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**Comments by True North Renewables on Meeting California's Carbon Neutrality
Goals: Approaches for the Industrial Sector**

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I. INTRODUCTION

True North Renewables¹ (TNRE) welcomes the opportunity to submit the following comments to the recent California Air Resources Board (CARB) webinar on Meeting California's Carbon Neutrality Goals: Approaches for the Industrial Sector, which took place on February 20, 2020. TNRE develops renewable gas projects in the United States and supports the advancement of technology to expand the use of zero carbon renewable gases to replace fossil gas and decarbonize all industrial and non-industrial gas end uses. We believe there is an immediate and significant opportunity to quickly, cost effectively, and deeply reduce greenhouse gas emissions in California's industrial sector by using renewable gaseous fuels. We appreciate CARB recognizing in the webinar presentation that renewable gaseous fuels and their infrastructure have a role in this effort.² There is an important, large opportunity to replace hydrogen produced with fossil gas used for industrial processes with green hydrogen, as well as to deploy green hydrogen for process heat. There are also immediate opportunities to displace fossil natural gas with renewable biogas from organic waste, complimenting the new organic diversion and recycling programs recently started under the short-lived climate pollutant (SLCP) policies. With ARB's focus on SLCP's, now is the time to move forward to create meaningful programs and new markets to enable the increased deployment and production of renewable and green gases. By identifying end uses of fossil gas and developing new opportunities through new markets to use green hydrogen and renewable gas instead of fossil gas, ARB will lead the international energy stakeholders in efforts to reduce emissions from remaining hard-to-decarbonize sectors of the economy.

¹ <https://truenorthrenewables.com/>

² Webinar presentation, Slides 9, 10, 11

We appreciate and agree with CARB's focus on international efforts, which as detailed below, demonstrate the global momentum toward transitioning to decarbonized gas, and especially green electrolytic hydrogen, as a key solution to achieving carbon neutrality in industrial applications. We believe there are several opportunities for CARB to leverage existing programs and initiate new ones to overcome barriers to adopting these important solutions in California. These are summarized below and elaborated on these in the Comments section that follows.

- CARB should lead development of a statewide hydrogen strategy aimed at accelerating adoption of hydrogen produced using renewable and zero carbon sources across sectors as a priority means of achieving carbon neutral economy wide by 2045 and negative emissions thereafter.
- The Low Carbon Fuel Standard (LCFS) distorts the market for renewable gases to the transportation sector, even though they are a critical solution for industrial and building decarbonization as well. CARB should consider allowing all uses of renewable gas to opt-in to the LCFS to provide a level playing field, including expanding opportunities for industrial decarbonization.
- CARB should consider opportunities through the Cap-and-Trade program to augment and support other regulatory programs – especially CalRecycle's organics diversion regulations, LCFS, and SB 1440 and SB 100 implementation. Cap-and-Trade could be leveraged to provide greater market support and certainty to ensure the state's regulatory programs succeed and to accelerate renewable gas project development and emissions reductions.
- CARB should consider targeted uses of Cap-and-Trade allowances to support (1) local jurisdictions and their procurement of recycled organics products, (2) renewable gas use in the commercial and industrial sectors, including among non-core gas customers who may have the most difficult time accessing renewable gas, but significant need, (3) cost reductions and development of a leading electrolytic hydrogen industry in California,

and (4) conversion of existing thermal power plants in California to renewable gas to put the state on the path to a truly zero carbon energy system.

II. COMMENTS

The following are detailed responses to the questions put forth by staff at the end of the webinar.

A. Question 1: What are your thoughts about the programs in other jurisdiction that were surveyed in this presentation? What elements of these programs might be worth considering for California?

TNRE generally agrees with CARB's choice of jurisdictions surveyed in the presentation. We especially recommend considering for California the focus of most of the regions highlighted on deploying renewable gas as a key enabler of carbon neutrality in the industrial sector and the inclusion of this approach as part of a holistic strategy to accelerate renewable hydrogen and other renewable gases.

Hydrogen and biogas, for example, are pillars of the European Union's strategy to achieve carbon neutrality by 2050, including for industrial processes.³ Investment in renewable gas specifically to decarbonizing industry is already occurring in several individual European countries, such as the UK, where the northern region is heavily focusing on hydrogen as a climate solution⁴ and is aiming to deploy hydrogen to become home the first net zero emissions industrial hub in Europe.⁵ HeidelbergCement's British subsidiary Hanson UK is undertaking research on the potential to reduce carbon emissions in cement production by switching from fossil to decarbonized gaseous fuels.⁶ Germany recently announced their draft national

³ *Going Climate Neutral by 2050*; European Commission (e.g. pp 10, 13)
https://ec.europa.eu/clima/sites/clima/files/long_term_strategy_brochure_en.pdf

⁴ <https://www.h21.green/>

⁵ <https://hynet.co.uk/>

⁶ <https://www.heidelbergcement.com/en/pr-26-02-2020>

hydrogen which envisions investing over 1 billion euros in research and development of industrial scale hydrogen, plus 3.4 billion euros toward hydrogen fueling infrastructure.⁷

German states such as North Rhine-Westphalia view hydrogen as instrumental in transitioning to carbon neutrality in the industrial sector,⁸ and have their own individual projects to advance that vision.⁹

Similarly, Australia has a National Hydrogen Strategy aimed at accelerating clean hydrogen hubs as a core strategy to “enhance Australia's energy security, create Australian jobs and build an export industry valued in the billions.”¹⁰ There are several other Australian hydrogen programs and projects not mentioned in the webinar presentation, such as the H2-Hub¹¹ in Gladstone, Queensland, which includes a 3 gigawatt electrolyzer for the production of renewable hydrogen and ammonia and a multi-million dollar hydrogen injection facility being supported by a grant provided under the Queensland government’s \$15 million Hydrogen Industry Development Fund. Demonstrating that Australia sees such projects as the job creator of the future, the project provides ongoing training of students through a partnership with the Central Queensland University.

On Slide 21, the webinar addresses programs in New Zealand, and again, we believe it is important to add to this the national Green Hydrogen Strategy, which includes renewable hydrogen as a core pathway to decarbonize the country’s industrial sector.²³ Renewable

⁷ <https://www.euractiv.com/section/energy-environment/news/germany-floats-draft-hydrogen-strategy-ahead-of-eu-presidency/>

⁸ <https://www.in4climate.nrw/en/newsroom/news/news-detail/ministry-for-economic-affairs-publishes-study-on-the-use-of-hydrogen-in-north-rhine-westphalia/>

⁹ For example: <http://hyer.eu/our-members/nrw-de/>

¹⁰ <https://www.industry.gov.au/sites/default/files/2019-11/australias-national-hydrogen-strategy.pdf> (see Forward)

¹¹ <http://statements.qld.gov.au/Statement/2020/2/27/eye-on-gladstone-for-proposed-gigawatts-scale-green-hydrogen-and-ammonia-development>

²³ p. 59-65, *Green Hydrogen Strategy – A Vision for Hydrogen in New Zealand*, New Zealand Government; September 2019 <https://www.mbie.govt.nz/dmsdocument/6798-a-vision-for-hydrogen-in-new-zealand-green-paper>

hydrogen has been identified as a significant opportunity to decarbonize process heat, as well as industrial applications – many of which occur in California, such as oil refining, ammonia production, and agriculture – that currently rely on hydrogen produced by fossil fuels. An early project that was announced in advanced of the release last fall of the national strategy is being led by Ballance Agri-Nutrients and Hirlinga Energy, which are investing \$50 million in a jointly developed industrial scale wind to hydrogen hub. The project will supply green hydrogen for heavy duty transportation, with a goal of expanding to production of green hydrogen for greenhouse gas free ammonia-urea production that they project will offset up to 12,000 tonnes of carbon emissions, avoid the import of 7,000 tonnes of urea from the Middle East and Asia, and eliminate the equivalent amount of CO₂ as taking 2,600 cars off the road.²⁴

We are glad you chose to also focus on Tokyo on Slide 24, which are like the regions above, is making hydrogen a central component to its energy strategy. This includes making hydrogen technology a core theme of the 2020 Tokyo Olympics, which will showcase latest hydrogen fuel cell technology via the addition of thousands of fuel cell passenger vehicles and a hundred fuel cell buses to the roads, new fueling stations, and increased electrolytic hydrogen production.²⁵ We encourage your consideration of Tokyo to expand to all of Japan, which is aiming to transition to a hydrogen based economy that includes using hydrogen in the industrial sector to reduce carbon emissions.²⁶

While the US Department of Energy has an H2@Scale program aimed at bringing down the cost of hydrogen by achieving economies at scale, California currently lacks an overall hydrogen policy. As the fifth largest economy in the world and one of the national state leaders in supporting hydrogen and carbon neutrality, we think that the state ought to develop a zero

²⁴ <https://ballance.co.nz/Kapuni-hydrogen-project>

²⁵ <https://fuelcellmaterials.com/tokyo-2020-the-first-hydrogen-olympic-games/>

²⁶ Basic Hydrogen Strategy, Japanese Ministry of Economy, Trade and Industry; 2017
https://www.meti.go.jp/english/press/2017/pdf/1226_003a.pdf (see p. 3 for industrial sector)

carbon hydrogen strategy of its own, that creating industrial hydrogen hubs ought to be a pillar of such a strategy, and CARB ought to be taking a lead in helping to launch such an initiative.

B. Question 2: What other programs administered by CARB could be leveraged or adjusted to support further reductions in the industrial sector?

We are excited to see CARB's interest in supporting additional measures through existing programs to support additional emissions reductions in the industrial sector. We strongly support these efforts and look forward to opportunities to further flesh out ideas with the agency.

The Low Carbon Fuel Standard (LCFS) and Cap-and-Trade Program are particularly powerful policies that can be leveraged to further support emissions reductions in the industrial sector. Using these programs to leverage and support other policies – including those developed pursuant to SB 1383 and SB 1440 – can provide additional market certainty that will support more rapid compliance at lower cost with the state's short-lived climate pollutant and other climate laws, while supporting additional innovation and opportunities for greater emissions reductions. We encourage CARB to consider leveraging these policies to:

- Support compliance with SB 1383 organics diversion requirements, but while providing market certainty and support for jurisdictions with a procurement obligation for products from organic waste, including renewable gas,
- Support innovation and market scale for electrolyzers, which offer the potential to be a transformative technology and game changer in California's and global efforts to address climate change,
- Enable access to renewable gas by commercial businesses and industrial facilities, for whom renewable gas may be the best option for decarbonizing their operations, but who often can't access it at reasonable cost, and

- Broadly support the state’s regulatory framework – including SB 1383 and SB 1440 regulations – by adding additional economic incentives or price certainty, and fill regulatory gaps where they may exist – including facilitating emissions reductions among industrial operations or non-core gas customers by establishing procurement programs and incentives for decarbonized gas, including biogas and green electrolytic hydrogen..

Broadly speaking, allowing renewable gas used in any sector to opt into the LCFS will level the playing field for access to limited supplies of biogas, allowing industrial users or others to compete for this valuable clean energy resource with the transportation sector. Leveraging cap-and-trade allowances to provide price certainty on the value of Low Carbon Fuel Standard credits over ten or more years will further support that program’s development of renewable gas supplies. Finally, targeted support for emissions reductions in the industrial sector or other priorities and opportunities, as described here, should be strongly considered.

As staff and the Board consider these and other proposals, they should carefully consider how to construct each program to best incentivize innovation and investment in multiple emissions reductions strategies. In some cases, it may make sense to make allowances or other forms of incentive available to the industrial facility, to encourage their direct investment in emissions reduction technologies and strategies. In others, it may make sense to encourage utility investments, through allowance allocations or other mechanisms, or otherwise leverage the utility and its resources to facilitate investments and projects by smaller entities. In others still, it may be best to consider other structures to support market development, innovation, and private sector investment.

Here, we offer a few specific suggestions, but additional structures or broader, overarching frameworks may be reasonable, as well:

1. Create a program to specifically designed to support market development and cost reduction of electrolyzers.

Electrolytic hydrogen may hold the greatest potential for decarbonizing the widest array of sectors at the broad scale. With low-cost renewable power now widely available, multiple studies now recognize that electrolytic hydrogen faces the prospect for rapid and significant cost declines over the next decade – on similar levels as solar and batteries experienced over the last decade.³⁶ Achieving these cost reductions would be a game-changer in the fight against climate change, allowing the state to envision scenarios with deeper and more rapid decarbonization of all sectors than currently envisioned, including all industrial sectors.

We encourage CARB to consider a specific program that directly reaches and incentivizes electrolytic hydrogen producers, independent of end use. The largest barrier to achieving these cost reductions, according to the studies, isn't technological maturity, but rather market scale: We do not need continued innovation as much as we need market certainty and investment. However, current programs and markets, including the hydrogen capacity credit provision under the Low Carbon Fuel Standard, do not reach the hydrogen producer, and do not provide for the market scale or certainty that is needed to lead to rapid cost reductions and emissions benefits. Similarly, providing crediting or other incentives at a facility- or project-specific level may not provide the tools needed to scale electrolyzer production and use in the state.

Allowing electrolytic hydrogen producers to capture credit value under a LCFS hydrogen capacity credit mechanism would be helpful, but transportation remains a small market for hydrogen at this point. CARB should consider additional crediting pathways under the LCFS and price support using cap-and-trade allowances to specifically support electrolyzer deployment at

³⁶ BNEF Report: <https://www.bloomberg.com/news/articles/2020-01-14/green-hydrogen-could-price-gas-out-of-power-markets-by-2050>; *Path to Hydrogen Competitiveness*, Hydrogen Council; January 2020 <https://hydrogencouncil.com/en/path-to-hydrogen-competitiveness-a-cost-perspective/>

scale. Additionally, CARB might consider specific crediting or incentive mechanisms for large-scale demonstration projects – like decarbonizing the port of LA and ships using electrolytic hydrogen – that on their own could be enough to develop the market at scale. CARB could also use cap-and-trade allowances to specifically incentivize and support electrolysis projects that help decarbonize industry and other sectors of California’s economy.

2. Allow all uses of renewable gas to opt-in to the LCFS.

Renewable gas is one of only a few strategies available to decarbonize certain aspects of the industrial sector, but the LCFS distorts the market toward the transportation sector. This is especially true for biogas, which is limited in supply, and is often unavailable for industrial or other users – except at costs inflated by the Low Carbon Fuel Standard. This deprives California businesses a primary opportunity to decarbonize their operations.

3. Support long-term price certainty.

The best way to support renewable gas projects, and associated opportunities to slash short-lived climate pollutant emissions and decarbonize the industrial sector and other hard-to-reach sectors, is to provide market certainty for project developers. If developers can sign long-term contracts at rates that support the cost of the project and an adequate rate of return, projects will be quickly developed, and the state’s regulatory framework will be sufficiently supported. Regulations at the CPUC, including SB 1440 implementation, will be important in this regard, but may not reach all sources of renewable gas and will surely not reach all end use sectors, as some like non-core customers do not fall under their jurisdiction. CARB can further support long-term price certainty and the renewable gas market by directing utilities to use some cap-and-trade allowance value to provide price certainty for projects and end uses that might rely on more volatile revenue streams, such as LCFS credits.

- 4. Specifically target programs at local jurisdictions to assist with SB 1383 compliance and for non-core customers, who may not be covered by SB 1440 regulations but are more likely to have regulatory obligations to reduce emissions.**

CARB should also consider dedicated programs to offset potential costs for local jurisdictions, and/or support necessarily project development, to assist with compliance with CalRecycle's SB 1383 organics diversion regulations. CARB should specifically allocate some cap-and-trade allowances to support the necessary organics recycling infrastructure investment and timelines in the regulations, as well as to offset any potential costs that might be expected to fall on local jurisdictions.

CARB should also consider similar programs for industrial and commercial entities who may be non-core customers and potentially not covered by SB 1440 regulations. These entities are most likely subject to compliance obligations and potential leakage concerns, and at the same time, might be last in line for accessing limited renewable gas supplies, if they are primarily headed to the transportation sector, local jurisdictions, and core customers under the state's current policy framework. CARB should consider mechanisms under its existing programs to further support decarbonization efforts and increased competitiveness among the state's businesses – including by supporting their efforts to decarbonize through renewable gas.

- 5. Consider demonstrations specific to the electricity sector and supporting SB 100.**

CARB, along with the Energy Commission and Public Utilities Commission, are currently in the process of developing a report to the legislature on SB 100 implementation. As part of that process, the agencies are highlighting a continuing, significant role for existing natural gas power plants – including as much as 25 GW of existing capacity and 15 MMTCO₂ or more remaining in the electricity sector by 2045. CARB should consider mechanisms through allocation of cap-and-trade allowances to specifically support deployment of zero-carbon

thermal resources that could replace the need to operate existing natural gas plants in SB 100-compliant scenarios and move the state towards a truly zero-carbon electricity grid. It should consider mechanisms to support converting existing fossil-fueled power plants to use biogas or renewable hydrogen, enabling those existing assets to provide needed grid reliability and balancing services, without the carbon emissions.

While it may be beyond the scope of the current workshop, in addition to the points identified here, we hope CARB will consider additional strategies – including new, dedicated policies – to support industrial sector decarbonization, necessary market development of renewable gases, including electrolytic hydrogen, and a broad set of opportunities for renewable hydrogen to decarbonize all sectors of the economy. Many ideas have been floated, including developing strategic plans to rapidly scale renewable hydrogen markets and bring down their costs, or to low carbon standards specific to hydrogen production, industrial operations, or specific sectors, potentially including buildings, cement/concrete, refining, thermal power generation, or other efforts. We look forward continuing the conversation with CARB around tools it can use through existing or new programs to further decarbonize California’s industrial and other sectors.

C. What hurdles does California face for decarbonizing the industrial sector? How can CARB help overcome these hurdles?

The industrial sector faces unique hurdles to decarbonization. For one, strategies to decarbonize are limited in many cases to carbon capture and sequestration or the use of renewable fuels, including biogas or hydrogen. Each of these strategies face various technological and regulatory barriers, and those developing these strategies are often not connected to the industrial sector, so the technologies evolve on their own. Enabling these technologies, especially biogas and hydrogen, requires supporting those fuels in their own right – a cement or steel plant, for example, is not a hydrogen developer. So, enabling that key

decarbonization solution for those sectors requires enabling hydrogen as a solution. CARB can help overcome this hurdle by targeting solutions and policies both on the industrial level, but also working to enable the solutions that the industrial sector may need. This could entail policies or incentives both for cement facilities, and hydrogen producers, for example.

Perhaps the biggest hurdles to renewable gas development and industrial decarbonization is uncertainty. This includes market uncertainty, and policy uncertainty – which also reinforce one another. For one, the state sends mixed signals about the role it envisions for renewable gas to play in California, often alluding to “either/or” solutions rather than enabling all solutions. Perhaps the most immediate need is for CARB, and the state, to say it welcomes all zero carbon and low carbon technologies and will support broad uses of renewable gas to help decarbonize all sectors. That alone will capture the attention of the industry and keep it focused on developing projects in California.

Once it knows its welcome, the renewable gas industry can flourish in California with additional market certainty. Access to markets with long-term contracts (i.e., 10 years or more) at enough prices will make sure projects are developed in line with the goals required by SB 1383 and other climate objectives. CARB can support these efforts by developing those markets and rules themselves, supplementing other programs that may not provide sufficient certainty by allowing utilities to use cap-and-trade allowances to provide additional price certainty, or by further incentivizing infrastructure development and strategic demonstration projects (like zero-carbon thermal power plants, zero carbon port projects, or industrial uses of electrolytic hydrogen).

Finally, as noted above, the Low Carbon Fuel Standard is an incredibly powerful and effective program, but perhaps so much so, that it distorts the market for renewable gas to the transportation sector. Renewable gas is a key decarbonization strategy for all sectors, and the LCFS makes it difficult to access renewable gas to decarbonize buildings, industry, or other



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sectors. CARB should consider allowing these uses of renewable gas to opt-in to the LCFS, or otherwise consider other mechanisms to level the playing field.

We appreciate the opportunity to comment and CARB's interest in steps it can take to accelerate decarbonization efforts in California – including by using existing programs to support the production and use of renewable gas in California to decarbonize the industrial sector and others. There is tremendous potential to develop a leading renewable gas industry in California, and one that could set the state and the planet on more rapid decarbonization schedules. We hope these comments offer some intriguing ideas, which we would welcome the opportunity to discuss further with you.

Regards,

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