Public Workshop to Discuss Potential Regulatory Revisions to the Low Carbon Fuel Standard
Comments by True North Renewable Energy and Ørsted

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True North Renewable Energy and Ørsted appreciate the opportunity to comment on the October 14-15 workshop to discuss potential regulatory revisions to the Low Carbon Fuel Standard (LCFS).

As you undoubtedly know, the LCFS is one of the most powerful climate policies in California. In particular, it provides a strong and targeted market signal for hard-to-abate sectors, which enables low carbon solutions to come to market that would not necessarily emerge otherwise through the Cap-and-Trade Program or the state's other climate policies. Indeed, recognition that Cap-and-Trade or other policies likely would be insufficient to foster investment in low carbon transportation fuels is what led to the creation of the LCFS in the first place.

As you look ahead to the next set of regulatory amendments, we encourage you to keep this original intent and ongoing rationale behind the LCFS in mind. We encourage you to reinforce the state's commitment to a strong, technology neutral LCFS that continues to drive innovation and progress in hard-to-abate sectors – now and beyond 2030. And we encourage you to make adjustments that reflect the urgency with which we need to act on climate change, and the opportunity we have to do so.

In particular, we encourage you to take deliberate steps to support the emerging market for green electrolytic hydrogen. In the last set of amendments, CARB deliberately set out to support deployment of hydrogen stations through the Hydrogen Refueling Infrastructure credit. This has proven successful and has helped dramatically increase deployment of refueling stations in the state, to the point the state seems on pace to achieve its goal of 200 light-duty hydrogen stations by 2025. Now we encourage you to take steps focused on hydrogen supply, to ensure those stations are fueled with the cleanest sources of hydrogen and to help create growing markets for green electrolytic hydrogen. Doing so will not only enable zero emission vehicles to be entirely zero emissions – from well to wheel – but will also support the rapid expansion of a cost-effective, green hydrogen market that can help decarbonize hard-to-abate sectors of the economy outside of the transportation sector, and dramatically accelerate our path to carbon neutrality and net-negative emissions. To this end, we offer the following recommendations for amendments to the LCFS regulations:

I. UPDATE "RENEWABLE HYDROGEN" DEFINTION: Develop a technology-neutral, emissions-based definition for green hydrogen, and update the current definition of "Renewable Hydrogen" in the LCFS regulations to reflect all technology available and to encourage development of new green hydrogen production.

Scaling the production and use of green hydrogen, and hydrogen from electrolysis in particular (green electrolytic hydrogen or "Green Hydrogen"), is key to decarbonizing hard-to-abate sectors of the economy. In order to help scale the electrolysis market and capture the opportunities it offers, and before the LCFS program is expanded, CARB should update the current definition of "Renewable Hydrogen" in the LCFS regulations to support new technology developments, encourage new investments in electrolytic hydrogen production, and support additional greenhouse gas emissions reductions. The current framework in the LCFS supports the prevailing least cost path to comply with renewable hydrogen content standards – allowing conventional brown hydrogen to qualify as

renewable hydrogen through a flexible biogas crediting system. While this framework helps reduce overall hydrogen fueling costs, it does not support new investments in green hydrogen and serves to disadvantage and/or discourage green electrolytic hydrogen.

CARB should develop a technology neutral definition for renewable hydrogen and also recognize the benefits of green hydrogen in the LCFS regulations. CARB should structure the LCFS program, starting with the definition, to afford the widest access to and use of all zero-carbon energy resources and to encourage hydrogen production from water and electricity and reformed biogas.

Specifically, CARB should define renewable hydrogen to include a broad definition of green hydrogen, and to include hydrogen from electrolysis using power derived from any zero-carbon resource. CARB should resist calls to define green hydrogen as deriving only from RPS-eligible resources, which would unnecessarily limit opportunities to integrate green hydrogen production with the electricity grid. CARB should also establish clear accounting mechanisms that facilitate putting zero-carbon curtailed power to use to generate electrolytic hydrogen. This will help optimize operation of the electricity grid and use of existing grid resources, while supporting additional greenhouse gas reductions in hard-to-abate sectors.

Today, Public Utilities Code Section 400.2 defines green hydrogen as follows:

> "green electrolytic hydrogen" means hydrogen gas produced through electrolysis and does not include hydrogen gas manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock.

In 2018, the Legislature created a formal definition of electrolysis as "green" hydrogen and further directed CARB and other the energy agencies to include green hydrogen in future electric sector planning and to consider other uses of green hydrogen. It's time to recognize it as the critical resource it is to achieve deep decarbonization and fully incorporate electrolysis into the state's climate and energy planning and programs, including the LCFS.

II. FIRM LCFS COMPLIANCE: Support new investments that lead to *new* green hydrogen production, increase green hydrogen storage options, repurpose infrastructure to enable green hydrogen deployment, and support *additional* emissions reductions furthering the state's short-lived climate pollutant goals.

To date, much of the hydrogen that qualifies as renewable under the current LCFS definition is fossil fuel-based – using conventional steam methane reformation plants cracking natural gas – and matching biogas credits to qualify the fossil-based hydrogen as renewable. This is achieved through the flexible compliance methodology of book-and-claim accounting and commonly facilitates biogas credits or biogas environmental attributes to convert fossil hydrogen to renewable hydrogen.

While the use of book-and-claim accounting may be appropriate in some cases, and during the early green hydrogen market may reduce costs for fuel station owners providing green or "renewable" hydrogen, it does not help to advance new markets and needed technology development for green hydrogen, which are important to scale new and advanced technology, bring down costs, and ultimately achieve deep decarbonization. CARB should take care to avoid any steps that might restrict new development and deployment of green hydrogen in the marketplace.

As part of CARB's LCFS definition of renewable hydrogen, we encourage you to include a broad zero carbon definition for green electrolytic hydrogen and to consider requiring biogas used to generate credits to come from new projects in-state or in the regions of the energy delivery systems that serve the state, to provide additional emissions reductions.

As a general rule, and especially as it relates to green hydrogen – which will only grow in importance under the LCFS in coming years – CARB should establish rules that serve to support investments needed to bring **new** renewable and green hydrogen production capacity and renewable fuel supplies online, grow the green economy, advance new technology deployment, bring costs down for new technologies and enable broad deployment of low- and zero-carbon fuels and renewable gases generally. Doing so will support the development of a new, innovative green hydrogen market that can help decarbonize many large industrial gas users, non-specific natural as end users, and go well beyond the transportation sector.

III. EXPAND LCFS: Expand the LCFS to decarbonize other hard-to-abate sectors, including adding the natural gas storage and carrier systems located in the state and which serve the state to the LCFS program.

As CARB turns its attention to additional hard-to-abate sectors and as new technologies are coming on line for large-scale green hydrogen production that serve multiple stationary, industrial end uses like refineries, power plants, and chemicals – decarbonizing well beyond the transportation sector – it is a good time to expand the LCFS to stationary sources other than refineries.

Even in its short lifetime, perhaps no policy has done more to support technologies like carbon capture and sequestration and renewable gases (including biomethane and green hydrogen) that are needed to decarbonize hard-to-abate sectors and achieve deep decarbonization economy-wide. We should celebrate this outcome and build on it. We encourage CARB to use the LCFS to do more to enable these solutions and accelerate the state's path to carbon neutrality and net-negative emissions.

We encourage CARB to expand the LCFS to include the natural gas storage and carrier systems, which in turn will accelerate decarbonization of the industrial sector, the power sector's critical baseload and peaking power plants covered under SB 100, and those non "retail" electric resources not covered under SB 100. An approach that covers all fossil natural gas use, which is the same approach under consideration in Canada, would build on the successful progress of the LCFS already and help to rapidly decarbonize all sectors of California's economy. It would also help avoid distorting markets for renewable gases toward the transportation sector and help the state meet its short-lived climate pollutant and organic waste diversion goals.

Coupled with CARB's authority to create financial mechanisms to spur new low-carbon infrastructure build, new jobs and attract private investments, CARB can leverage the LCFS to require fossil natural gas to be increasingly replaced with low-, zero- and even negative-carbon gases.

Like the Renewable Portfolio Standard reforms in the electricity sector from nearly 20 years ago – when the state set enforceable targets to shift from fossil-based energy to renewables and created a market framework to (1) encourage new infrastructure, (2) expand energy diversity, and (3) move towards environmentally sustainable energy resources – the end result from expansion of the LCFS to gas storage and carrier systems would jump start a new area of the green economy and support the successful transition of fossil-based gas delivery systems away from natural gas. Setting targets to

replace natural gas, creating environmental value for low- and zero-carbon renewable gases, and extending longer-term payments for new developments will attract investments and accelerate progress toward reaching the state's climate goals in the hard-to-abate sectors of the economy that currently rely on natural gas.

Thank you for the opportunity to comment on the LCFS program update and regulation amendments. Updating the LCFS "renewable hydrogen" definition, creating a specific pathway for green electrolytic hydrogen, tightening the book and claim accounting and expanding the LCFS to stationary sources – namely the state's natural gas storage and carrier systems – is a meaningful and effective strategy to decarbonize hard-to-abate industrial gas users and will accelerate the reduction of natural gas use overall.

We look forward to working with you in these areas of the program and are enthusiastic about creating new, disruptive green economic growth opportunities, green jobs and continuing to lead in helping the state overachieve on its climate goals.

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