TESTIMONY OF ERIK MILITO

PRESIDENT

NATIONAL OCEAN INDUSTRIES ASSOCIATION

"To reach the President's ambitious domestic climate goal of net-zero emissions economy-wide by 2050, the United States will likely have to capture, transport, and permanently sequester significant quantities of carbon dioxide (CO_2) … [It] is likely to be especially important for decarbonizing the industrial sector, where high-temperature heat can be difficult and expensive to electrify and where there are significant emissions..."

-- The White House Council on Environmental Quality Report to Congress on Carbon Capture, Utilization and Storage. June, 2021[1]

I appreciate the opportunity to testify today on behalf of the National Ocean Industries Association ("NOIA"). Now in our 50th year as an organization, NOIA represents all segments of the offshore energy industry. We are the voice and advocate for offshore oil and natural gas, offshore wind, offshore carbon capture and storage, and offshore mineral mining. Critically, our members include not just project developers, but also the businesses large and small that do the work of building, supplying, and maintaining infrastructure and projects in the domestic marine environment. Our members are energy companies, and their work is essential for providing the investment and jobs to generate the technologies and energy necessary for the U.S. and global economies to maintain a high quality of life and reduce poverty. We represent countless thousands of blue-collar and white-collar employees across the nation, stretching from New England to the Gulf Coast and to the West Coast. Indeed, we have confirmed that our member companies not only create jobs in the states of every member of this Committee, but in every state in the Union.[2] Together, we are working towards an affordable, reliable, safe, and low carbon energy system.

Progress towards addressing the climate challenge will depend upon increased innovation, conservation, efficiency, resiliency, mitigation, and adaptation. Carbon capture and storage (CCS) is an innovative approach to mitigating greenhouse gas emissions. The wide-spread deployment of CCS will be critical for achieving the climate change ambitions and goals that have been established by a diverse group of stakeholders around the world. CCS can serve as an important tool for balancing environmental, economic, and energy needs. U.S leadership in CCS will help ensure the availability of abundant, reliable, and affordable domestic energy, while continuously driving down emissions.

[1] https://www.whitehouse.gov/wp-content/uploads/2021/06/CEQ-CCUS-Permitting-Report.pdf

[2] https://www.noia.org/wp-content/uploads/2021/08/The-Gulf-of-Mexico-Oil-Gas-Project-Lifecycle.pdf

The Basics of CCS:

As its name suggests, CCS involves the capture of CO_2 from either large point sources – including power generation or industrial facilities – or directly from the atmosphere. The captured CO_2 is then compressed and transported to either be injected into deep geological formations which permanently trap the CO_2 or is used in a range of applications. CCS uses a robust supply chain and combines various technologies to effectively reduce the amount of carbon dioxide that is emitted into the air, thus mitigating against warming effects and the impacts of greenhouse gases in the atmosphere. Carbon dioxide is the most common greenhouse gas, and it is emitted through various industrial processes and the transportation sector, among others. Industrial processes include emissions from power plants, industrial furnaces and stoves, steel blast furnaces, cement plants, and others.

The below infographic[3] from the International Energy Agency does an excellent job of showing the basics of the concept and the ways in which carbon can be transported and ultimately used or stored.

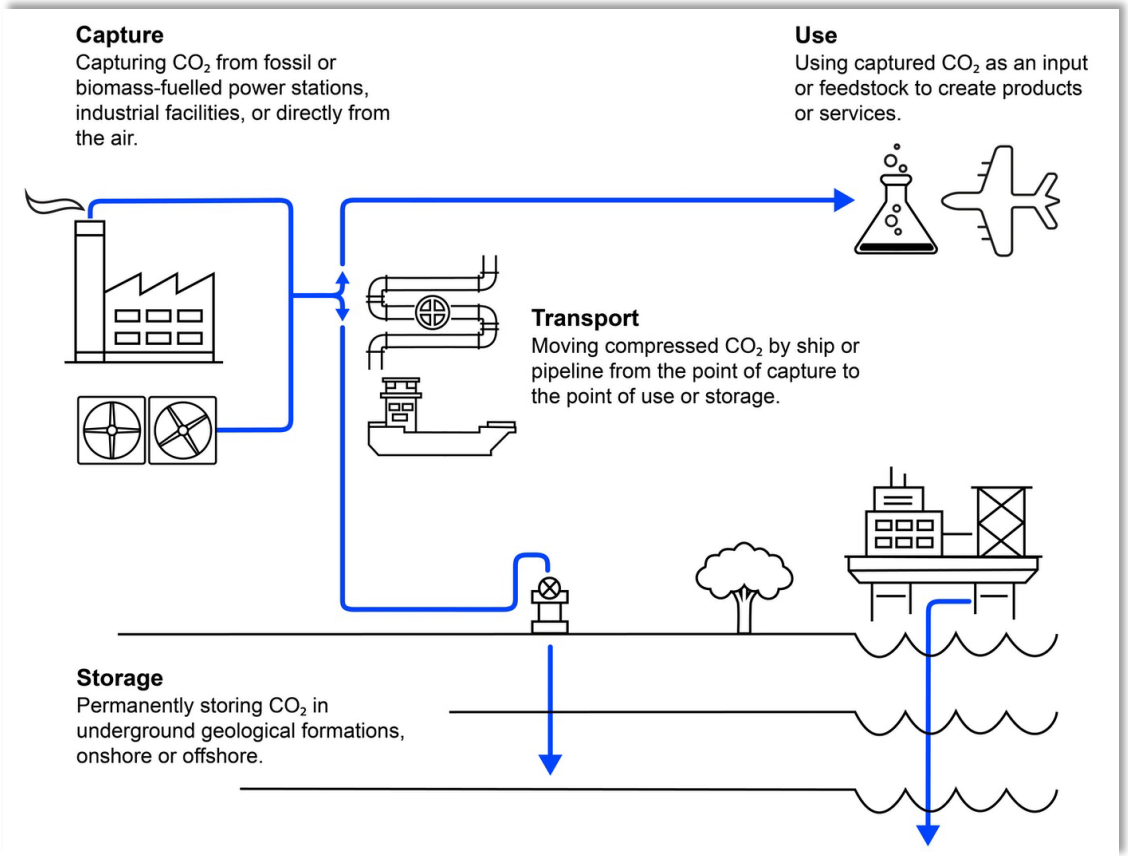

Figure 1: An IEA Infographic Explaining The Basics of CCUS

[3] https://www.iea.org/reports/about-ccus

The Challenge and Opportunity

While we continue to reduce greenhouse gas (GHG) emissions throughout our economy and the energy system, CCS will be key to achieving our climate ambitions. As Secretary of Energy Jennifer Granholm has discussed with regard to transitioning the economy towards lower emissions, "Some emissions sources, like cement plants, can't be phased out immediately or they don't have non-fossil-fuel options even available…that is where carbon capture and storage comes into play."[4] In other words, CCS will play a critical role in further reducing carbon dioxide emissions from hard to decarbonize industries and meeting the challenge of climate change.

Importantly, as federal policymakers consider options for domestic CCS, we applaud the increasing recognition that the U.S Gulf of Mexico's outer continental shelf offers tremendous advantages and can accelerate the emerging U.S. CCS sector and strengthen American leadership.

The Gulf aligns key drivers for success in CCS in the United States. First, the Gulf Coast is home to the full supply chain of energy companies with the engineering experience, expertise, and vision to deploy CCS projects with the scale and efficiency necessary for success. As the Greater Houston Partnership notes[5], the Houston area alone is home to more than twenty energy-focused R&D centers, sixty-seven energy technology companies, six hundred exploration and production firms, 1,100 oilfield service companies, 180 pipeline transportation firms, and the fourth largest concentration of engineers. Likewise, neighboring Louisiana is also a key area for the Gulf's energy economy. In 2020, the energy sector provided some $73 billion in state GDP and nearly a quarter of a million jobs—almost one-ninth of employment in the state.[6] Clearly, the region has a massive supply chain and a deep bench of technical expertise upon which to rely.

Second, the Gulf of Mexico is situated in close proximity to substantial industrial centers along the coastline for capturing emissions.[7]

Third, the Gulf is characterized by vast geologic prospects for CO_2 storage. As the National Petroleum Council reported, "One of the largest opportunities for saline formation storage in the United States can be found in federal waters, particularly in the Gulf of Mexico."[8] In fact, estimates have pointed to storage capacity along the Gulf Coast large enough for 500 billion metric tons of CO_2, which would equal about 130 years of industrial and power generation emissions in the U.S. as of 2018. [9]

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[4] https://twitter.com/secgranholm/status/1423023737289408512

[5] https://www.houston.org/why-houston/industries/energy

[6] https://www.lmoga.com/assets/uploads/documents/LMOGA-ICF-Louisiana-Economic-Impact-Report-10.2020.pdf

[7] https://www.colliers.com/en/news/houston/petrochemical-and-plastics-industry-2019-houston-economic-outlook

[8] *Meeting the Dual Challenge: A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage*, The National Petroleum Council, December 2019, p. 27.

[9] https://corporate.exxonmobil.com/News/Newsroom/News-releases/2022/0120_Industry-support-for-large-scale-carbon-capture-and-storage-gains-momentum-in-Houston

Fourth, an extensive and established energy infrastructure along the Gulf Coast and throughout the outer continental shelf will enable logistical efficiencies for transporting CO_2 from emissions sources to storage locations.

Foreign Examples and Domestic Announcements Of Offshore CCS

Figure 2: The North Sea's Sleipner Field

The technical and commercial feasibility of large offshore storage projects is being proven on the global stage. For example, the *Sleipner* project, led by NOIA member company Equinor, has been in operation since 1996. It involves the capture of CO_2 from industrial sites onshore in Norway and then the transport and geologic storage in saline aquifers off the coast, in volumes of approximately one million tons per year.[10] [11] By comparison, the average American car emits 4.6 tons of CO_2 each year[12]. There are other examples of offshore geologic storage as well, such as Equinor's second project - *Snøhvit* - in the far-north of Norway, Chevron's Gorgon project in Australia, a project in Brazil's Santos Basin operated by Petrobras, and another in the South China Sea operated by CNOOC.

Projects with engineering transferability to the Gulf of Mexico are also underway. With operations beginning in 2024, *Northern Lights* is a new CCS project under construction that will initially store up to 1.5 million tonnes of CO_2 per year with the goal to achieve five million tonnes of CO_2 per year by 2027. The *Northern Lights* project is part of a larger carbon capture and storage initiative that will capture CO_2 from industrial sources within Norway, ship liquid CO_2 from capture sites to an onshore terminal on the coast, and then transport the CO_2 by pipeline to an offshore storage site below the North Sea in water depths of more than 300 meters and total depth to injection of 2,500 to 3,000 meters. In the U.S., the Gulf of Mexico is well suited for the development of projects like *Northern Lights*.

Fortunately, there have been recent decisions and announcements related to the emergence of a domestic CCS industry in the Gulf of Mexico. Talos Energy, a NOIA member company, has moved ahead with a joint venture called Bayou Bend CCS LLC, which has formally executed a

[10] https://www.globalccsinstitute.com/wp-content/uploads/2021/11/Global-Status-of-CCS-2021-Global-CCS-Institute-1121.pdf

[11] https://www.equinor.com/en/news/2019-06-12-sleipner-co2-storage-data.html

[12] https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#:~:text=typical%20passenger%20vehicle%3F-,A%20typical%20passenger%20vehicle%20emits%20about%204.6%20metric%20tons%20of,8%2C887%20grams%20of%20CO2.s

lease from the State of Texas' General Land Office as part of an effort to undertake CCS projects off the coast of Texas in state waters near the industrial corridor around Beaumont and Port Arthur.[13] The lease covers some 40,000 acres and encompasses a formation which has the potential to store as much as 275 million metric tons of CO_2.

Further, fourteen companies have joined forces to establish Houston as a hub for large scale carbon capture and storage.[14] The group is forming a public-private partnership which could invest $100 billion to capture tens of millions of tons of CO_2 near the Houston ship-channel.[15] According to the consortium:

> With the appropriate government, industry and community backing, we believe we could help safely capture and store about 50 million metric tons of carbon dioxide a year from the area's petrochemical, manufacturing and power generation facilities by 2030, then double that to remove 100 million metric tons a year by 2040.
>
> We believe we could create tens of thousands of new jobs and protect existing ones that are important to Houston's economy while promoting long-term economic growth in Southeast Texas and beyond. We also believe carbon capture and storage could position Houston as a leader in future lower-carbon businesses like hydrogen, and help put the city well on its way to reaching its goal of being carbon-neutral by 2050.

The members of the group include Air Liquide, BASF, Calpine, Chevron, Dow, ExxonMobil, Ineos, Linde, LyondellBasell, Marathon Petroleum, NRG, Phillips 66, Shell, and Valero.

These are just examples, and there are countless companies with a history in the Gulf of Mexico exploring opportunities for offshore CCS. NOIA's membership alone includes dozens of companies throughout the supply chain with established experience or interest in participating in the build-out of the U.S. CCS sector.

Policy Action Necessary for Offshore CCS

As with any capital-intensive industry, the U.S. CCS sector requires certainty and predictability in the regulatory system, both at the state and federal level. Improvements must be made in U.S. laws and regulations to foster growth and enable success in U.S. CCS.

On January 12, 2022, NOIA released its Offshore CCUS Policy Paper, and this document included our public policy recommendations. This document is provided for your reference. The top priorities include:

1. Legislation to expand the 45Q tax credit, with direct pay option;

[13] https://www.offshore-mag.com/regional-reports/us-gulf-of-mexico/article/14241614/talos-energy-announces-formal-execution-of-carbon-capture-lease-site
[14] https://houstonccs.com/
[15] https://cleanenergynews.ihsmarkit.com/research-analysis/exxonmobil-unveils-vision-for-100billion-carbon-capture-hub.html

2. BOEM regulations for reasonable and predictable access to OCS geologic storage through leasing, permitting and approvals;
3. BSEE regulations for safety and environmental oversight of OCS transportation and sequestration;
4. Clear regulatory requirements for secure geologic storage in the OCS for purposes of qualifying for 45Q;
5. Prompt and thorough NEPA reviews for OCS storage program, leasing, projects, and infrastructure;
6. Consideration of related tax credits, such as 45X on hydrogen, and their interplay with 45Q; and

Fortunately, the Infrastructure Investment and Jobs Act of 2021 (P.L. 117-58) included Sec. 40307, explicitly authorizing the Department to grant leases, easements, or rights-of-way on the outer continental shelf for the purposes of long-term storage. It also directed the Secretary to issue regulations to that effect within one year of enactment. NOIA understands that Interior is in the process of developing the regulatory framework for offshore sequestration as directed by the Infrastructure Investment and Jobs Act. It will be important for Congress to ensure adequate funding for Interior to fulfill its responsibilities for leasing and regulating the activity.

There is also a need for a stable tax credit environment, particularly in the early years. The 45Q tax credit has been vital in driving domestic onshore CCS, and it should be extended and expanded to ensure a runway towards a viable and durable offshore CCS program.

Safety and Environmental Protection

America's offshore energy industry, including the carbon capture and storage sector, is characterized by the continued advancement of technology and systems integrity, the application of extensive industry technical standards, and a robust regulatory regime. The industry continues to develop and improve upon technologies designed to ensure that a safety or environmental incident never occurs, and this includes everything from the materials used in offshore operations, the development of software and control systems to manage operations, the development, production, and deployment of modern vessels, drill ships, and facilities to drill wells and sequester carbon dioxide in the offshore environment, and the design and manufacture of monitoring equipment, subsea safety valves, and other safety equipment.

Furthermore, the vast experience of the oil and gas industry throughout the world, and specifically in the U.S. Gulf of Mexico, in the field of health, safety, and environmental will enable the U.S. government and industry to move forward, at the outset, with a strong foundation for safe and environmentally responsible offshore carbon capture and storage. As discussed by the Bureau of Ocean Energy Management in its 2018 OCS Study, "Since at least 2005, it has been recognized that storage of CO_2 in the offshore sub-seabed geological formations will use many of the same technologies developed by the oil and gas (O&G) industry." The industry's experience in risk assessments, project planning and execution, monitoring, mitigation, inspections, and response are transferable and will be applied in the offshore carbon and storage

setting. In fact, the industry already has experience in developing and applying these practices in offshore carbon capture and storage projects throughout the world.

The United States, through its established regulatory oversight authorities within the Department of the Interior and other agencies within the federal family, is well positioned to develop a strong regulatory regime for leasing, permitting, oversight, and enforcement for carbon sequestration throughout the U.S. outer continental shelf. As discussed above, the success of a U.S. offshore carbon capture and storage sector will be contingent upon clear and predictable regulations that enable investment and protect the health and safety of workers, the public, and the environment. Interior has decades of experience in regulating offshore oil and gas operations and this established system of rules, along with institutional knowledge and practical application of engineering principles, is – in many respects – transferable to the development and execution of operational and regulatory requirements for offshore carbon capture and storage. As directed by Congress, Interior has begun the process for developing the regulations, and the industry remains committed to working with Interior and the entire federal family to establish a solid regulatory framework. Congress also should facilitate the necessary authorizations and funding for Interior to capably manage and oversee the safety and environmental requirements for offshore sequestration.

The combination of an experienced industry and an established regulator puts the United States in a unique position for confidently and effectively managing and overseeing safe and environmentally responsible carbon capture and storage in the U.S. outer continental shelf.

Continued Innovation and Development of Clean Energy Technologies

The Gulf of Mexico is a recognized energy center, with a vast ecosystem of companies and a workforce dedicated to developing all forms of abundant, reliable, and affordable energy, while continuously decreasing emissions. The offshore energy industry is uniquely situated to deploy energy projects at the scale and sophistication necessary to help lead the world in developing low carbon solutions. Many engineering projects and technologies can be integrated to provide a pathway to low carbon energy. This includes CCS and hydrogen. According to the International Energy Agency:

> Carbon capture, utilisation and storage (CCUS) technologies offer an important opportunity to achieve deep carbon dioxide emissions reductions in key industrial processes and in the use of fossil fuels in the power sector. CCUS can also enable new clean energy pathways, including low-carbon hydrogen production, while providing a foundation for many carbon dioxide removal (CDR) technologies.

Policy makers should recognize the homegrown expertise and the vast infrastructure throughout the Gulf of Mexico as we seek to secure the U.S. as a leader in global decarbonization efforts.

Conclusion

> *"CCUS is an essential element in the portfolio of solutions needed to change the emissions trajectory of the global energy system. In its Fifth Assessment Report, the IPCC concluded that*

the costs for achieving atmospheric CO_2 levels consistent with holding the average global temperature to 2 degrees Celsius—referred to as a "2 degree Celsius world"—will be more than twice as expensive without CCUS."[16]—The National Petroleum Council

We have an opportunity to set the stage for a 21st century in which carbon is responsibly captured and transported for long-term geologic storage or beneficial use. The offshore, and particularly the Gulf of Mexico, present one of the most advantageous opportunities in the United States and the world. The success of this nascent industry will be closely connected to the development and implementation of clear and predictable leasing, permitting, and regulations, along careful coordination among federal, state, and local authorities. NOIA and its members stand ready to work with policy makers to establish this important industry.

Very respectfully,

Erik Milito
President
National Ocean Industries Association

[16] *Meeting the Dual Challenge: A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage*, The National Petroleum Council, December 2019, p. 12.