

**Testimony of Richard J. Powell**  
**Executive Director, ClearPath Inc.**  
**House Committee On The Budget Hearing**  
**The Costs of Climate Change: From Coasts to Heartland, Health to Security**  
**Wednesday, July 24, 2019**

Good morning Chairman Yarmuth, Ranking Member Womack and members of the committee. My name is Rich Powell, and I am the Executive Director of ClearPath.

ClearPath is a 501(c)3 organization focused on conservative policies that accelerate clean energy deployment in the power sector. We support solutions that advance the wide array of clean energy technologies - including next-generation nuclear, hydropower, cleaner fossil fuel technologies and grid-scale storage solutions that improve grid efficiency, including the integration of additional renewable sources such as wind and solar. Our core mission advocates markets over mandates and bolstering technological innovation rather than implementing stifling regulation. ClearPath provides education and analysis to policymakers, collaborates with relevant industry partners to inform our independent research and policy development, and supports mission-aligned grantees. An important note: we receive zero funding from industry.

Given this committee's vital role in America's response to the global climate challenge, I will today discuss a few topics:

- The threat to the U.S. economy posed by climate change, and how its global nature requires a reorientation of our policy towards an innovation-focused approach.
- Within that approach -- and given our national budget constraints -- how we ought to think about investing in targeted solutions versus simply spending more federal dollars.
- How investments in clean energy must be oriented around aggressive goals that will bring real breakthroughs to market - and produce tangible environmental benefits for Americans
- How an investment lens requires us to throw out the old basic vs. applied distinction when we think about clean energy investment
- How Congress can build in the months ahead on your remarkable, bipartisan track record in clean energy innovation over the past 2 years

**An Innovation-Focused Approach To Climate Change**

It's always important to address the elephant in the room first. Climate change is real, industrial activity around the globe is the dominant contributor to it, and the challenge it poses society merits significant action at every level of government and the private sector.

I commend Chairman Yarmuth and Ranking Member Womack for holding a series of hearings on climate change. In your hearing last month<sup>1</sup>, Chairman Yarmuth noted the Fourth National Climate Assessment Report and how our economic, agriculture, national security, and health impacts are clearly rising.

Managing our country's debt will be another defining challenge of this century. I don't have to remind this committee that our national debt recently surpassed \$22.5 trillion. Meanwhile the National Oceanic and Atmospheric Administration estimates that the five-year running average of damage of weather events has risen five fold over the past 20 years from \$20 billion a year to \$100 billion year<sup>2</sup>. It is incumbent on today's policymakers to balance the demands of both challenges, and invest scarce American taxpayer resources efficiently and effectively in responsible action.

As the Committee considers the budgetary demands of each of these challenges, it is important U.S. policy synchronizes with the global nature of the climate challenge. Reducing American emissions is essential, but even if the U.S. somehow eliminated carbon emissions tomorrow, just the growth in carbon emissions from today through 2050 by developing Asian countries (e.g., China, India) would exceed total U.S. emissions today. For too long, however, this sobering reality has been used as an argument for inaction. Rather, it should be a call to action towards an immense economic opportunity to create high-paying American jobs, revitalize domestic manufacturing capacity, and grow U.S. exports.

Clean technology available today is simply not up to the task of global decarbonization. To reduce global emissions as quickly and cheaply as possible, better cost-effective clean technology is necessary so the developing world will consistently choose those tools over the higher-emitting options they are choosing today. And our Department of Energy and national lab system - the leading technology incubator of the world that has catalyzed such life-altering creations such as nuclear power, the internal combustion engine, and sequencing the human genome - can bring forth those breakthroughs. With the U.S. as the world's innovation center, chances remain high that the new generation of miracle technologies will be created in an American laboratory in collaboration with the U.S. private sector. These low-cost, high-performing technologies will be the backbone of efforts particularly targeting rising carbon emissions in the developing world.

Refocusing and modernizing key research, development, and demonstration (RD&D) programs is essential to securing our nation's role as a global technology innovation leader while facilitating a cleaner, more reliable, and affordable domestic electricity supply for the American public.

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<https://budget.house.gov/publications/report/hearing-costs-climate-change-risks-us-economy-and-federal-budget>

<sup>2</sup> <https://www.noaa.gov/>

The shale gas revolution, which I'll discuss further, is just one example of American public private leadership in energy innovation. Consider as well DOE's efforts to develop and deploy advanced nuclear energy technology, and to innovate in carbon capture systems and advanced energy storage.

Bill Gates recently made 10 predictions for world-altering breakthroughs<sup>3</sup>. Two of the ten were in the clean energy space, where he predicted new technology for carbon capture and small modular nuclear reactors are going to be game changers. These and other new clean technologies are coming, and we think it's the job of Congress to help ensure that we can build a bridge over the current valley of death that exists between R&D and commercial viability for these projects. And to help ensure that it's the United States leading the rest of the world.

Lastly, I must note that a clean innovation agenda offers numerous co-benefits to help lighten the impacts of climate change on all of the sectors my co-panelists are discussing today:

- **For our national security**, renewed leadership on nuclear innovation will strengthen our nuclear navy and global defense posture as it has for the last seven decades. And continuing an innovation-focused approach to American clean energy dominance will cement our geopolitical gains from the shale revolution, ensuring we continue as the global energy superpower through the 21st century. No longer will hostile states be able to ration energy to the U.S. or our allies as a tool to promote and entrench corrupt regimes.
- **For our national health**, advanced clean energy systems compact enough to site near high energy demand in urban centers are among our best options to ensure America continues its long progress on clean air and water. Consider NETPower - a natural gas fired power plant that will neither use any water to create electricity, nor produce any NOx or other criteria pollutants in its emissions. This could be safely cited in the middle of downtown Los Angeles or other non-attainment zone, contributing to cleaner air without adding to water stress.
- **For American agriculture**, an innovation focused approach to clean energy may well offer radically new options for improved agricultural productivity even in a climate stressed world. Already several ethanol and ammonia plants in the Midwest are preparing to take advantage of the 45Q tax incentive to capture and monetize their CO2 emissions. In the future, advanced carbon sequestration techniques may well enhance soils, fertilize indoor and urban agricultural systems, and provide new markets in power generation for some crops.

## Investing Versus Spending

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<https://www.msn.com/en-ca/money/topstories/bill-gates-predicts-the-next-10-world-changing-breakthroughs/ss-AADO8L8?li=AAggNb9&ocid=mailsignout#image=20>

Before we created ClearPath, I was a business consultant at McKinsey & Company. Of all the business philosophy I read and used to help clients, the simplest and most important came from the great Stephen Covey. His second rule for success was elegant, and all important: Begin with the end in mind.

When we confront the problem of a changing climate in a rapidly developing world, the end we must begin with is this: we must find a way for rapidly developing countries to choose to buy and build clean energy technologies instead of traditional energy technologies. They will do that infrequently if that choice is painful - if, as today, the traditional technologies are cheaper, easier to build, and better performing than the clean technologies. Some will put policies in place to make those painful decisions. Others will not. At ClearPath, we would argue that our “end” ought to be making that choice easy for developing countries - to make clean technologies cheaper, better performing, and easier to buy and build than traditional technologies.

With than end in mind, we need to evaluate our tools. We cannot spend our way to a solution -- the global energy economy and the demands of rising populations around the world are too much even for the mighty U.S. budget to facilitate these decisions around the world. Rather, we need to invest in a set of better mousetraps - ones that will leverage the scarce dollars of U.S. taxpayers into solutions that the global economy will pick up on their own merits, not because we are expediting or otherwise influencing the outcome. This kind of investment is the very definition of a market-based solution to climate change, one that makes markets themselves the force for change in distributing clean energy, instead of the force we work against.

In the U.S., our clean energy budget policy debate is often caught between two extreme perspectives. On one side, some have suggested that a very limited scope on the use of Federal budgets in the electricity sector. On the other, some argue for permanent, direct subsidies to favored clean technologies regardless of their long-term market viability.

To the first point -- why shouldn't energy companies be the ones to invest in research and bringing new energy technology to market, aka Silicon Valley innovation? Unfortunately advanced nuclear technology isn't Uber and can't be created by two guys in their garage. Energy innovation requires massive scale, sometimes taking decades to get from lab to market. And even then, the market is not as simple as going to a store and buying your new favorite technology off the shelf -- the power industry is a highly regulated commodity market that is structurally discouraged from bringing new technologies to market due to the way utilities are regulated or deregulated by states.

Given these dynamics, new energy technologies would not and have not happened without investments from the Department of Energy. All of our primary energy sources today were supported by government R&D early on and in many cases tax credits to facilitate their initial commercialization: natural gas, coal, solar, nuclear, wind and oil. This government support, while useful, should expire as technology matures and becoming commercial viable.

Energy research is a multi-billion-dollar opportunity to find the next fracking-like technology breakthrough. But without support, even a superior energy technology -- a truly better mousetrap -- won't be able to break into the market because the incumbent technologies have the scale and supporting infrastructure of a 50-year head start.

America needs a technology-neutral approach to supercharging innovation and financing first-of-a-kind projects, such as the successful Petra Nova and NETPower carbon capture projects in Texas and the NuScale small modular reactor in Oregon. Some upcoming energy breakthroughs already have received important help from the Department of Energy. Others still need much more to get to scale. Then the new technology can succeed or fail on its own merits on a level-playing field.

That's the governmental role we need, and it's neither a command-and-control approach that picks winners, nor a do-nothing-and-hope approach. The potential returns of such investment are world-changing.

### **Investment Goals Need Clear Outcomes**

As we begin with the end in mind, let me share a few examples of what an outcome looks like with the support of smart investment -- in other words, why simply more spending and subsidies will not catalyze the innovation we need.

DOE has been most successful when it has set long-term, aggressive milestones to develop and stand-up new technologies at price points and performance levels that are meaningful for private markets. The Office of Fossil energy's work on unlocking shale gas, the Energy Efficiency and Renewable Energy Office's work on SunShot to radically decreasing the cost of photovoltaic solar, and the Joint Bioenergy Initiative on lignocellulosic biofuels at the Lawrence Berkeley Laboratory are all strong examples. When DOE has a clear, well understood and shared goals, combined with strong innovation leadership and clear organizational accountability owning results, and steady investments against that goal over multiple administrations, the administration tends to produce breakthrough results.

In 2013 and subsequently in 2015,<sup>4</sup> the Department of Energy invested in technology being developed in partnership with the Idaho National Lab and Oregon-based NuScale to develop next generation nuclear reactors. Earlier this week, NuScale announced<sup>5</sup> that the U.S. Nuclear Regulatory Commission (NRC) completed the second and third phases of review of their small modular reactor (SMR) design which means they are one step closer to bringing the first SMR to market. The first SMR could then be sited and operating by 2026.

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<sup>4</sup> <https://www.nuscalepower.com/about-us/doe-partnership>

<sup>5</sup>

<https://newsroom.nuscalepower.com/press-release/company/nuscales-smr-design-clears-phases-2-and-3-nuclear-regulatory-commissions-revie>

Another example with great potential for a big goal: energy, or grid-scale battery storage. We believe energy storage technologies have the potential to modernize the U.S. electricity system, and storage-firmed ultra-cheap renewables will be a significant solution to climate change. Across the country, utilities are deploying lithium ion batteries to meet some storage potential, but that technology has its limitations. The future grid will need a suite of different storage technologies that have not yet been commercialized. This is why the Department of Energy's research, development, and demonstration (RD&D) programs are so important.

Currently, energy storage R&D at DOE lacks the organizational accountability usually needed for breakthrough success. The programs are spread across DOE in four offices from Electricity to EERE to Science to the Advanced Research Project Agency-Energy (ARPA-E). Many of these offices primarily focus on transportation rather than grid-scale storage. DOE's FY20 budget proposal takes a major step in the right direction by proposing a "launchpad" hosted at the Pacific Northwest National Lab (PNNL) focused on developing, testing and evaluating battery (and potentially other) materials and systems for grid applications. This investment in innovation leadership and organizational accountability, along with aggressive cost-based goals, offers a far better chance of success than intermittent and undirected spending at lower scale on a variety of programs.

### **The basic-only approach to research is not good enough**

As we continue to fine tune what these outcomes will look like, Congress must grow past the outdated mindset of basic-only research. Both examples I shared, and almost every other successful energy technology, has used applied research to solve a problem or deliver an outcome.

Nothing has illustrated this more than the shale gas boom. It took bold and visionary R&D, tax incentives and other federal help to lead to what has unquestionably been an economic windfall for the U.S. that will continue for many decades.

But this all started in 1977 when the Department of Energy demonstrated hydraulic fracturing in shale. There was \$500 million invested in *applied* R&D with the private sector - in particular, a long-term public private partnership with Mitchell Energy to demonstrate the technologies. And then between 1980 - 2002 there was \$10 billion in tax incentives. The Gas Research Institute contributed another \$100 million of voluntary commitments from the private sector, and we now have a legitimate revolution occurring with shale gas.<sup>6</sup>

Energy R&D is a smart investment for the country and pays back exponentially. The shale gas revolution contributes an estimated \$100 billion to consumers every year, and has been the main driver behind reducing power sector emissions in the past decade. It required a combination of basic and applied research, targeted incentives ramped down quickly, and

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<sup>6</sup> <https://clearpath.org/energy-101/hydraulic-fracturing-a-public-private-rd-success-story/>

voluntary commitments from the private sector. And thankfully, we are applying a similar R&D and tax incentive formula that we used for shale gas now toward advanced nuclear, carbon capture and, to a growing extent, energy storage.

And while a lot of that has occurred during the Trump administration and this past Republican Congress, it took broad, bipartisan support to get robust R&D investments in appropriations packages and a much-needed expansion and extension of the 45J advanced nuclear and 45Q carbon capture tax incentives signed into law.

Lastly, we should remember that our geopolitical competitors have no philosophical objections to applied energy research. Chinese state owned enterprises have active programs monitoring technological developments in the United States, much of it with support from basic and applied U.S. Federal R&D. In multiple cases they have invested in and brought back to China companies that have struggled to commercialize in the U.S. without enough support to bridge the valley of death. Through this lens, we should remember that a basic-only energy research energy is a subsidy to the Chinese economy -- not a wise investment.

### **Build On Strong Bipartisan Investment Record**

Specifically, how do we build on your strong bipartisan record in recent years? The most recent FY18 & 19 appropriations bills that passed were a great success and I applaud the critical programmatic direction and eagle-eyed investments in advanced nuclear, carbon capture, grid-scale storage and other clean energy technologies included.

Congress sent an undeniable message that lawmakers are serious about keeping the U.S. in the top tier of countries pursuing clean and reliable energy breakthroughs. While steady and sufficient funding is essential, providing important direction and reforms to the DOE to make sure that dollars are well spent is equally vital to spurring energy innovation.

Among the highlights in the most recent the FY19 Department of Energy spending bill:<sup>7</sup>

#### Advanced Nuclear

- Prioritizes R&D of new advanced reactor designs by increasing the department's reactor concepts program by \$96 million. This includes finishing the two cost-shared industry awards to Southern Company/TerraPower and X-energy, as well as furthering research on advanced small modular reactors (SMRs).
- Provides \$65 million for the versatile test reactor, a national lab facility critical to the development of advanced nuclear by private developers.

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<https://clearpath.org/energy-101/hydraulic-fracturing-a-public-private-rd-success-story/?highlight=shale%20revolution>

- Provides up to \$20 million for preparation and testing of high assay low-enriched uranium (HA-LEU), which will be needed to fuel many advanced nuclear reactors. DOE is also directed to provide Congress a timely report describing a plan and cost profile for developing a domestic HA-LEU supply.

### Carbon Capture

- Provides \$30+ million for Front-End Engineering and Design (FEED) assistance for two commercial-scale carbon capture power projects, one to retrofit an existing coal plant and one for a coal or natural gas plant that generates CO<sub>2</sub> suitable for utilization or storage. Public-private FEED partnerships is a cost-effective way for DOE to advance carbon capture, utilization and storage technologies within the R&D pipeline.

### Energy Storage

- Allocates \$46 million (\$5 million increase) for energy storage research and development efforts spearheaded by the Office of Electricity Delivery.
- Establishes a new facility dedicated to scaling up domestic advanced battery manufacturing capabilities.

### Broader Clean Energy Innovation

- Advances and fully funds the ongoing five-year R&D effort led by DOE's Energy Innovation Hubs - namely the Joint Center for Energy Storage Research (developing extraordinary new batteries) and the Joint Center for Artificial Photosynthesis (using sunlight to turn water into clean hydrogen fuel).
- Provides a record \$366 million to the department's highly-successful ARPA-E effort.
- Specifically allocates, for the first time, part of the solar technologies office's resources (\$10 million) for perovskite solar R&D, which can lead to panels that are printable and painted and are potentially thinner and more efficient than today's panels.
- Continues support for the Title XVII Loan Guarantee Program, which helps finance the first commercial deployment of highly innovative technologies.

These investments are going to make a huge impact accelerating clean energy innovation and we are very much looking forward to continuing that wonderful momentum.

Thank you again for the opportunity to provide remarks. ClearPath is eager to assist the Committee in developing innovative policies, identifying opportunities for investments instead of spending, tracking successful outcomes around the new moonshot energy technology goals outlined above, and building on the recent bipartisan success. We applaud the Committee for taking on this important task to help ensure the appropriate investments can be made to modernize and facilitate the research, development, and demonstration of cutting-edge energy technologies in the service of a stable global climate.