

Testimony of Elgie Holstein

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Technology

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Chairman Lamb, Ranking Member Weber, and Members of the Subcommittee:

Thank you for the opportunity to testify today. The clean energy revolution is underway. It is rapidly evolving into a global competition for market share in a world that is coming to understand how little time remains to avoid disastrous impacts from climate change.

But the imperative to reduce greenhouse gas emissions – and to do so quickly – is constrained by a variety of factors. Our fossil fuels-based legacy energy systems have a huge head start, with literally trillions of dollars worth of capital investment often backed by ongoing support from governments.

The costs of renewable electricity, energy efficiency, electric vehicles, and other emerging clean energy technologies have fallen steadily and will continue to do so. But even as the market continues to favor them over new coal-fired electricity generation, the existing fossil fuel and new gas-fired generating capacity, together with most of our transportation, industrial, and buildings sectors continue to require substantial quantities of fossil fuel-based energy inputs.

The result, unless we take strong action now, will be increasing levels of greenhouse gas pollution added to the dangerous concentrations already accumulated as a result of human activities – specifically, the burning of fossil fuels. In addition to greenhouse gases, other emissions from burning fossil fuels pose a continuing threat to the health of families and communities around the world.

Even as investments in, and deployments of, renewable energy, energy efficiency, electric vehicles, and other emerging clean energy technologies continue to grow, science is telling us that we need to move faster and more broadly to curb worldwide greenhouse gas emissions. The inescapable conclusion is that for as long as fossil fuels remain a part of our energy profile, we will need strategies to improve their environmental performance.

The pace of global climate change is simply too fast, and the consequences of inaction too dire, to do otherwise.

Still, even as we invest in ways to reduce the environmental impacts of make investments in cleaning up fossil fuels and in developing non-carbon alternatives, we still need the additional support of a clear policy framework that reflects the cost of carbon pollution and limits carbon emissions. That framework must be constructed on a timetable for emissions reductions sufficiently ambitious to ensure that we stay below a 2-degree Celsius increase from pre-

industrial levels in average global temperatures. In terms of a deadline, we need to achieve a net zero greenhouse gas emissions rate by 2050. Science tells us in no uncertain terms that temperature increases above the 2-degree threshold will lead to dangerous, potentially irreversible “tipping points.”

Disruption and outright loss of agricultural capacity, coastal inundation, shifting and loss of fish stocks, spreading disease vectors, widespread species extinction, super-fires, and of course, catastrophic storms and changing weather patterns are, to varying extents, happening already. If we do not act decisively, those impacts will become commonplace and far more severe. They will cost more human lives – and a lot more money. They will destroy more communities, disrupt economies and ways of life, drive destabilizing land changes, set in motion mass human migrations, and present serious new national security challenges. Future generations will never forgive us if we allow that nightmare to become real.

To make sure it does not, we must act on all fronts. Such action should reflect both domestic and international opportunities for collaboration and outreach. It must also draw upon the enormous advantages we have in science, technology, economic strength, and our skilled and educated workforce.

To fight climate change, American leadership is desperately needed both at home and internationally. Withdrawing from the Paris Climate Accord, as the President has promised to do, is a mistake. So is restricting clean energy and climate-related funding for science agencies, researchers, and programs – including at the Department of Energy, NASA, NOAA, EPA and others.

This hearing, and most of my testimony, focuses on efforts to catalyze innovation through federally supported technology research, development, demonstration and commercialization -- including of technologies that remove carbon directly from the atmosphere. But it is crucial for us to remember that even as we invest in ways to reduce the environmental impacts of fossil fuels, and develop and deploy non-carbon alternatives, we need an overarching economic policy framework.

That framework should provide enforceable, declining, and economy-wide limits on carbon emissions, while providing flexible, market-based approaches to staying within them – all on a timetable that ensures that we avoid the worst tipping points associated with unconstrained and rising greenhouse gas concentrations. That means achieving net zero global greenhouse gas emissions by 2050. Such an economic framework would ensure several things:

First, it sends a definitive signal to all sectors of our economy about where we are headed: toward a clean and sustainable energy future. That signal will awaken the collective ambitions and skills of our entrepreneurial, dynamic economy. It will serve as a call to action for everyone from inventors to international investors, including profit-seekers, scientists, and yes, political leaders -- all chasing the opportunities to make a difference and to secure a place in the accelerated, purpose-driven clean energy revolution.

Second, it will mobilize America’s vast scientific, technical, and manufacturing assets. Policy uncertainty has kept too many of those assets disengaged from the race to develop new clean energy-related technologies and to reduce the environmental harm from large-scale dependence on fossil fuels.

Third, it will stimulate corporate investment decisions, so that emissions reductions will become an important driver of R&D and capital equipment spending decisions.

Fourth, it will engender a surge in job creation as American workers produce and install the equipment needed to reduce emissions.

This economic policy framework, when paired with innovation programs, will result in deeper pollution reductions, accomplished more quickly and affordably. That's because a limit and price on emissions will accelerate demand for clean energy, creating powerful economic incentives to adopt new technologies and provide a market for innovators who develop better ways to cut carbon. Innovation programs can help make new technology options available – but in order to ensure that they will be adopted on the timeline needed to meet climate goals, we also need policies that create a level playing field that allows clean technologies to thrive.

The political will to establish carbon limits has emerged in a number of new states, including Virginia, Oregon, and Colorado. And for years, California – the largest economy among the states, (and the 5th largest in the world if it were a nation) – has been reducing its emissions ahead of schedule and at lower costs than predicted using a flexible market-based approach with declining limits on pollution. This has also been the case in regional markets, such as the Regional Greenhouse Gas Initiative (RGGI) which focuses on reducing emissions in the electricity sector.

In just the latest vote of confidence in such market-based approaches, New Jersey has just this week re-enlisted in RGGI's now-10-state collaboration to reduce greenhouse gas emissions from the electricity sector. In the U.S. and around the world, these types of flexible, market-based programs that establish limits on pollution continue to drive emissions reductions faster and more cheaply than originally expected.

While we may not yet have the bipartisan consensus needed to enact a carbon price and limit, an aggressive program to drive clean energy and climate innovation is achievable. Such an innovation portfolio will help build political confidence by accelerating the decline in the cost of emissions reductions. Happily, many Members of Congress on both sides of the aisle are coming to recognize that American industrial innovation aimed at averting climate change disaster will yield enormous economic benefits in terms of job creation, export opportunities, industrial competitiveness and more. They realize that such investments are good not only for the climate but for the health of our families and our economy as well.

That emerging consensus is reflected in the House version of the FY20 Energy and Water appropriations bill on the floor this week. The bill soundly rejects the President's recommendations to cut deeply or eliminate funding for renewable energy development, building and industrial energy efficiency programs, and for innovative financing and investment programs, including those at ARPA-E. Instead, the bill provides major funding increases across a variety of clean energy and efficiency programs.

Fighting and winning a campaign to prevent the worst impacts of climate change from occurring means we must use every tool at our disposal, and resolve to invent new ones as we go forward.

In making judgements about the pace and scope of government's innovation investments, we must always be cognizant that we have little time to avert widespread ecological and economic

disaster. But we must also have the confidence that America has the intellectual capital, the research infrastructure, the workforce, and the manufacturing prowess to solve our technology challenges. And we know that markets can be successfully harnessed to leverage and incentivize public and private investments in emissions-reducing technologies.

We do need to “do it all.” In the context of today’s hearing and the draft bills you are considering, that means mounting ambitious research, development, demonstration, and commercialization efforts aimed at those technologies that:

- a) have the potential for delivering significant greenhouse gas emissions reductions in the near- and mid-term;
- b) are targeted at sectors, industries, products and processes that are particularly difficult to de-carbonize using current technology and under current market conditions;
- c) have a viable pathway to commercialization, especially under market conditions where strong policies are in place that reflect the real cost of those emissions;
- d) hold the promise of developing both domestic and export market opportunities while opening up new job opportunities for American workers.

The bills under consideration today reflect those criteria. To be sure, there are some efforts and technology directions mentioned in the drafts that may not prove out. That is, they may not reach the goals of cost-effective de-carbonization and marketable, viable technology applications. The point is to find out. And these bills help do that. These bills provide clear direction to the Department of Energy, accompanied by significant funding authorizations, to develop roadmaps for determining how we can best enable major reductions in fossil fuel-related emissions.

The draft Fossil Energy R&D Act of 2019 provides funding in the form of grants and prizes to those with the technical skills, experience, and entrepreneurial drive to discover what works in carbon capture, storage, utilization, and removal. The bill wisely emphasizes the need for environmental integrity safeguards as part of any plan to develop and commercialize carbon management technologies. Such measures are needed to protect our successes in de-carbonizing fossil fuels from being compromised by haphazard and ineffective containment. We strongly endorse such measures as a key element of any carbon-reduction policy or program.

The draft Fossil Energy R&D bill also instructs the Department of Energy to undertake a research program to identify the best methods, and to assess the state of technology, for preventing and detecting methane emissions from the nation’s extensive natural gas infrastructure.

I have previously testified before members of this subcommittee regarding how important it is to control methane emissions, and the bill will help industry as well as state and federal policy-makers and regulators to forge solutions.

Natural gas is mostly methane, and when it leaks or is vented into the atmosphere, it is more than 80 times as potent as CO₂ over the first twenty years following its release, in terms of the damage it does to the climate. In fact, methane is responsible for about 25% of the climate change we are experiencing today. At Environmental Defense Fund, we have been studying

methane in the oil and gas sector for a number of years, along with numerous research partners from across industry and academia. We welcome the methane provisions in the draft bill.

The draft Industrial Decarbonization Technology Development Act (IDTA) tackles another aspect of our efforts to control greenhouse gas emissions. The power sector has seen many innovations that hold the promise of de-carbonizing and building resilience in our electricity sector, including cost-competitive solar and wind generation, grid management software and sensors, demand response, utility-scale storage, clean and linked micro-grids, etc. But other sectors, including buildings, process industries, shipping, aviation, and manufacturing, have not seen the same level of technology innovation and adoption.

That's why the IDTA offers a promising new focus on developing additional opportunities to drive industrial de-carbonization. The bill leverages existing DOE programs that have deep and longstanding professional experience with energy efficiency and manufacturing. Of particular value is the bill's creation of two new entities designed to leverage those capabilities. First, it creates an advisory committee to bring to the Department the best of government and private-sector expertise in developing needed new technologies.

Second, it helps the Department overcome an area of longstanding weakness: translating technology development into commercial deployment. The technical assistance provisions of the bill will help provide the outreach and connectivity with the private sector that is needed in order to maximize the de-carbonization opportunities that the Department is developing. The clearinghouse function for best practices and technology should be seen not only as a way to accelerate emissions reductions, but also as an ingredient of national industrial competitiveness.

Taken together, these two draft bills represent a strong step in the direction of answering the key question about de-carbonization: "What works?" -- and then getting solutions into the market.

Looked at more broadly, they help define the research, development, demonstration and commercialization elements of a critically needed de-carbonization agenda. As discussed above, that agenda also includes robust appropriations support for clean energy innovation.

Finally, in addition to ensuring progress toward a net-zero emissions goal by 2050, we also need a policy framework that drives emissions reductions now by setting declining limits on carbon pollution and helps achieve them by ensuring that the cost of that pollution is reflected in energy and climate markets.

Thank you for the opportunity to testify today, and I look forward to any questions you may have.

Note: Attached to this testimony is a set of principles EDF believes should be applied to any national innovation program designed to help cut greenhouse gas emissions to a tolerable level. Many of the principles are reflected in the draft bills before you, but they are useful in considering other parts of a national de-carbonization agenda as well.

EDF Clean Energy Innovation Principles

Innovation programs can play a critical role in meeting climate goals by driving the development and commercialization of new, high-impact, breakthrough emissions-reduction technologies; driving down the costs and accelerating the adoption of existing, emissions-reducing technologies; and attracting private investment. Important technology areas include “negative emissions technologies” that remove carbon from fossil fuel combustion and from the air; utility-scale energy storage; building and industrial process efficiency; and next-generation batteries, nuclear designs, electric vehicles, and grid equipment.

While investment in innovation and technology is necessary, it is not sufficient on its own to solve the climate challenge. It must be paired with policies that set a declining limit on greenhouse gas emissions that puts us on a path to reach net zero greenhouse gas pollution by 2050, and account for the real costs of this pollution through a meaningful and transparent price on carbon. A price and limit on emissions will accelerate demand for clean energy, creating powerful economic incentives to adopt new technologies and providing a market for innovators who develop better ways to cut carbon. Working together, strong policies that limit emissions paired with investment in innovation will result in deeper carbon reductions, accomplished more quickly and affordably.

In addition, national innovation policy should be consistent with the following principles:

- **Performance-based.** The most promising technologies should receive the most funding, with the most important metric of performance being potential tons of pollution reduced per dollar invested.
- **Diversified.** Federal investment in innovation should take a broad-based approach, encompassing a wide range of technologies that can reduce emissions in sectors throughout the economy.
- **Risk tolerant.** Government should provide high-risk early-stage investments in potential breakthrough technologies, considering both likelihood of success and possible impact.
- **Ambitious.** Dramatic transformation of our energy system demands – at a minimum – doubling overall investment, from clean technology and energy efficiency R&D to deployment, commercialization, and financing programs that can help overcome market barriers while lowering costs and improving performance of more mature technologies.
- **Strategic.** Policies should aim to leverage private capital as much as possible, and avoid duplicating or “crowding out” private investment.
- **Coordinated.** Coordination across government agencies and programs, including within DOE, is critical to ensure investments are streamlined and their impacts maximized.
- **Adaptive.** Programs should require robust data collection and performance tracking to evaluate effectiveness per dollar and improve performance over time.
- **Environmental integrity.** Robust monitoring and verification of emissions reductions is critical – including carbon that’s captured and stored underground or used in products or processes. It’s also important to ensure full life-cycle accounting of emissions impacts – for example, taking into account land use changes as a result of biofuels production. Policies should guard against negative environmental or health impacts and respect local and national environmental laws.

Elgie Holstein

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He has held a number of senior positions in government and the private sector with a focus on energy, natural resources, and environmental policy.

His government service includes:

- Associate Director for Natural Resources, Energy and Science in the Office of Management and Budget;
- Special Assistant to the President for Economic Policy at the National Economic Council;
- Deputy Undersecretary and Assistant Secretary at the National Oceanic and Atmospheric Administration; and
- Chief of Staff at the U.S. Department of Energy.

Mr. Holstein has served as a consultant to DOE, including serving on an advisory committee of Sandia National Laboratories. He also has been an advisor to local governments on water and energy matters.

Earlier, Mr. Holstein served as Energy and Environment Staff Director for the National Conference of State Legislatures, worked as a congressional staff member specializing in energy and environmental policy, and headed a national consumer financial education and advocacy group.