



April 26, 2024

Low Carbon Fuels Division  
Environment and Climate Change Canada (ECCC)  
Gatineau, Quebec

Via e-mail to [cfsnccp@ec.gc.ca](mailto:cfsnccp@ec.gc.ca)

Dear Low Carbon Fuels Division,

**Subject: Feedback to pre-publication 2.3 (proposed changes to V. 2.0 of the Clean Fuels Regulation)**

Writing on behalf of the Canadian Hydrogen Association (CHA) and our approximately 200 members, I am enclosing below our feedback on pre-publication 2.3 of the Clean Fuel Regulations (CFR), proposed changes to version 2.0 of the Clean Fuel Regulations.

While version 2.3 contains plentiful changes to the regulations, some of which address the clean hydrogen industry's concerns and asks in the context of the Quantification Method for Low-Carbon Intensity Hydrogen Integration, our feedback further explains the industry's concerns and asks and raises additional issues with version 2.0 of the supporting documents that the most recent pre-publication does not address.

At a high level, the overarching concern of our members is that, by being overly prescriptive, the CFR could inadvertently prevent the decarbonization of hard to abate sectors. At the end user's tail pipe, hydrogen use is zero emissions. As the industry advances and we incentivize low carbon hydrogen production, upstream emissions will also approach zero. However, at this early stage, an over-prescriptive CFR may overly constrain this nascent industry, preventing it from emerging as a viable pathway to support Canada's decarbonization goals.

We urge the Government of Canada to better support primary fuel suppliers by improving the incentivization of low-carbon hydrogen production and integration to reduce the carbon intensity of fuels and increase the supply of low-carbon fuels. Below are our key asks, followed by a more thorough analysis of each point:

- *Expand the technological coverage of eligible clean hydrogen pathways to also include non-reforming processes and expedite the addition of these pathways to the Fuel LCA Model.*
- *Allow a 100% allocation of renewable natural gas to a portion of hydrogen production.*
- *For hydrogen distributed to multiple locations, do not penalize shorter routes by having to utilize the CI of longer routes.*
- *Allow the use of purchased clean electricity that is imported from connected or adjacent jurisdictions as grid interconnections improve.*



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- *Extend eligibility to those projects that produce hydrogen using purchased renewable electricity sourced from renewable generation that commenced before July 1, 2017.*
- *Ensure that the eligible uses of indirect accounting for renewable power are extended to cover hydrogen production, compression, liquefaction, CCS, and hydrogen-ammonia conversion.*
- *Verify the quantity of renewable electricity identified in the vPPA against renewable electricity generation on an annual basis.*
- *Expand the definition of allowable generation sources so that biomass-based electricity generation is feedstock agnostic and expand the list of eligible low-carbon electricity sources to also include nuclear generation.*
- *Allow 100% of the renewable natural gas (RNG) book and claims to be used for producing clean hydrogen.*
- *Publish the final Low CI Hydrogen Quantification Method and Book and Claim guidance as soon as possible.*



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## 1 Technological Coverage

### 1.1 Expanding the list of eligible pathways

In A2.4.1.1 of 2.3 of the CFR pre-publication, the scope of the technologies covered under the Life Cycle Assessment (LCA) model through the CFR is limited to low-temperature electrolysis, reforming of natural gas, and reforming of syngas.

Version 2.3 of the pre-publication does not indicate the extension of eligibility to non-reforming processes. These pathways are in abundance and are emerging and low carbon, deserving inclusion among the fuel LCA options under the regulations.

For example, demand for industrial-grade hydrogen is increasing, and as a result, more fuel suppliers are recovering hydrogen as a by-product of other processes. In 2021, Canada was the top exporter of sodium chlorate, whose low carbon-intensive production process creates by-product hydrogen. The chloralkali industry, whose major products, chlorine, sodium hydroxide, caustic soda, sodium bicarbonate, and sodium carbonate are used in everyday life and industries, produces by-product hydrogen. This by-product hydrogen is currently being vented into the atmosphere, wasting its potential to contribute to decarbonizing Canada's economy.

Refineries also produce some by-product hydrogen, particularly through catalytic reforming of naphtha into higher-value high-octane products, and petrochemical plants release hydrogen as a by-product of their olefin production.

Recovering and then using by-product hydrogen will help fuel suppliers reduce the carbon intensity of fuels throughout their lifecycle and increase hydrogen supply in the low-carbon fuels market. Hydrogen recovery units can be used to recover this by-product of hydrogen lost in reaction loops or off-gas streams.

As another example, through methane pyrolysis, fuel suppliers can utilize Canada's vast natural gas and biogas resources and clean electricity to produce clean hydrogen and by-product solid carbon without CO<sub>2</sub> emissions. By removing CO<sub>2</sub> before combustion is completed, CO<sub>2</sub> emissions from methane fuels are displaced without the need to use CCS technologies. Solid carbon enhances the advanced manufacturing sectors due to its convertibility into non-combustion high-value carbon products and materials.

All in all, to support industry efforts to reduce their CO<sub>2</sub> emissions, we call on the government to expand the technological coverage of pathways:

- ***By extending eligibility to non-reforming pathways and process, e.g., hydrogen recovery units, methane pyrolysis, and by-product pathways.***



## 1.2 Expediting the addition of new and emerging pathways to the Fuel LCA Model

The fuel LCA model is designed to be an evolving and living tool that calculates the carbon intensity of fuels and energy sources used and produced in Canada. To bridge the gap between the supply and demand of low-carbon fuels in the fast-growing clean energy industry, it is crucial to leverage all low-carbon hydrogen pathways through robust and vigilant identification and approval of these pathways.

As such, an expedited process of approval for the above pathways must be developed, including but not limited to by-product hydrogen, refinery hydrogen recovery units, and methane pyrolysis. We understand that the National Research Council (NRC) continues to work to develop LCA methodologies for such pathways, so to ***smoothen the inclusion process, we encourage*** the expedition of these inclusions among the Fuel LCA model options under CFR. To that end we recommend:

- ***Expediting the process to approve non-reforming pathways among the fuel LCA model options under CFR, e.g. by-product hydrogen, refinery recovery units, and methane pyrolysis.***

## 2 Allocation

As we understand, Section A2.4.2 indicates that a hydrogen producer will only be able to claim a portion of the hydrogen as low carbon if it is produced with steam methane reforming (SMR) feedstock and renewable natural gas (RNG). It is unclear if 100% of the RNG can be allocated to a percentage of the hydrogen production. For example, if RNG and natural gas are used as feedstocks to an SMR for hydrogen production that produces 100 tonnes of hydrogen per day and there are 5 tonnes of hydrogen that is used to fuel vehicles for credit creation under Compliance Category 3, then 100% of the RNG should be allowed to be allocated to the 5 tonnes to maximize the lowest carbon intensity (CI) hydrogen possible supplied to vehicles. In this example, the natural gas would be allocated to the remaining 95 tonnes of hydrogen produced that is not used for fueling. The recommended approach is:

- ***100% allocating the RNG to a portion of hydrogen production to help spur investments for hydrogen pilot projects in the short term and support decarbonization in the transportation sector.***

## 3 Distribution

According to Section A2.4.3.6, if hydrogen is distributed to multiple locations, the applicant may use the leg of the trip with the highest CI value calculated for the total CI of the hydrogen.

Further clarification is needed to understand if this means that if there are two end customers at locations A and B, and location B is at a further distance, in order to generate credits from the A location scenario, the producer/distributor will need to rely on the customer B location with a higher CI given the longer distribution distance. We ask that:



- ***For hydrogen distributed to multiple locations, do not penalize shorter routes by having to utilize the CI of longer routes.***

## **4 Case Specific Instructions on Energy and Material Inputs**

### **4.1 Case 6 – Electricity from PPAs or RECs: Supporting grid interconnections**

Section 4.6.6.6 Case 6 states that the electricity from Power Purchase Agreements (PPA) or Renewable Energy Certificates (RECs) used to produce hydrogen “must be generated in the same province, territory or state as the hydrogen production facility”. This does not align with the draft version of the Low CI Hydrogen Integration Quantification Method or the RNG book and claim which allows for the supply of hydrogen or RNG from the same province as the receiving facility or an adjacent province or state to the receiving facility.

As electricity markets become more and more inter-connected, with energy exports and imports becoming a key feature of ensuring grid resilience, the current language in the pre-publication does not support expanded interconnection of provincial and state electricity markets. As an analogy, no region in Canada restricts eligibility for an electric vehicle subsidy – or support for the construction of charging stations – based on where electricity is generated. Thus, the CHA urges the government:

- ***To allow imported power from connected or adjacent jurisdictions as grids become more inter-connected.***

### **4.2 Case 6 – Electricity from PPAs or RECs: In-production date of renewables**

In this pre-publication, the government stipulates that electricity purchased through a virtual power purchase agreement (vPPA) used to produce hydrogen may be considered in the determination of the CI of the hydrogen, if it has been established that the generation of the renewable electricity source commenced on or after July 01, 2017. The timelines needed to develop new renewable power do not align with the timelines for hydrogen production, which limits the full realization of the CFR’s benefits, and the net-zero tariff rates in provinces.

Flexibility must apply to a nascent industry that will only have a marginal impact on near-term energy demand. With an understanding of these realities, we urge the government to:

- ***Extend eligibility to those projects that produce hydrogen using purchased renewable electricity sourced from renewable generation that commenced before July 1, 2017.***



#### 4.3 Case 6 – Electricity from PPAs or RECs: Broader inclusions of critical hydrogen processes

With regards to the indirect accounting of the CI of the hydrogen that is produced using electricity purchased through PPAs, CHA members have raised concerns about the exclusion of the use of electricity in the following processes, which are critical to the development of hydrogen economy:

- Electricity to run carbon capture, compression, and storage equipment;
- Electricity to run processes to convert hydrogen into ammonia or from ammonia into hydrogen; and
- Electricity for hydrogen compression or liquefaction.

The Government of Canada must support the development of the entire hydrogen value chain to remain competitive. Compression and liquefaction currently play an essential role in enabling the efficient and effective storage and distribution of hydrogen. The volumetric density advantage of liquid hydrogen enables distribution over greater distances and at a larger scale. This advantage also enables cost reductions and efficiencies essential for domestic hydrogen networks.

Carbon capture, compression, and storage are also integral to the production of clean hydrogen in provinces where significant fossil fuel reserves and sequestration potential are present. To properly incentivize the production cost-competitive hydrogen from reforming processes that are coupled with carbon capture, utilization and storage (CCUS), a technology critical to producing the molecule, i.e., CCUS, at a low-carbon intensity must not be excluded from such specifications.

It is also worth noting that the above exclusions are the processes with the highest electrical loads. For many hydrogen developers, PPAs are the only option to minimize the levelized cost of hydrogen while offsetting carbon emissions. If these exclusions remain, low-carbon hydrogen development may be hindered in jurisdictions with comparatively higher average grid intensities, as the ability to qualify for credit under the CFR may be severely impacted.

As industry looks to develop “hubs” to ensure that hydrogen supply and demand are combined across multiple applications and assets while increasing scale, maximizing asset utilization, and reducing costs, these exclusions are detrimental to the development of hydrogen economy. The exclusion of critical elements in the hydrogen value chain would severely limit the ability of clean energy projects to recover costs through the announced regulatory frameworks, which goes against the intended purpose of the CFR, which accelerate the supply and use of clean fuels.

To that end we urge the Government of Canada to:

- ***Ensure that the eligible uses of indirect accounting for renewable power be extended to cover hydrogen compression, liquefaction, CCS and hydrogen-ammonia conversion.***

#### 4.4 Case 6 – Electricity from PPAs or RECs: Better supporting fuel suppliers’ use of renewable electricity sources



Based on the pre-published CFR specifications, the renewable electricity identified in the vPPA must be from hydro, solar, wind, or wood biomass, and consumption at the hydrogen production facility should not exceed the quantity of electricity generated on a monthly basis.

As solar and wind assets have high seasonal variability in output, achieving production matching on a monthly scale would likely result in a need to over-purchase renewable electricity through a PPA or vPPA to ensure coverage in all months. This, in turn, unnecessarily increases the production cost of hydrogen. Since hydrogen is not yet cost competitive compared to other conventional fuels, strong, flexible policy support is needed to build up the hydrogen economy. We call on the government to:

- ***Verify the quantity of renewable electricity identified in the vPPA against renewable electricity generation on an annual basis.***

#### **4.5 Case 6 – Electricity from PPAs or RECs: Broadening the scope of eligible electricity sources**

With regards to sourcing the purchased electricity for PPAs, i.e., hydro, wind, solar, and wood biomass, the inclusion of biomass-based electricity generation as being eligible for renewable vPPAs is a welcome addition. However, biomass availability varies by region, and therefore there should be an avoidance of being overly prescriptive in the type of feedstock of use. For example, most bioenergy feedstocks in Alberta, Saskatchewan, and Manitoba originate from agriculture whereas forestry-based biomass is more prevalent in Quebec and B.C.

Also, qualifying PPAs should be expanded to include electricity sourced from nuclear-powered generation stations. Nuclear energy is another source of low-carbon power generation that deserves inclusion, as nuclear plants can generate the clean electricity needed to crack water and produce hydrogen without emitting any carbon dioxide.

To incentivize all low-carbon sources in order to remain competitive, there should be an expansion of the list of eligible electricity sources. The CHA calls on government to:

- ***Expand the definition of allowable generation sources so that biomass-based electricity generation is feedstock agnostic and other non-emitting generation sources, such as nuclear generation, are made eligible.***

#### **4.6 Case 7 – Indirect Accounting of Material Inputs**

In section 4.6.6.7 Case 7, RNG book and claim (indirect accounting) for fuel gas used in hydrogen production. Specifically, in the section in Table 1, page 52 “*Specifications for applicant data and predefined data used for energy and material inputs and direct emissions flows*” where it states that fuel inputs need to physically be supplied. We recommend that:

- ***ECCC publish the final Low CI Hydrogen Quantification Method and Book and Claim guidance soon so that clarity is provided for determining carbon intensities and credit creation value.***



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The CHA continues to support the technology neutral, science-based approach of life cycle assessment within the Clean Fuel Regulations to establish the carbon intensity of fuels and material inputs for fuels. It is critical that the foundational principles of LCA are maintained, and that these principles are consistently applied to all elements of the LCA and within CFR credit creation pathways.

We thank you for this opportunity to provide feedback to the pre-publication 2.3 of the CFR. The CHA and our members are ready to work together with the ECCC to ensure the successful deployment of the CFR.

Please do not hesitate to contact me at your earliest convenience to schedule a time to discuss further.

Sincerely,

Ivette Vera-Perez  
President and CEO