Hydrogen Energy Center

May 2, 2023

Senate Chair: Senator Mark Lawrence
House Chair: Representative Stanley Paige Zeigler
Energy, Utilities and Technology Committee
c/o Legislative Information
100 State House Station
Augusta, Maine 04333

Re: Testimony on LD1775 – An Act to Establish a Clean Hydrogen Pilot Program

Senator Lawrence and Representative Zeigler:

Thank you for allowing me to present this testimony. My name is Brad Bradshaw, I am President of the Hydrogen Energy Center based in Portland, Maine and am providing testimony in favor of the Clean Hydrogen Pilot Program legislation. I have been working in the hydrogen industry for twenty years, advising states, territories, and companies on hydrogen technologies, markets and policies. I am currently leading developing the hydrogen strategy for Puerto Rico, identifying the best strategies and policies for Puerto Rio to pursue, considering the economy, the environment and grid resilience. I am also a lead advisor to the states of Louisiana, Oklahoma and Arkansas on the development and recent submittal of an application for $1.25 billion in DOE funds for building out a hydrogen hub, consisting of seven carbon capture and sequestration projects and seventeen electrolyzer projects.

Five years ago, I was hired by the United States Small Business Administration to identify emerging market opportunities associated with hydrogen and fuel cells in the State of Maine. The objective was to identify potential projects which represented the best opportunities from an economic and business development perspective. What did we find? The best opportunities focused on converting biomass into natural gas, using waste wood and municipal water treatment facilities.

Where does hydrogen come into play? Decaying matter is converted by microbes into methane and carbon dioxide. This takes place in landfills, wastewater treatment facilities, animal farms,

and in the logging industry. All of these processes are responsible for the emission of methane and carbon dioxide into the atmosphere, contributing to Maine's global warming impact. These natural processes can be leveraged to divert methane into productive uses such as generating power or being injected into natural gas pipelines. The excess carbon dioxide can also be combined with hydrogen to generate additional methane, also for productive purposes. So, where do we get that hydrogen?

The best way to integrate hydrogen into these biomass facilities is to locate an electrolyser at the facility, and to use electricity from the power lines to power the electrolysers. The power can be sourced from renewable energy facilities in the state, through power purchase agreements or the purchase of renewable energy credits. Certain facilities will have the opportunity to collocate large photovoltaic facilities to feed the electrolyzers directly, there will, however, be cases where the opportunity to collocate photovoltaic facilities may not exist. Even with collocated photovoltaic facilities, there will be a need to connect to the grid to use additional power to keep the biomass facility running.

Greenhouse Gas Emissions

The clean hydrogen criteria in this legislation of 4 kilograms of carbon dioxide per kilogram of hydrogen is a significant improvement of the estimated grid emissions of approximately 13 to 16 kg CO2 per kg of hydrogen. The hydrogen will be used to accelerate decarbonization cost effectively in multiple end-uses and sectors, specifically including the hard to abate sectors including biogenic sources and transportation. There are multiple applications for hydrogen that could be implemented under this initiative.

- **Decarbonizing Natural Gas** - This can include decarbonizing methane molecules by producing and injecting methane into natural gas pipelines, advancing the state's decarbonization objectives.
- **Decarbonizing Transportation** - Hydrogen can also be used for transportation fuel in trucks, helping reduce transportation carbon emissions.
- **Reducing Biogenic Sources of Methane and CO2 Emissions** – The errant emissions associated with the natural decay of biomass can be thwarted by introducing this legislation. Agriculture and waste are responsible for approximately 4% of Maines 2017 emissions.

Cost Impact

The impact of this specific program will be negligible for gas and electric ratepayers. If the program implements 60 MW of electrolysers, the demand charge savings would be roughly equivalent to about $[redacted] million per year, resulting in about [redacted] cents per customer per day. There are, however, multiple value streams that counterbalance any costs.

- **Cost Impact is Zero if Individual Projects Never Proceed** – There is no out-of-pocket cost associated with the pilot. If the alternative is the null set, i.e., the projects in the pilot would not proceed without the pilot, then there is zero cost impact on ratepayers.
- **Lowering Customer Bills by Spreading Fixed Costs Across More Electrons** – The increase in electricity sales will spread utility fixed and overhead costs across more electrons, helping to reduce customer utility bills.
- **Creating a More Reliable Grid** – Electrolyzers can be used to provide ancillary services such as frequency regulation to help stabilize the grid at a lower environmental and economic cost than power plants.
- **Helping Absorb Stranded Electrons Associated with Curtailment** – Curtailment of renewable energy facilities is going to increase as the penetration of renewable energy continues to increase. Steady state demand for electricity will contribute to reducing renewable energy overproduction, improving renewable energy and grid economics.

Economy Impact

Through this legislation, Maine has the opportunity to accelerate the development of advantageous projects that revitalize multiple Maine industries while creating jobs, tax revenues, and accelerating the reduction of harmful emissions.

- **Creating Jobs** – Proving out the financial returns associated with the projects in the pilot will contribute to further development of similar projects in the sate of Maine. These innovative projects will place Maine on the map in terms of the capabilities, services and solutions needed to develop the industry. This pilot program helps catalyze the resources, capital and solutions needed to get moving and spark growth in a new industry for Maine.
- **Revitalizing Maine's Biomass and agricultural Industries** – The wood forest products industry has seen significant reduction in activity over losses in both the paper industry and the biomass power industry. This pilot will contribute to monetizing waste streams in both the timber industry and the farm industry.
- **Expanding Maine's Renewable Energy Installations –** The installation of low carbon electrolyzers will increase the demand for and investment in renewable energy facilities in the state of Maine, creating jobs and a cleaner environment.

HEC thanks the Committee Chairs and Committee members for their consideration of this testimony in support of LD1775. Please do not hesitate to contact me if you have any questions or if I can provide additional information and support. I look forward to working with the Committee to expand economic opportunities for Maine and her citizens.

Sincerely,

Brad Bradshaw
President

Cc: Members of the Energy, Utilities and Technology Committee
Jacob Faria, Committee Clerk