

Testimony of Farah Benahmed
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Hearing:

“From Lab to Market: Accelerating our Progress toward Economic Recovery and a Clean Energy Future”

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Chairwoman Fletcher, Ranking Member Weber, and members of the committee, thank you for the invitation to testify on the importance of clean energy innovation to an economic recovery that builds toward a clean energy future.

My name is Farah Benahmed and I am a Climate and Energy Policy Advisor at Third Way, a public policy think-tank based in Washington, DC. I’m honored to speak before you amongst my esteemed panelists, Jetta Wong, Dr. Emily Reichert, Jennifer States, and Dr. Lee Chattam during a time when our nation faces enormous challenges, and needs equally great solutions.

I would like to thank the members of this Committee and others in Congress who have supported major policies like the CARES Act and the HEROES Act, aimed at flattening the curve of COVID-19 cases, saving American lives, and protecting America’s workers and businesses from the economic downturn this pandemic has caused. The nation needs additional, aggressive policy interventions that get this public health crisis under control and, ultimately, accelerates America’s economic recovery.

While we work to resolve the public health and economic crises, the growing threat of climate change has not gone away. How we choose to rebuild will determine not only the speed and scale of our economic recovery, but also our ability to reach net-zero emissions by mid-century, if not sooner. We need additional policies that put Americans back to work, while making our society and economy much cleaner and more resilient.

Hearings like this one are crucial to highlight the policy solutions that can address these crises and help rebuild our economy, while avoiding the worst impacts of climate change. Clean energy innovation is an area that creates high-quality jobs across multiple industries and reduces carbon pollution. Prior to the pandemic, clean energy jobs had grown for the fifth straight year, employing over 3.3 million US workers.¹ By accelerating investment in the research and development of crucial clean energy technologies, we can meet our climate goals faster and at lower cost.

¹ “Clean Jobs America 2020.” E2, April 15, 2020, <https://e2.org/reports/clean-jobs-america-2020/#:~:text=At%20the%20start%20of%202020,beyond%203.3%20million%20workers%20nationwide.&text=Jobs%20in%20renewable%20energy%20grew,a%20rebound%20in%20solar%20j obs>. Accessed July 12, 2020.

With the enormous economic opportunity in the clean energy transition, other countries are racing to establish themselves as market leaders for emerging clean energy technologies. As a longstanding world leader in innovation, the United States has the institutions, resources, and capabilities to reap a major share of the benefits as an inventor and exporter of clean energy technologies. By investing further in demonstration and deployment, we can ensure that an even greater number of our emerging clean energy technologies have a chance to compete in global markets. Simultaneously, these investments in innovation will create millions of jobs, build up thousands of small businesses, and make the U.S. economy stronger and more resilient.

Policies Needed to Advance Clean Energy Innovation

There are a number of ways the federal government could advance clean energy innovation. My testimony will focus on the following policies:

1. Emergency relief for clean energy startups and entrepreneurs;
2. Increasing investment in clean energy innovation;
3. Committing to clean energy demonstrations; and
4. Establishing and scaling clean energy technology transfer programs.

1. Emergency Relief for Clean Energy Startups and Entrepreneurs

COVID-19 has created immense uncertainty in the market as the pandemic runs rampant across the United States. With market volatility plaguing investors, many in the venture capital community are holding onto their cash and refraining from making new investment decisions. In fact, VC investment activity has plummeted 25% since the pandemic hit.² Entrepreneurs face challenges in raising capital as they struggle through production and project delays and determine how to keep staff on payroll. The pandemic has thrown an unusually large wrench into the steady supply of materials. On a good day, supply chain disruptions can be debilitating for startups, especially if they have near-term deadlines to meet.

The pandemic could take many companies down, especially capital-intensive clean energy startups, without concerted federal action. Congress must ensure that an entire generation of early-stage innovative companies—including clean energy startups—does not die on the vine as part of its broader emergency measures to stabilize the economy and prevent further job loss. The U.S. government is well positioned to take on this challenge. The public sector can provide long-term financial support and technical expertise to innovative clean energy technologies until the private sector is ready to step in,³ saving and supporting clean energy

² “Venture Capital’s New Normal.” Axios, May 13, 2020, https://www.axios.com/venture-capital-investments-pandemic-0dcd8dd5-fafd-41b9-9ea9-84c3e012c7fa.html?utm_campaign=organic&utm_medium=socialshare&utm_source=email. Accessed July 10, 2020.

³ “Catalyzing American Ingenuity: The Role of Government in Energy Innovation.” American Energy Innovation Council, 2011,

startups that the United States and other countries desperately need to fight climate change and lay the groundwork for long-term economic prosperity.

Congress should implement the following actions:

- **Temporarily waive cost-share requirements.** Department of Energy research programs typically require awardees to achieve 20-50% cost-share from non-federal sources. This can be difficult for startups in the best of times and should be waived for the duration of the current national emergency.
- **Eliminate government payment delays.** Even when a small business successfully wins a federal agency contract or grant, they typically face a delay of 45–90 days before receiving the funds, awaiting final negotiations and payment processing. Congress should authorize the Treasury Department to make zero-interest advance loans to startups at the moment they receive a federal agency award notification.
- **Fix PPP's ability to reach startups.** The Small Business Administration's Payment Protection Program (PPP) should continue to process and accept loans, and receive increased funding in further rescue and recovery bills as needed. All small businesses that certify they need help in this crisis, including startups that are part of another firm's investment portfolio, should qualify for relief through this program.⁴
- **No-cost extensions and cash grants to keep existing government awardees afloat.** Congress should provide no-cost extensions and supplemental funding to federal agencies, allowing them to send emergency payments to cover payroll and other expenses to any existing contractor or grantee that cannot meet its performance obligations due to disruptions caused by the COVID-19 pandemic (e.g. shelter-in-place orders, restricted access to lab facilities, etc.). These direct cash payments from federal agencies, including to existing Small Business Innovation Research (SBIR) awardees, would likely be more rapid and efficient than the Paycheck Protection Program (PPP), which relies on private-sector banks as intermediaries.
- **Expand the SBIR Program to extend a lifeline to promising at-risk companies.** Eleven federal agencies have longstanding SBIR programs that together provide over \$3 billion per year to support innovative technology startups and small businesses. While many clean energy startups are struggling to make ends meet, Congress should provide supplemental funding of at least \$300 million (allocated among these agencies) to immediately make awards of \$100,000 to prior high-quality SBIR applicants that were not selected simply due to funding limitations at the time. Within the DOE alone, this would mean about \$30 million spread across 300 additional small businesses.

2. Increasing Investment in Clean Energy Innovation

http://www.americanenergyinnovation.org/wp-content/uploads/2012/04/AEIC_Catalyzing_Ingeniuty_2011.pdf. Accessed May 05, 2020.

⁴Glottmann, Sunny and Moller, Zach, "Three Ways to Save Small Businesses." Third Way, 21 May 2020, <https://www.thirdway.org/memo/three-ways-to-save-small-businesses>. Accessed May 22, 2020.

Effectively tackling the economic and climate crises must include at least a doubling of federal investment in clean energy research, development, demonstration, and deployment (RDD&D) over the next ten years. This recommendation has also been made by many credible institutions including the National Academies of Science⁵ and the American Energy Innovation Council.⁶ Funding for the Department of Energy must be increased to match the scale of the climate crisis, and the structure should be updated to maximize efficient utilization of these resources.

Since 1987, energy research has decreased from 14.4 percent of federal R&D to 5.3 percent by 2017.⁷ The U.S. has continued to fall behind in terms of public energy R&D spending relative to national GDP as compared to other developed economies.⁸ This means that the U.S. is spending a smaller share of research budgets on energy at a time when other countries are racing ahead to capture their share of what is a \$40 trillion opportunity for global energy technology markets over the next 20 years.⁹ Congress has shown great foresight and wisdom in bolstering federal RD&D investments at DOE in recent years, but America cannot rest on previous successes while the rest of the world continues to surge ahead. Without continuing to expand federally supported RD&D we further imperil our prospects to lead the global energy transition and reap the economic rewards that come with it.

3. Committing to Clean Energy Demonstrations

While increasing investment is essential, it's equally important that we are intelligent about how those investments are made. Today, clean energy researchers and entrepreneurs face an innovation gap, struggling to secure either private sector investment or federal funding for their technology demonstration projects. This "Valley of Death," where a lack of funding kills off many promising technologies before they are able to reach their full potential, can leave economically viable solutions behind.¹⁰ Given the uncertainty and scale of investment involved, the private sector is generally unwilling to take risks in this area until the technologies are tested and proven by the government and the economic returns are assured.

⁵National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. 2007. *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/11463>. Accessed July 15, 2020

⁶ American Energy Innovation Council. November 2018. Energy Innovation: Fueling America's Economic Engine. <http://americanenergyinnovation.org/wp-content/uploads/2018/11/Energy-Innovation-Fueling-Americas-Economic-Engine.pdf>. Accessed July 15, 2020.

⁷ Townsend, Brad. April 4, 2017. "Energy Innovation: By the Numbers." American Energy Innovation Council. <https://americanenergyinnovation.org/2017/04/energy-innovation-by-the-numbers/#:~:text=Declining%20Investment%20in%20Energy%20Innovation&text=By%202016%2C%20that%20number%20had,to%205.3%20percent%20by%202017>. Accessed July 15, 2020.

⁸ American Energy Innovation Council "Energy Innovation: Supporting the Full Innovation Lifecycle" February 2020 <http://americanenergyinnovation.org/wp-content/uploads/2020/02/Energy-Innovation-Supporting-the-Full-Innovation-Lifecycle.pdf>

⁹"World Energy Outlook 2018." International Energy Agency, 2018, <https://webstore.iea.org/download/summary/190?fileName=English-WEO-2018-ES.pdf>

¹⁰Wong, Jetta and Hart, David, "Mind the Gap: A Design for a New Energy Technology Commercialization Foundation." Information Technology and Innovation Foundation, 11 May 2020, https://itif.org/publications/2020/05/11/mind-gap-design-new-energy-technology-commercialization-foundation?mc_cid=0fbbedf645b&mc_eid=e66b2f5eac. Accessed May 13, 2020.

Public investment in clean energy technology demonstrations is an effective way to jumpstart the economic recovery while advancing the technology solutions we require to reach our long-term climate goals. Demonstrations help identify system-level challenges, pinpoint opportunities for cost reduction, and validate the maturity of the tested technology. They also put people to work immediately in fields such as engineering and design, with construction, operations, and a host of other jobs following close behind. In some cases, jobs created by demonstrations of emerging technologies would be very well-suited for underutilized workers in struggling fields. For instance, skills from oil and gas drilling are directly transferable to the advanced geothermal sector, creating a pathway for workers to apply their skills to a job-rich and rapidly growing clean energy sector.

Technology demonstrations reduce the time to market for more efficient, cleaner technologies, which can give US companies a competitive advantage in the global marketplace. Federal and state policy assistance for renewable energy has helped catalyze a robust and expanding industry. Wind and solar costs have declined 10-fold over the last 10 years, and the positions associated with these technologies (e.g., wind technicians and solar installers) were the fastest growing of any industry in the country up until the pandemic.¹¹

Policymakers should replicate this success for technology solutions in harder to decarbonize sectors like transportation, manufacturing, and industry. A recent report from the International Energy Agency finds that three-quarters of the cumulative emissions reductions necessary to avoid the worst impacts of climate change will depend on technologies in early stages of development that need assistance in quickly getting to market.¹² Testing, validating, and scaling these early-stage technologies, like carbon capture, use, and storage (CCUS) for industrial processes and low-carbon hydrogen fuel for marine transport, will make it possible to get all the way to net-zero. It also gives the companies that develop these technologies an edge in capturing markets in Europe¹³, Asia¹⁴, and other areas of the world clamoring for low-carbon solutions; and it could create new opportunities to license, construct, manufacture, and supply components for these innovations around the world.

Demonstrations are most often a partnership between industry and the federal government, where both parties have an interest in the success of a project. However, with the economy in

¹¹“Fastest Growing Occupations.” U.S. Bureau of Labor Statistics: Occupational Outlook Handbook, September 4, 2019. <https://www.bls.gov/ooh/fastest-growing.htm>

¹² “Clean Energy Innovation: Part of Energy Technologies Perspective.” International Energy Agency, July 2020, <https://www.iea.org/reports/clean-energy-innovation>

¹³ Strauss, Marine, “EU Lawmakers Agree to Include Shipping Emissions in EU Carbon Market.” Reuters, July 7, 2020, <https://www.reuters.com/article/us-climate-change-eu-shipping/eu-lawmakers-agree-to-include-shipping-emissions-in-eu-carbon-market-idUSKBN2481UD>

¹⁴ “Global Ring Main Unit Market (2020 to 2025) - Growing Renewable Energy Sector Presents Opportunities.” PR Newswire, July 6, 2020, <https://www.prnewswire.com/news-releases/global-ring-main-unit-market-2020-to-2025---growing-renewable-energy-sector-presents-opportunities-301088327.html>

disarray from the global pandemic, it is more challenging for businesses to secure private capital. Without government support for demonstrations, only a fraction of promising new technologies have a chance of reaching commercialization. The federal government should significantly increase its investment in clean energy demonstration projects while temporarily reducing the amount the developer must contribute through what is often referred to as the non-federal “cost share.”

Congress should start by investing in the following types of clean energy demonstrations that could quickly receive funding through DOE and start making an economic impact in the near future:

Advanced Nuclear Reactor Demonstrations: Congress provided \$230 million in FY2020 to initiate a Department of Energy program aimed at demonstrating a minimum of two advanced nuclear reactors as soon as 2025. Teams of reactor developers, manufacturers, utilities, and others are already forming to apply for funding. At least that same level of investment should be made in the program each year to enable recipients to immediately expand their operations and quickly commercialize technologies that will advance America’s climate, economic development, and national security goals. Committees in both the Senate and House have cleared legislation authorizing these demonstrations with bipartisan support.

Enhanced Geothermal Demonstrations: Conventional geothermal energy could be an important source of readily-available, carbon-free power, but only a small portion of the country has the right geological conditions to take advantage of it. Enhanced geothermal systems (EGS) use different techniques that could allow for geothermal energy generation in a much larger area of the country. Congress should invest \$150 million to build four EGS demonstrations by 2025 and put the U.S. closer to unlocking massive new energy resources. With a number of similarities in drilling techniques, an expansion of EGS projects would also create opportunities for workers in the volatile oil and gas production industry to transition to a promising new clean energy sector. Committees in both the House and Senate have passed bills with bipartisan support to establish EGS demonstrations.

Energy Storage Demonstrations: Federal research has been critical to bringing down the price of lithium-ion batteries, currently the most ubiquitous battery technology. To fulfill the promise of renewables to affordably make up a major share of our power, additional innovation in energy storage is needed. Congress should invest \$1 billion to support energy storage demonstrations for technologies by 2025 aimed at solving emerging grid challenges and paving the way for emissions reductions.

Clean Hydrogen Demonstrations: Hydrogen and fuel cells have the potential to significantly reduce carbon emissions from multiple sectors: power, transportation, buildings, and industry. With its wide-range of applications, hydrogen can tackle difficult to decarbonize industries and help the U.S. get all the way to zero. Realizing hydrogen’s potential will also build a diverse set of jobs in a fast-growing industry. Congress should provide \$1 billion for multiple hydrogen

demonstration projects. These demonstrations should, at a minimum, target industries such as port operations, heavy-duty land and marine transportation, heat and power applications in buildings, and iron/steel manufacturing. The funding should build on existing programs and existing partnerships among the national labs and DOE.

Carbon Capture Demonstrations: Carbon capture is one of the only technologies that can address emissions from hard-to-abate industrial processes, and remains a critical tool for decarbonizing natural gas power plants. Meanwhile, direct air capture (DAC) will be needed to remove gigatons of carbon dioxide from the air to achieve our climate goals. Recent research has shown carbon capture projects will generate hundreds to thousands of high-wage, high-skill jobs. Congress should provide \$3 billion in funding for large-scale carbon capture, use, and storage (CCUS) demonstrations at industrial facilities in hard-to-abate sectors like steel, cement, or chemicals. An additional \$3 billion should be invested in demonstrations of CCUS at natural gas power plants and DAC facilities (specifically no less than two natural gas facilities and one DAC facility).

4. Establishing and Scaling Clean Energy Technology Transfer Programs

The U.S. Department of Energy and other federal agencies have a wide range of programs with a proven track record of supporting talented energy technology entrepreneurs who create high-quality jobs.¹⁵ As Congress crafts economic stimulus measures, it must ensure that clean energy technology transfer programs have the necessary authorizations and appropriations to rebuild an even larger and more dynamic clean technology startup ecosystem across the United States, laying a firm foundation for long-term US leadership in clean energy innovation.

Important technology transfer programs include, but are not limited to, the Lab-Embedded Entrepreneurship Programs (LEEP), Energy I-Corps, Small Business Vouchers, the National Incubator for Clean Energy, American-Made Challenges, Manufacturing USA, and the previously mentioned SBIR program. The success of these programs to-date could not have been made without the dedication and hard work of several offices at DOE, including the Office of Technology Transitions (OTT). Since 2015, OTT has effectively embedded itself within the Department's ecosystem and successfully managed and overseen programs focused on accelerating innovation. However, in order for the OTT to achieve optimal success, modernization of technology transfer programs is needed.

¹⁵This section focuses primarily on programs at the U.S. Department of Energy, since the DOE accounts for roughly three-quarters of all U.S. government spending on clean energy R&D. This is not to say that other agencies do not have an important role to play, especially the Department of Defense, NASA, USDA, the National Institute of Standards and Technology (NIST), and the Department of Transportation. *Domestic Implementation Framework for Mission Innovation*, Executive Office of the President, November 2016. https://obamawhitehouse.archives.gov/sites/default/files/omb/reports/final_domestic_mission_innovation_framework_111616_700pm.pdf

The Energy Technology Transfer Act enhances and expands many of these programs, conveying the serious leadership and thoroughness of this committee in its efforts to address climate change. I also commend this bill for realigning OTT's mission around climate. Focusing solely on advancing clean energy technologies will be crucial to our nation's ability to achieve emissions reduction targets, while prioritizing energy sectors that are expected to see robust and sustained growth for decades.

Congress could take additional actions to strengthen OTT, most notably by giving this office its own budget line to enable greater certainty and direction in regards to federal spending. There are several programs related to OTT's mission that are managed elsewhere at DOE, such as the Lab-Embedded Entrepreneurship Program. Congress should also transfer management of all of these programs to OTT, so that project managers can more effectively share best practices, increase coordination, and scale these important programs under one roof.

Furthermore, scaling the innovative clean energy technologies we need to fight climate change will require large-scale efforts beyond the programs at the Department of Energy. The Increasing and Mobilizing Partnerships to Achieve Commercialization of Technologies for Energy Act (IMPACT for Energy Act), sponsored by Representative Ben Ray Lujan and Senator Chris Coons, would establish a non-profit foundation aligned with DOE's mission is the kind of creative thinking needed to meet the scale of these crises. This foundation's ability to raise private capital would allow it to grow rapidly with less reliance on government appropriations. Like other successful federally authorized foundations, a DOE-allied foundation would increase private investment, public-private collaboration, and access to DOE's resources and facilities. It would create new opportunities for clean energy researchers and entrepreneurs looking to bring their technologies to market, leading to greater innovation, new startups, and the creation of new jobs and entire industries.

Conclusion

The challenges of the crises before us are a massive undertaking. They will require bold and thoughtful actions that aid this country in both the short- and long-run. Carrying out clean energy innovation policies can support struggling businesses and workers now and drive long-term economic growth, while also putting the United States on a faster, fairer path to net zero emissions by 2050, at the latest. Thank you again for the opportunity to testify today, and for this Committee's efforts on key legislation like the Energizing Technology Transfer Act and IMPACT for Energy Act. I look forward to the continued work and progress on these issues.