TESTIMONY OF

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BEFORE THE

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REGARDING

GEOLOGIC HYDROGEN

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Introduction

Thank you, Chairman Manchin, Ranking Member Barrasso, and distinguished members of this Committee. It is my privilege to appear before you today to represent the Department of Energy as Director of the Advanced Research Projects Agency – Energy, commonly known as ARPA-E.

Our agency is often referred to as the Department of Energy's "Moonshot Factory," tasked with supporting the research and development of high-risk, high-reward energy technologies that have the potential to fundamentally change the way we generate, store, and use energy.

ARPA-E has helped realize technologies across sectors, including industrial decarbonization, geothermal, and energy storage.

Our success in advancing this research stems from the philosophy that we embrace challenges that few others dare to and accept that this risk is essential in our mission to revitalize American innovation.

Today, I am pleased to appear before you to discuss this important topic of geologic hydrogen.

ARPA-E's support of this topic aligns with our mission of disrupting learning curves and creating new markets.

Opportunity of Geologic Hydrogen

Hydrogen is an element that can be used to cleanly produce heat and electricity, and is relevant to reducing harmful emissions from some of the most energy-intensive sectors of the economy, such as chemical and industrial processes – like ammonia and steel – and heavy-duty transportation.

Clean hydrogen is a flexible energy carrier that can be produced from a diverse mix of domestic clean energy resources, including renewables, nuclear, and fossil resources with safe and responsible carbon capture. Hydrogen has end-uses across almost all sectors – from industrial to commercial, transportation, agriculture, and more.

Geologic hydrogen presents a unique opportunity where advanced technologies can stimulate and extract hydrogen directly from the Earth's subsurface.

The realization of these technologies would make hydrogen a primary energy source in addition to a carrier of energy, potentially increasing the domestic supply of hydrogen and lowering costs of this form of energy for millions of Americans.

Opportunity to Support Technologies

Given recent interest in the discovery of naturally accumulating deposits of subsurface hydrogen, ARPA-E is interested in accessing these deposits and exploring the possibility of developing this source of hydrogen.

By advancing transformative technologies that would enable the stimulation and extraction of this hydrogen, we could potentially yield larger quantities of it than are currently produced.

Exploratory Topics

To that end, in September 2023, ARPA-E announced $20 million dollars in available support for teams to be a part of this historic effort to advance the research and development of this technology. ARPA-E selected 18 projects across 9 states as part of this Funding Opportunity Announcement. In addition, the projects selected are the lead organization and work in conjunction with other research teams spread out across the country.

This effort could enable the production of enough hydrogen to decarbonize industries that may have a more difficult path transitioning through renewables or electrification.

While simply extracting the current supply of naturally accumulating hydrogen, in and of itself, can enhance the U.S. energy economy, ARPA-E is committing research support to explore a potentially disruptive step in the process.

Through understanding how we can artificially stimulate these deposits, there is a theoretical potential to produce enough clean hydrogen to impact U.S. energy demand.

Therefore, the funding announced in September is part of two ARPA-E Exploratory Topics.

The first explores research into the aforementioned stimulation processes, specifically identifying the technologies and developing an understanding of controlling these hydrogen-producing geochemical reactions.

The second focuses on technologies relevant to the management and extraction of hydrogen from geologic reservoirs, this includes how we can contain and transport this source of energy from the Earth's subsurface, and mitigate risks associated with these efforts.

This funding will include significant research using advanced modeling and characterization tools so that we can better predict the viability of subsurface resources both on and offshore.

Using samples from sites of interest, teams will utilize analytical laboratory techniques to understand the environment necessary to stimulate and extract hydrogen from the subsurface. The historic significance of this moment is clear with this being the first time that the U.S. government has competitively selected teams to research this technology.

Conclusion

The potential for geologic hydrogen represents a paradigm shift in the way we think about hydrogen as an energy source.

If our programs show success, this new source of hydrogen could lower energy costs and increase our nation's energy security and supply chain.

In other words, it could fundamentally change how we use energy.

In addition, existing technology, infrastructure, and workforce capabilities from industries such as geothermal, oil, gas, and mining may be leveraged for the previously referred-to stimulation and extraction methods.

While we are encouraged by these possible benefits, we believe the first step in realizing this technology is extensive research and development.

We understand the inherent risks of this early-stage research, and recognize this risk is essential in ARPA-E's mission to revitalize American innovation.

ARPA-E has consistently proven its ability as an agency to not only fund these R&D efforts, but to successfully guide the realization of disruptive energy technologies.

Thank you for the opportunity to appear before the Committee today, and I look forward to your questions.