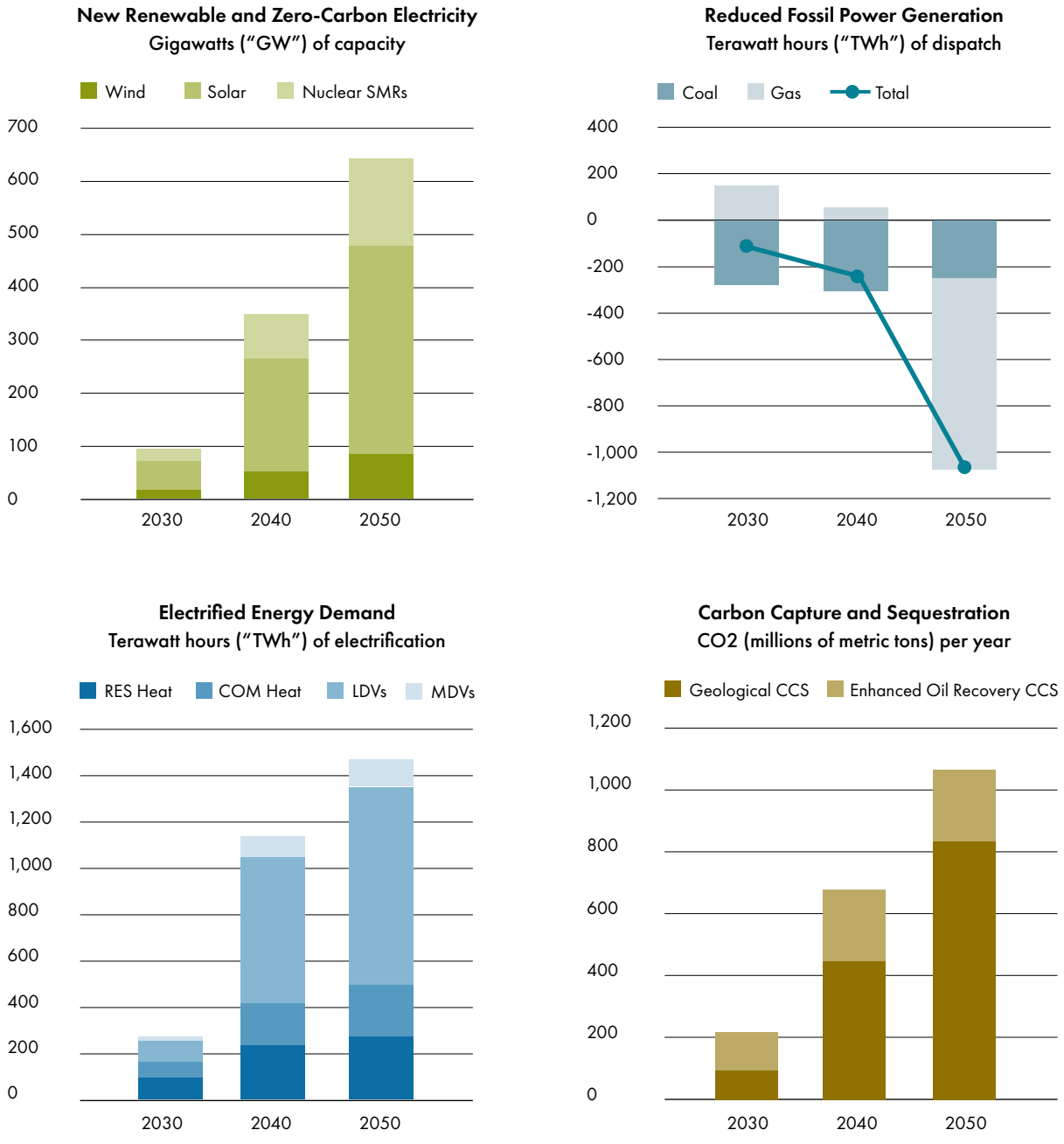
FIGURE 2 – ACHIEVING DECARBONIZATION TARGETS WITH THE BAKER-SHULTZ CARBON DIVIDENDS PLAN



A carbon fee encourages innovation across the economy. It accelerates technology replacement, unlocks cost reductions through "learning by doing," and increases benefits from initial research.[7] CERT shows the Baker Shultz Plan drives emissions reduction through electrification, zero-carbon power generation, fuel switching in power markets, efficiency, and discrete technology deployment.

Between 2025 and 2035, emissions reduction primarily come from familiar technology like solar and wind power and coal-to-gas switching in power dispatch. After 2035, emerging technologies like Small Modular Reactors ("SMRs"), widespread vehicle electrification, and carbon capture and sequestration ("CCS") gain an increasingly important role in furthering deeper levels of U.S. decarbonization.

FIGURE 3 – ADDITIONAL TECHNOLOGY DEPLOYMENT WITH A CARBON PRICE COMPARED TO CURRENT POLICY



By 2050, the carbon fee incentivizes an additional 84 GW of wind capacity (about 56% of present capacity) and 393 GW of solar capacity (3.1x present capacity) beyond levels anticipated under current policy. Baker-Shultz helps revitalize the nuclear fleet with 166 GW of SMRs. New zero-carbon generation helps reduce coal and natural gas dispatch by nearly 1,100 TWh per year by 2050.

The increasingly clean grid in turn serves growing energy demand as electrification replaces direct fuel use in residential and commercial heating ("RES Heat" and "COM Heat" in Figure 3) and in light-duty and a portion of the medium-duty vehicle fleets ("LDVs" and "MDVs" in Figure 3). By 2050, CCS technology would sequester over one billion metric tons of CO2 each year.

An added benefit of the carbon fee is an improvement in direct and indirect efficiency. At present, the U.S. energy system converts approximately one-third of primary energy into useful energy. Two-thirds of primary energy is wasted to heat losses from power, fuel combustion, and transmission and distribution. By 2050, Baker-Shultz increases the successful conversion rate to roughly one-half.

Beyond these considerations, revenues netted from a carbon fee provide an opportunity to return dividends to American households. A carbon fee also justifies the streamlining of redundant regulations.

CONCLUSION

A carbon fee will accelerate technology deployment, incentivize innovation, and boost efficiency across the economy. This will result in lower U.S. emissions compared to the Current Policy scenario. The Baker-Shultz Plan increases the rate of emissions reduction[8] from a compounded 2.1% per year to 6.7% per year from 2023 to 2050. The carbon price would help the U.S. cut emissions 42% below 2005 levels by 2030, 57% by 2035, and 87% by 2050. The carbon price offers the U.S. a realistic pathway to moving substantially closer to even its most ambitious emissions reduction pledges.

ENDNOTES

1 In each case, the U.S. goal is set in terms of reductions of net emissions (after land-use changes) for all greenhouse gases ("GHGs"). CO2 is the most important GHG (about 80% of all GHG emissions on a carbon-equivalency basis) and is thus the focus of this proposal. The CO2 price would likely generate accompanying reductions in methane, but those reductions are not directly reflected in Figure 1 and Figure 2. The Biden administration is taking action on other GHGs through a variety of measures designed to reduce those emissions.

2 https://budgetmodel.wharton.upenn.edu/estimates/2023/4/27/update-cost-climate-and-energy-inflation-reduction-act

3 Ben King, Michael Gaffney, and Alfredo Rivera, "Preliminary U.S. Greenhouse Gas Emissions Estimates for 2023," Rhodium Group, January 10, 2024, https://rhg.com/research/us-greenhouse-gas-emissions-2023/

4 Additional plan details, including those pertaining to an emissions assurance mechanism, the carbon dividend, regulatory trade, and border carbon adjustments, are described in the Council's Bipartisan Climate Roadmap, available at, https://clcouncil.org/report/bipartisan-climate-roadmap/

5 More information on the assumptions, data, and modeling techniques used to create the CERT model are described in the Council's methodology memorandum, https://clcouncil.org/reports/CERT_Methodology_Memorandum.pdf

6 Like all models, the input assumptions regarding technology availability, technology cost, and competitiveness are based on present understanding of the market. Beyond 2035, the impact and mix of technology deployment is informative but increasingly speculative because of a lack of certain information about future innovation and changes to technology deployment and utilization throughout the economy.

7 David Bailey, "Unlocking Net Zero Emissions: Accelerating Innovation & Deployment through Carbon Pricing," March 2023, https://clcouncil.org/report/unlocking-net-zero-emissions/

8 Compound Annual Growth Rate ("CAGR") from 2023 to 2050

clcouncil.org