

Prepared remarks for The Committee on Science, Space, and Technology of the U.S. House of Representatives

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Thank you for the opportunity to speak with you today. My name is Tim Held, I am the Chief Technology Officer at Echogen Power Systems. Echogen is a small business located in Akron, Ohio. Our mission is to develop and commercialize innovative energy solutions using technologies that we have developed over our 17-year history.

I came from a large business – GE Aviation – in 2008 to lead the engineering team at Echogen, which was a 1-year-old startup at the time. We’ve put together a small team of talented and motivated engineers in Northeast Ohio who rival other groups across the country, and indeed worldwide in terms of accomplishments in our field. We pride ourselves in being efficient users of the resources that we have received, both private and public, including significant support from the U.S. Department of Energy.

The core technology that we are developing—using supercritical carbon dioxide in a closed-loop system to convert between power and heat—has been selected by the DOE Solar Energy Technology Office as the preferred power generation technology for the next generation of concentrating solar power systems and is also a candidate for advanced nuclear reactor power generation systems. Our current focus is integrating power to heat and heat to power processes into a solution for long duration energy storage, which will be critical in maintaining grid stability and reliability as more wind and solar generation come online.

Bringing new technology from a concept to commercial deployment is a challenging process. It’s not called the “Valley of Death” lightly. The initial capital outlay by angel investors is often sufficient to go from a good idea to a laboratory-scale demonstration. But unlike developing a new app, new energy technologies need metal and heat and power to go from concept to a pilot system. And those take money.

The next steps are even more difficult. Scaling up from a pilot system to something that will be commercially viable is even more costly and requires convincing customers who are understandably reluctant to buy “serial number 1”.

We were fortunate enough to be an ARPA-E awardee under their DAYS solicitation for long duration energy storage. The federal funding under that program, around \$4 million, was enough for us to advance our energy storage technology from a paper concept to a laboratory-scale system. We were able to develop and explore several different design options, demonstrate the basic performance of the system, and learn valuable lessons about the operation and control of our pilot scale energy storage system.

Our experience with the ARPA-E team was extremely valuable. The interactions with the Technical Program Managers were active dialogs, where perspectives and ideas flowed in both directions, and we ended up with a better program because of it. The Tech To Market, or T2M process had a

good focusing effect on the long-term goals of the program and the company, which was to transition from technology development to commercial deployment – and navigate the Valley of Death.

The DAYS program funding allowed us to take those first few steps into the Valley but was not sufficient to navigate to the other side. The ARPA-E SCALEUP solicitations offer additional resources to advance technologies that were originally developed under ARPA-E funding and are highly valuable in taking those next steps. The SCALEUP program is extremely competitive, and the additional funding under SCALEUP is limited. While we have applied twice, thus far we have not been selected for follow-on support through that program.

However, the DAYS program also helped us to create valuable partnerships, including a key relationship with Westinghouse Electric Corporation. As a team, along with the Golden Valley Electric Association (GVEA) in Fairbanks Alaska, we applied for funding under the DOE Office of Clean Energy Demonstrations (OCED) Energy Storage Grand Challenge solicitation. Last September, we were pleased to be selected for contract negotiations for a \$50 million federal award in support of a 1.2 GWh long duration energy storage system. This energy storage capacity will be critical to GVEA's mission of maintaining low cost, reliable generation in an arctic environment. The ARPA-E experience and exposure were invaluable in helping us to take these next steps through the Valley.

We are extremely grateful to ARPA-E and the other DOE agencies that have helped support our technology development. We appreciate the mission of ARPA-E and would advocate for even more support for SCALEUP and similar programs that help companies like ours bridge the “Valley of Death.”

Thank you again.