Testimony of Edward Stones
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Introduction

Thank you, Chairman Manchin, Ranking Member Barrasso, and distinguished Members of the Committee. My name is Edward Stones, and I am vice president of energy and climate for Dow. I appreciate the opportunity to appear before you today.

About Dow, Inc.

Dow has a global footprint of large-scale operations. We combine global breadth, asset integration and scale, focused innovation and materials science expertise, leading business positions, and environmental leadership to achieve profitable growth while delivering a sustainable future. The Company's ambition is to become the most innovative, customer centric, inclusive and sustainable materials science company in the world.

Here in the United States, we operate assets in eleven states, employing over 17,000 people. Globally, Dow operates manufacturing sites in 31 countries and employs approximately 37,800 people. Our portfolio of plastics, industrial intermediates, coatings and silicones businesses deliver a broad range of science-based products and materials for customers in market segments such as mobility, packaging, infrastructure and consumer care.

Dow's strategy to reduce greenhouse gas emissions is to *Decarbonize and Grow* – meaning that we are investing in both growing our ability to serve customers and reducing emissions. We are investing approximately $1 billion per year to drive growth and decarbonize our manufacturing assets. We have a detailed investment plan and roadmap to our 2050 carbon neutrality target that touches nearly every aspect of our business.

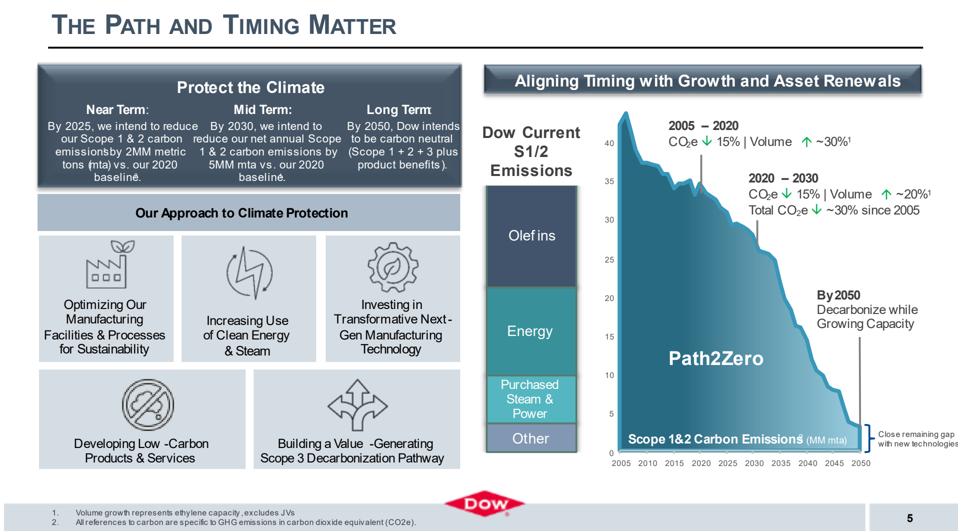

Figure 1. Dow's Decarbonize and Grow Strategy.

An important part of this strategy is to replace end of life assets with known, proven technologies that enable us to decarbonize – preparing our sites for a more sustainable future. We plan to phase out inefficient and aging assets and build best-in-class net-zero assets designed for growth. Investments to reduce and eliminate greenhouse gas emissions will continue until we attain our overall 2050 carbon neutrality goals.

The challenge of decarbonization is significant, but achievable. Decarbonization is also not new to Dow. From 2005 to 2020, Dow reduced its scope 1 and 2 greenhouse gas emissions by 15%, and we are on track to reduce those emissions by another 15% by 2030. To achieve these reductions, we have focused on optimizing our facilities and processes, developing low emissions products and technologies for our customers, investing in next generation manufacturing technology and increasing our use of clean energy. This also includes a multi-generation site decarbonization plan for each of our top 25 sites globally.

The Energy Hurdle

At Dow we use approximately 10 gigawatts of energy from fuel to produce heat, power and steam at 25 major manufacturing sites worldwide – that's enough energy for more than 7 million homes, which is more than the number of homes in Michigan and Louisiana combined (6.64 MM homes). That energy powers more than 50 gas and steam turbines and boilers, as well as more than 100 furnaces around the world.

In our industry, energy costs are one of the highest input costs we face. Therefore, to maintain competitiveness, it is essential to use hydrocarbon inputs as efficiently as possible. Our industry is the nation's largest owner and operator of combined heat and power (CHP) systems, also known as cogeneration. Making useful thermal energy and electricity in one process achieves a far higher efficiency level than can be achieved by separately producing steam in a boiler and buying electricity from a third party. Using on-site systems can also result in lower greenhouse gas emissions.

In a similar vein, there is currently no competitive alternative to the carbon and hydrogen molecules found in hydrocarbon feedstocks that are the very foundation of our industry. When these molecules are used as a raw material, they help create useful products in the conversion process, from accelerating electric vehicle technologies to food packaging and medical and pharmaceutical products.

Dow is a leading user of renewable energy. We are among the top-20 global corporate purchasers of renewables, having secured access to over 1,000MW of renewable power for use at Dow sites around the world. However, there's a limitation in the ability for renewables to support our decarbonization efforts.

Traditional clean energy such as wind, solar and storage are a valuable resource to meet our 2050 goals. But they present reliability challenges. They must be paired with baseload sources such as comparatively low-emissions energy from natural gas or non-emissions technology such as nuclear. Technologies such as hydrogen, advanced nuclear, and natural gas connected to CCUS will be required for the energy transition and we are actively working with all these technologies in our planning.

Chemical manufacturing, like other energy-intensive processes such as steel, glass, and cement manufacturing, requires a very large supply of process heat and steam at a very high temperature, available 24 hours a day, seven days a week. While renewables generate enough electricity to run some of our processes, they cannot deliver the high temperature and high-pressure heat and steam that many of our processes require. We cannot have power interruptions when the sun isn't shining, or the wind isn't blowing.

Dow considers nuclear energy, especially advanced small modular reactors, to be a long-term viable source of sustainable, zero-emissions energy and steam for our manufacturing operations. Advanced nuclear has attractive advantages over other sources of clean power, including a compact footprint. We also believe that advanced nuclear can be helpful in the future to generate hydrogen from electrolysis, which will be critical to the decarbonization of high heat industrial processes, and hydrogen can be blended with natural gas to reduce carbon dioxide emissions.

Advanced Small Modular Nuclear

Advanced reactors are smaller than those in the current domestic fleet, typically 60-300 megawatts, and are often referred to as small modular reactors (SMRs). The size and inherent safety features of these designs eliminate the need for many systems, greatly simplifying the design and construction. These advanced reactors also require a much smaller footprint, a key characteristic for industrial site applications. They can also be deployed in packs, or groups of reactors, which allow additional reactors to be added as the need arises. For example, our project with X-Energy is a four (4) pack of 80MW reactors. These smaller reactors employ air or gas cooling systems and use far less water than reactors that use water from an ocean, lake, or river. Our project technology is using helium gas to control the temperature of the fuel pellets.

Next generation SMRs can safely and reliably generate carbon dioxide emissions-free steam and electricity. Advanced SMRs offer the advantage of baseload replacement and renewable supplement with better environmental performance and fewer issues than conventional nuclear. These reactors utilize different cooling mediums, such as helium gas, and advanced fuel designs that often use high-assay low-enriched uranium (HALEU) fuel that offers additional protection to possible fuel meltdown events.

Figure 2. Dow Seadrift Operations are approximately 25 miles from Victoria, 15 miles from Port Lavaca and 48 miles from South Texas Nuclear Project (not pictured).

Our project with X-Energy is focused on installing an advanced SMR nuclear plant at Dow's Seadrift Texas manufacturing site. Each reactor can produce 80 MW output or support industrial applications with 200 MW thermal output per unit of high pressure, high temperature steam. Our plan is to install 4 reactors on our site. The project will provide the Seadrift site with safe, reliable, zero carbon emissions power and steam as the existing energy and steam assets reach their end-of-life. The project is expected to reduce the site's emissions by 440,000 MT CO2e/year.

Dow selected the Seadrift site because it is an important manufacturing site for current and future products. The Seadrift site covers 4,700 acres and the advanced nuclear reactors will occupy approximately 30 acres. The site manufactures more than 4 billion pounds of materials per year used across a wide variety of applications including food packaging and preservation, footwear, wire and cable insulation, solar cell membranes, and packaging for medical and pharmaceutical products.


Figure 3. Artist's rendering of Dow's proposed advanced small modular nuclear facility in Seadrift, Texas.

One advantage for our Texas project is that the region is familiar with nuclear technology as the site is located approximately 50 miles from the existing South Texas Project nuclear facility near Bay City, Texas. We expect to submit Construction Permit Applications to the Nuclear Regulatory Commission early next year. If granted the permit, we anticipate beginning construction on the nuclear assets in 2026 and expect to be operational by approximately 2030.

Policy Considerations

Advanced nuclear provides a huge opportunity for industrial users of power and steam. Navigating the deployment challenges will require continued engagement between the private sector and federal government, particularly around the financial and operating risks to early adopters of this technology. To realize the opportunity of advanced nuclear technology in the U.S., we see three key areas of risk and opportunity and they are all inextricably linked: fuel, timing, and budget.

> **Fuel Assurance**: Concerns about the long-term availability and geopolitical issues related to uranium supply could impact the sustainability of nuclear power. Industrial customers need confidence that fuel supply will enable steady operation and operating costs. I know this issue in particular is something this committee has been working on, and we appreciate the leadership shown by the Chairman in particular to develop this fuel.
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> **Timing**: Most industrial users will install advanced nuclear technologies to replace existing assets reaching end-of-life. Therefore, projects must be delivered on strict timelines. Ensuring that

regulatory frameworks are adaptable and efficient is crucial to avoiding prolonged approval timelines. I want to compliment the Nuclear Regulatory Commission. The NRC has undergone a shift in mindset from permitting traditional nuclear – what they were created to do – to now permitting advanced nuclear assets like SMRs. I appreciate their willingness to listen and consider new ideas while continuing to hold applicants to high standards when it comes to safety and operability.

Budget: Capital costs must be clear, competitive, and constant. Significant changes in timing affect costs. And the lack of a fuel source affects both timing and costs.

In addressing these risks and leveraging opportunities, it's crucial for stakeholders, including governments, industry players, and the research community, to work collaboratively. Clear regulatory frameworks, strategic investments, and a commitment to innovation are essential for the successful deployment of advanced nuclear technologies.

Conclusion

Members, thank you again for the opportunity to be here today and offer support for the acceleration of advanced nuclear technology deployment. As you and your House colleagues continue to develop a comprehensive policy approach, I hope you will continue to engage in close partnership with the private sector. We want to be a resource in these discussions.