



**ORDER NUMBER
G-95-23**

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Utilities Commission
An Inquiry into the Regulation of Hydrogen Energy Services

BEFORE:

D. M. Morton, Panel Chair
A. K. Fung, KC, Commissioner
M. Kresivo, KC, Commissioner

on April 26, 2023

ORDER

WHEREAS:

- A. The *Utilities Commission Act* defines a public utility and sets out the jurisdiction of the British Columbia Utilities Commission (BCUC);
- B. On December 27, 2012, in the Inquiry into FortisBC Energy Inc.'s Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives report, the BCUC established key principles and guidelines to determine when regulation is needed and, where it is needed, the form of regulation;
- C. On July 6, 2021, the Government of British Columbia released the BC Hydrogen Strategy;¹
- D. By Order G-330-22, the BCUC established an inquiry into the BCUC's regulation of the provision of hydrogen energy services (Inquiry)²;
- E. On January 20, 2023, the BCUC led a workshop regarding hydrogen energy services with the purpose of providing industry stakeholders and other interested participants with the opportunity to make submissions regarding the hydrogen energy service industry which may inform the BCUC as to how it can most effectively and efficiently regulate these services (Workshop);
- F. The BCUC has reviewed the submissions made during the Workshop as well as written submissions made during the Inquiry, summarized same and made provisional recommendations in a draft report; and

¹ https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/electricity/bc-hydro-review/bc_hydrogen_strategy_final.pdf

² <https://www.bcuc.com/OurWork/ViewProceeding?applicationid=1050>

- G. The BCUC considers that establishing a regulatory timetable is warranted, to provide parties the opportunity to make further submissions.

NOW THEREFORE pursuant to section 82 of the *Utilities Commission Act*, the BCUC orders as follows:

1. A regulatory timetable is established, attached as Appendix A to this order.
2. A draft report, including a summary of the Workshop and provisional recommendations regarding the regulation of hydrogen energy services in BC, is attached as Appendix B to this order.

DATED at the City of Vancouver, in the Province of British Columbia, this 26th day of April 2023.

BY ORDER

Original signed by:

D. M. Morton
Commissioner

Attachment

British Columbia Utilities Commission
An Inquiry into the Regulation of Hydrogen Energy Services

REGULATORY TIMETABLE

Action	Date (2023)
Written submissions regarding Draft Report recommendations and further regulatory process, if any	Thursday, June 8
Written reply submissions	Thursday, June 29
Further process if required	To be determined
Final Panel Report	To be determined



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British Columbia Utilities Commission

Inquiry into the Regulation of Hydrogen Energy Services

Hydrogen Workshop

Draft Report

April 26, 2023

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1.0 Workshop Overview

On November 21, 2022, the British Columbia Utilities Commission (BCUC) established an Inquiry into the regulation of the Hydrogen Energy Services in British Columbia (Inquiry). On January 20, 2023, the BCUC hosted an interactive industry workshop and invited registered participants to present on the following topics:

1. The status and anticipated development of the hydrogen energy services industry in British Columbia (BC);
2. Whether the Hydrogen Energy Services industry sectors are or are anticipated to be competitive markets; and
3. The nature and scope of BCUC regulation that would be appropriate for each of the Hydrogen Energy Services industry sectors.

The following registered participants presented in the workshop:

- Hydrogen Naturally Inc.;
- Hydra Energy Corporation;
- Hydrogen Technology and Energy Corporation (HTEC);
- Hydrogen BC, a member of Canadian Hydrogen and Fuel Cell Association;
- Sea to Sky Energy Solutions;
- Pacific Northern Gas Ltd. (PNG);
- FortisBC Energy Inc. (FEI);
- British Columbia Hydro and Power Authority (BC Hydro)/Powertech Labs;
- Ellen Gould; and
- Chris Shelton.

In addition, the following parties provided written submissions:

- TC Energy;
- Hydrogen BC;
- Cellcentric Canada;
- Air Products; and
- Thor Hydrogen.

Below is a summary of the input from the participants in the workshop and the written submissions. Having considered the presentations and submissions, in section 4 of this report the Panel makes provisional findings and recommendations respecting the regulation of hydrogen energy services.

2.0 Hydrogen Energy Services

2.1 Hydrogen Production

2.1.1 Sources of Hydrogen

There are multiple pathways to produce hydrogen, using various fuel sources. The table below summarizes the hydrogen production pathways as presented in the workshop and the written submissions:

Table 1: Hydrogen Production Pathways

Fuel Source	Process
Natural Gas	Steam Methane Reforming
	Methane Pyrolysis
	Partial Oxidation
	Autothermal Reforming
Coal	Gasification
Electricity	Electrolysis
Chemical process	By product
Biomass	Gasification

Regional differences in availability provide natural advantages to certain pathways, which may be leveraged to encourage the broad development of low-carbon hydrogen. BC has favorable resources for both electrolytic and natural gas-based hydrogen production.¹

2.1.2 Hydrogen Producers

While none of the participants are currently producing hydrogen at a commercial scale in BC, many of them have plans to do so. The current hydrogen production status, based on the workshop presentations and subsequent written submissions, is summarized in the table below:

¹ Air Products written submission, p. 4.

Table 2: BC Hydrogen Production

Entity	Current Status
Hydrogen Naturally	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC First production facility planned in Alberta but plans for future hubs in BC
Hydra Energy Corporation	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC Plans to build a hydrogen production and distribution site in Prince George, BC <ul style="list-style-type: none"> The produced hydrogen will be used for their hydrogen truck refueling station
Hydrogen Technology and Energy Corporation	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC <ul style="list-style-type: none"> Purchasing green hydrogen for use at their refueling stations² Two production facilities and one liquefaction facility planned in BC (2023-2024) Looking to partner with chemical company to use byproduct hydrogen
Air Products	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC Assessing opportunities for development in BC
Thor Hydrogen	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC Provides hydrogen project development and management services
TC Energy	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC Executed a joint development with multiple hydrogen fuel cell vehicle manufacturers (Nikola and Hyzon) for the construction and operation of large-scale production facilities in Canada and the U.S.
FortisBC Energy Inc.	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC <ul style="list-style-type: none"> Assessing in-BC and out-BC resources for hydrogen production
Pacific Northern Gas Ltd.	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC <ul style="list-style-type: none"> Could potentially own production facilities at some point Primarily an off taker, purchasing hydrogen, climate credits, or both
British Columbia Hydro and Power Authority	<ul style="list-style-type: none"> Not currently producing commercial hydrogen in BC Considered themselves as having more of a support role for hydrogen production, for example: <ul style="list-style-type: none"> Providing electricity for electrolytic hydrogen production

² Transcript Volume 1, p. 59.

Entity	Current Status
	<ul style="list-style-type: none"> ○ Providing consulting, testing, and R&D services for hydrogen production (via Powertech subsidiary) ○ Implementing a load attraction program for hydrogen producers
Sea to Sky Energy Solutions	<ul style="list-style-type: none"> ● Not currently producing commercial hydrogen in BC ● Proposing to convert their Brandywine Creek run-of-river electricity production plant into a ~4200 kg/day hydrogen plant

BC Hydro discussed its discounted Clean Energy Industry Innovation rate that is available to hydrogen projects for producing low carbon fuel. BC Hydro has had more than 5,000 megawatts of project inquiries in the hydrogen space.³

2.2 Hydrogen Distribution

As presented in the workshop, the two likely methods to distribute hydrogen within BC are by trucking or by pipeline. For longer distance transport to export markets, there was discussion about the production and use of hydrogen derivatives such as methanol and ammonia; however, these may be slower to develop at scale and are not expected in the near future.⁴

2.2.1 Trucking

The current primary transport method for hydrogen is trucking, either as a gas or as a liquid. At lower volumes and smaller quantities, it is easier to move hydrogen as a compressed gas (such as HTEC’s modular “power cube”).⁵ However, as volumes and distances increase, hydrogen can be liquefied and put into a larger tank (as opposed to having multiple trucks transporting the same mass of gaseous hydrogen).⁶

2.2.2 Pipeline

Multiple submissions cited the need for a bulk hydrogen transportation corridor to accommodate large-scale adoption. As it is difficult for individual hydrogen producers to own their own pipeline networks, bulk pipeline transportation was stated to be better suited for existing regulated utilities like FEI or PNG.⁷ FEI would like to rely on the continued use of its existing gas pipeline infrastructure rather than duplicating its network for hydrogen.⁸ This will require repurposing of equipment to accommodate a blended hydrogen stream. To develop its understanding of the requirements of delivering a natural gas and hydrogen blend, FEI has partnered with

³ Transcript Volume 1, pp. 133-134.

⁴ Ibid., pp. 20-38; Air Products written submission, p. 4.

⁵ Transcript Volume 1, pp. - 57.

⁶ Ibid., pp. 50-74.

⁷ Ibid.

⁸ FEI Workshop Presentation, p. 9.

PNG and Enbridge to complete a technical feasibility study.⁹ All of FEI's new pipelines are being designed to be "hydrogen ready" and the upcoming edition of the national pipeline code CSA Z662 is expected to include a new section on renewable gas and hydrogen.¹⁰

In the long term, FEI foresees a hydrogen hub model developing, as well as the potential need for a low-carbon pipeline transmission system.¹¹ Hydrogen hubs are to be developed in the Lower Mainland, Interior, and Northern BC, with hydrogen distributed in the low-pressure gas distribution network to customers. As demand grows, the existing pipeline corridors in BC may be retrofitted, upgraded, and expanded to transport renewable gases (biomethane and hydrogen).

2.3 Hydrogen Energy Services End Use

Hydrogen is a unique commodity due to its multitude of potential end uses. The primary end uses discussed in the workshop included hydrogen as: an export commodity; energy storage medium; home heating fuel; industrial process fuel; and transportation fuel.

2.3.1 Export Commodity

BC may be producing substantial amounts of clean hydrogen by 2030 and therefore consideration is being given to hydrogen as an export commodity.¹² There are potential export markets for hydrogen in Europe, the Indo-Pacific region, and the U.S. Emphasis was placed on the potential for California as an export market as it seeks aggressively to decarbonize.¹³ As this hydrogen would not be sold in BC, it was not clear how relevant these production volumes would be to the BCUC.¹⁴

A significant jump in the demand for hydrogen exports is projected in 2030 and by 2035, it is expected that demand for hydrogen exports will outpace BC-based hydrogen supply (but this gap is expected to be made up by new hydrogen production announcements).¹⁵ The need to align the regulation of hydrogen across regions of a potential export market was mentioned during the workshop.¹⁶

2.3.2 Energy Storage

As renewable energy (including hydrogen) becomes more commonplace for power generation and heating use, energy storage mediums become increasingly necessary to compensate for intermittency. Consideration has therefore been given to the use of hydrogen as an energy storage medium to compensate for intermittency while also improving grid reliability and resiliency.¹⁷ Energy storage is also required to compensate for seasonal

⁹ Transcript Volume 1, pp. 74-82.

¹⁰ Ibid., p. 92.

¹¹ FEI Workshop Presentation, p. 8.

¹² Hydrogen BC written submission, p. 3.

¹³ Ibid., p. 112.

¹⁴ Hydrogen BC written submission, p. 3; Transcript Volume 1, p. 115.

¹⁵ Transcript Volume 1, p. 64.

¹⁶ Ibid., p. 182.

¹⁷ Air Products written submission, p. 5.

demand fluctuation. Currently, Canada has 278,000 GWh of natural gas storage capacity, drawing upon approximately 105,000 GWh annually (in the winter). This represents a large market that may be filled by hydrogen in the future.¹⁸

There have been several inquiries into the development of renewable energy microgrids in areas of the Kootenays that are dispersed with relatively small populations due to the mountainous geography. Green hydrogen as an energy storage medium is proposed for these microgrids to support the intermittency from renewable electricity generation.¹⁹ Additionally, the hydrogen energy storage system for these microgrids may be oversized, providing small surpluses of hydrogen, which can be used as a fuel for municipal vehicles²⁰ (see Section 2.3.5 for further discussion on hydrogen as a transportation fuel).

2.3.3 Home Heating

Blending of hydrogen into the natural gas stream for the purpose of home heating or other domestic uses was mentioned by multiple workshop participants. The demand for hydrogen blended with natural gas is expected to grow to between 210,000 – 420,000 tonnes per year by 2030.²¹ In the near term, the workshop participants indicated that the amount of hydrogen blended into the natural gas system will exceed the amount of hydrogen used as a transportation fuel, due to the decarbonization goals of natural gas utilities.²² As discussed in Section 2.2.2 above, the technical feasibility of hydrogen blending into existing natural gas infrastructure is still being explored.

2.3.4 Industrial Process Heat

Hydrogen may be used to replace natural gas for the purpose of generating industrial process heat.²³ It is predicted that large industrial facilities like cement plants and refineries are likely to be the largest individual end users for hydrogen in BC.²⁴ Some participants believe the best way for BC to achieve hydrogen production at scale (and subsequently lower production costs) is to focus on larger consumption markets like industrial process heat.²⁵

2.3.5 Transportation Fuel

Currently, hydrogen as a transportation fuel is the only hydrogen energy service being provided in BC.²⁶ The Government of BC mandates for zero emissions vehicles and low carbon fuels have had a major influence on

¹⁸ Transcript Volume 1, pp. 105-119.

¹⁹ Thor Hydrogen written submission, p. 1.

²⁰ Ibid.

²¹ CHFCA Workshop Presentation, p. 26.

²² Ibid., pp. 115.

²³ Ibid., pp. 82-105.

²⁴ Hydrogen BC written submission, pp. 1-6.

²⁵ Air Products written submission, p. 2.

²⁶ Ibid., pp. 1-6.

hydrogen use as a transportation fuel in BC. It is predicted that the size of the hydrogen as a transportation fuel market will be between 4,400 – 23,000 tonnes by 2030.²⁷

Hydrogen can be used as a direct combustion fuel in a hybrid diesel/hydrogen engine or for electricity generation in a fuel cell vehicle. These two engine types, while both requiring hydrogen for refueling, will require the hydrogen fuel at different delivery pressures when refueling and, as such, refueling stations will have to specify the engine type they are meant for.²⁸ In addition to requiring hydrogen delivery at a higher pressure, fuel cell vehicles require a higher purity hydrogen fuel than diesel/hydrogen hybrid vehicles, which increases the cost of hydrogen fuel production.²⁹

Transportation accounts for approximately 27 percent of global greenhouse gas emissions (GHG) and medium/heavy duty commercial trucks represent approximately one-third of this figure.³⁰ As such, hydrogen fuel cells are viewed as a potential way to decarbonize the commercial transportation sector due to their more advantageous power to weight ratio compared to battery electric systems. Fuel cell vehicles are also projected to play a role in the light truck passenger vehicle sector in remote locations and northern territories given their greater range and cold weather reliability compared to battery electric vehicles.³¹

The main barrier to commercial deployment is the price of hydrogen compared to incumbent fuels. It is estimated that for hydrogen to be competitive in the commercial vehicle market, the retail price needs to fall to ~ USD \$5/kg. The current price of hydrogen is CAD \$12.75/kg in BC.³²

3.0 Hydrogen Energy Services Regulation

3.1 Economic Regulation

In the workshop, the participants expressed different views on the role of the BCUC in the economic regulation and general oversight of public utilities and had different perspectives on the appropriate level of economic regulation for hydrogen energy services in BC. There was, however, some acknowledgement that there are services which display natural monopoly characteristics, for which economic regulation is appropriate; and there are other services, which are competitive, and for which economic regulation would potentially inhibit market growth. In the areas where economic regulation is deemed appropriate, there was a desire for the development of a regulatory framework that allows for the efficient development of hydrogen projects, ensuring regulation does not create a barrier to entry for potential new entrants to the hydrogen energy services industry.³³

Another topic raised by the participants was the encouragement for cooperation amongst regulatory authorities. There was a recognition that regulatory bodies will have to “learn as they go” with regards to

²⁷ Transcript Volume 1, pp. 105-119.

²⁸ Ibid., pp. 38-49.

²⁹ Ibid., p. 43.

³⁰ Cellcentric written submission, p. 1.

³¹ Thor Hydrogen written submission, p. 4.

³² Cellcentric written submission, pp. 1-3.

³³ TCE written submission, pp. 1-5.

economic regulation and, as such, knowledge sharing between jurisdictions and a flexible regulatory framework were seen as requirements to allow the industry to evolve.³⁴ We also heard that clarifying the role of the regulators, including the BCUC, can help with investor uncertainty.³⁵

Hydrogen production was largely viewed by participants as a competitive market, with producers competing on the basis of customer satisfaction, superior logistics, operational capacity, and strategic market development.³⁶ Therefore, economic regulation in the hydrogen production market was seen to cause an undue burden on producers and would slow the progress of the hydrogen sector in BC.³⁷ FEI, however, indicated that hydrogen production and distribution displayed natural monopoly tendencies.³⁸ Given the capital intensity of hydrogen production, FEI believes regulated utilities are well positioned to be the bulk supplier of hydrogen in the province due to its access to capital and ability to aggregate demand to produce hydrogen at scale, resulting in cost efficiencies.³⁹

With regard to hydrogen pricing, some participants viewed that hydrogen pricing should be not regulated, or compared hydrogen with other fuels such as gasoline and diesel.⁴⁰ As transportation fuel buyers can already elect to purchase gasoline, diesel, or electricity instead of hydrogen, there is no need for price regulation as the market is already competitive.⁴¹ The participants acknowledged the BCUC's role in regulating the price of hydrogen via the price regulation of feedstocks used to produce hydrogen (electricity and natural gas).⁴²

Some participants recognized that the bulk distribution of hydrogen via pipeline displays natural monopoly characteristics and thus, may be best suited to a regulated utility, although as discussed in the preceding sections, bulk pipeline distribution of hydrogen is not anticipated to be feasible in the near-term future.⁴³ Once the industry has matured to the point that there is sufficient supply and demand to necessitate bulk distribution, having infrastructure and service provided by one operator would be economically efficient, removing barriers leading to a more rapid buildout of hydrogen adoption in BC. The role of the BCUC would be to oversee the utility as it actions enabling hydrogen legislation.⁴⁴

3.2 Safety Regulation

Suitable safety regulations are required to promote safe hydrogen production, distribution, and use without adverse consumer impacts that would erode consumer adoption of hydrogen.⁴⁵ While many participants

³⁴ Transcript Volume 1, pp. 82-105, Thor Hydrogen written submission, pp. 7-8.

³⁵ Transcript Volume 1, p. 197.

³⁶ Ibid., p. 67.

³⁷ Hydrogen BC written submission, pp. 1-6.

³⁸ FEI Workshop Presentation, p. 11.

³⁹ Transcript Volume 1, p. 95.

⁴⁰ Cellcentric written submission, pp. 1-3, Transcript Volume 1, pp. 50-74.

⁴¹ Ibid., pp. 105-119.

⁴² Ibid., pp. 50-74.

⁴³ Ibid., pp. 20-38, pp. 50-74; Air Products written submission, pp. 5-8.

⁴⁴ Transcript Volume 1, pp. 82-105.

⁴⁵ Air Products written submission, p. 7.

acknowledged the importance of safety in hydrogen production, transmission, and use, there was limited discussion from the participants regarding the appropriate involvement of the BCUC in safety regulation. The participants expressed an overall desire for regulators to work with industry, leveraging existing research and work done to ensure appropriate safety regulations are established.⁴⁶ Studies undertaken in other jurisdictions (California, UK and US) were also cited as potential resources.⁴⁷ An emphasis was placed on ensuring adequate engineering reviews and assessments are done on all existing natural gas infrastructure that will be used for blending hydrogen to ensure sustained durability. This includes consumer equipment as well as “behind the meter” piping, connectors, and appliances. Upgrades should then be rolled out, as necessary, to ensure the whole system is fit for service at the proposed blend level.⁴⁸

Some participants raised concern regarding a potential gap in existing hydrogen safety regulations.⁴⁹ Recent legislation has been passed,⁵⁰ amending the *Oil and Gas Activities Act* (OGAA) to give the BC Energy Regulator oversight of hydrogen production and transportation.⁵¹ The participants expressed concerns with leak mitigation at hydrogen production and distribution facilities, requesting that safety regulations require advanced technology to detect and prevent leaks.

4.0 Panel Findings and Determinations

The Panel makes these provisional findings based on the information presented during the workshop and provided in the written submissions. The purpose of this draft report is to set out the provisional findings and to seek submissions on them.

4.1 BC Hydrogen Energy Services

Based on the information and submissions from the workshop presentations and written submissions we find that the BC hydrogen energy services industry is nascent with a variety of business models and services developing and evolving. The information and submissions received to date indicate that the hydrogen energy services currently being contemplated in BC include:

1. Hydrogen production;
2. Hydrogen distribution;
3. Hydrogen end uses:
 - a. Home Heating;
 - b. Industrial/process heat;
 - c. Energy Storage;
 - d. Transportation fuel; and
 - e. Export Commodity.

⁴⁶ Transcript Volume 1 p. 96.

⁴⁷ Ibid., pp. 186-187, 144-157.

⁴⁸ Air Products written submission. p. 7.

⁴⁹ Transcript Volume 1, pp. 144-157.

⁵⁰ *Energy Statutes Amendment Act* (2022).

⁵¹ Transcript Volume 1, p. 155.

Hydrogen as a transportation fuel, and the associated supply chain for that service, are the only hydrogen energy services currently being provided commercially in BC.

4.2 BCUC Regulation of Hydrogen Energy Services

The *Utilities Commission Act* (UCA) defines a public utility⁵² as a person who owns or operates in British Columbia, equipment or facilities for the production, generation, storage, transmission, sale, delivery or provision of electricity, natural gas, steam or any other agent for the production of light, heat, cold or power to or for the public or a corporation for compensation, unless specifically excluded from the UCA [Emphasis added]. **Th Panel finds that, while hydrogen has multiple uses, it can be an agent for the production of light, heat, cold or power and, therefore, the provision of certain hydrogen energy services for compensation to the public falls within the definition of a public utility in the UCA.**

4.3 BCUC Approach to Regulating New Service Offerings

In 2012, the BCUC issued the Report on the Inquiry into the Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives (AES Report)⁵³ for regulated public utilities which provide products and services outside traditional utility activities. In the AES Report, the BCUC established key principles and guidelines to determine when regulation is needed and, where it is needed, principles and guidelines for determining the form of regulation. The AES Report key principles and guidelines are as follows:

- When to regulate:
 - Only regulate where required:
 - Natural monopoly characteristics are present and there is a need to regulate to protect the public interest; and/or
 - Legislation requires an activity to be regulated.
 - Regulation should not impede competitive markets.
- How to Regulate:
 - Where regulation is required, use the least amount to protect the ratepayer;
 - The benefits of regulation should outweigh the costs;
 - Provide adequate customer protection in a cost-effective manner;
 - Consider administrative efficiency;
 - Consider characteristics of parties involved; and
 - Require provision of enough information to allow the BCUC to properly assess the new business activity.

⁵² [UCA, RSBC 1996, c 473, section 1.](#)

⁵³ [FortisBC Energy Inc. \(FEI\) Inquiry into the Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives \(AES Inquiry Report\) dated December 27, 2012.](#)

When regulation is required, the BCUC may perform a number of regulatory functions which are within its jurisdiction. These include:

- Approving the rate charged for an energy service;
- Determining that the construction or operation of a capital project is in the public interest;
- Determining a fair rate of return for the public utility;
- Accepting energy supply contracts filed by a public utility; and
- Monitoring the activities of public utilities to ensure the safety and convenience of the public.

The BCUC recovers its costs from utilities and other regulated entities by both direct billings and through a levy assessed on energy sold by regulated utilities.⁵⁴ To the extent the Panel determines any aspects of the hydrogen energy services sector should be regulated, the appropriate billing mechanism, if any, to apply to such entities will also need to be considered.

4.4 BCUC Approach to Regulating Hydrogen Energy Services

The Panel's approach to the regulation of the hydrogen energy services industry in BC follows the principles set out in the AES report. Where it can be established that there is a competitive market, we will consider recommending to the Minister partial or full exemption from price regulation.

This was the approach taken in the Electric Vehicle (EV) Charging Services Inquiry, where the BCUC found that the provision of EV Charging Services is a competitive market and sought – and received – an exemption from regulation for all providers that were not already public utilities. Concerns about the potential of cross subsidization from other utility customers and the possible negative impact of that on the growth and development of the developing charging services market led the BCUC to withhold any recommendation for exemption for entities that were otherwise public utilities.

As there currently are very limited hydrogen energy services in BC, it is challenging to establish the exact nature of the form and function of regulation, or exemptions from regulation. In addition, we have not yet provided participants in the industry, public utilities and the general public with the opportunity to provide input on this matter. However, the establishment of regulatory frameworks should not be left too late in the development of the hydrogen energy services industry. The hydrogen services industry is anticipated to grow quickly. Therefore at this time the BCUC needs to monitor the development of that industry to ensure that appropriate regulatory mechanisms are established as it grows. In the following sections we discuss the various segments of the hydrogen energy services industry and our approach to regulation in each segment.

4.5 The Sale of Hydrogen as a Transportation Fuel

⁵⁴ See for example: <https://docs.b cuc.com/documents/AnnualReports/2023/BCUCF2021-22AnnualReport.pdf> pp. 41-43.

At this time, hydrogen as a transportation fuel is being provided at a retail level in BC and workshop participants stated that this end-use is currently the most active component of the hydrogen energy service industry. Workshop submissions suggest that the market is currently developing, with a limited customer base. Submissions also indicate that the sale of hydrogen as a transportation fuel occurs in a competitive market, in that fuel buyers have a choice of fuel (e.g. gas, diesel, electricity). It is anticipated that in the future, as the number of market entrants grows, providers of hydrogen as a transportation fuel will also compete amongst themselves, for example on the basis of price or customer satisfaction.

The hydrogen for transportation fuel market is nascent and there is uncertainty regarding how and at what rate the market for this end-use of hydrogen will develop in BC. Technology is developing, sometimes rapidly, in the areas of new engine technology and existing engine conversions.⁵⁵

It is our view that the current hydrogen fueling market is small and that economic regulation would not be appropriate at this time. We find sufficient evidence to provide a presumption that there is a competitive market but that presumption needs to be tested and the market needs to be monitored as it grows. **Therefore, the Panel finds it necessary for the BCUC to collect information which will enable the BCUC to determine whether the hydrogen as a transportation fuel market is competitive and that an exemption from active economic regulation is appropriate.**

There is a risk that the establishment of economic regulation at this time for hydrogen as a transportation fuel may impede the development of what otherwise can and should continue to develop as a competitive market. Submissions to the Inquiry indicate that government policy and financing will incent new entrants into the hydrogen as transportation fuel market, and the barrier to entry for this particular hydrogen energy service is relatively lower than that for other hydrogen energy services in BC.

Therefore, given the presumption that the market is competitive and until and unless sufficient information is available to draw any other conclusions about the hydrogen transportation fuel market, the BCUC will seek advance approval of the Minister responsible for the *Hydro and Power Authority Act* for an exemption from certain provisions of Part 3 of the UCA, for the provision of hydrogen as a transportation fuel, pursuant to section 88 of the UCA. This exemption should be subject to the reporting requirements discussed below. Any such exemption granted by the BCUC may be lifted as circumstances may require in the future. **We require entities providing hydrogen transportation fueling services to register with the BCUC and to file an annual report each year in order to be granted and maintain the exemption.** Annual reporting may be initially limited to reporting on total energy sale volumes, description of customers and/or end-uses of hydrogen sold, and description of hydrogen suppliers, where applicable. If the exemption granted includes exemptions from safety oversight, annual safety or complaint related reporting is also recommended.

To clarify, “entities providing transportation fueling services” means entities selling hydrogen at both the retail and the wholesale level. We consider hydrogen production and hydrogen transportation in sections 4.6, 4.7 and 4.8 below.

⁵⁵ Transcript Volume 1, p. 40.

As noted in past BCUC decisions, the test for granting an exemption pursuant to section 88(3) of the UCA is that the exemption should serve the objects and purposes of the UCA and that it is in the public interest to grant the exemption.⁵⁶

The submissions received to date in this Inquiry did not indicate any existing BC public utilities anticipate entering into the hydrogen as a transportation fuel market at this time. **However, the exemption of this hydrogen energy service should only be extended to entities which are not otherwise public utilities.** This recommendation is consistent with recommendations made by the BCUC in its Electric Vehicle Charging Service Inquiry – Phase 1 Report, as discussed in section 4.4 above.⁵⁷

The workshop scope, as outlined in Exhibits A-2 and A-3, did not specifically seek input on the topic of safety. Nonetheless, issues related to the safety of hydrogen energy services, and the nature of the BCUC's oversight of the safety of these services, were raised by workshop participants and in written submissions. **We invite further submissions on the appropriate nature of the BCUC's safety oversight over the provision of hydrogen as a transportation fuel.** As noted in the BCUC's Final Report for Stage 1 of its Safety Inquiry, the BCUC should not recommend an exemption for a public utility from the BCUC safety oversight without explicitly considering whether an exemption from safety regulation is in the public interest.⁵⁸

We invite submissions on this issue and the Panel's proposed approach.

4.6 Hydrogen Production

The workshop submissions demonstrate that many parties are currently assessing opportunities for hydrogen production in BC with some planning to establish, within the next two years, production facilities for the end-uses identified during the workshop. Some submissions indicate that the production of hydrogen, and its sale to industrial or transportation customers, are anticipated to develop within a competitive market. Other submissions state that hydrogen production is capital intensive, and therefore public utilities are well positioned to take on the development of hydrogen production themselves in the future.

Based on these submissions, there appears to be uncertainty regarding how and at what rate hydrogen production will develop in BC. We heard that the hydrogen production market, which may develop in BC may initially only attract non-utility entrants and is not likely to exhibit natural monopoly characteristics.

However, as with the sale of hydrogen as a transportation fuel, at this time there is insufficient information to assess the competitiveness of the hydrogen production market. Until sufficient information is available to draw any conclusions about the degree of market monopoly, **the BCUC will seek advance approval of the Minister**

⁵⁶ [Order G-167-07 with reasons for decision dated December 19, 2027 Unocal Application for Approval of the Disposition of its Interest in the Aikten Creek Storage Facility to its Wholly-Owned](#), Appendix B, p. 6.

⁵⁷ [Report – Phase 1 dated November 26, 2028 – British Columbia Utilities Commission An Inquiry into the Regulation of Electric Vehicle Charging Service](#)

⁵⁸ [Decision and Order G-381-22 dated December 22, 2022 – British Columbia Utilities Commission An Inquiry into the Regulation of Safety – Stage 1](#), p. 13.

responsible for the *Hydro and Power Authority Act* for an exemption from certain provisions of Part 3 of the UCA, for the production of hydrogen as a transportation, heating fuel or a fuel for the production of electricity, pursuant to section 88 of the UCA and that this exemption be subject to the reporting requirements discussed below.

The exemption of the production of hydrogen from active economic regulation should only be extended to entities which are not otherwise public utilities. This is consistent with the approach to the exemption recommendations in the previous section.

The Panel also finds that certain sections of the UCA related to safety should not be included as part of any exemptions extended to producers of hydrogen. We heard during the workshop that there are concerns that gaps exist with respect to the regulatory oversight of the safety of hydrogen production. Until such time, the BCUC is assured that safety oversight of hydrogen production is adequate and that an exemption from safety regulation by the BCUC is in the public interest, the BCUC should retain its jurisdiction on this matter. We invite submissions from parties on this issue.

As with the retail sale of hydrogen as a transportation fuel, entities producing hydrogen in BC must register with the BCUC in order to be granted an exemption and they are required to file annual reports. The purpose of the annual reporting is to collect information, which will provide the BCUC with an understanding of the hydrogen production market in BC and will provide insights into whether to amend any exemptions that have been granted. The annual reporting for hydrogen producers may be initially limited to reporting on the method of hydrogen production, the GHG intensity of the hydrogen produced, the total energy sale volumes, a description of customers and a description of end-uses of the hydrogen that is sold. Annual reporting should also include safety or complaint related reporting.

We invite submissions on this issue and the Panel's proposed approach.

4.7 Hydrogen Delivery by Truck

The current primary transport method for hydrogen is by truck. The "delivery of electricity, natural gas, steam or any other agent for the production of light, heat, cold or power to or for the public"⁵⁹ is considered a public utility, and generally speaking, the BCUC has not regulated the delivery of these substances by truck. The trucking industry is considered competitive and does not require economic regulation. In addition, the need for separate safety oversight is not required.

Therefore, given the presumption that the provision of hydrogen by truck is competitive, the BCUC will seek advance approval of the Minister responsible for the *Hydro and Power Authority Act* for an exemption from Part 3 of the UCA, for the provision of hydrogen by truck, pursuant to section 88 of the UCA.

We invite submissions on this issue and the Panel's proposed approach.

⁵⁹ UCA section 1(1).

4.8 Hydrogen Delivery by Pipeline

Pipeline transportation of “natural gas, steam or any other agent for the production of light, heat, cold or power” is regulated by the BCUC in two ways:

- Pipelines operated by public utilities
 - subject to Part 3 of the UCA including BCUC approval of a CPCN, rate approval and safety regulation
 - Subject to all BCUC reporting requirements
- Common carrier pipelines
 - BCUC approval of Tolls.
 - Subject to UCA section 43 reporting requirements
 - Not subject to CPCN or BCUC safety regulation.

Section 65(2) of the UCA establishes the basis of the UCA’s jurisdiction over common carriers:

- 2) On application by an interested person and after a hearing, sufficient notice of which has been given to all persons the commission believes may be affected, the commission may
 - a) issue an order, to be effective on a date determined by it, declaring a person who owns or operates a pipeline for the transportation of
 - i. one or more of crude oil, natural gas and natural gas liquids, or
 - ii. any other type of energy resource prescribed by the Lieutenant Governor in Council, to be a common carrier with respect to the operation of the pipeline, and
 - b) in the order establish the conditions under which the common carrier must accept and carry energy resources.

Pipeline transportation of hydrogen – as contemplated by submissions made at the workshop – is still in its infancy. It was noted at the workshop that it may be difficult for individual hydrogen producers to own their own pipeline networks, and that bulk pipeline transportation of hydrogen would be better suited for existing regulated utilities. It remains to be seen whether this service would be mostly or entirely undertaken by existing public utilities.

Further, at this time, common carrier legislation would not apply to a pipeline carrying hydrogen, absent the prescription by the Lieutenant Governor in Council with respect to the common carriage of hydrogen.

Therefore, at this time, we make no recommendations or direct any action regarding the pipeline transmission of hydrogen, although **we recommend the BCUC monitor the development of the distribution of hydrogen by pipeline.**

We invite submissions on this issue and the Panel’s proposed approach.

4.9 Hydrogen Exports

There is a potential that production of hydrogen in BC will develop and increase to a point where, possibly by 2030, there are sufficient volumes to support the export of hydrogen to markets in the United States and/or further abroad. The production of hydrogen derivatives, such as ammonia or methanol, may be required to efficiently export hydrogen to any markets located overseas.

Hydrogen exports may fall within the definition of a public utility where equipment or facilities owned or operated in BC are used for the export of hydrogen, and where the hydrogen is sold for energy purposes. However, we note that hydrogen also has non-energy end uses, and practically it may not be possible to determine the end use of hydrogen where it is being exported. Therefore, in the absence of a hydrogen export industry in BC, at present, there are uncertainties regarding the scope of the BCUC's jurisdiction.

Workshop participants generally do not consider that the export of hydrogen falls under the BCUC's jurisdiction; however, there appears to be uncertainty on this issue and, **therefore, we invite submissions on the issue of whether the export of hydrogen falls under the BCUC's jurisdiction and if so, the extent of that jurisdiction.**

One specific issue that may also warrant consideration is the role of existing public utilities in hydrogen exports in future. There may be public interest considerations regarding the impact of costs and revenues associated with export activities upon the rates paid by British Columbia public utility ratepayers.

4.10 Other Related Substances

For longer distance transport to export markets, there was discussion about the production and use of hydrogen derivatives such as methanol and ammonia; however, these may be slower to develop at scale and are not expected in the near future.

Therefore, at this time, we make no recommendations or direct any action regarding other related substances, although we recommend that the BCUC monitor the development of these substances as they relate to hydrogen for energy.