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Utilities Commission

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November 23, 2023

Sent via email/efile

**BCUC INQUIRY INTO REGULATION OF HYDROGEN ENERGY SERVICES EXHIBIT A-8**

The Honourable Josie Osbourne
Minister of Energy, Mines and Low Carbon Innovation
PO Box 9060, Stn Prov Govt
Victoria, BC V8W 9E2
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**Re: British Columbia Utilities Commission – An Inquiry into the Regulation of Hydrogen Energy Services – Project No. 1599391 – Exemption Approval**

Dear Minister Osbourne,

On November 21, 2022, the British Columbia Utilities Commission (BCUC) established an inquiry to explore the development of hydrogen as an energy resource (Hydrogen Energy Services) in British Columbia and to examine the role of the BCUC in the effective and efficient regulation of these services (Inquiry). This Inquiry was initiated in response to energy industry stakeholders increasingly viewing Hydrogen Energy Services as a critical clean-energy solution which can support the BC Government achieve its greenhouse gas (GHG) emission reduction plans.

The purpose of the Inquiry was to gather information to support the BCUC's assessment of whether the provision of Hydrogen Energy Services falls under the *Utilities Commission Act* (UCA) definition of a public utility and if so, to determine the suitable scope and form of BCUC regulation. On January 20, 2023, the BCUC hosted an interactive industry workshop and invited registered participants to present on the development of the Hydrogen Energy Services industry in British Columbia and on the appropriate nature and scope of BCUC regulation of this industry (Workshop). Thirteen Inquiry participants presented at the Workshop, and five others provided written submissions. Inquiry participants represented existing BCUC-regulated public utilities, technology companies, intervener groups and industrial chemical companies.

On April 26, 2023, the BCUC issued a draft report with its preliminary findings (Draft Report). The Draft Report included key findings and recommendations, including that persons who provide certain Hydrogen Energy Services fall under the definition of a public utility. Further, the Draft Report proposed to extend exemptions from active BCUC regulation to the following Hydrogen Energy Services: 1) hydrogen as a transportation fuel, 2) the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating, and 3) hydrogen delivery by truck. Inquiry participants were provided an opportunity to comment on the Draft Report.

The BCUC considered the submissions made regarding the Draft Report and now provides its final recommendations regarding the BCUC's regulation of Hydrogen Energy Services (Final Report).

The Final Report, attached to this letter, includes the following key findings and recommendations:

- A person engaged in the provision of certain Hydrogen Energy Services for compensation falls under the definition of public utility in the UCA;
- Exemption from active BCUC regulation is warranted for:
    a. the provision of hydrogen as a transportation fuel;
    b. the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating; and
    c. the provision of hydrogen delivery by truck.
- The proposed exemptions should only be extended to entities which are not otherwise public utilities;
- Sections of the UCA related to safety should not be included as part of certain exemptions; and
- Entities providing Hydrogen Energy Services must register with the BCUC in order to be eligible for any relevant exemptions.

At this time, the BCUC seeks the advance approval of the Minister of Energy, Mines and Low Carbon Innovation to issue orders under section 88(3) of the UCA to exempt, from certain provisions of the UCA, the classes of Hydrogen Energy Service cases noted here and in the attached Final Report. Table 3 in Section 5 of the Final Report summarizes the recommended exemptions.

The documents filed in connection with this Inquiry are available on the proceeding webpage, which can be found on the BCUC website at www.bcuc.com under "Our Work."

Sincerely,

*Original signed by Diane Basarich for:*

Patrick Wruck
Commission Secretary

IL/dg
Enclosure

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# British Columbia Utilities Commission

# Inquiry into the Regulation of Hydrogen Energy Services

## Final Report

November 23, 2023

Before:
A. K. Fung, KC, Panel Chair
M. Kresivo, KC, Commissioner

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## Executive Summary

In November 2022, the British Columbia Utilities Commission (BCUC) established an inquiry to examine its role in the effective and efficient regulation of hydrogen as an energy resource (Hydrogen Energy Services) (Inquiry). The objectives of the Inquiry are to:

1. Gather information about Hydrogen Energy Services in British Columbia;
2. Determine whether the provision of Hydrogen Energy Services falls under the *Utilities Commission Act* (UCA) definition of public utility; and if it does,
3. Determine the suitable scope and form of BCUC regulation of Hydrogen Energy Services.

On January 20, 2023, the BCUC hosted an interactive industry workshop (Workshop) and invited registered participants to present on the development of the Hydrogen Energy Services industry in British Columbia and on the appropriate nature and scope of BCUC regulation of this industry. The BCUC also received written submissions on these topics by Inquiry participants which did not present at the Workshop.

On April 26, 2023, the BCUC issued a draft report with its preliminary findings (Draft Report). Parties were provided an opportunity to comment on the Draft Report. In this final report, the Panel considers the submissions made regarding the Draft Report and provides its final recommendations regarding the BCUC's regulation of Hydrogen Energy Services (Final Report).

The Final Report includes the following key findings and recommendations:

- A person engaged in the provision of certain Hydrogen Energy Services for compensation falls under the definition of public utility in the UCA;
- Exemption from active BCUC regulation is warranted for:
    a. the provision of hydrogen as a transportation fuel;
    b. the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating; and
    c. the provision of hydrogen delivery by truck.
- The proposed exemptions should only be extended to entities which are not otherwise public utilities;
- Sections of the UCA related to safety should not be included as part of certain exemptions; and
- Entities providing Hydrogen Energy Services must register with the BCUC in order to be eligible for any relevant exemptions.

Where the Panel finds that extending exemptions from parts of the UCA to Hydrogen Energy Services is warranted, the Panel recommends to the minister responsible for the administration of the *Hydro and Power Authority Act* (Minister) that they issue advance approval of these exemptions. If the Minister decides to issue advance approval of these exemptions, the BCUC will then issue orders granting the exemptions, pursuant to section 88(3) of the UCA.

The Panel recommends that the BCUC develop guidelines which explain how entities providing Hydrogen Energy Services are to register with the BCUC. The Panel recommends that the BCUC issue this information at the same time as the future exemption orders, which would be issued in the event that the Minister provides advance approval of the recommended exemptions.

## 1.0 Introduction

On November 21, 2022, the British Columbia Utilities Commission (BCUC) established an inquiry to explore the development of hydrogen as an energy resource (Hydrogen Energy Services) in British Columbia and to examine the role of the BCUC in the effective and efficient regulation of these services (Inquiry). This Inquiry was initiated because energy industry stakeholders are increasingly viewing Hydrogen Energy Services as critical to meeting the BC Government's greenhouse gas (GHG) emission reduction targets.

In 2019, the BC Government adopted a Hydrogen Strategy, which outlines plans to accelerate the production and use of renewable and low-carbon hydrogen.[1] Specifically, the BC Hydrogen Strategy includes 63 actions for government, industry and innovators to undertake during the short term (2020-25), medium term (2025-30) and long term (2030 and beyond). The strategy's immediate priorities include scaling up production of renewable hydrogen, establishing regional hydrogen hubs and the deployment of fuel-cell vehicles. The Hydrogen Strategy also identifies several potential roles for regulated public utilities to grow the use of hydrogen as an energy resource in BC.

The *Utilities Commission Act*[2] (UCA) is the BCUC's governing legislation. Section 1 of the UCA defines a public utility, in part, 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. The BCUC regulates public utilities in BC by reviewing, among other things, their rate applications, plans for new facilities, energy supply contracts, and the issuance of securities.

The purpose of the Inquiry is, in part, to gather information to support the BCUC's assessment of whether the provision of Hydrogen Energy Services falls under the UCA definition of a public utility and if so, to determine the suitable scope and form of BCUC regulation. As the Hydrogen Energy Services industry is considered to be new and developing, the BCUC will rely to a large extent on key principles identified by its previous inquiries into new energy service offerings to determine its recommendations regarding effective and efficient BCUC regulation of these services.

### 1.1 The AES Report and the BCUC's 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) for regulated public utilities which provide products and services outside traditional utility activities.[3] 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 include the following:

[1] BC Hydrogen Strategy
[2] *Utilities Commission Act,* [RSBC 1996] c 473.
[3] AES Report

- 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 of regulation necessary 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.

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.

While the AES Report does not explicitly consider any aspects of the economic regulation of activities related to the provision of hydrogen as an agent for the production of light, heat, cold or power, in this Inquiry we assess whether and how the principles established in the AES Report should apply to the regulation of Hydrogen Energy Services under the UCA. The BCUC has applied these principles in recent proceedings and inquiries related to new energy service offerings by public utilities – such as during the Review of Thermal Energy Systems Regulatory Framework Guidelines proceeding[4] and the EV Charging Services Inquiry[5].

[4] Review of Thermal Energy Systems Regulatory Framework Guidelines
[5] Inquiry into the Regulation of Electric Vehicle Charging Services

### 1.2 Inquiry Process and Draft Report Recommendations

On January 20, 2023, the BCUC hosted an interactive industry workshop (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;
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 at 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 (Ms. Gould); and
- Chris Shelton (Mr. Shelton).

In addition, the following parties provided written submissions for the Workshop:

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

On April 26, 2023, the BCUC issued its Hydrogen Inquiry Draft Report (Draft Report) which proposed to extend exemptions to public utilities providing certain Hydrogen Energy Services. **The Draft Report included the following key findings and draft recommendations:**

- **A person engaged in the provision of certain Hydrogen Energy Services for compensation falls under the definition of public utility in the UCA;**

- **Exemption from active BCUC regulation is warranted for:**
  - **the provision of hydrogen as a transportation fuel;**
  - **the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating; and**
  - **the provision of hydrogen delivery by truck.**
- **The proposed exemptions should only be extended to entities which are not otherwise public utilities;**
- **Certain sections of the UCA related to safety should not be included as part of any exemptions; and**
- **Entities should file annual reports in order to be granted and to maintain exemptions.**

The BCUC sought submissions on the draft findings and recommendations included in the Draft Report. Inquiry participants were provided with an opportunity to file written submissions by June 8, 2023, and also to provide reply submissions by June 29, 2023. Ms. Gould, British Columbia Old Age Pensioners' Organization et al. (BCOAPO), FEI, Powertech, BC Hydro, BC Sustainable Energy Association (BCSEA), HTEC and Air Products filed written submissions regarding the Draft Report. Air Products, BCSEA and FEI subsequently filed reply submissions.

On July 27, 2023, the BCUC issued a request that Inquiry participants and interested parties who are currently filing, or that anticipate filing, Hydrogen Energy Services related information with the BC government to provide additional information to the BCUC regarding the nature and frequency of this reporting, by September 6, 2023. Air Products, HTEC, Powertech, FEI and Fortescue[6] filed submissions regarding their respective reporting requirements.

### 1.3 Final Report Structure

Section 2 describes the current landscape of Hydrogen Energy Services in BC based on submissions made by the Inquiry participants during the Workshop and in subsequent written submissions.

Section 3 discusses the economic and safety related aspects of Hydrogen Energy Services regulation.

Section 4 provides the Panel's final findings and recommendations.

Section 5 provides a summary table of the Panel's recommended exemptions.

[6] Fortescue had not made any written submission prior to this filing.

## 2.0 Hydrogen Energy Services in BC

This section briefly describes the various Hydrogen Energy Services that are contemplated, and the extent to which they have been developed in BC to date according to the Inquiry participants' submissions.

### 2.1 Hydrogen Production

There are multiple pathways to produce hydrogen, with each pathway relying on different fuel sources and a variety of processes. The table below summarizes the hydrogen production pathways as presented at the Workshop and in the Inquiry participants' 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 fuel source availability provide natural advantages to certain pathways. BC has favorable resources for both electrolytic and natural gas-based hydrogen production.[7]

Hydrogen production methods are often represented by various colours. The BC Hydrogen Strategy provides the following definitions of common hydrogen production methods according to colour:[8]

- Green Hydrogen: this production method relies on the use of clean electricity to split water into hydrogen and oxygen through a process called electrolysis.
- Blue Hydrogen: this production method relies on processes such as steam methane reforming or methane pyrolysis to convert fossil fuels, such as natural gas, into hydrogen. GHG emissions from the steam methane reforming process are captured and sequestered, thereby reducing the carbon intensity of this production methodology. Solid carbon is a byproduct of methane pyrolysis.
- Grey Hydrogen: this production method relies on the use of fossil fuels and processes such as steam methane reforming. There is no carbon dioxide capture and sequestration, and therefore the amount of GHG emissions is greater as compared to Blue Hydrogen.

The methods of hydrogen production listed above reflect increasing levels of GHG emissions.

[7] Air Products written submission, p. 4.
[8] BC Hydrogen Strategy, p. 11.

### 2.1.1 Status of Hydrogen Production in BC

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

**Table 2: BC Hydrogen Production**

| Entity | Current Status |
|---|---|
| Hydrogen Naturally | • Not currently producing commercial hydrogen in BC<br>• First production facility planned in Alberta but plans for future hubs in BC[9] |
| Hydra Energy Corporation | • Not currently producing commercial hydrogen in BC<br>• Plans to build a hydrogen production and distribution site in Prince George, BC[10]<br>  ○ The produced hydrogen will be used for their hydrogen truck refueling station |
| Hydrogen Technology and Energy Corporation | • Not currently producing commercial hydrogen in BC<br>  ○ Purchasing green hydrogen for use at their refueling stations[11]<br>• Two production facilities and one liquefaction facility planned in BC (2023-2024)<br>• Looking to partner with chemical company to use byproduct hydrogen |
| Air Products | • Not currently producing commercial hydrogen in BC<br>• Assessing opportunities for development in BC[12] |
| Thor Hydrogen | • Not currently producing commercial hydrogen in BC<br>• Provides hydrogen project development and management services[13] |
| TC Energy | • Not currently producing commercial hydrogen in BC<br>• 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.[14] |
| FortisBC Energy Inc. | • Not currently producing commercial hydrogen in BC<br>  ○ Assessing in-BC and out-of-BC resources for hydrogen production[15] |

[9] Hydrogen Naturally Workshop Presentation, p. 7.
[10] Hydra Energy Workshop Presentation, p. 7.
[11] Transcript Volume 1, p. 59.
[12] Air Products Workshop Submission, p. 1.
[13] Thor Hydrogen Workshop Submission, p. 5.
[14] TC Energy Workshop Submission, p. 3.
[15] FEI Workshop Presentation, p. 7.

| Entity | Current Status |
|---|---|
| Pacific Northern Gas Ltd. | • Not currently producing commercial hydrogen in BC<br>  ○ Could potentially own production facilities at some point<br>• Primarily an off taker, purchasing hydrogen, climate credits, or both[16] |
| British Columbia Hydro and Power Authority | • Not currently producing commercial hydrogen in BC<br>• Considered themselves as having more of a support role for hydrogen production, for example:[17]<br>  ○ Providing electricity for electrolytic hydrogen production<br>  ○ Providing consulting, testing, and R&D services for hydrogen production (via Powertech subsidiary)<br>  ○ Implementing a load attraction program for hydrogen producers |
| Sea to Sky Energy Solutions | • Not currently producing commercial hydrogen in BC<br>• Proposing to convert their Brandywine Creek run-of-river electricity production plant into a ~4200 kg/day hydrogen plant[18] |

BC Hydro discussed its discounted Clean Energy Industry Innovation rate that is available to projects which produce a renewable or low carbon fuel, such as green hydrogen (Rate Schedule 1894).[19] As of the date of the Workshop, BC Hydro has had more than 5,000 megawatts of project inquiries in the hydrogen space.[20]

## 2.2 Hydrogen Distribution

As presented at the Workshop, the two most 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.[21]

### 2.2.1 Trucking

The current primary transport method for hydrogen is trucking, either as a gas or liquid. At lower volumes and smaller quantities, it is easier to move hydrogen as a compressed gas (such as HTEC's modular "power cube").[22] However, as volumes and distances increase, hydrogen can be liquefied and put into larger tanks.[23]

[16] PNG Workshop Presentation, p. 7.
[17] Transcript Volume 1, p. 130.
[18] Ibid., p. 125.
[19] Rate Schedule 1894 offers a discount from the standard transmission service rate on both the energy charge and demand charge for a period of seven years. More information is available at BC Hydro's Industrial Electrification rates website.
[20] Transcript Volume 1, pp. 133-134.
[21] Ibid., pp. 20-38; Air Products written submission, p. 4.
[22] Transcript Volume 1, pp. 53-57.
[23] Ibid., pp. 50-74.

### 2.2.2 Pipeline

Multiple submissions cited the need for a bulk hydrogen transportation corridor to accommodate large-scale adoption. As it may be challenging for individual hydrogen producers to own their own pipeline networks, some parties consider bulk pipeline transportation to be better suited for existing regulated utilities like FEI or PNG.[24] In the near term, FEI would like to rely on the continued use of its existing gas pipeline infrastructure rather than duplicating its network for hydrogen.[25] 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 PNG and Enbridge to complete a technical feasibility study.[26] All of FEI's new pipelines are being designed to be "hydrogen ready" and in accordance with the national pipeline code CSA Z662, which includes a new section on the transportation of hydrogen.[27]

In the long term, FEI foresees a hydrogen hub model developing, as well as the potential need for a low-carbon pipeline transmission system.[28] A hydrogen hub is described as a limited geographical area wherein hydrogen demand is supplied directly by local hydrogen production.[29] FEI anticipates hydrogen hubs will 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 hydrogen.

## 2.3 Hydrogen Energy Services End Use

Inquiry participants noted multiple potential end uses for hydrogen as an energy resource. Potential 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.[30] There are potential export markets for hydrogen in Europe, the Indo-Pacific region, and the United States. Emphasis was placed on the potential for California as an export market as it seeks aggressively to decarbonize.[31] As this hydrogen would not be sold in BC, it was not clear at the time of the Workshop how relevant these production volumes would be to the BCUC in terms of assessment of its role, if any, in the regulation of hydrogen exports.[32]

[24] Ibid.
[25] FEI Workshop Presentation, p. 9.
[26] Transcript Volume 1, pp. 74-82.
[27] Ibid., p. 92; subsequent to the date of the Workshop, CSA Z662:23 was issued and includes additional clauses specifically related to the transportation of hydrogen and hydrogen/natural gas blends by pipeline.
[28] FEI Workshop Presentation, p. 8.
[29] Transcript Volume 1, p. 93.
[30] Hydrogen BC written submission, p. 3.
[31] Ibid., p. 112.
[32] Hydrogen BC written submission, p. 3; Transcript Volume 1, p. 115.

Nonetheless, a significant jump in the demand for hydrogen exports is projected in 2030 and by 2035, by which time it is expected that demand for hydrogen exports will outpace BC-based hydrogen supply.[33] The need to align the regulation of hydrogen across regions of a potential export market was also mentioned during the Workshop.[34]

### 2.3.2 Energy Storage

Consideration has been given to the use of hydrogen as an energy storage medium. Inquiry participants noted the current seasonal need for natural gas storage capacity in Canada, and the potential for hydrogen to serve a similar seasonal energy storage purpose in the future.[35]

Inquiry participants also noted that 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 potential intermittency from renewable electricity generation.[36] The hydrogen energy storage system for these microgrids may be oversized, providing small surpluses of hydrogen, to be used as a fuel for municipal vehicles[37] (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 distribution system for the purpose of home heating or other domestic uses was mentioned by multiple Workshop participants. In the near term, Workshop participants expect that the amount of hydrogen blended into the natural gas distribution system will exceed the amount of hydrogen used as a transportation fuel, due to the decarbonization goals of natural gas utilities.[38] 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.[39] It is predicted that large industrial facilities like cement plants and refineries are likely to be the largest individual end users of hydrogen in BC.[40] Some participants believe the best way for BC to achieve hydrogen production at scale is to focus its usage on the generation of industrial process heat.[41]

[33] Transcript Volume 1, p. 64.
[34] Ibid., p. 182.
[35] Transcript Volume 1, p. 111.
[36] Thor Hydrogen written submission, p. 1.
[37] Ibid.
[38] Transcript Volume 1, p. 115.
[39] Ibid., pp. 82-105.
[40] Hydrogen BC written submission, pp. 1-6.
[41] Air Products written submission, p. 2.

### 2.3.5 Transportation Fuel

Currently, hydrogen as a transportation fuel is the only hydrogen energy service being provided in BC.[42] Government of BC mandates for zero emission vehicles and low carbon fuels have had a major influence on hydrogen use as a transportation fuel in BC. It is predicted that the size of the hydrogen as a transportation fuel market in BC will be between 4,400 – 23,000 tonnes by 2030.[43] There were no submissions made during the Inquiry which indicated that existing public utilities anticipate pursuing the provision of hydrogen as a transportation fuel.

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, require hydrogen at different delivery pressures when refueling and, as such, refueling stations will have to specify the engine type for which they are designed.[44] 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 for fuel cell vehicle use.[45]

The main barrier to commercial deployment is the price of hydrogen compared to incumbent transportation fuels. It is estimated that for hydrogen to be competitive in the commercial vehicle market, the retail price needs to fall to approximately USD $5/kg.[46] The current price of hydrogen is approximately USD $9/kg in BC.[47]

## 3.0 Hydrogen Energy Services Regulation

This section provides a summary of Inquiry participants' viewpoints on the economic and safety related aspects of any BCUC regulation of Hydrogen Energy Services. It references submissions made throughout the Inquiry, including from the Workshop, subsequent written submissions and from the written responses to the Draft Report.

### 3.1 Economic Regulation

During the Workshop, the Inquiry participants expressed different views on the role of the BCUC regarding the appropriate level of economic regulation of Hydrogen Energy Services in BC. There was some acknowledgement that there are services which may display natural monopoly characteristics, and for which economic regulation is appropriate. Other Hydrogen Energy Services were characterized by the Inquiry participants as operating in competitive markets, and it was noted that the Inquiry participants expressed concern that any economic regulation of these services could potentially inhibit market growth. In the areas where the Inquiry participants viewed economic regulation as 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 potential new entrants to the Hydrogen Energy Services industry.[48]

[42] Ibid., pp. 1-6.
[43] CHFCA Workshop Presentation, p. 26; BC Hydrogen Study, Figure 39.
[44] Ibid., pp. 38-49.
[45] Ibid., p. 43.
[46] Cellcentric written submission, p. 2.
[47] Ibid.
[48] TCE written submission, pp. 1-5.

The Inquiry participants also raised the issue of the need for the BCUC to encourage cooperation amongst regulatory authorities. There was a recognition that regulatory bodies will have to "learn as they go" with regards to economic regulation of Hydrogen Energy Services and, as such, knowledge sharing between jurisdictions and a flexible regulatory framework were seen as requirements to allow the industry to evolve.[49] It was also noted that clarifying the role of the various relevant regulators, including the BCUC, can help alleviate concerns about investor uncertainty.[50]

Regarding hydrogen production specifically, many Inquiry participants view this service as largely a competitive market, with producers competing on the basis of customer satisfaction, superior logistics, operational capacity, and strategic market development.[51] Therefore, they regard economic regulation in the hydrogen production market to cause an undue burden on producers and to slow the progress of the hydrogen sector in BC.[52] FEI, however, indicated that hydrogen production and distribution display natural monopoly tendencies.[53] 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 their access to capital and ability to aggregate demand to produce hydrogen at scale, resulting in cost efficiencies.[54] Other Inquiry participants, such as Air Products, rejected any suggestion that regulated utilities are best positioned to be the bulk supplier of hydrogen.[55] Air Products states its hydrogen production and transportation business has operated within a competitive environment for more than four decades.[56] The topic of hydrogen production, along with its regulation by the BCUC, is further discussed in Section 4.2 below.

With regard to hydrogen pricing, for example as a transportation fuel, some Inquiry participants viewed that hydrogen pricing should not be regulated, and compared hydrogen to other transportation fuels such as gasoline and diesel.[57] 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.[58] The Inquiry participants acknowledged the BCUC's role in regulating the price of hydrogen via the price regulation of feedstocks used to produce hydrogen (e.g. electricity and natural gas).[59]

Some Inquiry 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 or necessary in the near-term future.[60] Once the industry has matured to the point that there is sufficient supply and demand to necessitate bulk distribution, having this infrastructure and service provided by one operator may be economically efficient. The Inquiry participants note that the role of the BCUC in such future circumstances

[49] Transcript Volume 1, pp. 82-105, Thor Hydrogen written submission, pp. 7-8.
[50] Transcript Volume 1, p. 197.
[51] Ibid., p. 67.
[52] Hydrogen BC written submission, pp. 1-6.
[53] FEI Workshop Presentation, p. 11.
[54] Transcript Volume 1, p. 95.
[55] Air Products Reply to Draft, p. 4.
[56] Ibid., p. 3.
[57] Cellcentric written submission, pp. 1-3, Transcript Volume 1, pp. 50-74.
[58] Ibid., pp. 105-119.
[59] Ibid., pp. 50-74.
[60] Ibid., pp. 20-38, pp. 50-74; Air Products written submission, pp. 5-8.

would be to oversee the utility as it implements bulk hydrogen distribution.[61] The Panel provides its final recommendations regarding economic regulation of the various Hydrogen Energy Services in Section 4 below.

### 3.2 Safety Regulation

The need for suitable safety regulations which promote safe hydrogen production, distribution, and use was discussed throughout the Inquiry. While many Workshop participants 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. Workshop submissions expressed an overall desire for regulators to work with industry, leveraging existing research to ensure appropriate safety regulations are established.[62] Studies undertaken in other jurisdictions (e.g. California, UK and US) were cited as potential resources.[63] 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 and integrity. This includes consumer equipment as well as "behind the meter" piping, connectors, and appliances. It was noted that upgrades to this equipment may be necessary to ensure the entire system is fit for service at the proposed hydrogen/natural gas blend level.[64]

Some Workshop participants raised a concern regarding a potential gap in existing hydrogen safety regulations.[65] Recent legislation[66] has been passed which amends and renames the *Oil and Gas Activities Act* (OGAA), now called the *Energy Resource Activities Act*[67] (ERAA) to give the new BC Energy Regulator (BCER) oversight of hydrogen production and transportation.[68]

The Workshop scope, as outlined in Inquiry Exhibits A-2 and A-3, did not specifically seek input on the topic of the BCUC's oversight of Hydrogen Energy Services safety. Therefore, the Panel sought submissions on this topic in the Draft Report.

Some Inquiry participants' responses to the Draft Report indicated support for the BCUC retaining some jurisdiction over the safety of Hydrogen Energy Services. BCOAPO states retaining jurisdiction over safety is a prudent course of action "until, at least, appropriate [safety-related regulatory] mechanisms are developed. [69] BCSEA similarly agrees with the Draft Report's suggestion not to recommend exemption from BCUC safety oversight.[70]

Other submissions in response to the Draft Report addressed the safety concern of hydrogen leaks. In particular, the submission made by Ms. Gould, raises the concern of hydrogen leaks from a climate change and safety perspective. Ms. Gould states new reports have recently been published regarding the global warming impact of

[61] Transcript Volume 1, pp. 82-105.
[62] Ibid., p. 96.
[63] Ibid., pp. 186-187, 144-157.
[64] Air Products written submission. p. 7.
[65] Transcript Volume 1, pp. 144-157.
[66] *Energy Statutes Amendment Act* (2022).
[67] *Energy Resource Activities Act,* [SBC 2008] c 36.
[68] Transcript Volume 1, p. 155.
[69] BCOAPO Draft Report Submission, p. 4.
[70] BCSEA Draft Report Submission, para. 4.

leaked hydrogen emissions.[71] Further, Ms. Gould submits that in the absence of regulatory oversight "the hydrogen industry on its own is unlikely to invest in the needed levels of leak detection and prevention as this could add substantially to the cost of producing, distributing, and using hydrogen."[72] In reply on this matter, FEI strongly objects to the submission by Ms. Gould. FEI states that it takes its responsibility to safely and reliably provide energy to its customers very seriously.[73] FEI further states it "will take the necessary actions to address the potential for hydrogen leakage, just as it currently manages the potential for leakage of natural gas from its transmission and distribution network."[74]

Some Inquiry participants indicated that the BCUC does not need to exercise safety oversight over the Hydrogen Energy Services industry. HTEC indicated that existing technical authorities manage safety regulations of all aspects of Hydrogen Energy Services (i.e. production, distribution, dispensing).[75] Specifically, the Inquiry participants pointed to the mandates of both Technical Safety BC (TSBC) and the BCER.

Air Products states that TSBC oversees the safety of hydrogen storage systems, piping systems and utilization equipment through installation permits, assessments and operating permits issued under the *Safety Standards Act*[76] and *Gas Safety Regulation*. [77] Under this legislative framework, TSBC provides the design and installation requirements for compressed or liquefied hydrogen dispensing stations.

FEI notes that the BC Government enacted the *Energy Statues Amendment Act* in November 2022, which established the BCER's authority to regulate the manufacturing of hydrogen under the ERAA.[78] Air Products references a BC Government news release explaining that the purpose of these legislative changes is to "ensure an experienced single-window regulator provides a one-stop place [to] industry for permitting, and a consistent regulatory, safety, and compliance authority for hydrogen projects from site planning to restoration."[79] FEI points to a recently completed BC Hydrogen Regulatory Mapping Study, which similarly describes the BCER amended hydrogen related mandate.[80]

Powertech expressed no concern with the BCUC retaining jurisdiction over safety. However, Powertech notes that the BCUC should refrain from active regulation where the jurisdiction and experience of other regulators are established.[81]

The Panel provides its final findings and recommendations regarding the BCUC's safety oversight of Hydrogen Energy Services in Section 4.1.2 below.

[71] Ms. Gould Draft Report Submission, p. 1.
[72] Ibid., p. 2
[73] FEI Reply Submission, p. 5.
[74] Ibid.
[75] HTEC Draft Report Submission, p. 6 of 6.
[76] *Safety Standards Act*, [SBC 2003] c 39.
[77] *Gas Safety Regulation*, BC Reg 103/2004; Air Products Draft Report Submission, p. 5.
[78] FEI Reply Submission, p. 5.
[79] Air Products Draft Report Submission, p. 5.
[80] Ibid.
[81] Powertech Draft Report Submission, p. 5 of 5.

## 4.0 Panel Findings and Determinations

As noted earlier, the purpose of the Inquiry was to assess whether the provision of Hydrogen Energy Services falls within the UCA definition of a public utility, and if so, what the appropriate scope and form of BCUC regulation of these services should be.

The Draft Report included the following Panel findings and draft recommendations regarding the scope and form of BCUC's regulation of Hydrogen Energy Services:

- **A person engaged in the provision of certain Hydrogen Energy Services for compensation falls under the definition of public utility in the UCA;**
- **Exemption from active BCUC regulation is warranted for:**
    - **the provision of hydrogen as a transportation fuel;**
    - **the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating; and**
    - **the provision of hydrogen delivery by truck.**
- **The proposed exemptions should only be extended to entities which are not otherwise public utilities;**
- **Certain sections of the UCA related to safety should not be included as part of certain exemptions; and**
- **Entities should file annual reports in order to be granted and to maintain exemptions.**

As outlined in turn in the sections below, the Panel broadly adopts these draft recommendations in this Final Report, with the exception of the annual reporting draft recommendation. The Panel finds that BCUC-specific annual reporting is not required at this time, and provides its reasons in Section 4.1.3 below.

In instances where the Panel finds that extending exemptions from parts of the UCA to Hydrogen Energy Services is warranted, the Panel will recommend to the minister responsible for the administration of the *Hydro and Power Authority Act*[82] (Minister) that they issue advance approval of these exemptions. If the Minister decides to issue advance approval of these exemptions, the BCUC will then issue orders granting the exemptions, pursuant to section 88(3) of the UCA.

### 4.1 BC Hydrogen Energy Services

Based on the submissions made during the Inquiry, 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 indicate that the Hydrogen Energy Services currently being contemplated in BC include:

1. Hydrogen production
2. Hydrogen distribution:
    a. Delivery by Truck; and
    b. Delivery by Pipeline.

[82] *Hydro and Power Authority Act*, [RSBC 1996] c 212.

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

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.

Section 1 of the UCA defines a public utility, in part, 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]. [83] The 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.

The Panel notes that there was general agreement among Inquiry participants' responses to the Draft Report that the provision of Hydrogen Energy Services for compensation to the public falls within the definition of a public utility in the UCA. No participant disputed this finding in the Draft Report. Pursuant to that finding, the Panel must go on to make recommendations regarding the appropriate form and scope of BCUC regulation of Hydrogen Energy Services in BC.

### 4.1.1 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 or there is a potential for a competitive market to develop, we will consider recommending to the Minister partial or full exemption from economic regulation under the UCA.

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 from the Minister, an exemption from regulation for all providers that were not already public utilities. The BCUC withheld recommending that exemptions be extended to entities that were otherwise public utilities due to 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 charging services market.

As there currently are very limited Hydrogen Energy Services in BC, it is challenging to establish the exact necessary nature of the form and function of regulation, or exemptions from regulation. Through this Inquiry, industry, public utilities and the general public have been provided the opportunity to make submissions on this matter. The Draft Report recommended exemptions be extended to some aspects of Hydrogen Energy Services, and that the BCUC actively monitor all aspects of the Hydrogen Energy Services industry. The Inquiry participants were generally supportive of the BCUC's proposed approach to regulating Hydrogen Energy

[83] *Utilities Commission Act*, [RSBC 1996] c 473, section 1.

Services, with some notable exceptions. For example, FEI notes that there is currently insufficient information available to assess the suitability of the recommended exemptions.[84]

The Panel acknowledges there is currently limited information regarding the actual delivery of Hydrogen Energy Services in BC. At the same time, however, we consider that the establishment of regulatory frameworks should not be left too late in the development of the Hydrogen Energy Services industry. The Hydrogen Energy Services industry is anticipated to grow quickly. The Panel finds that, consistent with the AES Inquiry principles, regulation should not impede the development of competitive markets, and therefore we maintain support for the proposed Draft Report exemptions. The Panel recommends that the BCUC continue to monitor the development of the Hydrogen Energy Services industry to ensure the exemptions remain appropriate as the industry grows. The proposed Draft Report exemptions are discussed in the following sections, beginning with BCUC's safety oversight of Hydrogen Energy Services.

Table 3 in Section 5 below provides the recommended actions or exemptions from the UCA.

### 4.1.2 BCUC's Safety Oversight of Hydrogen Energy Services

Where exemptions were proposed for Hydrogen Energy Services within the Draft Report, the Panel stated that exemptions from parts of the UCA related to safety should not be included. This approach is consistent with the outcomes of the recently completed BCUC Safety Inquiry. The BCUC's Final Report for Stage 1 of its Safety Inquiry noted that the BCUC should not recommend an exemption for a public utility from BCUC safety oversight without explicitly considering whether an exemption from safety regulation is in the public interest.[85]

The Panel acknowledges the submissions made by the Inquiry participants regarding the BCUC's safety oversight of Hydrogen Energy Services, including submissions that there is no need for BCUC safety oversight of this industry. However, the Panel maintains its position stated in the Draft Report, which is that exemptions from parts of the UCA related to safety should not be included as part of the exemptions extended to providers of Hydrogen Energy Services. The Panel provides the following clarification regarding the scope of its anticipated safety oversight.

The Panel notes recent legislative changes which have authorized the BCER to be the primary safety regulator for the manufacturing of hydrogen. Although the Panel recommends that the BCUC retain its authority to oversee safety related matters of Hydrogen Energy Service providers, the Panel does not intend for the BCUC to actively regulate in this area. Consistent with the Safety Inquiry Stage 1 Final Report, **the Panel recommends that the BCUC refrain from actively regulating the safety of Hydrogen Energy Services provided by public utilities where it is satisfied that another regulatory body is providing adequate safety oversight.** The Panel is satisfied that the BCER and the TSBC are tasked by legislation to provide safety oversight of Hydrogen Energy Services. However, the Panel considers it necessary to exclude safety related sections of the UCA from the proposed exemptions – at this time.

[84] FEI Draft Report Submission, p. 3.
[85] 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.

The Panel considers that there will likely be a transitional period wherein the BCER develops the regulations applicable to hydrogen projects, as noted in the BC Hydrogen Regulatory Mapping Study.[86] The BCUC will continue to monitor the safety oversight of the Hydrogen Energy Service activities of public utilities during this time of regulatory transitions. **Therefore, until such time that the BCUC is assured that safety oversight of Hydrogen Energy Services is adequate and that an exemption from safety regulation by the BCUC is in the public interest, the BCUC will retain its jurisdiction on this matter. Accordingly, the Panel does not propose to include sections 23, 25, and 38 of the UCA within the exemptions it will recommend be approved by the Minister. The Panel also does not propose to include sections 42 and 43 of the UCA within the recommended exemptions, to the extent orders or directions may be required from the BCUC relating to sections 23, 25, and 38 of the UCA. There is one exception to the Panel's recommendation to retain safety oversight of Hydrogen Energy Services; the Panel recommends that hydrogen delivery by truck by entities that are not otherwise public utilities be issued an exemption by the Minister to all of Part 3 of the UCA, including sections of the UCA related to safety. This is further discussed in Section 4.3 below.**

### 4.1.3 Registration and Annual Reporting Requirements

The Draft Report indicated that where exemptions have been proposed, Hydrogen Energy Service providers must register with the BCUC and must file annual reports in order to be granted and to retain the proposed exemptions. The purpose of the annual reporting is to allow the BCUC to collect information regarding the various sectors of the Hydrogen Energy Services industry, in an effort to monitor the development of markets and to gather insights into the need, if any, for future amendments to any exemptions that have been granted. The Draft Report states that annual reporting may be initially limited to reporting of information such as total energy sale volumes, end-uses, GHG intensity, safety matters and complaints. The Draft Report sought submissions from the Inquiry participants on this topic.

Some Inquiry participants did not agree with the proposed annual reporting requirements in the Draft Report. HTEC states that the reporting requirements add an additional administrative burden, and that "this information, if required, may be better collected, and managed through other existing provincial reporting programs to avoid redundant reporting."[87] Air Products similarly disagrees with the proposed annual reporting requirements. Air Products states that it is "unprecedented for any provincial regulator to request this type of information" and considers the proposed reporting requirements to be a barrier to entry to the market.[88] Regarding reporting of complaints, Air Products encourages the BCUC to primarily rely on the existing mechanisms under the UCA.[89] Air Products also states that the BCUC may obtain information on energy sale volumes from the Ministry of Energy, Mines & Low Carbon Innovation – as it collects this information through the administration of the BC Low Carbon Fuel Standard.[90] BCSEA supports the concerns expressed by Air Products regarding the potentially onerous nature of the reporting requirements.[91]

[86] BC Hydrogen Regulatory Mapping Study, p. 8.
[87] HTEC Draft Report Submission, p. 5 of 6.
[88] Air Products Draft Report Submission, para. 27.
[89] Ibid., para. 29.
[90] Ibid., para. 27.
[91] BCSEA Reply Submission, para. 3.

Other Inquiry participants supported the proposed annual reporting requirements. Powertech accepts the BCUC's proposed reporting requirements, as it understands the BCUC's desire to monitor the development of the Hydrogen Energy Services industry to ensure that appropriate regulatory mechanisms are established as the industry grows.[92] BCOAPO and FEI similarly support the proposed reporting requirements.[93]

The Panel acknowledged the concerns raised regarding the proposed annual reporting requirements, and accordingly sought additional information. By letter dated July 27, 2023, the Panel requested the Inquiry participants currently filing, or that anticipate filing, Hydrogen Energy Services related information with the BC Government, to provide additional information regarding this reporting. As noted previously in this Final Report, Air Products, HTEC, Powertech, FEI and Fortescue filed submissions regarding reporting requirements.

Fortescue states that it understands and supports the BCUC's intention to monitor the development of BC's Hydrogen Energy Services industry, and therefore accepts the proposed requirement for Hydrogen Energy Service providers to register with the BCUC prior to being granted any exemptions.[94] However, Fortescue agrees with Inquiry participants which have raised concerns regarding potentially duplicative reporting requirements from multiple regulators.[95] HTEC provides further details regarding its current level of reporting activities. HTEC states that it reports its hydrogen fuel production, dispensing volumes and end-uses to the BC Government under the Low Carbon Fuel Regulation[96] credit process; workplace safety information is reported to WorkSafe BC; and technical, environmental and safety issues are reported to the BCER beginning on September 1, 2023.[97]

Further, in response to the BCUC's request for information regarding reporting requirements, Air Products submits that the BCUC should assist the BCER in assuming its role as the single-window hydrogen regulator, such that the BCER is the only data recipient under government reporting.[98] Air Products further states that other agencies that require data can obtain it from the BCER, as needed and where appropriate, after the fact.[99] Air Products concludes that the BCUC should not establish a multiple-window permitting and reporting system – unless the BC government enacts specific legislation empowering the BCUC, as it did, for example, in the case of the *Fuel Price Transparency Act*.[100]

Following the review of these submissions, the Panel is satisfied that entities engaged in the Hydrogen Energy Services industry currently provide information regarding production volumes, GHG intensity, customer numbers and public safety to the BC Government or to other BC regulatory agencies. The Panel recommends that the BCUC coordinate information sharing efforts with other government agencies, such as the Ministry of Energy, Mines & Low Carbon Innovation, the BCER and TSBC. **The Panel finds that no further BCUC-specific annual reporting is required at this time.**

[92] Powertech Draft Report Submission, p. 4 of 4.
[93] BCOAPO Draft Report Submission, p. 2, FEI Reply Submission, p. 5.
[94] Fortescue Submission on Reporting Requirements, p. 1.
[95] Ibid.
[96] *Renewable and Low Carbon Fuel Requirements Regulation*, BC Reg 394/2008.
[97] HTEC Submission on Reporting Requirements, p. 1.
[98] Air Products, Submission on Reporting Requirements, p. 3.
[99] Ibid.
[100] Ibid.

Regarding the need for Hydrogen Energy Service providers to register with the BCUC prior to being granted any exemptions, the Panel maintains its views on this topic as expressed in the Draft Report. The Panel notes that Inquiry participants were generally supportive of this requirement. Accordingly, **the Panel recommends that the BCUC require entities providing Hydrogen Energy Services to register with the BCUC in order to be eligible for any relevant exemptions. The Panel recommends that the BCUC develop guidelines which explain how entities providing Hydrogen Energy Services will be expected to register with the BCUC, as well as provide any template forms to support this registration process. The Panel recommends that the BCUC issue this information at the same time as the future exemption orders, which would be issued in the event that the Minister provides advance approval of the proposed exemptions.**

### 4.2 Hydrogen Production

Submissions made during the Inquiry demonstrate that many parties are currently assessing opportunities for hydrogen production in BC. Some submissions indicate that the production of hydrogen in BC, and its sale to industrial or transportation customers, is 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 as a BCUC regulated activity.

In the Draft Report, the Panel proposed to recommend that the Minister issue exemptions from certain provisions of Part 3 of the UCA to parties engaged in the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating. The exemption of the production of hydrogen from active economic regulation was proposed to only be extended to entities which are not otherwise public utilities.

Comments on the Draft Report by Inquiry participants presented opposing views regarding the BCUC's regulation of hydrogen production by entities that are otherwise already regulated public utilities. Specifically, opposing views were presented as to whether the production of hydrogen by established/incumbent public utilities should be undertaken outside of the regulatory purview. The following paragraphs in this section summarize these opposing views, followed by the Panel's final findings and recommendations on the topic.

#### Established/Incumbent Public Utilities should establish non-BCUC Regulated Subsidiaries to Produce Hydrogen

BCOAPO submits that there is not a sufficient basis upon which to find that the production of hydrogen exhibits natural monopoly characteristics, and accordingly that it is not clear whether it is appropriate for a regulated utility to actively participate and compete with activities in a competitive hydrogen production marketplace.[101] For example, it does not appear that a single firm can produce hydrogen at a lower average cost or that competition within the hydrogen production market is undesirable. BCOAPO further states that it is unclear "on what basis a party could successfully argue that hydrogen production is sufficiently distinct from other similar commodities like natural gas so as to justify production, exploration, and manufacturing within the regulated utility, exposing [public utility's] captive ratepayers to the resulting cost and service risk."[102] BCOAPO submits that hydrogen production by an entity such as FEI should be undertaken "as part of an unregulated subsidiary

[101] BCOAPO Draft Report Submission, p. 3.
[102] Ibid., p. 4.

with appropriate transfer pricing and codes of conduct established between the regulated and unregulated entities."[103]

Air Products submits similar concerns to those raised by BCOAPO regarding the production of hydrogen. Air Products agrees that the exemptions proposed by the Draft Report for the production of hydrogen should only be granted to entities that are not otherwise public utilities. At the same time, however, Air Products notes its concern that incumbent utilities "competing on the strength of ratepayer cross-subsidies can easily crowd out or deter private actors from participating or even investigating the [hydrogen production] marketplace."[104] Air Products states that if a regulated public utility, such as FEI, seeks to enter the hydrogen production market "it should do so through an unregulated and unsubsidized affiliate, i.e. with appropriate walls and protections in place."[105]

## Hydrogen Production should be included as a Part of Regulated Public Utility Operations

FEI states that it is "actively exploring opportunities to become involved in the production and distribution of hydrogen" and that it "anticipates that hydrogen production will occur near load centres and will be directly integrated with FEI's existing distribution system, with FEI recovering the full cost of service of the production facility."[106] FEI states that hydrogen production should not be treated as a new service offering outside of FEI's traditional utility activity, and further notes that the "divide between 'traditional' and 'new' services and the principles used to constrain regulated public utilities from offering such new service offerings as part of their core business are outdated in the context of the current energy transition."[107]

In response to submissions made by BCOAPO and Air Products, FEI states that the hydrogen industry in BC is in a nascent stage, and that natural monopoly situations may develop regarding the production of hydrogen requiring some form of regulation.[108] FEI states that it is interested in the production and distribution of hydrogen on a scale similar to its current natural gas and propane utility business, and that its hydrogen business would have similar natural monopoly characteristics as its current services. FEI acknowledges that the BCUC has the jurisdiction to consider and address cross-subsidization to ensure fair treatment of ratepayers. However, FEI submits that the UCA does not provide the BCUC with the jurisdiction to ensure a level playing field amongst competitors.[109]

Ultimately, FEI states public utility involvement in the hydrogen production and distribution market is supported by the inclusion of the production or purchase of hydrogen as a prescribed undertaking in the *Greenhouse Gas Reduction (Clean Energy) Regulation*[110] (GGRR), subject to cost and total energy volume parameters.[111] FEI submits that the BCUC does not have the jurisdiction to require FEI to use a non-regulated entity to purchase or produce hydrogen when it is a prescribed undertaking.[112] FEI notes that pursuant to section 18 of the *Clean*

[103] BCOAPO Draft Report Submission, p. 3.
[104] Air Products Draft Report Submission, pp. 3-4.
[105] Air Products Reply Submissions, para. 15.
[106] FEI Draft Report Submission, p. 2.
[107] Ibid., p. 1.
[108] FEI Reply Submission, p. 4.
[109] Ibid.
[110] *Greenhouse Gas Reduction (Clean Energy) Regulation*, BC Reg 102/2012.
[111] FEI Reply Submission, p. 3.
[112] Ibid.

*Energy Act*[113], the BCUC may not exercise its powers either directly or indirectly to prevent a public utility from carrying out a prescribed undertaking and that the BCUC must allow public utilities to recover their costs of doing so.[114]

## Panel Recommendations regarding Hydrogen Production

The Panel notes that there is not an established hydrogen production market currently in BC, and therefore the extent of available information makes it challenging to definitively assess the competitiveness of this market. However, based on the information submitted in this Inquiry, the Panel considers there is a risk that establishing economic regulation of the hydrogen production market may impede the development of what otherwise can and should be a competitive market. The Panel agrees with BCOAPO's assessment that the hydrogen production market does not appear to exhibit natural monopoly characteristics.

The Panel maintains its view expressed in the Draft Report regarding exemptions for hydrogen production from active economic regulation. Until sufficient information is available to draw any conclusions about the degree of market monopoly, **the Panel recommends that the Minister issue advance approval of an exemption from certain provisions of the UCA[115], for the production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating.**

**The Panel further recommends to the Minister that the exemption of the production of hydrogen from active economic regulation should only be extended to entities which are not otherwise public utilities.** The Panel notes the submissions made by BCOAPO and Air Products expressing their views that should a regulated public utility choose to enter into the hydrogen production market, it should do so via an unregulated affiliate. The Panel reiterates its view that the hydrogen production market does not appear to exhibit natural monopoly characteristics and that it can develop within a competitive environment. The Panel affirms the AES Report key principles, particularly that regulation is only required where natural monopoly characteristics are present or where legislation requires regulation.

Accordingly, the Panel considered directing existing public utilities to conduct any anticipated hydrogen production business within non-BCUC regulated affiliates. However, the Panel agrees with FEI's submissions, that the production of hydrogen is a prescribed undertaking under the GGRR[116], and that the BCUC cannot prevent a public utility from carrying out a prescribed undertaking. Further, the *Clean Energy Act* states that the BCUC set rates that allow public utilities to collect sufficient revenue to enable the public utility to recover its costs incurred with respect to prescribed undertakings.[117] The Panel cautions that the purchase or production of hydrogen is only considered a prescribed undertaking if it meets certain production methodology, cost and volume criteria, as set out in the GGRR.[118] Therefore, any hydrogen production ventures undertaken by FEI or other public utilities in BC which do not meet the criteria set out in the GGRR are not prescribed undertakings. The Panel similarly considered whether to direct existing public utilities including FEI to conduct the parts of its anticipated hydrogen production business which do not fall under the definition of a prescribed undertaking

[113] *Clean Energy Act*, [SBC 2010] c 22
[114] FEI Reply Submission, p. 3
[115] *Utilities Commission Act*, [RSBC 1996] c 473, Part 3, excluding sections 23, 25, 38, 42 & 43.
[116] *Greenhouse Gas Reduction (Clean Energy) Regulation*, BC Reg 102/2012, section 6
[117] *Clean Energy Act*, [SBC 2010] c 22, section 18(2).
[118] *Greenhouse Gas Reduction (Clean Energy) Regulation*, BC Reg 102/2012, section 6

through an unregulated affiliate; however, the Panel considers that such direction is not necessary for the following reason.

Hydrogen production related expenditures which do not fall under the definition of a prescribed undertaking must be filed by existing public utilities with the BCUC for review and approval. The BCUC would have the jurisdiction to assess whether non-prescribed undertaking expenditures are in the public interest, in a similar manner to how the BCUC reviews other capital expenditures by existing public utilities. The Panel considers that maintaining BCUC oversight of such expenditures is the most effective method to reduce the risk of cross-subsidization between ratepayer classes. Accordingly, the Panel finds that the exemption from active economic regulation of the production of hydrogen should only be extended to entities which are not otherwise public utilities.

### 4.3 Hydrogen Delivery by Truck

The current primary transport method for hydrogen is by truck. Although 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"[119] is considered a public utility activity, Inquiry participants have stated that the trucking industry is considered competitive and does not require economic regulation.[120] In addition, the Inquiry participants stated that the need for separate BCUC safety oversight of hydrogen delivery by truck is not required.[121] The Panel agrees that there is no role for the BCUC in regulating any aspects of the delivery of hydrogen by truck by entities which are not otherwise public utilities. The extent to which established/incumbent public utilities will engage in the delivery of hydrogen by truck, and the methods by which these public utilities will recover associated costs, remain unknown at this time. Although not discussed specifically by Inquiry participants, it is conceivable that established/incumbent public utilities may in the future deliver hydrogen by truck to the premises of their customers, similar to how FEI includes delivery of liquefied natural gas by truck to its customers under its Rate Schedule 46.[122]

**Therefore, the Panel recommends that the Minister issue advance approval of an exemption from all of Part 3 of the UCA, for the provision of hydrogen delivery by truck. The exemption of this Hydrogen Energy Service should only be extended to entities which are not otherwise public utilities.**

### 4.4 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.

[119] *Utilities Commission Act*, [RSBC 1996] c 473, section 1.
[120] HTEC Draft Report Submission, p. 4.
[121] Air Products Draft Report Submission, para. 33.
[122] Rate Schedule 46 Application for Permanent Rates and Revised Tariff Pages effective January 1, 2021 | BCUC Order G-113-21

- 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 in the Inquiry – 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. Other submissions argue the opposite. For example, Air Products submits that it rejects any suggestion that regulated utilities are best positioned to transport hydrogen by pipeline.[123] The Panel notes that submissions in this Inquiry indicate that Hydrogen Energy Services may initially develop as part of a hydrogen hub model, thereby limiting the short or medium term need for bulk transportation of hydrogen by pipeline. In any event, it remains to be seen to what extent hydrogen delivery by pipeline will be undertaken exclusively by entities that are otherwise public utilities.

Further, section 65(2)(a)(ii) of the UCA gives the BCUC jurisdiction over a common carrier who "owns or operates a pipeline for the transportation of...any other type of energy resource prescribed by the Lieutenant Governor in Council." While "energy resource" is not defined within the UCA, recent amendments to the OGAA, now the ERAA*t,*[124] provide, at section 1, a new definition of "energy resource", which includes hydrogen. As such, the BCUC appears to have jurisdiction over common carriers owning or operating pipelines carrying hydrogen.

In the Draft Report, the Panel did not recommend any exemptions from BCUC regulation of the transmission of hydrogen by pipeline. As the timing and extent of future bulk hydrogen delivery by pipeline remain uncertain, the Draft report did recommend that the BCUC continue to monitor the development of this Hydrogen Energy Service. In response to the Draft Report, HTEC, Air Products and BCSEA supported the BCUC's continued general monitoring of the pipeline transmission of hydrogen. **The Panel maintains the view expressed in the Draft Report and accordingly recommends that the BCUC continue to monitor the development of the distribution of hydrogen by pipeline in BC. For clarity, the Panel does not recommend any exemptions from BCUC**

[123] Air Product Draft Report Submission, p. 4.
[124] *Energy Resource Activities Act*, [SBC 2008] c 36.

**regulation of the transmission of hydrogen by pipeline.** Further, the Panel reiterates that the BCUC has jurisdiction over the delivery of hydrogen by pipeline under Part 3 and section 65 of the UCA, as noted above.

### 4.5 Sale of Hydrogen as a Transportation Fuel

At this time, hydrogen as a transportation fuel is being provided at a retail level in BC and the Inquiry participants stated that this end-use is currently the most active component of the Hydrogen Energy Service industry. Inquiry 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.[125]

The Draft Report expressed the Panel's view that the current hydrogen fueling market is small and that economic regulation would not be appropriate at this time. Submissions in response to the Draft Report generally agreed with this finding. The Panel maintains its view on this issue. 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.

**Therefore, the Panel recommends that the Minister issue advance approval of an exemption from certain provisions of the UCA,[126] for the provision of hydrogen as a transportation fuel. The exemption of this Hydrogen Energy Service should only be extended to entities which are not otherwise public utilities.**

To clarify, "entities providing transportation fueling services" means entities selling hydrogen at both the retail and the wholesale level.

### 4.6 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, the Panel notes 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. The Draft Report requested submissions on this issue.

[125] Transcript Volume 1, p. 40.
[126] *Utilities Commission Act*, [RSBC 1996] c 473, Part 3, excluding sections 23, 25, 38, 42 & 43.

Air Products and FEI state that the BCUC does not have jurisdiction over hydrogen exports.[127] FEI notes that the BCUC may have jurisdiction over FEI sales of hydrogen within BC to third parties who then export the hydrogen (similar to FEI's current sales of liquefied natural gas to third party exporters under Rate Schedule 46).[128] BCSEA submits that it does not believe that production of hydrogen will develop sufficiently to support export activities. However, it states that a determination regarding the BCUC's jurisdiction should be deferred until elements of an export business model are identified.[129]

The Panel finds that the export of hydrogen by entities not otherwise public utilities falls outside of the definition of public utility and therefore outside of the BCUC's jurisdiction. However, the Panel agrees with FEI's submission that there may be circumstances where public utilities sell hydrogen for export. In such instances, the Panel expects that the BCUC will oversee the sale of hydrogen by public utilities for export through its regulation of public utility rates pursuant to sections 59 to 61 of the UCA and requests for the granting of CPCNs for any public utility system or facility expansions to accommodate such exports.

### 4.7 Other Hydrogen Related Substances

For longer distance transport to export markets, there was discussion about the potential 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, the Panel makes no recommendations regarding the BCUC's role in the regulation of other hydrogen related substances, although **we recommend that the BCUC monitor the development of these substances as they relate to the provision of Hydrogen Energy Services in BC.**

[127] Air Products Draft Report Submission, p. 8, FEI Draft Report Submission, p. 4.
[128] FEI Draft Report Submission, p. 4.
[129] BCSEA Draft Report Submission, p. 2.

## 5.0 Summary of Recommended BCUC Exemptions

**Table 3: Recommended Hydrogen Energy Services Exemptions**

| Hydrogen Energy Service | Recommended Exemption or Action |
|---|---|
| Production of hydrogen as a fuel for the production of electricity or as a fuel for transportation or heating | Exemption from Part 3 of the UCA, except sections 23, 25, 38, 42 and 43, subject to registration with the BCUC; exemptions do not apply to existing public utilities. |
| Hydrogen delivery by truck | Exemption from Part 3 of the UCA, subject to registration with the BCUC; exemptions do not apply to existing public utilities. |
| Hydrogen delivery by pipeline | Continued monitoring by the BCUC. |
| Hydrogen as a transportation fuel | Exemption from Part 3 of the UCA, except sections 23, 25, 38, 42 and 43, subject to registration with the BCUC; exemptions do not apply to existing public utilities. |
| Hydrogen Exports | No action, outside of current BCUC jurisdiction over public utility rates and CPCNs. |

**DATED** at the City of Vancouver, in the Province of British Columbia, this 23rd day of November 2023.

*Original signed by:*

A. K. Fung, KC
Panel Chair / Commissioner

*Original signed by:*

M. Kresivo, KC
Commissioner