COMMITTEE ON
ENERGY & COMMERCE
CHAIRMAN FRANK PALLONE, JR.

MEMORANDUM

December 2, 2019

To: Subcommittee on Environment and Climate Change Members and Staff

Fr: Committee on Energy and Commerce Staff

Re: Hearing on "Building a 100 Percent Clean Economy: Solutions for Economy-Wide Deep Decarbonization"

On **Thursday, December 5, 2019, at 10:30 a.m. in room 2322 of the Rayburn House Office Building**, the Subcommittee on Environment and Climate Change will hold a hearing entitled, "Building a 100 Percent Clean Economy: Solutions for Economy-Wide Deep Decarbonization." The hearing will consider economy-wide approaches to address climate change in the United States.

I. BACKGROUND

Throughout the 116th Congress, the Subcommittee on Environment and Climate Change and the Subcommittee on Energy have held a series of hearings focused on decarbonizing the U.S. economy, including hearings on pathways to deep decarbonization, the industrial sector, buildings, heavy-duty transportation, the power sector, and environmental justice. This hearing will focus on economy-wide, rather than sector-specific, measures to address climate change. In contrast to policies that focus on individual segments of the economy, economy-wide policies have cross-cutting impacts across all sectors. These measures may include carbon pricing, complementary policies, and various forms of state-level action. A comprehensive climate strategy will likely require some combination of these and other policy solutions.[1]

II. CARBON PRICING

Economists and climate policy experts largely agree that an economy-wide price on carbon is needed to reduce greenhouse gas (GHG) emissions at a meaningful scale.[2] A carbon price charges polluters, either directly or indirectly, for each ton of carbon dioxide (CO_2) they

[1] Hal Harvey, *Designing Climate Solutions: A Policy Guide for Low-Carbon Energy* (2018).

[2] *See, e.g.*, Robert Stavins, *The Future of U.S. Carbon-Pricing Policy*, National Bureau of Economic Research (May 2019); Severin Borenstein, et al., *Expecting the Unexpected: Emissions Uncertainty and Environmental Market Design*, American Economic Review (Aug. 2019); and Institute for Policy Integrity, *Economists and Climate Change: Consensus and Open Questions* (Nov. 2009).

emit.[3] Carbon pricing provides flexibility for individual sources to select the most cost-effective way to reduce emissions.[4]

Carbon pricing typically takes one of two forms: a cap-and-trade system or a carbon tax.[5] While both mechanisms aim to achieve the same outcome, they do so in fundamentally different ways. Cap-and-trade systems limit emissions at the outset and let the market determine the price of abatement. Carbon taxes, on the other hand, set the price of abatement without guaranteeing an emissions outcome.[6] In both cases, carbon pricing can generate substantial revenue. Those funds can be put towards various uses, such as providing dividend payments to households; funding transition assistance in adversely effected communities; investing in climate mitigation and adaptation efforts; deficit reduction; or tax reduction.[7]

Globally, there are 57 carbon pricing initiatives in effect or in development. In 2018, those programs collectively represented 20 percent of global GHG emissions and raised $44 billion in revenues.[8] The following sections provide an overview of the two main carbon pricing mechanisms, as well as the complementary policies needed to accompany them.

A. Cap-and-Trade

A cap-and-trade system places a limit, or cap, on GHG emissions from certain sources. The government then issues allowances (or permits), each representing one ton of emissions, via auction or free allocation. Regulated entities must hold enough allowances at the end of each compliance period to account for their emissions. Those with insufficient allowances may purchase the remaining amount from other parties or incur a penalty. Conversely, those with excess allowances may sell them to other parties or, if allowed, "bank" them for use in future years.[9] The ability to trade allowances creates a financial incentive for regulated sources to reduce emissions below the cap.

Cap-and-trade systems provide "quantity certainty" by capping emissions at a set, predictable level. Emissions costs then fluctuate based on the buying and selling of

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[3] Congressional Research Service, *A Brief Comparison of Two Climate Change Mitigation Approaches: Cap-and-Trade and Carbon Tax (or Fee)* (Feb. 12, 2019) (IF11103).

[4] Resources for the Future, *Carbon Pricing 101* (rff.org/publications/explainers/carbon-pricing-101/) (Jun. 6, 2019).

[5] The terms "carbon tax" and "carbon fee" are often used interchangeably. Both concepts function similarly in practice, but the terminology affects jurisdiction and certain design features.

[6] *See, e.g.*, note 3.

[7] Union of Concerned Scientists, *Carbon Pricing 101* (ucsusa.org/resources/carbon-pricing-101) (Jan. 8, 2017).

[8] World Bank Group, *State and Trends of Carbon Pricing 2019* (Sept. 2019).

[9] *See, e.g.*, notes 3 and 4.

allowances.[10] Cap-and-trade systems can be designed to ensure that allowance prices stay above or below certain levels, guaranteeing "price certainty."[11]

The United States has a long and successful history with cap-and-trade programs. The Acid Rain Program, established under the Clean Air Act Amendments of 1990, created a highly effective trading system to limit emissions of sulfur dioxide and nitrogen oxides.[12] The United States is now also home to two cap-and-trade systems for GHG emissions: the Regional Greenhouse Gas Initiative (RGGI) and the California cap-and-trade program.

RGGI, the first mandatory cap-and-trade system in the Nation, launched in 2009 and now includes nine Northeastern and Mid-Atlantic states.[13] New Jersey and Pennsylvania plan to join in 2020, while Virginia may follow suit in 2021. RGGI covers emissions from the power sector, including any power plant with a capacity of 25 megawatts or greater.[14] Since 2009, RGGI states raised $3.2 billion in revenues from the program. Research suggests that the trading system has contributed to the region's overall emissions decline.[15] California's cap-and-trade program, launched in 2014, covers 85 percent of the state's GHG emissions. The cap applies to electricity generators, large industrial facilities, and fuel distributors (including transportation fuels and natural gas).[16] California credits its cap-and-trade system, in part, for the declining carbon intensity of the state's power sector.[17]

The European Union's Emissions Trading System (ETS) is the largest cap-and-trade system in the world, covering 45 percent of Europe's emissions.[18] Launched in 2005, the ETS caps emissions from power plants, industrial facilities, and airlines operating between member countries. Research suggests that the ETS reduced European emissions ten percent between 2005 and 2012.[19] The program raised some $42.4 billion since 2005, including around $16.8 billion in 2018 alone.

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[10] *See* note 3.

[11] Resources for the Future, *Quantities with Prices* (Mar. 2018).

[12] U.S. Environmental Protection Agency, *Acid Rain Program* (epa.gov/airmarkets/acid-rain-program) (Apr. 3, 2018).

[13] Congressional Research Service, *The Regional Greenhouse Gas Initiative: Background, Impacts, and Selected Issues* (Jul. 16, 2019) (R41836).

[14] *Id.*

[15] *Id.*

[16] California Air Resources Board, *Overview of ARB Emissions Trading Program* (Feb. 9, 2015) (arb.ca.gov/cc/capandtrade/guidance/cap_trade_overview.pdf).

[17] California Air Resources Board, *California Greenhouse Gas Emissions for 2000 to 2017* (2019) (arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf).

[18] European Commission, *2020 Climate & Energy Package* (ec.europa.eu/clima/policies/strategies/2020_en) (accessed Nov. 26, 2019).

[19] OECD, *The Joint Impact of the European Union Emissions Trading System on Carbon Emissions and Economic Performance* (Dec. 14, 2018).

B. Carbon Taxes

A carbon tax (or fee) is levied on each ton of CO_2 emitted from covered sources, creating a direct incentive for polluters to reduce emissions.[20] Key elements of carbon tax design include scope and coverage (i.e., which fuels, sectors, and gases are subject to the tax); the initial tax rate and annual rate of increase; the point of taxation (i.e., where along the supply chain the tax is imposed); revenue allocation; and international trade protections.[21] In contrast to cap-and-trade systems, carbon taxes provide "price certainty" by setting a predictable price on pollution. The effect on actual emissions reductions then depends on regulated entities' sensitivity to the price.[22] A well-designed carbon tax, however, can provide some degree of "quantity certainty" by including backstop mitigation measures.[23]

Numerous carbon taxes have been proposed in the United States. They vary widely in form and function, particularly in regard to scope and coverage, revenue allocation, and the tax rate itself. Current proposals, for example, set initial tax rates ranging from $15 to $52 per ton of CO_2 in 2020 and increasing to as much as $160 per ton by 2050.[24]

C. Complementary Policies

Although carbon pricing has an important role to play in reducing emissions, most experts believe it will be insufficient on its own to enable deep decarbonization.[25] Carbon pricing must, instead, be part of a broader portfolio of solutions, including a wide a range of complementary policies.

Complementary policies are defined by two key features. First, they correct market failures not addressed by a carbon price (such as addressing public underinvestment in clean energy technologies).[26] Second, complementary policies reduce emissions while simultaneously achieving other policy objectives (such as reducing local air pollution).[27] Complementary

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[20] *See* note 3 and Tax Policy Center, *Taxing Carbon: What, Why, and How?* (Jun. 2015).

[21] Columbia Center on Global Energy Policy, *US Carbon Tax Design: Options and Implications* (Jan. 2018).

[22] *See* note 3.

[23] Nicholas Institute for Environmental Policy Solutions, Duke University, *Increasing Emissions Certainty under a Carbon Tax* (Oct. 2016).

[24] *See, e.g.*, Columbia Center on Global Energy Policy, *What You Need to Know About a Federal Carbon Tax in the United States* (energypolicy.columbia.edu/what-you-need-know-about-federal-carbon-tax-united-states) (accessed Nov. 26, 2019) and Congressional Research Service, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th through 116th Congresses* (Oct. 23, 2019) (R45472).

[25] *See* note 1 and World Resources Institute, *Putting a Price on Carbon: Evaluating a Carbon Price and Complementary Policies for a 1.5°C World* (Sept. 2019).

[26] Columbia Center on Global Energy Policy, *Interactions Between a Federal Carbon Tax and Other Climate Policies* (Mar. 2019).

[27] *Id.*

policies may include: regulating GHG emissions and other pollutants not covered by the tax; energy efficiency and fuel economy standards; or funding for clean energy technologies and infrastructure.[28]

In sectors less responsive to a price on carbon, complementary policies are particularly important. The transportation, buildings, and industrial sectors, for instance, typically have very slow turnover rates. Given that replacements of long-lived assets in these sectors are made infrequently, they will be slow to respond to a price on carbon.[29] Policies such as border adjustment measures or preferential allowances could ensure the competitiveness of domestic energy-intensive and trade-exposed (EITE) industries that operate in highly competitive global markets, where entities may choose to relocate overseas rather than comply with a carbon price.[30]

III. THE ROLE OF STATES

Economy-wide climate policies are not limited to the federal level. Since 2015, five states – California, Colorado, Hawaii, Maine, and New York – have adopted economy-wide emissions reductions or carbon neutrality targets.[31] These targets complement a wide range of sector-specific policies. For instance, 29 states and the District of Columbia have adopted Renewable Portfolio Standards or Clean Energy Standards. Those standards mandate that a specified share of utilities' electricity sales come from renewable or clean energy sources.[32]

States are also working to reduce barriers to climate-related financing. They increasingly recognize the importance of access to capital in spurring innovation and supporting research, development, demonstration, and deployment of low-carbon technologies. Five states have established "green banks," which mobilize public and private funding to invest in mitigation and adaptation initiatives.[33] Green banks in California, Connecticut, and New York have together spurred more than $3.8 billion in clean energy investment since their inception.[34]

Partnerships between states and the Federal Government can play an important role in economy-wide climate action. Most major U.S. environmental statutes create roles and

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[28] *Id*.

[29] *See* note 26.

[30] Center for Climate and Energy Solutions, *Getting to Zero*; Center for American Progress, A 100 Percent Clean Future

[31] Center for American Progress, State Fact Sheet: A 100 Percent Clean Future (americanprogress.org/issues/green/reports/2019/10/16/475863/state-fact-sheet-100-percent-clean-future/) (Oct. 16, 2019).

[32] Database of State Incentives for Renewables & Efficiency, *Renewable & Clean Energy Standards* (Jun. 2019) (bit.ly/35EvAJX).

[33] Coalition for Green Capital, *Example Green Banks* (accessed Nov. 26, 2019) (coalitionforgreencapital.com/green-banks/).

[34] United States Climate Alliance, *Green Banking* (accessed Nov. 26, 2019) (usclimatealliance.org/greenbanks).

responsibilities for regulators at both the federal and state level.[35] This partnership arises from the potential interstate and national impacts of environmental degradation. Under this framework – known as "cooperative federalism" – Congress creates the law, the executive branch sets standards to implement the law, and states are granted flexibility in how to best meet those standards.[36] This relationship has long been an effective model for preserving clean air, water, and land in the United States.

A similar model may be well-suited for climate policy. Within a state-federal approach, the Federal Government could set minimum requirements for economy-wide emissions reductions (i.e., requiring that all states meet a specified target by a given date).[37] States would then have the flexibility to develop plans to meet (or exceed) that standard based on their policy preferences, priorities, and particular circumstances. The Federal Government would then review, approve, or disapprove such plans and could maintain "backstop" authority to intervene if a state does not comply with the standard.[38]

IV. WITNESSES

The following witnesses have been invited to testify:

Tim Profeta
Director, Nicholas Institute for Environmental Policy Solutions
Duke University

Noah Kaufman, Ph.D.
Research Scholar, Center on Global Energy Policy
Columbia University

Daniel C. Esty
Director, Center for Environmental Law and Policy; and
Hillhouse Professor of Environmental Law and Policy
Yale University

David K. Gattie, Ph.D.
Associate Professor, College of Engineering
University of Georgia

[35] Environmental Council of the States, *Cooperative Federalism 2.0: Achieving and Maintaining a Clean Environment and Protecting Public Health* (Jun. 2017).

[36] *Id.*

[37] Nicholas Institute for Environmental Policy Solutions, Duke University, *Using the Old to Solve the New — Creating a Federal/State Partnership to Fight Climate Change* (Oct. 2019).

[38] *Id.*