Appendix S: Response to Comments

For Programmatic Environmental Impact Statement on Green Hydrogen Energy Facilities in Washington State

By

HDR

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Washington State Department of Ecology

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DEPARTMENT OF ECOLOGY
State of Washington

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Acronyms and Abbreviations List

BESS	battery energy storage system
CEJST	Climate and Economic Justice Screening Tool
CO_2	carbon dioxide
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EHD	environmental health disparities
EHS	environmental health and safety
GHG	greenhouse gas
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
PFAS	perfluoroalkyl and polyfluoroalkyl substances
PEIS	Programmatic Environmental Impact Statement
PNWH2	Pacific Northwest Hydrogen
RCW	Revised Code of Washington
RFFA	Reasonably Foreseeable Future Action
SEPA	State Environmental Policy Act
SWD	state waste discharge
WAC	Washington Administrative Code
WA-GREET	Washington Greenhouse gases, Regulated Emissions, and Energy use in Technologies

1 Introduction

1.1 Background

The Washington State Department of Ecology (Ecology) prepared a State Environmental Policy Act (SEPA) Programmatic Environmental Impact Statement (PEIS) to evaluate green electrolytic and renewable hydrogen production and storage facilities (referred to as "green hydrogen facilities") in Washington state. A PEIS is a type of nonproject environmental review used for planning; it is not an evaluation of a specific project. The PEIS considers potentially significant adverse environmental impacts at a broad level. It analyzes general types of facilities—but not individual projects—to identify probable significant adverse environmental impacts and possible ways to avoid, minimize, or mitigate those impacts.

The intent of the PEIS is to:

- Support the state's transition to clean energy while protecting the environment, Tribal rights and resources, and local communities.
- Identify the range of probable significant adverse environmental impacts green hydrogen facilities can pose.
- Provide information about facility siting and design that may be used to help avoid or minimize adverse environmental impacts for proposed projects.
- Identify general potential mitigation measures for impacts.
- Provide information for lead agencies to consider when conducting environmental reviews for green hydrogen facilities.

The PEIS focuses on green hydrogen energy facilities.[1] Green hydrogen includes:

- Green electrolytic hydrogen[2] is hydrogen produced through electrolysis. It does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock. In this definition, water is the feedstock, while electricity is not a feedstock but is the input energy or process energy used in electrolysis of the water. Hydrogen produced through electrolysis will meet this definition regardless of whether the electricity is produced from renewable sources, fossil-fired generation, or any combination of these resources. The Clean Energy Transformation Act[3] requires all electricity used in Washington to be greenhouse gas (GHG) neutral by 2030 and 100% clean by 2045.
- Renewable hydrogen[4] is hydrogen produced using renewable resources both as the source for the hydrogen and the source for the energy input into the production process.

[1] https://app.leg.wa.gov/RCW/default.aspx?cite=43.21C.535
[2] https://app.leg.wa.gov/RCW/default.aspx?cite=43.158.010
[3] https://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/Senate/5116-S2.SL.pdf
[4] https://app.leg.wa.gov/RCW/default.aspx?cite=43.158.010

Ecology evaluated three types of green hydrogen energy facilities and a No Action Alternative in the Draft PEIS. The facility types were:

- **Green hydrogen production facilities:** A green hydrogen production facility producing hydrogen using one of the following processes: electrolysis, steam-methane reforming, pyrolysis, or bio-gasification.
- **Green hydrogen production facilities with battery energy storage systems (BESSs):** This facility type would be a green hydrogen production facility with up to two co-located BESSs for backup power.
- **Green hydrogen storage facilities:** A green hydrogen storage facility storing hydrogen in gas or liquid form. This type of facility could be co-located at green hydrogen production facilities, at a stand-alone facility, at transport terminals, or at an end-use location such as an industrial facility or fueling facility.

The geographic scope for the green hydrogen PEIS includes areas throughout the state of Washington where green hydrogen facilities are likely to be developed based on proximity to transmission lines, proximity to freight highway routes, and industrial or industrial-use-supporting zoning.

This *Response to Comments* appendix provides a summary of the comments received during the public comment period for the Draft PEIS, along with Ecology's responses. Responses include factual corrections, clarification, and how substantive comments were addressed in the Final PEIS.

1.2 Comment process

The Draft PEIS was published on January 7, 2025, and interested parties were notified of the document's availability and opportunities to comment on the Draft PEIS. Comments were accepted during a 30-day public comment period (January 7, 2025, through February 6, 2025).

The Draft PEIS and its appendices were available for public review during the public comment period on the SEPA Register and Ecology's PEIS website,[5] with information on how to provide comments. The Draft PEIS and associated technical appendices developed specifically for this environmental review were also available at the Ecology Headquarters in Lacey, Washington, and Ecology's Central Region Office in Union Gap, Washington. CD or additional printed copies were also available upon request. TTY or relay services, as well as Americans with Disabilities Act accommodations, were also available.

Three virtual public hearings were held during the Draft PEIS comment period. Comments were accepted through various methods, including electronic submittals using a comment form on

[5] https://ecology.wa.gov/regulations-permits/sepa/clean-energy/programmatic-eis

the PEIS website, oral and written comments provided at the public hearings, and comments submitted by mail.

Ecology conducted a variety of public notice and outreach activities to notify Tribes, agencies, members of the public, and interested parties of the public comment period and to announce upcoming public hearing dates. Ecology offered Spanish language translation services at the public meetings and additional language translations if requested. The following outreach and notification methods were used to communicate information about the public comment period:

- Washington State SEPA Register (25-06-004 for the Draft Green Hydrogen Energy Facilities PEIS) legal notices for the release of the Draft PEIS, comment period, and public hearings were published on January 7 and 8, 2025.
- Legal notices were published at the start of the public comment period in the following 10 newspapers:
    - *The Columbia Basin Herald*
    - *The Kitsap Sun*
    - *The Seattle Times*
    - *Spokane Spokesman-Review*
    - *The Tri-City Herald*
    - *The Yakima Herald*
    - *Daily Journal of Commerce*
    - *The Bellingham Herald*
    - *The Columbian*
    - *Tú Decides* (in Spanish)
- Public and media notifications were provided, as follows:
    - Information was sent to Ecology's clean energy email distribution list and SEPA email distribution list on January 7, 2025.
    - Information was shared on Ecology's blog[6] on January 8, 2025.
    - Messages were posted to Ecology's main Twitter (X) account (@ecologyWA) and Ecology's Facebook account ("Washington Department of Ecology") on January 21, 2025.
    - Information was published on Ecology's Public Input and Events website.
    - Updates were made to Ecology's PEIS website.
    - Information was shared in Spanish-language radio ads between four different radio groups: Bustos Media Group (Seattle and Tri-Cities), Cascade Radio Group (Bellingham) and Gorge Country Media (South Washington).
- Tribal notifications were provided as follows:
    - Email sent to federally recognized Tribes, including Tribal leaders, Cultural and Natural Resource Directors, and Tribal associations on January 7, 2025.
    - Two virtual Tribal Forums, each with a formal hearing, were held on February 20, 2025, at 2:00 p.m., and February 25, 2025, at 1:00 p.m.

[6] https://ecology.wa.gov/blog/january-2025/new-study-examines-green-hydrogen-fuel-production-in-washington

- Agency notifications were provided as follows:
    - State agencies were notified by email, listserv, and SEPA Register notices.
- Public hearings provided a forum for Ecology to present an overview of the PEIS and to receive comments on the Draft PEIS. Attendees were able to provide written or oral comments and were also provided with instructions on how to submit written or electronic comments. Public hearings were held as follows:
    - Virtually on January 23, 2025, at 9:00 a.m.
    - Virtually on January 28, 2025, at 12:30 p.m.
    - Virtually on January 30, 2025, at 5:30 p.m.

1.3 Comment analysis process

A comment analysis process was developed to organize and track the comments received during the Draft PEIS comment period. First, a coding structure was developed to identify each commenter and each of their concerns or questions. Each comment was entered in a database along with these codes, referred to as comment codes. At the conclusion of the comment period, electronic copies of the comments and the comment log were provided to Ecology technical experts to respond.

1.4 Report overview

All comments submitted during the public comment period were reviewed and considered in the development of this report and the Final PEIS. Where relevant and appropriate, revisions identified in the comments, as well as other substantive changes to the Draft PEIS, have been incorporated into the Final PEIS. This report includes reponses to all substantive comments on the Draft PEIS.

Chapter 2 of this report provides summary information about the commenters and comments received on the Draft PEIS.

Chapter 3 includes responses to comments. Sections 3.1 through 3.9 provide a summary of comment codes organized by topic area. A complete record of all comments and responses is provided in Table 2 of this report.

Attachment 1 includes a complete record of all comments, with numbering that corresponds to the comment codes shown in the comment record. An index of the comment record is also presented in Attachment 1.

2 Comment Analysis

2.1 Draft PEIS commenters

During the comment period for the Draft PEIS, 14 communications (letters, emails, and online forms) were received from 14 commenters consisting of local agencies, Tribes, organizations, businesses, and individuals. Within the communications received, there were approximately 71 comments.

Table 1 summarizes the communications received. Ecology appreciates the time and attention that commenters committed to reviewing the Draft PEIS.

Table 1. Summary of communications

Commenters	Communications received
Tribes	3
Agencies	1
Organizations	3
Businesses	3
Individuals	4

3 Comment Responses

All comments submitted during the public comment period were reviewed and considered in the development of the Final PEIS. Substantive comments are those that question a point of fact or analysis in the PEIS (such as the accuracy of information or the adequacy of analysis), suggest alternatives other than those evaluated in the PEIS, or request or provide additional information or studies. Where relevant and appropriate, revisions identified in the comments, as well as other substantive changes to the Draft PEIS, have been incorporated into the Final PEIS.

Sections 3.1 through 3.9 of this report provide a summary of comment codes organized by topic area. A complete record of all comments and responses is provided in Table 2 of this report. Attachment 1 of this report provides a coded commenter index with numbering that corresponds to the specific commenters, as well as the date each communication was received and the means by which it was submitted.

3.1 Environmental process, procedures, and agency coordination

The Washington State Legislature directed Ecology to prepare nonproject environmental reviews of utility-scale onshore wind energy facilities, utility-scale solar energy facilities, and green electrolytic and renewable hydrogen facilities in Washington by June 30, 2025. The reviews are being prepared pursuant to SEPA. The Draft PEIS was prepared under Revised Code of Washington (RCW) 43.21C.030(2)(c)[7] per Chapter 197-11 Washington Administrative Code[8] (WAC) procedures. See PEIS Section 1.5 for more information on the SEPA process.

Comments on the environmental process, procedures, and agency coordination include (listed by comment code):

- 1-D
- 4-C and 4-D
- 7-A
- 9-H and 9-F
- 10-J
- 11-C and 11-H

3.2 Scope of analysis

The scope of study for green hydrogen facilities was defined by considering areas where facilities could be built (geographic bounds) and the time period in which facilities may be

[7] https://app.leg.wa.gov/rcw/default.aspx?cite=43.21C.030
[8] https://app.leg.wa.gov/WAC/default.aspx?cite=197-11

constructed and operational (time scale or temporal bounds). The decision regarding where to site a green hydrogen facility would be determined by developers based on their needs. As allowed by law and landowners, facilities could be sited throughout Washington. Green hydrogen facilities could be built on private, city, county, state, or federal lands with agreement from the landowner or manager. In all cases, developers would need to work directly with the landowner(s) or land manager(s) for individual facilities.

The PEIS does not approve, authorize, limit, or exclude future facilities. A green hydrogen facility is expected to have an operational life of 20 to 50 years, at which time it is expected to be decommissioned. Therefore, an approximate 75-year time period is used for resource analyses. Additional details on the scope of analysis can be found in Section 3 of the PEIS.

Comments (by comment code) on scope of analysis include:

- 1-A
- 2-A
- 5-A, 5-B, 5-D, 5-E, 5-F, 5-G, and 5-H
- 7-G, 7-H, 7-J, 7-K, and 7-N
- 8-A
- 9-A, 9-B, 9-E, 9-G, and 9-I
- 10-B and 10-D
- 11-E, 11-F, and 11-G
- 12-B
- 14-D, 14-E, and 14-F

3.3 Tribal rights, interests, and resources

The *Tribal Rights, Interests, and Resources Technical Appendix* and Section 4.1 of the PEIS include the full analysis and technical details used to evaluate Tribal resources. Tribes are recognized as unique sovereign people who exercise self-government rights that are guaranteed under treaties and federal laws. Tribal rights, interests, and resources refer to the collective rights and access to traditional areas and times for gathering resources associated with an Indian Tribe's sovereignty since time immemorial. They include inherent rights or formal treaty rights associated with usual and accustomed territories. Tribal resources include Tribal cultural lands, archaeological sites, sacred sites, fisheries, and other rights and interests in Tribal lands and lands within which a Tribe or Tribes possess rights reserved or protected by federal treaty, statute, or executive order. Resources include plants, wildlife, and fish used for commercial, subsistence, and ceremonial purposes.

The analysis of impacts to Tribal rights, interests, and resources is different than the impact analysis for environmental resources. Natural and built resources were analyzed in the appendices to determine whether green hydrogen facilities would have significant impacts from a non-Tribal perspective and whether those impacts could be mitigated. For impacts to Tribal rights, interests, and resources, any determinations of significance or non-significance

would be done with engagement and in consultation with each potentially affected Tribe at the project level. This would be done through the SEPA process or the federal National Historic Preservation Act (NHPA) Section 106 process.

Comments (by comment code) on Tribal rights, interests, and resources include:

- 4-A
- 1-C
- 10-C
- 14-B and 14-C

3.4 Environmental justice

RCW 70A.02.010(8)[9] defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, rules, and policies." The *Environmental Justice Technical Appendix* and Section 4.1 of the PEIS include the full analysis and technical details used to evaluate whether potential impacts in the PEIS disproportionately affect people of color populations and low-income populations. The report also identifies where overburdened community areas are located in the study area. The environmental justice appendix uses information from other resource sections in the PEIS to inform impact analysis.

Comments (by comment code) on environmental justice include:

- 1-B
- 7-F
- 11-D
- 12-A

3.5 Air quality and greenhouse gases

Air quality refers to the condition of the breathable air and the presence of pollutants or particles. The *Air Quality and Greenhouse Gases Technical Appendix* and Section 4.4 of the PEIS include analysis and technical details used to evaluate air quality and GHGs.

Comments (by comment code) on air quality and greenhouse gases include:

- 7-B, 7-E, 7-L
- 8-B
- 10-E, 10-F, and 10-G
- 11-A

[9] https://app.leg.wa.gov/RCW/default.aspx?cite=70A.02.010

3.6 Water resources

The *Water Resources Technical Appendix* and Section 4.5 of the PEIS evaluate surface water, groundwater, wetlands, and floodplains as well as the following features related to water resources: water quality, water quantity, and water availability and water rights. The PEIS includes analysis and technical details used to evaluate water resources.

Comments (by comment code) on water resources include:

- 3-A
- 6-A and 6-B
- 7-D, 7-I
- 14-D

3.7 Energy and natural resources

The *Energy and Natural Resources Technical Appendix* and Section 4.7 of the PEIS describe sources and availability of energy and natural resources and the amount that would be required by the facilities considered.

Comments on energy and natural resources include:

- 5-C

3.8 Environmental health and safety

Environmental health and safety (EHS) refers to the risks or hazards that threaten the well-being of people or other elements of the environment. The *Environmental Health and Safety Technical Appendix* and Section 4.8 of the PEIS include analysis and technical details used to evaluate EHS.

Comments (by comment code) on EHS include:

- 9-D
- 10-A
- 12-B

3.9 Public services and utilities

Public services and utilities include basic services and facilities that support development and protect public health and safety. The public services evaluated include emergency response services, health care facilities, and public school enrollment. The utilities evaluated include solid

waste disposal, wastewater and stormwater, water supply, electricity and communications, and natural gas.

The *Public Services and Utilities Technical Appendix* and Section 4.15 of the PEIS include the full analysis and technical details used to evaluate public services and utilities in the PEIS.

Comments (by comment code) on public services and utilities include:

- 10-I
- 11-B

3.10 Cumulative impacts

The *Cumulative Impacts Technical Appendix* and Section 5 of the PEIS describe cumulative impacts from green hydrogen facilities and other developments in the study area over a 75-year timeframe. Cumulative impacts are effects that would result from the impacts of green hydrogen facilities added to the impacts from other past, present, and Reasonably Foreseeable Future Actions (RFFAs). Cumulative impacts can result from incremental, but collectively significant, actions that occur over time. The cumulative impacts analysis was prepared in accordance with SEPA (WAC 197-11-060[10]) and RCW 43.21C.535.[11] The purpose is to make sure that decision-makers consider the full range of consequences under anticipated future conditions. Future project-specific environmental reviews would need to consider the cumulative impacts of the project with other local and regional actions.

Comments (by comment code) on cumulative impacts include:

- 7-M

3.11 Updates and corrections

Comments concerning corrections to errors or updates to materials referenced in the Draft PEIS include the following comment codes:

- 9-C
- 13-A

[10] https://app.leg.wa.gov/Wac/default.aspx?cite=197-11-060
[11] https://app.leg.wa.gov/RCW/default.aspx?cite=43.21C.535

3.12 Comments and responses

Substantive comments and responses to the comments are provided in Table 2. Attachment 2 includes a complete record of all comments, with numbering that corresponds to the comment codes shown in the table.

Table 2. Comments and responses

Communication code	Organization/Commenter	Comment	Draft response
1-A	City of Hoquiam, WA	I think that a lot of things are pointed out in there, like this, substantial unavoidable impacts that I don't know that are backed in science. So you know, to be effective comments like we just talked about a second ago from the staff of ecology, I think if we're going to ever call out unavoidable impacts, they need to be backed in science as proof, and if there are unavoidable impacts, the PEIS should address how those unavoidable impacts can be addressed so that these projects could ultimately be built.	The PEIS identifies probable significant adverse environmental impacts and relevant mitigation at a broad level. The analysis of each resource was based on the best available science and information. Technical Appendices B through P describe the methodologies and data used for the analyses and identify measures to avoid, reduce and mitigate impacts. In some cases, mitigating to a level below significance may not be feasible and in these cases, the potential impacts are identified as significant and unavoidable adverse impacts.
1-B	City of Hoquiam, WA	I find flaws in the environmental justice section. It fails to look at the benefits of low-income communities. I live in one of the most severely distressed communities, and work for one, and we would love to see clean energy facilities built in our community. So I feel like the environmental justice should also look at the benefits of these being built in communities like ours.	RCW 43.21C does not require consideration of benefits. Additional studies, such as economic analysis, may be conducted and considered by the SEPA lead agency. Appendix C, *Environmental Justice,* evaluates whether potential impacts disproportionately affect people of color populations and low-income populations. Disproportionate impacts would need to be further analyzed and mitigated appropriately at the project level.
1-C	City of Hoquiam, WA	Tribal consultations, I think that that should be done now to look at tribal treaty impacts for facilities that could be built near certain tribes, to streamline the projects possibly getting permitted if they are proposed in those areas.	The PEIS does not evaluate individual projects. As described in PEIS Section 4.1 and Appendix B, *Tribal Rights, Interests, and Resources*, any determinations of significance or non-significance would be done through engagement and consultation with potentially affected Tribes at the project level. This would be done through the SEPA process or the federal NHPA Section 106 process.
1-D	City of Hoquiam, WA	And, you know, I just think that there's, there's a lot more that can be done with the PEIS to try to make a future project go quicker. I mean if we're not going to look at transportation impacts now, we'd only do that on a case by case basis, well then let's run some scenarios, because we've all seen the challenges that go around with life cycle greenhouse gas emissions by transportation impacts and any of that that can be done now should be done. I mean if the goal is to build these facilities in our state to move towards clean energy, then the PEIS needs to be as thorough as possible so that it is a reliable tool for some project specific application later.	The PEIS provides a framework for assessing a range of potential impacts and evaluating proposals at the project level. Project-level reviews can tier to the PEIS, resulting in a more efficient project-level review. The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. The transportation of green hydrogen to end users can vary greatly for projects and would need to be evaluated at the project level. General information on transportation systems is provided in PEIS Section 2.2.6 for context.
2-A	Atul Deshmane	I am concerned that the emphasis on maritime transportation and the challenges it might pose for a green hydrogen project. I am in Whatcom County and believe that substantial new maritime shipping associated with green hydrogen will not be well received by environmental and tribal organizations. To some extent a lack of preliminary work and engagement is what led to the termination of the Green Apple Renewable Diesel Project. I am hoping that if you bolster the maritime transportation impacts section 4.14 it might help a project proponent better assess the compatibility of their project.	The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. General information on transportation systems is provided in PEIS Section 2.2.6 for context. General information on the maritime freight systems and infrastructure associated with facility shipments for the production and storage of green hydrogen is discussed in PEIS Section 4.14 and Appendix O, *Transportation*. Specific impacts for the transportation of green hydrogen to end users would need to be evaluated at the project-level.
3-A	Anonymous	The world has far less water than necessary to sustain life on the planet. We should not be investing in anything that utilizes, pollutes, desalinates, or has potential to negatively affect water sources. We should be investing in solar, wind, & possibly water wheels, not trying to create a dangerous gas by separating water molecules that could be used as drinking water.	Appendix F, *Water Resources,* describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including surface and groundwater quantity. A green hydrogen facility developer would need to ensure that there is sufficient water available for a project, both physically and legally. The amount of water available will vary based on a project and its location and the PEIS does not evaluate specific sites. If the water needed for a project to be built and operated is not available, the project would not be feasible. Potential cumulative impacts on water resources are also discussed in Appendix Q, *Cumulative Impacts*.

Communication code	Organization/Commenter	Comment	Draft response
4-A	Confederated Tribes of the Colville Reservation	Firstly, the statement "This will depend on the project and the federally recognized Tribes potentially affected" should be reconsidered. It is crucial to acknowledge that there are state recognized tribes that may not be federally recognized, and their potential impact should not be overlooked.	SEPA regulations were used to develop the PEIS and Chapter 197-11 WAC states “Affected tribe or "treaty tribe" means any Indian tribe, band, nation or community in the state of Washington, that is federally recognized by the United States Secretary of the Interior and that will or may be affected by the proposal.”
4-B	Confederated Tribes of the Colville Reservation	Section 4.1.3.2 "Actions to avoid and reduce impacts" is adequate and slightly above the norm in terms of protecting resources. However, I noticed similar language throughout the document for all tribal resources. In particular, I would like to highlight the cultural resources Key Finding in 4.13: "The significance of impacts to Tribal cultural resources can be understood only from within the cultural context of an affected Tribe. Accordingly, impact assessment and determinations of significance or non-significance would be done with engagement and in consultation with potentially affected Tribes and DAHP at the project level." Although no specific cultural resource, project, or undertaking type is identified, Section 4.13.3.2 "Actions to avoid and reduce impacts" covers a comprehensive range of measures: • Design and site projects to avoid impacts on cultural and historic resources. Begin with the use of the DAHP predictive model, then refine through the development of site specific environmental and cultural context and Tribal coordination. • Contact potentially affected Tribes early in the siting process, ideally before land is acquired for a project or before permit applications are developed. • Consider potential impacts on Tribal treaty-reserved rights, Tribal reservations, off reservation rights, trust lands, other Tribal-owned land, and other areas of significance to Tribes. • Conduct a site-specific cultural survey to evaluate potential impacts. Offer DAHP and cultural experts from potentially affected Tribes the option to help develop the survey strategy. • Consider requiring a Tribal monitor for survey crews. • Provide cultural resources survey results to potentially affected Tribes for early review. • Use previously disturbed lands and lands determined by archaeological inventories to be devoid of historic properties to the maximum extent possible. • Where homesteading was a prevalent historic activity, contact the local assessor's office and historical museums to determine if the area includes known homestead sites. Conduct a cultural resources survey of the entire project site. • Use training/educational programs for workers to reduce disturbances, vandalism, and harm to cultural resources. Incorporate adaptive management protocols for addressing changes over the life of the project. • Address impacts to historic and cultural resources that follow the best available guidance and strategies developed by the federal, Tribal, and state governments, including, but not limited to, compensatory mitigation, formalized ongoing consultation between Washington state and Tribes to address new concerns and monitor long-term mitigation, and the development and maintenance of new technologies and geospatial analysis that help identify and avoid historic and cultural resources. However, the document does not include appendices, such as Appendix N: Historic and Cultural Resources Technical Appendix. The presence of a link to another link makes accessing them complicated.	The PEIS was revised to provide more clarity on measures to avoid, reduce, and mitigate impacts. More detailed information is provided in Appendix B, *Tribal Rights, Interests, and Resources* and Appendix N, *Historic and Cultural Resources*. In addition, Appendix A, *Measures to Avoid, Reduce, and Mitigate Impacts,* was added to the Final PEIS to provide a comprehensive list of the measures to avoid and reduce impacts.
4-C	Confederated Tribes of the Colville Reservation	Additionally, the list of preparers is not specific, with several state agencies and three contractors mentioned.	The Fact Sheet lists authors and principal contributors. Chapter 8 lists of preparers and contributors along with the specific subject area(s) of their contribution.

Communication code	Organization/Commenter	Comment	Draft response
4-D	Confederated Tribes of the Colville Reservation	Lastly, it is important to note that, as with all environmental impact analyses and statements, they are not legally binding, which means that a standard project-by-project review is still necessary.	The PEIS does not evaluate individual projects and states that projects will need their own environmental review. As described in PEIS Section 4.1 and Appendix B, *Tribal Rights, Interests, and Resources*, any determinations of significance or non-significance of impacts would be done through engagement and consultation with potentially affected Tribes at the project level. This would be done through the SEPA process or the federal NHPA Section 106 process.
5-A	NovoHydrogen, Inc	1. Separately assess green electrolytic hydrogen and renewable hydrogen projects in the PEIS According to section 1.3 of the draft PEIS, the study assesses several types of "green hydrogen" production facilities such as those that use electrolysis, steam methane reforming, pyrolysis, and bio-gasification. However, different methods of hydrogen production are not assessed individually but rather grouped together throughout the study. By grouping these types of projects together, green electrolytic hydrogen producers are unfairly burdened by negative environmental impacts associated with other methods of production. This is inconsistent with the Washington state tax code as well. According to RCW 36.57.140, green electrolytic hydrogen is defined as "hydrogen produced through electrolysis, and does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock." While this definition is mentioned in section 2.1, the study does not separately analyze electrolytic production pathways from those that produce "renewable hydrogen" which covers a broader range of projects including those that use steam methane reforming, pyrolysis, and bio-gasification. Moreover, the U.S Department of Treasury recently released final regulations for the Section 45V Clean Hydrogen Production Tax Credit ("45V"), which incentivizes the use of hydrogen production pathways that demonstrate a well-to-gate carbon intensity of less than 0.45 kg CO2/kg H2. Since electrolysis powered by renewable energy sources is the only feasible way to achieve this emissions threshold, electrolytic hydrogen pathways will increasingly be the preferred method of production. It is therefore imperative that Ecology distinguish the different environmental impacts associated with green electrolytic hydrogen and renewable hydrogen production in all parts of the PEIS.	The types of facilities that were considered in the PEIS are grouped into alternatives for the purpose of considering ranges of potential impacts in the analysis. See Table 2-2 in the PEIS for the green hydrogen production pathways analyzed. The PEIS and technical appendices identify within the analysis where there are differences in impacts for the production methods analyzed. Appendix E, *Air Quality and Greenhouse Gases*, Section 3.4.2.3, provides analysis of greenhouse gas life-cycle emissions for the four production pathways evaluated in the PEIS, including electrolysis, pyrolysis, steam-methane reforming, and bio-gasification.
5-B	NovoHydrogen, Inc	2. Include sourcing power for hydrogen production in the scope of the PEIS Section 2.3 of the draft PEIS makes clear that end uses and power sources are not factored into the scope of the analysis as these factors can be project-dependent. While that can be true, we urge Ecology to consider evaluating the most common project constructs that are likely to be deployed in Washington State.	As described in PEIS Section 1.3 and 1.4, Ecology considered the potential for impacts from these types of facilities, as well as comments received during scoping, to determine the scope of the PEIS. The PEIS does not evaluate the source used to create green hydrogen or the end uses. The source of electricity would vary depending on the project. End uses of green hydrogen vary widely, such as refineries, industrial chemical processes, transportation, and powering the electrical grid or buildings. The sources and end uses would be evaluated during project-level reviews.

Communication code	Organization/Commenter	Comment	Draft response
5-C	NovoHydrogen, Inc	Given the versatility of hydrogen as an energy carrier, we understand and agree with Ecology's conclusion to not analyze end uses in the study. However, the power supply for electrolysis can be more predictable. According to the final regulations for 45V, Washington State received an exemption from a provision known as "incrementality", a requirement for hydrogen producers to source power from newly built or incremental renewable energy resources. Having an exception to this requirement means that green electrolytic hydrogen production in Washington is likely be powered by local electric utilities through a grid connection. If the intent of the PEIS is to "capture the types of facilities and technologies most likely to be proposed based on current and best available information", then Ecology should include the most common forms of sourcing power which, in this case, should include projects that connect to local electric utilities for power supply.	Please see Appendix H, *Energy and Natural Resources*, including Section 3.4.2.1, which discusses operational impacts on electricity. All types of green hydrogen facilities would be expected to use electricity during operations to power stationary equipment for production and storage. Based on the state regulatory definitions, green hydrogen production facilities could use electricity generated by different types of energy sources. Electricity from fossil-fired generation sources would decrease over time to meet the state's greenhouse gas limits. The PEIS does not evaluate the specific source or sources of electricity used by green hydrogen facilities. A green hydrogen facility developer would need to ensure that there is sufficient electricity for a project available by establishing an agreement with a utility for access to the electrical grid or with a producer of electricity. The source and amount of electricity available would vary based on the project location.
5-D	NovoHydrogen, Inc	3. Increase the acreage assumptions for green hydrogen projects In section 2.3, the PEIS assumes a range of 1–10 acres for land use requirements of all hydrogen production facilities based on the size of similar industrial facilities. We urge Ecology to expand this size range to account for the growth of the hydrogen industry and construction of larger facilities beyond what is currently deployed. Most of the green hydrogen production facilities currently deployed or announced are smaller scale projects or potentially even pilot projects. According to the U.S National Clean Hydrogen Strategy and Roadmap, the U.S expects to produce 10 million metric tons ("MMT") of clean hydrogen annually by 2030, 20 MMT annually by 2040, and 50 MMT annually by 2050. As the green hydrogen industry grows, projects will likely increase in size to accommodate growing demand for low carbon feedstocks and fuels. NovoHydrogen is currently developing a project in Texas that can produce up to 175 metric tons per day, which may require up to 100 acres for the hydrogen facility alone, in addition to tens of thousands of acres for large-scale wind and solar power generation infrastructure. In contrast, our project in eastern Oregon is expected to produce 550 kg per day of green electrolytic hydrogen, (orders of magnitude smaller than the Texas project), and we are leasing about 10 acres which would align with the maximum bound used in the study. Therefore, a range of up to 100 acres is more suitable for the scale of projects that are currently being planned.	The facilities evaluated in this PEIS are intended to represent the types of facilities and technologies most likely to be proposed in Washington state based on current and best available information. The range of 1–10 acres is representative of the technology and facilities for the hydrogen output range considered in the PEIS. The PEIS uses a range from 1 acre to 10 acres, based on the size of similar industrial facilities and the proposed size of green hydrogen production and storage facilities in Washington. The range is based on publicly available information about typical hydrogen production components. The dimensions of these were used to estimate the footprints that would be the space required for the equipment. Additional space may be needed for setbacks based on surrounding buildings, property limits, or boundaries. The PEIS does not evaluate larger facilities with associated energy sources or end uses on the site. Additional environmental review would be required for those facilities.
5-E	NovoHydrogen, Inc	4. Reduce the construction timeline assumption for green hydrogen projects In section 2.4 the PEIS assumes that the timeline for construction would be 1–3 years dependent on the size of the facility. This assumption is inconsistent with Novo's understanding of "construction" which we define to include site preparation, equipment delivery, facility construction, and commissioning. Using this definition, Novo expects to complete construction in 6–12 months for smaller, onsite projects (which would be the case for a 1–10-acre site that is modeled in the PEIS) that don't require the development a renewable energy generation facility. Another way we think about the construction timeline is dependent on the energy source providing power for our production facility. As demonstrated in the graphic below, "construction" can take anywhere from 6–24 months dependent on the project including incremental solar/wind resources or an onsite project that connects to a local electricity grid. We urge Ecology to reduce the construction timeline and clarify the definition to include specific project development milestones.	The construction timeline would vary based on existing site conditions and the amount of work needed for each phase. Section 2.4 of the PEIS was revised and acknowledges that the construction period could be less than 1 year.

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5-F	NovoHydrogen, Inc	5. Expand the staff assumptions for green hydrogen projects In section 2.4, the PEIS assumes that 1–3 full-time employees would be sufficient to operate a hydrogen production facility on 10 acres of land whereas smaller facilities (e.g a project on a 1-acresite) would have limited staffing hours with remote operations. These assumptions are generally in line with the full-time operations jobs Novo expects to create for our smaller projects. However, we urge Ecology to expand the staff assumptions to account for both medium-to-large sized projects that create more operational jobs and the number of jobs created during construction. For Novo's 550 kg per day project in eastern Oregon, we expect to create 20–30 construction jobs and 1–10 long-term operational jobs. The 175 metric ton per day project in Texas is expected to create 400–600 construction jobs and 10–20 well-paying, full-time jobs. This also includes jobs created through apprenticeship programs, a requirement to maximize the credit value for 45V.	The number of employees is representative of the scope of the PEIS for production and storage facilities and does not include employees for construction or operation of the energy sources and end uses.
5-G	NovoHydrogen, Inc	6. Use a wider range for electricity and water consumption assumptions for green hydrogen projects In section 2.5, the PEIS assumes that 2–3 gallons (7.6–11.4 liters) of water is typically required to produce 1 kg of hydrogen using electrolysis and around 1 gallon would be discharged as wastewater. These assumptions are far too conservative and do not distinguish between "reacted" or "consumed" water versus water that is needed for the electrolysis process. Most PEM electrolyzer technologies utilize more than this amount as an input to produce 1 kg H2, but only a portion is reacted electrochemically. The balance is processed water and comes out as effluent, or more concentrated mineralized water which could potentially be re-used, as an example, for agricultural use. It should not be categorized as wastewater in the PEIS. Typically, between 20–30 liters of water is needed to produce 1 kg H2, but only 1/3rd on average gets reacted or consumed. The remaining 2/3rds is left as a byproduct that can be used for other purposes with no or minimal treatment.	Appendix F, *Water Resources,* describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including water consumption, water byproducts, and wastewater. It also includes water conservation measures in Section 3.4.3, "Measures to avoid, reduce, and mitigate impacts." Estimated ranges of water requirements and wastewater generation for green hydrogen production provided are consistent with the output range in the PEIS; see Table 5 and 6 of Appendix F, *Water Resources*. The estimated ranges provided in the PEIS are based on published specifications (data sheets) for commercial electrolysis units on the market today, which advertise that they require between 2.6 and 2.9 gallons (10 and 11 liters) of deionized water per kilogram of hydrogen produced. Commercial electrolyzer units with data sheets that publish water consumption estimates include the Siemens Silzer 300 (2.6 gallons or 10 liters), Hydrogenics Hylzer (2.9 gallons or 11.1 liters), Plug EX-4250D (2.7 gallons or 10.23 liters), Plug Allagash (2.9 gallons or 11 liters), and Plug Merrimack Stack (2.9 gallons or 11 liters). Text clarifying the estimated ranges for water have been added to Section 2.5 of the Final PEIS and Section 3.4.2 of Appendix F, *Water Resources*. Site-specific calculations for water consumption requirements would be done during project level environmental review when estimates would be refined based on technology selected for the project, or combination of technologies and their requirements for operation, for the project proposed. The definition of wastewater used in the PEIS is consistent with wastewater definitions in WAC 173-240-020. Reuse application would depend on the National Pollutant Discharge Elimination System (NPDES) and state waste discharge (SWD) permit requirements and can be identified during project-level environmental review. Wastewater estimates in Appendix F, Table 6, are approximately 1/3 of the estimated water requirements in Table 5.
5-H	NovoHydrogen, Inc	Section 2.5 also makes assumptions about the electricity requirements for electrolysis which are shown to be about 50 kilowatt-hours (kWh) of energy to produce 1 kg H2. We suggest using a wider range of electricity requirements to account for different electrolyzer technologies and future improvements to efficiency. An acceptable range for the PEIS should be between 50–60 kWh/kg H2.	The electricity requirement assumptions are representative of the technology and facilities for the output considered in the PEIS. The information in the PEIS can be tiered for future evaluations of a specific project and as a guide for facilities outside the size range considered in the PEIS.
6-A	Lora Petso	Please revise to include an analysis of the impact on the Washington Water equation (water for people + water for fish + water for ag + water for data/AI + water for hydrogen(?) + water for a million new homes LESS water lost to aquifer	Appendix F, *Water Resources*, describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated. Appendix Q, *Cumulative Impacts*, describes water resources and potential impacts when combined with other similar actions in the same timeframe. When siting a green hydrogen production facility, both physical water availability

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		depletion, PFAS [perfluoroalkyl and polyfluoroalkyl substances] contamination, and climate).	and legal water availability would need to be considered in relation to potential water quantity needed. A green hydrogen facility developer would also need to ensure that there is sufficient water available for a project, both physically and legally. If water is needed for a project and is not available, a project would not be feasible.
6-B	Lora Petso	Please also revise to include an analysis of PFAS impacts. (H2 is PFAS dependant every step from inputs to manufacture, to distribution, to fueling, to use, to end of life). PFAS will certainly be in the wastewater streams (what types and concentrations?), but will it also be discharged via steam or air? Finally, please revise to specify the "treatment" that will be provided for the various wastewater streams, and whether or not the "treatment" will remove metals, PFAS, and other contaminants. The heavy reliance in the report on municipal sewer treatment plant disposal of the contaminated water is a significant error since those plants are not designed to treat all contaminants. In addition, many municipal treatment plants have current capacity issues.	Appendix F, *Water Resources,* describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including water quality and water discharges. PFAS are included in the analysis under “toxics from industrial activities” in common water quality issues that affect some waters within Washington (Section 3.2.1.2). The potential for impacts to water quality of surface waters and groundwater was considered in the analysis, and potential impacts were identified. Water quality permitting was identified to prevent contamination of municipal and industrial wastewaters and protect water quality. During construction, a Construction Stormwater General Permit to control and reduce water pollution would be required. During operation, green hydrogen facilities may be required to comply with NPDES and SWD standards and requirements. Wastewater would be treated on site to NPDES and SWD requirements or routed to a wastewater treatment plant. If an NPDES or SWD permit is not required, developers would still be required to manage projects to prevent pollutants from reaching groundwater. Ecology issues permits for major municipal wastewater treatment plants and industries that use or produce PFAS, which include PFAS monitoring requirements. Municipalities that have authorized industrial pretreatment programs must investigate and control industrial sources discharging into their sewer systems. Source investigation and control has proven successful in greatly reducing the amount of PFAS coming into wastewater treatment facilities in other states. The PEIS addresses the available routes of wastewater treatment, including treatment on site and at wastewater treatment facilities. Appendix P, *Public Services and Utilities,* describes wastewater and stormwater utilities and assesses potential impacts. Coordination with local treatment facilities would be necessary for off-site disposal and discharges to wastewater treatment facilities. Potential cumulative impacts on wastewater treatment facilities were added to the Final PEIS in Appendix Q, *Cumulative Impacts*.

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7-A	Front and Centered	I. Washington's green hydrogen definition is not aligned with global and national industry-wide usage. Washington state's definition of green electrolytic hydrogen is inconsistent with both national and global definitions of green hydrogen developed within similar timeframes, which refer to hydrogen produced through electrolysis with entirely or "near 100%" renewable energy. Washington's definition for "green electrolytic hydrogen" includes hydrogen produced through electrolysis and does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock. Despite the Draft PEIS stating that current laws will require an electricity supply free of GHG emissions by 2045, this discrepancy in definitions is misleading. This is especially so given that many of the most prominent impacts and harms resulting from green hydrogen production are derived from the type of electricity source used and recent uncertainty about the future of the Clean Energy Transformation Act potentially altering state decarbonization requirements. While the term "renewable hydrogen" is more aligned with standard definitions of green hydrogen by explicitly requiring electricity inputs be renewable, failing to use industry standards for commonplace terms like "green hydrogen" increases the potential for harms stemming from the use of fossil fuels in production to be improperly assessed and mitigated in Washington.	The PEIS evaluates potential impacts and mitigation for green hydrogen energy facilities, as directed by the Legislature using the definitions in RCW 43.158.010 and RCW 80.50.020. Section 2.1 of the PEIS includes the definitions. **Green electrolytic hydrogen** is hydrogen produced through electrolysis. It does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock. In this definition, water is the feedstock, while electricity is not a feedstock but is the input energy or process energy used in electrolysis of the water. Hydrogen produced through electrolysis will meet this definition regardless of whether the electricity is produced from renewable sources, fossil-fired generation, or any combination of these resources. The Clean Energy Transformation Act requires all electricity used in Washington to be GHG neutral by 2030 and 100% clean by 2045. **Renewable hydrogen** is hydrogen produced using renewable resources both as the source for the hydrogen and the source for the energy input into the production process. The Washington Department of Commerce webpage[12] has additional information about how green hydrogen is defined under state law.

[12] https://www.commerce.wa.gov/energy-policy/renewable-fuels/

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7-B	Front and Centered	II. There will likely be significant localized pollution impacts that are not discussed in the Draft PEIS. However, given the way that existing laws and permit processes allow certain communities to bear the worst effects of pollution, pollution impacts cannot accurately be assessed solely from permit and regulation compliance. Therefore, it is inappropriate to determine the significance of any impacts on air quality and local water bodies based on the likelihood of mere compliance with existing legal requirements. The Department of Health recognizes certain “essentials” to community health like access to healthy foods, clean air, quality schools, and job opportunities as being foundational to our ability to live a healthy life. Given the way past polices have led to disparate distribution of resources in different communities across the state, true health and environmental equity cannot be achieved without understanding the ways that present day decisions around siting, even when made in ways that are aligned with current laws and permit requirements, often exacerbate existing disparities resulting from “discriminatory practices, structural racism, and deep-rooted inequities.” When assessing the impacts of a project on air and water quality, Ecology should use existing data in the Environmental Health Disparities map, which includes a more detailed analysis for health and pollution indicators categorized by environmental exposures and environmental effects. Socioeconomic and sensitive population indicators will also be crucial to determining how certain populations are being disproportionately affected by existing pollution that will likely be exacerbated by a new green hydrogen project. The Draft PEIS concludes that there will likely be less than significant pollution impacts from green hydrogen facilities based on the assumption that laws regulating air and water pollution will be met and relevant permits will be obtained and abided by.	Appendix E, *Air Quality and Greenhouse Gases,* provides an analysis of the air emissions and life-cycle greenhouse gas emissions associated with the types of facilities considered in the PEIS, including discussion of indirect GHG emissions. The technical approach for analysis of air emissions and greenhouse gas emissions is described in Section 2.2 of Appendix E; impacts were assessed based on threshold criteria for air pollutant emissions, hazardous air pollutant emissions, and toxic air pollutant emissions, as well as greenhouse gas emissions. Section 3.3 in Appendix E includes a list of permits that could be required to mitigate potential impacts to air quality and greenhouse gas emissions that could be identified at the project-level review. Where compliance with the appropriate permits would avoid and reduce impacts to levels below significance, the PEIS identified those impacts as less than significant. Project impacts to air pollution emissions would need to be determined during project-level review, as would compliance with the appropriate permits. Appendix I, *Environmental Health and Safety*, provides an analysis of the probable environmental health and safety (EHS) impacts associated with the types of facilities considered in the PEIS, including exposure to air pollution emissions. Appendix I refers to the analysis in Appendix E to determine the potential impacts to EHS from air pollution emissions from the types of facilities considered. Impact assessments in the EHS analysis considered the release of hazardous materials to the environment that increases the risk of environmental contamination (e.g., air or water) or threats to human health and safety. Section 3.3 in Appendix I includes a list of permits that could be required to mitigate potential impacts to EHS that could be identified at the project level review. Where compliance with the appropriate permits would avoid and reduce impacts to levels below significance, the PEIS identified those impacts as less than significant. Appendix C, *Environmental Justice*, provides an analysis of the potential impacts to environmental justice communities, including EHS impacts to those populations, and refers to the analyses in Appendices E and I to determine the potential impacts on environmental justice communities. For the environmental justice analysis, overburdened communities were identified using the Overburdened Communities of Washington State dataset, which integrates data from the Washington Environmental Health Disparities Map, the federal Climate and Economic Justice Screening Tool, and Tribal lands maps. Impacts were determined in the PEIS analysis by overlaying potentially significant adverse environmental impacts with census tract data of overburdened communities to determine the relative type and severity of effects and determine the potential for environmental impacts to disproportionately affect those populations. There are no specific permit requirements that pertain to environmental justice. Future project developers would need to be compliant with local plans, which could include environmental justice elements.
7-C	Front and Centered	II A. Impacts from wastewater pollution cannot be determined through general compliance with relevant laws and permits. The Draft PEIS identifies wastewater generated by electrolysis as a source of water pollution for both surface and groundwater, but concludes that as long as plants comply with existing regulations and mitigation measures, there will likely be “less than significant impacts.” While we recognize that a more in-depth analysis of project specific impacts will happen when individual sites are assessed for feasibility, the Final PEIS should include a more nuanced discussion of the potential impacts of this type of wastewater and why mitigation for concentrated brine streams are often unsustainable. The hidden burdens of treating wastewater generated by green hydrogen, both financial and pollution based, must be included in an assessment of wastewater impacts. Many desalination processes and treatment technologies, including options identified in the Draft PEIS such as onsite treatment or discharge to publicly owned	Appendix F, *Water Resources,* describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including water consumption, water byproducts, and wastewater. Section 3.4.2.1 states that electrolysis and steam-methane reforming production methods would require demineralized water, which would be produced on site through reverse osmosis. Wastewater from the reverse osmosis process would be treated on site or routed to a wastewater treatment plant. To produce 1 kilogram of hydrogen through electrolysis, on-site water treatment through reverse osmosis would produce approximately 1 gallon of wastewater. The source of water would vary but is not likely to include seawater, so brine would not be created. A list of potentially required permits is provided in Chapter 7 of the PEIS, and the Final PEIS includes a general measure for facilities to obtain required approvals and permits and ensure that a project adheres to relevant federal, state, and local laws and regulations. Laws, regulations, and permits provide standards and requirements for the protection of resources, and the PEIS impact analysis and significance findings assume that developers would comply with all relevant laws and regulations and

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		treatment works, can be incredibly expensive and energy intensive. 1 kWh of electricity is needed for every m^3 of purified water produced through desalination and currently, “only 1% of desalination projects around the world are powered by renewable energy.” Further, while it can be assumed that brine discharge will be regulated through National Pollutant Discharge Elimination System permits for surface water, osmotic shock is a local pollution risk that can harm animals, algae, and marine ecosystems at large in sensitive environments. The Draft PEIS also fails to account for gaps in existing regulations and enforcement systems that illustrates how permit compliance is not adequately indicative of pollution impacts. For example, raised water temperature caused by climate change–which contributes heavily to ecosystem health–is not explicitly regulated by the Clean Water Act (CWA). Instead, thermal pollution is regulated through requirements for “best available treatment economically available” and variance processes due to the unique properties of heat pollution, such as dissipation rates. However, climate change induced warming can interact with existing heat pollution and create uncertainties for water quality in ways that states are currently not explicitly required to account for when creating TMDLs. In particular, the discharge allowance for brine is limited by the scope of other pollution specific standards (like those in the CWA). As a result, if factors like climate change induced rising water temperatures are not accounted for when pollution limits are created, the resulting pollution standards are less holistic due to “additional uncertainties to the data-based assumptions in TMDLs concerning hydrologic scenarios and influences on the pollutant being addressed.” Finally, during the period of 2012-2022, the Department of Ecology has been late in submitting its impaired water list by the required deadline. Since NPDES permits are created based on the specific pollution levels and sensitivities of the individual water bodies on the impaired water list, not having the most accurate and updated information at the time of permit condition setting can make compliance with NPDES permits a significantly less effective measure for pollution impacts in Washington state. These fundamental flaws in the permitting process indicate that permit compliance cannot be the main determinate for whether water resources are likely to be impacted.	obtain required approvals. Additional measures to avoid, reduce, and mitigate impacts are comprehensively listed in Appendix A of the final PEIS.
7-D	Front and Centered	II. B. Impacts from air pollution cannot be determined through general compliance with relevant laws and permits. While Washington currently meets criteria pollutant air quality standards for most areas within the state, “compliance with laws and permits” should not result in a finding of less than significant impacts on air quality. The PEIS focuses on national ambient air quality standards (NAAQS) attainment as one of the major indicators that impacts from air pollution will not be significant. However, even with current attainment designations across the state, Ecology has identified 16 overburdened areas which have communities facing “a higher death rate from air pollution than the state average” because of health conditions linked to anthropogenic particulate matter 2.5 pollution. These areas also have higher rates of chronic respiratory, cardiovascular conditions, and lower average life spans than people in the rest of	Refer to the response to comment 7-B. Additionally, Appendix Q, *Cumulative Impacts*, discusses probable significant impacts of the types of facilities analyzed in the PEIS in combination with other similar actions taken during the same timeframe. Section 4.2 in Appendix Q discusses probable cumulative impacts to environmental justice communities. Disproportionate impacts would need to be analyzed and mitigated appropriately at the project level.

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		the state. PM 2.5 is a criteria pollutant with an air quality standard that is accounted for when making a final designation for an area, which means that these health risks exist even when most of the state is in attainment for NAAQS. This demonstrates the ineffectiveness of relying on compliance with air quality standards set by current laws to determine the scale of air pollution related impacts stemming from green hydrogen production. Even if a potential project site is within NAAQS attainment, existing pollution burden in an overburdened community could lead to significant air quality impacts and should be a part of the programmatic risk assessment. The Draft PEIS also states that because electrolysis uses electricity, "it does not directly produce regulated pollutants such as NOx (nitric oxide and/or nitrogen dioxide) and SOx (sulfur oxides; sulfur monoxide, sulfur dioxide, and/or sulfur trioxide) or emit carbon dioxide (CO2)". Despite not being within the scope of this assessment, air pollution impacts are almost entirely dependent on the source of electricity being used for electrolysis. The entire life cycle of hydrogen, from material extraction to distribution, must be included in an impact assessment for air pollution caused by different production methods. If electrolysis is powered via a carbon-intensive grid, this technology can result in large CO2 emissions. For example, a green hydrogen plant in Texas using electrolysis powered by a fossil-fuel heavy grid would "have an average annual carbon intensity over 20 kg CO2 per kg H2. In highly industrialized areas within the geographic scope of the Draft PEIS such as Yakima and South King County, these emissions will only compound the health impacts already being felt by communities who live and work near a multitude of air pollution sources. When accounting for potential emissions from electrolysis that uses electricity produced by fossil fuels in addition to existing air pollution conditions, is it unlikely that a finding of less than significant impacts on air quality can be justified.	
7-E	Front and Centered	III. Green hydrogen projects will likely burden natural resources and public utilities resulting in significant impacts. Some of the most serious environmental justice concerns related to green hydrogen production stem from the potential to strain water and energy resources in communities that are already facing the consequences of water scarcity, overburdened energy grids, and unaffordable energy. Priorities for local water and energy use must be weighted heavily when making siting decisions. While a site specific analysis will occur during environmental reviews of sites, certain environmental and climate justice considerations must be an integral part of the broader assessment of resource impacts due to green hydrogen as a whole.	Appendix C, *Environmental Justice*, includes an analysis of the potential impacts to overburdened communities. For the environmental justice analysis, overburdened communities were identified using the Overburdened Communities of Washington State dataset, which integrates data from the Washington Environmental Health Disparities Map, the federal Climate and Economic Justice Screening Tool (CEJST) (which has since been taken down from the website), and Tribal lands maps. The CEJST included data on indicators in the following eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. The tool uses this information to identify communities defined as disadvantaged because they are overburdened and underserved. Appendix F, *Water Resources,* Appendix H, *Energy and Natural Resources*, and Appendix P, *Public Services and Utilities*. describe water, energy, and public utility resources, respectively, within the study area and assess potential impacts associated with the types of green hydrogen facilities evaluated, including capacity. A green hydrogen facility developer would need to ensure that there is sufficient water available for a project, both physically and legally. Water availability will vary based on the project and location. If water is needed for a project and is not available, a project would not be feasible. A green hydrogen facility developer would also need to ensure that there is sufficient electricity for a project available by establishing an agreement with a utility for access to the electrical grid or with a producer of electricity. The amount of electricity available will vary based on the project location. If electricity is not available, a project would not be able to operate.

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			A general measure was added to the Final PEIS for projects to consider during siting and design the limitations of existing infrastructure such as water and energy resources.
7-F	Front and Centered	III. A. Additionality must be considered when analyzing impacts on public utilities and communities throughout the state. Despite the Draft PEIS' limited scope, which prevents meaningful consideration of hydrogen production fuel sources, impacts on public utilities and the communities who rely on them cannot be properly assessed without considering issues surrounding additionality. Additionality is the concept that renewable energy used in hydrogen production must come from new renewable sources rather than existing ones to ensure that hydrogen projects do not detract from other decarbonization efforts. This is particularly important given Washington's codified distinctions between green hydrolytic hydrogen, which can use electricity derived from fossil fuels in hydrogen production, and renewable hydrogen, which must be made with renewable resources. Additionality must be one of the considerations used to make decisions about hydrogen projects. The benefits of no direct emissions from hydrogen production are not material if facilities use electricity that originally went to other homes and businesses. Even if said electricity is generated with renewables, this diversion could create gaps in supply that are filled with electricity generated with fossil fuels. The Draft PEIS is clear that analysis depends on assumptions that hydrogen facility developers have "contracted for sufficient electricity" and that state decarbonization goals will be met within mandated timeframes. However, without discussing the importance of electricity sources and current grid capacity to sustain future hydrogen projects, the Final PEIS will not include an adequate discussion of "probable significant adverse environmental impacts, and related mitigation measures."	The PEIS focuses on green hydrogen facilities, with green hydrogen including green electrolytic hydrogen and renewable hydrogen as defined in RCW 43.158.10. The scope of analysis is described in Section 1.4 of the PEIS. This comment is outside the scope of the PEIS.

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7-G	Front and Centered	III. B. Energy affordability is not properly identified as a significant impact. Rising costs associated with green electrolytic hydrogen production will likely exacerbate existing inequities that put lower and fixed income people at risk from high utility debt and disconnection, and any siting decisions must consider how these costs will be felt by communities who are already experiencing this energy burden. Current cost estimates of energy production through electrolysis are $5-$6/kg. For comparison, hydrogen produced using natural gas costs between $0.5-$1.7/kg. A study that looked at U.S. grid-based hydrogen production found that failure to account for additionality, along with deliverability and hourly matching, could increase power prices in California by 8%. These higher production costs, as well as increased competition for limited energy supply, raise questions about how these additional demands on the electrical grid will affect consumer electrical rates. This demonstrates that even if sufficient renewable electricity supplies exist to support hydrogen production, there are a wide range of impacts related to energy affordability that must also be a part of the framework for green hydrogen production. Cost related impacts of hydrogen are not assessed in the Draft PEIS based on the assumption that impacts related to construction, operation, and decommissioning a green hydrogen plant using biomass fuels or renewable natural gas would not change despite high production costs because a plant would not be built where it was not cost-effective to provide these fuels. Electrolysis is a highly energy intensive process, which can require 50 kWh for every 1 kg hydrogen produced. Environmental justice concerns and cumulative impacts associated with green hydrogen must include an assessment of the potential cost burden associated with high production costs that could be felt by proximate communities.	Energy affordability is not analyzed in the PEIS. SEPA Rules, WAC 197-11-448, states “SEPA contemplates that the general welfare, social, economic, and other requirements and essential considerations of state policy will be taken into account in weighing and balancing alternatives and in making final decisions. However, the environmental impact statement is not required to evaluate and document all of the possible effects and considerations of a decision or to contain the balancing judgments that must ultimately be made by the decision makers. Rather, an environmental impact statement analyzes *environmental* impacts and must be used by agency decision makers, along with other relevant considerations or documents, in making final decisions on a proposal. The EIS provides a basis upon which the responsible agency and officials can make the balancing judgment mandated by SEPA, because it provides information on the environmental costs and impacts. SEPA does not require that an EIS be an agency's only decision making document.”
7-H	Front and Centered	III. C. Water scarcity is not accurately weighted as a limiting factor for green hydrogen projects that could have severe impacts on nearby communities and the local environment. Availability of water resources is one of the most important factors to consider when making siting decisions for green hydrogen, as the amounts of water needed for these processes are staggering. A single SMF facility could use over 293 million gallons of water a year. On a national scale, low-end estimates of green hydrogen production would require 140 billion gallons of water per year. Even if the proper water rights and related permits were issued, confirming the underlying assumption in the PEIS’ analysis that this ensures there is enough water to meet production demand, it is still highly unlikely that there will be no significant impacts on water availability for the broader area. The Draft PEIS analyzes water resources impacts with the assumption that if enough water does not exist to support a green hydrogen project, it would not be built due to infeasibility. Therefore if there is enough water to sustain a project, that must mean that “no significant and unavoidable adverse impacts related to water resources would occur.” Despite water resources being a highly site-specific issue that will be further analyzed in the environmental review stage, the Final PEIS should include a general assessment of the ways green hydrogen could impact water resources in different areas of the state. Raising these issues in the Final	Appendix F, *Water Resources*, describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including surface and groundwater quantity. A green hydrogen facility developer would need to ensure that there is sufficient water available for a project, both physically and legally. Water availability will vary based on the project and location. If water is needed for a project and is not available, a project would not be feasible. Potential cumulative impacts on water resources are discussed in Appendix Q, *Cumulative Impacts*. A general measure was added to the final PEIS for projects to consider during siting and design the limitations of existing infrastructure such as water and energy resources.

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		PEIS will provide agencies and local jurisdictions with better guidance and more information as they develop mitigation strategies and community impacts. For example, some central Washington locations within the geographic scope of the study include cities within the Yakima River Basin, such as Sunnyside, Yakima, and Kennewick. When determining whether adverse impacts related to water could occur if a project were to be built in this area, some necessary context is missing. In 2023, Ecology declared a drought emergency in the Yakima River Basin that remained in effect into 2024. Even outside of periods of drought, “water is a finite resource in the Yakima Basin.” The geographic scope also includes potential project sites in Clallam and Whatcom counties, where communities have dealt with low surface water and groundwater availability and have had to truck in water to meet their needs.” For agricultural areas, junior water rights were curtailed to protect senior water rights and for private landowners, warnings were issued to prepare for reduced pumping from local shallow wells. Given existing stressors on water resources already being experienced across the state and future climate trends indicating that our region will likely “see longer and more severe droughts in the future,” it is unlikely that green hydrogen would have no significant and unavoidable adverse impacts related to water resources. Further, the true scale of water resources needed for green hydrogen cannot fully be realized without considering water usage for electricity sources used in hydrogen production. While outside the scope of the PEIS, gross water use rather than net water use must be included in decision making processes. For example, impacts on water resources will vary depending on whether renewable electricity or thermal electricity is used during electrolysis, the latter of which uses substantial quantities of water with an average of 15 gallons used to produce one kWh of electricity. While this type of analysis will occur on a project specific level, it is crucial to identify these potential impacts at the PEIS level to avoid replicating the same harms and inequities perpetuated by current fossil fuel extraction and production methods.	
7-I	Front and Centered	IV. Broader transportation justice concerns must be properly identified at the programmatic level. The Draft PEIS concludes that there will likely be less than significant impacts on transportation despite acknowledging an anticipated increase in heavy trucks, personal vehicles, rail shipments, trains, and barge transport that will contribute to traffic delays and congestion. Given that many areas being considered for potential green hydrogen projects are already experiencing heavy traffic due to other industrial operations, any transportation analysis must consider the ways green hydrogen projects could compound existing conditions. The Final PEIS should include a general framework for assessing transportation impacts, which can be done without getting into a more site specific analysis.	The Draft PEIS evaluates potential impacts and mitigation for production and storage facilities at a broad level. Appendix O, *Transportation,* provides a framework for transportation analysis in the PEIS, and the methodology is described in Section 2. Project and site-specific analysis would need to be completed to address project-level impacts. Appendix Q, *Cumulative Impacts*, discusses trends in transportation across the state and how the types of facilities analyzed might affect transportation when combined with other similar actions in the same timeline.

Communication code	Organization/Commenter	Comment	Draft response
7-J	Front and Centered	The PEIS also states that transportation of hydrogen is outside the scope of the document despite this technical challenge being at the core of many environmental justice concerns. The PEIS must include hydrogen transport to facilities in Washington as part of its program level impact assessment, because leaving this analysis to the individual project level could result in inconsistent and inadequate consideration of cumulative risk. For example, many of the risks associated with leaks occur at the transport phase of production due to hydrogen's light and flammable characteristics. Hydrogen must also be compressed to be stored in vehicle tanks, which is an energy-intensive process. The true risks associated with transportation cannot be fully accounted for without determining how far hydrogen must be transported to project sites in the state. Vehicle and tank size used for transport is highly dependent on transportation time frame, which will also impact strain on local infrastructure, which further proves the need to account for these potential scenarios at the PEIS level. If green hydrogen projects are built in overburdened communities, increased use of and development of existing transportation infrastructure would increase the likelihood of disproportionate impacts on communities who are already experiencing environmental harms from living near heavy transportation corridors. This type of broader analysis must occur at the programmatic level to identify potential cumulative risks for overburdened communities.	The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. The transportation of green hydrogen to end users can vary greatly for projects and would need to be evaluated at the project level. General information on transportation systems is provided in PEIS Section 2.2.6 for context. Appendix Q, *Cumulative Impacts*, discusses the effects that would result from the impacts of green hydrogen facilities added to the impacts from other past, present, and reasonably foreseeable future actions. Section 4.14 in Appendix Q discusses probable cumulative impacts to transportation. The final PEIS was also revised to include a general measure for cumulative impact analysis at the project-level and to identify measures to avoid, reduce, and mitigate cumulative impacts.
7-K	Front and Centered	V. Climate and warming impacts stemming from hydrogen leaks must be included in GHG emission evaluations. The PEIS' assessment of GHG emissions only considers emissions from direct production. An accurate analysis of potential climate impacts stemming from green hydrogen production and operation must include leakage scenarios in addition to direct emissions. Leaks are highly variable and can occur at all stages of the hydrogen life cycle, the warming impacts of which could be significant. Industry related green hydrogen leakage estimates can range from 0.48% to 10.62% and in some scenarios, leakage can result in exceedances of the Department of Energy's guidance on clean hydrogen with an established target of 4.0 kgCO2e/kgH2 for life cycle emissions. While total emissions will be project-specific and dependent on factors such as production energy sources and mitigation technologies, an assessment of potential impacts even at a "broad level" must include a more robust analysis of climate impacts to avoid minimizing the severity of potential risks. The Draft PEIS accurately states that hydrogen is included in GHG emission evaluations despite it not being a GHG itself due to its warming impacts. However, none of the potential warming processes associated with hydrogen leaks are explained and it is unclear how potential reactions are accounted for in the impact analysis for any of the production processes or associated activities despite these interactions accounting for a substantial portion of hydrogen's total warming impact. Hydrogen reacts with hydroxyl radicals which increases atmospheric methane concentrations, tropospheric ozone, and stratospheric water vapor. So while hydrogen emissions alone do not have a warming impact, leaks can lead to increased warming through how hydrogen interacts with other common gasses in the air.	The PEIS focuses on probable significant adverse impacts. Appendix E, *Air Quality and Greenhouse Gases,* provides an analysis of the life-cycle greenhouse gas emissions associated with the types of facilities considered in the PEIS. Appendix E also includes discussion of indirect greenhouse gas emissions. Hydrogen leakage and the technical analysis methodology for greenhouse gas emissions are discussed in Appendix E, Section 3.2.2 and Table 3. Appendix E identifies life-cycle greenhouse gas emissions by reviewing life-cycle assessment studies to identify potential life-cycle GHG emissions factors, and by identifying Washington carbon intensity values from the Washington Clean Fuels Program Rule (Chapter 173-424 WAC) that were calculated using hydrogen pathways from the Washington GREET (WA-GREET) model. The WA-GREET model accounts for feedstock production, fuel processing, transportation, and end use. The final PEIS was revised to include a mitigation measure for hydrogen leaks, which states "Install hydrogen leak detection equipment to reduce risk of leakage causing indirect GHGs." Climate impacts on a broader scale are discussed in Appendix Q, *Cumulative Impacts,* which includes a discussion of leaked hydrogen and its enhancement of the greenhouse gas effect. Appendix Q also discusses the air quality and greenhouse gas impacts of other similar actions occurring in the same timeframe as the types of facilities analyzed in the PEIS.

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7-L	Front and Centered	VI. The cumulative impacts analysis should be more integrated in the PEIS to better identify and assess potential harms to overburdened communities. The Draft PEIS takes a siloed approach to assessing cumulative impacts that limits how risks and impacts are assessed by topic. For example, the cumulative impacts assessment lists reasonably foreseeable future actions (RFFAs) and considers them by looking at each impacted resource. Cumulative impacts to public services and utilities will likely increase, but earlier in the PEIS it states that green hydrogen facilities would "likely result in less than significant impacts on public services and utilities." By not integrating consideration of cumulative impacts into the greater analysis, discrepancies in identified impacts and findings of whether these impacts will likely be significant are less accurate and can lead to greater harms. The cumulative impacts assessment also results in findings that are so broad that it will be difficult to meaningfully incorporate them into project specific assessments. When assessing potential cumulative impacts for water resources, a whole range of issues including spill of hazardous materials, ground disturbance, decrease in floodplain function, risk to habitat and wildlife projects, drought conditions, and water scarcity are listed. Despite these being serious risks that would impact most facets of life for nearby communities and ecosystems, the section concludes by stating that "cumulative impacts to water resources from green hydrogen facilities and other RFFAs may increase or decrease, depending on the size, type, and number of activities within a given area." While specific conclusions for each project cannot be determined at this stage of analysis, it is almost certain that cumulative impacts in an area will increase based on both RFFAs and highlighted impacts. A key finding of "impacts that range from less than significant to potentially significant" is similarly broad and leaves this crucial analysis, upon which many of the potential mitigation measures implemented hinges upon, to the discretion of individual project managers and local jurisdictions. Assessing potential impacts for green hydrogen projects can only be done by considering the greater context of existing conditions. This can be done in a generalized way without getting into a site-specific analysis by being realistic about the ways impacts that have already been identified in the Draft PEIS would affect surrounding communities. Drawing clearer conclusions about the scale of potential impacts is not only more protective of frontline and overburdened communities, but would also benefit local jurisdictions by allowing for more impactful mitigation measures to be assessed on a project level.	Appendix Q, *Cumulative Impacts*, discusses the effects that would result from the impacts of green hydrogen facilities added to the impacts from other past, present, and reasonably foreseeable future actions. As described in Appendix Q, RFFAs are evaluated as trends that could affect the study area. This trend analysis is appropriate for this planning document, as it considers impacts at a broad level. All RFFAs have the potential to impact resources. The cumulative impacts would depend on the locations and number of activities and how near they are to each other. The Final PEIS was revised to include a general measure for cumulative impact analysis at the project level and to identify measures to avoid, reduce, and mitigate cumulative impacts.

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7-M	Front and Centered	VII. Conclusion When environmental justice principles and community leadership are at the core of decisions made throughout the entire hydrogen supply chain, including production, storage, transportation, and utilization of hydrogen, there is potential for positive local impacts and technological advances in energy generation that are necessary to achieve a carbon-free energy future. Washington state has been a national leader of environmental justice through groundbreaking initiatives like the Clean Energy Transformation Act and the Healthy Environment for All Act and has the opportunity to build upon this legacy by creating equitable and comprehensive frameworks for green hydrogen implementation. Since the impacts of green hydrogen are highly dependent on production methods, inputs, and end uses, the programmatic level assessment of risks must include a high-level analysis of the entire supply chain. Failure to do so can perpetuate and even exacerbate existing harm in overburdened communities caused by exploitative resource extraction methods that prioritize capital gain over climate justice and public health. In order to fully experience the emerging benefits of green hydrogen, the PEIS should include a more robust analysis of potential impacts related to: (1) local pollution impacts including wastewater and air quality, (2) the potential burden on natural resources and public utilities with a focus on energy affordability, additionality, and water scarcity, (3) inequitable transportation impacts, (4) climate impacts from different warming scenarios, and (5) develop a more holistic and integrated cumulative impacts analysis.	See responses to comments 7-A through 7-L above.
8-A	Puget Sound Energy	Due to the tremendous hurdles faced by hydrogen developers and end users, PSE reiterates comments made in our previous comment letter on scoping. We understand that Ecology has made intentional choices as to the Draft PEIS's scope, but we would like to emphasize that by omitting key methods of hydrogen production and transport, Ecology limits the potential use of the document for future development. Because a key lesson from the last five years is that system level constraints (e.g., governmental incentives and production pathways) can fundamentally undermine this emerging economy, we respectfully reemphasize the benefits of increase the PEIS's scope before it goes final. Most significantly, by excluding consideration of the potential impacts of building hydrogen pipelines between production facilities to end users (the nature of which are regularly limited and capable of being mitigated), Ecology misses an opportunity to provide meaningful analysis of facilities that are reasonably foreseeable to be required. Hydrogen production does not exist in a vacuum. There must be an economy of end users to buy that hydrogen. Including pipelines in the analysis of the Final PEIS would help end users to see a path in Washington for hydrogen development and use.	Ecology considered the potential for impacts from green hydrogen facilities, as well as comments received during scoping, to determine the scope of the Draft PEIS. The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. The PEIS does not evaluate the supply chains used to create green hydrogen or the end uses. End uses of green hydrogen vary widely and include such uses as refineries, industrial chemical processes, transportation, and powering an electrical grid or buildings. Production process inputs and end uses would be evaluated during project-level reviews. The source of electricity would vary depending on the project, and this would be evaluated during the project-level review. The PEIS does not analyze new transmission pipelines for green hydrogen. New pipelines are likely to cover multiple jurisdictional areas with federal, state, and local permits and would be reviewed on a project-by-project basis.

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8-B	Puget Sound Energy	PSE also encourages Ecology to include an expanded discussion on hydrogen production through pyrolysis, including a discussion of using natural gas as a potential bridge fuel while a more reliable and robust supply. Today, end users throughout Washington— including PSE— are looking for reliable sources of renewable natural gas and biomass. The bottom line, however, is that the quantity of renewable natural gas that would be required to support a green hydrogen economy is not yet available. Moreover, there are serious questions as to whether it is prudent to prioritize the use of renewable natural gas for hydrogen production. In other words, if renewable natural gas were available in large quantities, would it make sense to convert that gas to another energy resource? From an energy generation perspective, renewable natural gas can be used directly for electricity production; converting renewable natural gas into hydrogen both takes energy and the resulting gas (green hydrogen) has less energy density on a volumetric basis. Application of [the U.S. Department of Energy's] DOE's latest GREET H2 model demonstrates that pyrolysis of natural gas, when abating upstream emissions, can meet requirements specified in the National Clean Hydrogen Production standard. The economics of pyrolytic hydrogen are also substantially better than competing alternatives, which can stimulate market demand for clean hydrogen that will ultimately benefit all sources of low and zero carbon hydrogen. Incorporation of multiple production pathways that are based on carbon intensity will allow for faster adoption by industries that need clean hydrogen, while providing critical momentum to reach commercial liftoff. For these reasons, PSE requests that Ecology include analysis and consideration of pyrolytic hydrogen made with natural gas on an interim basis.	The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. This comment is outside the scope of the PEIS.
9-A	AltaGas	We appreciate the contents of the Draft PEIS and believe that the information included is a valuable resource to inform siting, planning and project design, analyze potential impacts and identify possible mitigations. However, we recommend the final PEIS more clearly articulate the limitations and scope of its findings. For example, we suggest the following acknowledgement of the limitations of the Draft PEIS and its applicability to future decision-making. The Draft PEIS, by design, studies only non-project-specific adverse environmental impacts and related mitigation measures for green hydrogen projects. There are many avoidance, minimization, and mitigation measures, and best practices, applied based on project-specific needs, stakeholder engagement, and company practice that are not considered in this draft programmatic. These measures are advanced through the natural course of project development and advancement as well as through existing regulatory and engagement processes. Being overly prescriptive of mitigations at a non-project level does not adequately account for local geographic, stakeholder, and environmental needs unique to each project. Flexibility and adaptive management in the assessment of potential impacts, avoidance and minimization measures, and mitigations is essential to being responsive to each project and community's needs. Acknowledgement of project-specific measures is required to allow for flexible impact management catered to project and stakeholder needs.	The PEIS identifies probable significant adverse environmental impacts and relevant mitigation at a broad level. The analysis of each resource was based on incorporation of the best available science and information. The final PEIS includes a comprehensive list of the measures to avoid, reduce, and mitigate impacts in Appendix A. The appendices are the official technical documentation for this PEIS. Project and site-specific analysis would need to be completed to address project-level impacts.
9-B	AltaGas	The scope of the Draft PEIS represents broad impacts and mitigations based on a limited scope of general regulations that could apply and does not consider all applicable regulatory processes and standards that may apply in project design and execution to reduce potential impacts below a "significant" level.	The PEIS evaluates potential impacts and mitigation at a broad level. Project and site-specific analysis would need to be completed to address project-level impacts.

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9-C	AltaGas	Specifically, we recommend correcting the inconsistent language used in the Summary so that it consistently reflects “potential” significant adverse impacts rather than “probable” significant adverse impacts (compare p. S-9 and Table S-1).	The PEIS is intended for use by multiple readers and uses the terms “probable” and “potential” throughout the document. This is consistent with plain language guidance. When referring to RCW requirements, the term “probable” is used. The PEIS evaluates impacts at a broad level and identifies these as potential. Project-level review would be required with additional project- and site-specific information to identify probable impacts specific to a proposal.
9-D	AltaGas	We also recommend Ecology consider other states’ experiences (such as the ACES Project in Utah) and federal regulations (Ex. OSHA, PHMSA), as well as international standards (such as ISO standards for electrolytic hydrogen), with respect to Health and Safety, Risk, Process Safety and Pipeline safety for inclusion of guidance applicable to hydrogen systems. This is especially important given the early-stage development of the green hydrogen ecosystem in Washington, and because global best practices, lessons, and learnings from elsewhere can and should inform regulatory decisions and processes in Washington State as well.	Appendix I, *Environmental Health and Safety*, includes plans, policies, and regulations from federal, state and local entities. Regulations, guidelines, and codes and standards have been established through years of hydrogen use. Industry requirements and standard practices identify ways to reduce the risks associated with gas or liquid hydrogen. However, there are gaps in current requirements. The PEIS describes current requirements and where there are gaps. Specifically, EHS laws, regulations, and industry standards that can reduce the risks through safety, prevention, and response requirements and where there are gaps in standards are provided in Table 1 of Appendix I. Risks, safety requirements, and best practices are described in Section 4.8 of the PEIS and Appendix I, *Environmental Health and Safety*. The analysis identifies where there are gaps in regulations and includes measures to address those gaps. For example, while there are pressure and cryogenic industry standards to address construction and maintenance best practices, hydrogen storage is not specifically currently addressed by federal or international regulations. Liquefied hydrogen has similar properties to liquefied natural gas, so some of the same siting and safety requirements may be used. The DOE is working on developing standards. Project-level review would consider the most updated requirements to identify risks and mitigation. Additionally, the PEIS includes a mitigation measure to address potentially significance impacts, which states “Where NFPA [National Fire Protection Association] guidelines are not required by law, follow NFPA guidelines, specifically NFPA 2, Hydrogen Technologies Code.” Following these guidelines would reduce hydrogen-specific safety and fire risks.
9-E	AltaGas	The Draft PEIS represents a snapshot in time and given the rapidly evolving nature of the new and developing green hydrogen ecosystem in Washington state, acknowledgement should be made that project technologies and applications may evolve in ways such that the potential effects, avoidance, and minimization measures would result in different conclusions than those reached here concerning the potential “significance” of adverse impacts or appropriate mitigations.	The PEIS does not limit the types of facilities or technologies that could be proposed or built in Washington state. The facilities evaluated in this PEIS are intended to capture the types of facilities and technologies most likely to be proposed based on current and best available information. The Draft PEIS evaluates potential impacts and mitigation at a broad level. Project and site-specific analysis would need to be completed to address project-level impacts.
9-F	AltaGas	The Draft PEIS does not adequately consider the No Action Alternative, which would have significant adverse effects on the state’s ability to meet the Washington Legislature’s limits on the emissions of GHGs. We recommend the final PEIS include additional analysis of the long-term vision for clean hydrogen in Washington, and how clean hydrogen development aligns with the state’s comprehensive clean energy strategy. The No Action Alternative should include discussion of how continued delays in environmental reviews and permitting processes sought to be addressed through this PEIS will significantly hinder clean hydrogen project developers from being able to fulfill the state’s projected share of emissions reductions targets attributable to clean hydrogen. Specifically, we recommend including the analysis from Washington Department of Commerce’s January 5, 2024 Report to the Legislature submitted to Chapter 292, Laws of 2022: Green Electrolytic Hydrogen and Renewable Fuels: Recommendation for Deployment in Washington, which concluded, among other things, that: Robust siting and permitting processes for green hydrogen are needed, and siting and permitting of new renewables to support a hydrogen economy and economy-wide decarbonization poses even greater challenges… (emphasis in original)	The PEIS analysis under the No Action Alternative states that environmental review and permitting for green hydrogen facilities would continue to occur on a project-by-project basis.

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9-G	AltaGas	The Draft PEIS does not adequately consider that the development of clean hydrogen facilities can bring socio-economic and other community benefits, specifically localized air quality improvements, job creation and innovation, including to historically disadvantaged populations and communities. The PEIS should highlight these potential benefits and outline strategies to maximize them, including for communities and populations who are historically disproportionately impacted by prior industrial development.	Chapter 43.21C RCW does not require consideration of benefits. Additional studies, such as economic analysis, may be conducted and considered by the SEPA lead agency.
9-H	AltaGas	Community Benefit Agreements. To the extent the Draft PEIS recommends that developers should use Community Benefit Agreements in coordination with potentially affected communities to address impacts through mutually agreed upon mitigation, we encourage you to consider the January 20, 2025 federal Executive Order and related US Department of Energy's (DOE) Memo of January 28, 2025, directing the suspension of the following activities in any DOE cooperative agreements, contracts, contracts awards, including the PNWH2 [Pacific Northwest Hydrogen] Hub grant agreements: • Diversity, equity, and Inclusion (DEI) program and activities involving or relating to DEI objectives and principles; • Community Benefits Plans (CBP); and • Justice40 requirements, conditions, or principles. Sub-recipients have been advised that continuing any of these activities, including Community Benefits Planning, even if we are not filing for federal cost-reimbursement under our federal grant agreements, puts us at risk of being in default of the federal Executive Order and having our federal grant funding terminated. We request that the final PEIS recognize that it may not be possible for projects such as ours within the PNWH2 Hub to use Community Benefit Agreements without jeopardizing federal grant funding.	The measure was revised in the final PEIS to clarify that there are multiple types of agreements that could be developed, including Community Benefit Agreements, Tribal Benefit Agreements, community investments, or other agreements.
9-I	AltaGas	The PEIS only contemplates impacts from small scale projects and does not include auxiliary facilities or associated pipelines. This severely limits the utility of the PEIS, and we encourage inclusion of larger facilities and auxiliary associated infrastructure within a reasonable distance.	The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS. The facilities evaluated in this PEIS are intended to capture the types of facilities and technologies most likely to be proposed based on current and best available information. The impact analysis included in the PEIS could be used as a guide for facilities outside the size range considered in the PEIS. The PEIS does not evaluate the supply chains used to create green hydrogen or the end uses. The source of electricity would vary depending on the project, and this would be evaluated during the project-level review. End uses of green hydrogen vary widely and include such uses as refineries, industrial chemical processes, transportation, and powering the electrical grid or buildings. Production process inputs and end uses would be evaluated during project-level reviews. The PEIS does not analyze new transmission pipelines for green hydrogen. New pipelines are likely to cover multiple jurisdictional areas with federal, state, and local permits and would be reviewed on a case-by-case basis.

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10-A	Joint Environmental Organizations	2.4 Development of green hydrogen facilities 2.4.1 Site characterization The PEIS should include consideration for permit compliance and/or proper decommissioning when a hydrogen facility is built as an expansion to a current facility or in the place of a former, decommissioned facility. As future green electrolytic and renewable hydrogen facilities are likely to be co-located with other types of facilities or constructed at the site of former industrial facilities, it is important that a hydrogen facility is not constructed on a site where an existing facility has any unpermitted prior projects and/or is out of compliance with existing permits, a site that shares infrastructure with an existing facility that has any unpermitted prior projects and/or is out of compliance with existing permits, or a site of a former industrial facility that was improperly decommissioned. This should be added to the list of activities in the site characterization process that would involve minimal or no site disturbance.	Site-specific permits and actions will need to be determined at the project level on a project-by-project basis. Existing land use considerations for a facility site are discussed in Appendix K, *Land Use*, and Appendix I, *Environmental Health and Safety*. Required permits and approvals are described in Chapter 7 of the PEIS. The final PEIS was revised to include a general measure to obtain required approvals and permits and ensure that a project adheres to relevant federal, state, and local laws and regulations. Site characterization is described in PEIS Section 2.4.1. Site characterization would include consideration of existing land uses, and the Final PEIS was revised to clarify that site characterization would include identifying requirements for land use and environmental permits.
10-B	Joint Environmental Organizations	3.1 Geographic scope of study We are concerned that a parcel of the Hanford Site is included in the geographic scope of study. With the fire and explosion risks associated with hydrogen production and storage, the dangers of radioactive waste, and the ongoing leakage and cleanup at the Hanford Site, we ask Ecology to completely remove the Hanford Site from the study.	The parcel of the Hanford Site, known as the Northwest Advanced Clean Energy Park, that is included in the PEIS geographic scope of study has been identified as a location for carbon-free clean energy production by the DOE. Project-level reviews would need to consider site-specific conditions, and impacts would need to be analyzed and mitigated appropriately at the project level.
10-C	Joint Environmental Organizations	4.1 Tribal rights, interests, and resources We appreciate Ecology's work in the draft PEIS to respect Tribal sovereignty, rights, interests, and resources. While the siting and design considerations will be helpful to developers, it is important that impact assessment and determinations of significance or non-significance will be conducted in consultation with Tribes at the project level. This is necessary for respecting the sovereignty of each Tribe and the uniqueness of each potential location.	As discussed in Appendix B, T*ribal Rights, Interests, and Resources*, any determinations of significance or non-significance would be done with engagement of and in consultation with each potentially affected Tribe at the project level.
10-D	Joint Environmental Organizations	4.2 Environmental justice We appreciate Ecology's attention to environmental justice and adverse effects on overburdened communities. At the same time, we urge Ecology to include more robust discussion, recommendations for community benefits, and specific ways that a facility might provide benefits for communities in the final PEIS. Examples could include local hiring and living wage commitments, investments in affordable housing and community green spaces, and childcare and healthcare centers.	RCW 43.21C, SEPA regulations, does not require consideration of benefits. Additional studies, such as economic analysis, may be conducted and considered by the SEPA lead agency. Appendix C, *Environmental Justice*, evaluates whether potential impacts disproportionately affect people of color populations and low-income populations. The PEIS includes proposed mitigation related to impacts to develop Community Benefit Agreements, Tribal Benefit Agreements, community investments, or other agreements in coordination with potentially affected communities and Tribes to address impacts. Examples of agreement outcomes could include measures to support local labor, such as workforce development opportunities, or measures to support community facilities and services.
10-E	Joint Environmental Organizations	4.4 Air quality and greenhouse gases The PEIS should include more detailed information about the ways hydrogen can function as an indirect greenhouse gas. While the potential global warming effects are noted later in section 5.3.4, hydrogen's significant long-term global warming potential should be discussed more in depth in Chapter 4: Affected Environment, Potential Impacts, and Mitigation.	Appendix E, *Air Quality and Greenhouse Gases,* provides an analysis of the life-cycle greenhouse gas emissions associated with the types of facilities considered in the PEIS, including a discussion of indirect GHG emissions. Appendix E identifies life-cycle greenhouse gas emissions by reviewing life-cycle assessment studies to identify potential life-cycle GHG emissions factors and by identifying Washington carbon intensity values from the Washington Clean Fuels Program Rule (Chapter 173-424 WAC) that were calculated using hydrogen pathways from the WA-GREET model. The WA-GREET model accounts for feedstock production, fuel processing, transportation, and end use.
10-F	Joint Environmental Organizations	4.4.3.1 Impacts As noted in 2.5.1.4, bio-gasification facilities could potentially use several different biomass feedstocks, including field and forest residue, wood, and dedicated crops. Each of these feedstocks would have a different level of carbon intensity and lifecycle greenhouse gases. Table 2-3 delineates between forest residue, wood pellets, and switchgrass, but Table 4-7 does not separate the various biomass	Appendix E, *Air Quality and Greenhouse Gases,* includes the full analysis and technical details used to evaluate air quality and GHGs in the PEIS. Table 4-7 is informed by information in Appendix E, specifically Table 15, "Expected direct GHG emissions from hydrogen production process," that shows probable emissions from hydrogen production via biomass gasification. For gasification of biomass, GREET does not report the actual biogenic emissions from the gasification process, but rather assumes that CO_2 emissions from gasification equal CO_2 emissions captured during growth of biomass

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		feedstocks. We urge Ecology to expand the data on lifecycle emissions for bio-gasification and delineate between forest residue, wood pellets, and switchgrass.	feedstocks. Additional hydrogen LCA studies for bio-gasification with differing biomass feedstocks were added to Appendix E in Tables 15 and 17, and estimated GHG emissions were updated to reflect these studies.
10-G	Joint Environmental Organizations	Carbon capture is briefly mentioned in 4.4.3.1, as a likely means of lowering greenhouse gas emissions, but the PEIS does not cover the impacts of carbon capture and storage. Carbon capture and storage has its own unique risks and threats to the environment and public health. If carbon capture technology is a commonly anticipated aspect of hydrogen production, the PEIS should make it clear that carbon capture will require separate studies and permitting.	Appendix E, *Air Quality and Greenhouse Gases*, includes discussion of carbon capture as it relates to the studies analyzed within the PEIS. Project-specific reviews and studies would need to occur to determine potential carbon capture impacts and appropriate permits.
10-H	Joint Environmental Organizations	4.5 Water We are concerned that the draft PEIS declares only "less than significant impacts" throughout the section on water and water quality. In each case, the finding of less than significant impacts is explicitly dependent on compliance with laws and permits. However, there is already significant over-appropriation of water in Washington, and complying with laws and permits does not guarantee that there will be less than significant impacts to water. This is especially important to note with regard to the Yakima River Basin, which has several plots within the geographic scope of the study. As Washington continues to experience warmer temperatures than ever and droughts become more frequent, water will only become more over-appropriated than it already is. Over the course of a hydrogen facility's decades-long life, less than significant impacts today could be very significant in the future. We urge Ecology to reassess impacts to water in light of expected climate change trends, expand recommended actions beyond compliance with laws and permits, and require projects to specify the water sources that will be used in addition to the quantity of water.	A green hydrogen facility developer would need to ensure that there is sufficient water available for a project, both physically and legally. Water availability would vary based on the project and location. Appendix F, *Water Resources,* describes water resources within the study area and assesses potential impacts associated with types of green hydrogen facilities evaluated, including surface and groundwater quantity. When siting a green hydrogen production facility, both physical water availability and legal water availability would need to be considered in relation to potential water quantity needed. Physical water availability would include, but not be limited to, an assessment of drought and water scarcity in relation to potential water quantity needed. Potential cumulative impacts on water resources are discussed in Appendix Q, *Cumulative Impacts*.
10-I	Joint Environmental Organizations	4.15 Public services and utilities 4.15.3.1 Impacts In considering impacts on emergency response services, significant impacts should be considered in more than just remote areas. Some cities in Washington may also have limited response capabilities to attend to possible disasters at a hydrogen facility without significantly investing in local emergency response services. We urge Ecology to consider impacts on emergency response services to all areas.	In Appendix P, *Public Services and Utilities*, analysis was conducted for impacts on emergency services to urban areas as well as rural. The language in the Final PEIS was revised to clarify that both urban and rural areas were considered in the analysis.

Communication code	Organization/Commenter	Comment	Draft response
10-J	Joint Environmental Organizations	Consistent definitions across state and federal agencies. The PEIS should use language that is consistent with terms and definitions used by other state and federal agencies. It is misleading to use the term green hydrogen to collectively refer to both green electrolytic hydrogen and renewable hydrogen made from renewable hydrocarbons. In most state, federal, and international documents, the classification of green only applies to green electrolytic hydrogen. On an international level, the United Nations defines green hydrogen as hydrogen produced through electrolysis, adding that "To be considered green hydrogen, the electricity required for its production should mostly come from renewable power sources, such as solar, wind and geothermal." Federally, Section 45V of the Inflation Reduction Act collectively refers to low-emission hydrogen production as clean, rather than green. It is especially confusing that the Washington State Department of Commerce report on green electrolytic hydrogen and renewable energy "focuses exclusively on green hydrogen production, which uses renewable electricity to convert water to hydrogen using an electrolyzer." Because Commerce's study, which was published before the scoping process for the hydrogen PEIS began, has a clear definition of green hydrogen that refers only to green electrolytic hydrogen, Ecology should not use a contradicting definition in the PEIS. In order to make such documents accessible and understandable for the public, readers should not be expected to alternate between agency- and jurisdiction-specific definitions that contradict each other. Both green electrolytic hydrogen and renewable hydrogen may be referred to as clean, but should not be referred to as green. As a specific goal of Clean Energy Environmental Impact Statements is to "provide consistent information," the PEIS for green electrolytic hydrogen and renewable hydrogen should use a common set of definitions across the many documents and reports that developers and agencies are likely to consult. Consistent, shared language is necessary for transparency and better public understanding in the rapidly changing landscape of emerging fuel technologies.	The PEIS evaluates potential impacts and mitigation for green hydrogen energy facilities, as directed by the Legislature using the definitions in RCW 43.158.010 and RCW 80.50.020. Section 2.1 of the PEIS includes the definitions. **Green electrolytic hydrogen** is hydrogen produced through electrolysis. It does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock. In this definition, water is the feedstock, while electricity is not a feedstock but is the input energy or process energy used in electrolysis of the water. Hydrogen produced through electrolysis will meet this definition regardless of whether the electricity is produced from renewable sources, fossil-fired generation, or any combination of these resources. The Clean Energy Transformation Act requires all electricity used in Washington to be GHG neutral by 2030 and 100% clean by 2045. **Renewable hydrogen** is hydrogen produced using renewable resources both as the source for the hydrogen and the source for the energy input into the production process. The Washington Department of Commerce webpage[13] has additional information about how green hydrogen is defined under state law.
11-A	Renewable Hydrogen Alliance	RHA also supports the finding that GHG emissions from non-fossil sources will have less than significant impacts on lifecycle GHG emissions. With that noted, RHA would encourage narrow use of lifecycle GHG emissions so as not to overcount upstream or downstream emissions in ways that are inconsistent with emissions accounting for other clean energy technologies such as wind and solar. Hydrogen emissions are appropriately accounted through well-to-gate emissions for hydrogen production facilities and well-to-wheel emissions for road transportation applications such as LCFS.	The Draft PEIS evaluates potential impacts and mitigation at a broad level. The analysis of each resource was based on incorporation of the best available science and information. Appendix E, *Air Quality and Greenhouse Gases,* identifies life-cycle greenhouse gas emissions by reviewing life-cycle assessment studies to identify potential life-cycle GHG emissions factors and by identifying Washington carbon intensity values from the Washington Clean Fuels Program Rule (Chapter 173-424 WAC) that were calculated using hydrogen pathways from the WA-GREET model. The WA-GREET model accounts for feedstock production, fuel processing, transportation, and end use.
11-B	Renewable Hydrogen Alliance	RHA appreciates the attention by Ecology for safety considerations in "remote locations with limited response capabilities". By their nature, many hydrogen projects are located in rural, industrial, or remote areas, and RHA would encourage state and local governments to continue to coordinate to ensure sufficient support and resources for the communities that will be hosting the first round of hydrogen projects.	Each proposed project is required to have its own SEPA environmental review as determined by the lead agency. During that process, site-specific information and project-specific effects would be evaluated and developers can develop mitigation plans to reduce potentially significant impacts. See Appendix I, *Environmental Health and Safety,* and Appendix P, *Public Services and Utilities*, Section 3.4.3 for measures to avoid, reduce, and mitigate impacts.

[13] https://www.commerce.wa.gov/energy-policy/renewable-fuels/

Communication code	Organization/Commenter	Comment	Draft response
11-C	Renewable Hydrogen Alliance	RHA appreciates the considerations by Ecology to understand and mitigate impacts to communities located in and around hydrogen projects. RHA encourages Ecology to continue to clarify potential compliance and mitigation activities for developers, especially for developers who have established “community benefit plans” or similar community due diligence activities.	The PEIS provides information that project developers could use to develop their proposals and develop mitigation plans. The information in the PEIS is intended to help a developer identify a suitable site, design a project, and submit a proposal that has considered potential environmental impacts. Each proposed project is required to have its own SEPA environmental review as determined by the lead agency. During that process, site-specific information and project-specific effects would be evaluated and developers can design mitigation plans to reduce potentially significant impacts. Appendix C, *Environmental Justice,* includes potential mitigation measures in Section 3.4.3.3 that developers could use to address potential project-level impacts, including Community Benefit Agreements, Tribal Benefit Agreements, community investments, or other agreements
11-D	Renewable Hydrogen Alliance	Especially, RHA would encourage clarity on how the Hydrogen EJ Toolkit under development by Commerce would align with the program of mitigations outlined by Ecology.	The Department of Commerce is developing an environmental justice toolkit for hydrogen developers, and Ecology is part of the workgroup for this to ensure consistency with the PEIS.
11-E	Renewable Hydrogen Alliance	RHA encourages the PEIS to consider a wider range of potential green hydrogen projects. Given that this PEIS is a high level, guidance document meant to inform the individual project permitting process, RHA believes that it appears to treat the green hydrogen industry fairly relative to other industrial development in the state. However, RHA would encourage Ecology and this PEIS to broaden the established project parameters to encompass a wider spectrum of projects. More specifically, RHA members recommend that Ecology consider a wider range of potential hydrogen projects and environmental impacts, including expanding the expected footprint, range of water outcomes, employment numbers, electricity requirement and construction timeline.	The scope of the PEIS is analysis of production and storage facilities as described in Section 1.4 of the PEIS.
11-F	Renewable Hydrogen Alliance	The PEIS assumes a range of 1-10 acres of land use for hydrogen. However, there is a national trend towards larger hydrogen production facilities to achieve economies of scale and drive down the $/kg price. RHA would recommend that the PEIS consider projects of up to 100 acres to be consistent with trends expected by local developers.	The PEIS uses a range from 1 acre to 10 acres, based on the size of similar industrial facilities and the proposed size of green hydrogen production and storage facilities in Washington. The range is based on publicly available information about typical hydrogen production components. The dimensions of these were used to estimate the footprints that would be the space required for the equipment. Additional space may be needed for setbacks based on surrounding buildings, property limits, or boundaries. The PEIS does not evaluate larger facilities with associated energy sources or end uses on the site. Additional environmental review would be required for those facilities.
11-G	Renewable Hydrogen Alliance	The PEIS assumes a range of 1-3 years for project construction. However, hydrogen production facilities can come in a variety of sizes, and some of the smaller near-term projects under development may be able to complete construction in as little as 6 months. RHA would recommend that the PEIS consider construction ranges accordingly to be consistent with trends expected by local developers.	The construction timeline would vary based on existing site conditions and the amount of work needed for each phase. Section 2.4 of the PEIS was revised and acknowledges that the construction period could be less than 1 year.
11-H	Renewable Hydrogen Alliance	The PEIS identifies approximately 200 siting, design, and mitigation considerations. Many of these considerations are discretionary and may not be fully achievable depending on the project. If a project was to ‘Tier’ of the PEIS as is the intent, the need for discretionary review by the lead agency could extend the environmental review process. Therefore, RHA would recommend that the PEIS establish mechanisms that clarify guidelines for agency review to ensure applications are processed efficiently within a reasonable timeframe.	The Final PEIS was revised to clarify the measures to avoid, reduce, and mitigate impacts. These measures are described in Section 4 of the PEIS, and a compressive list of measures is included in Appendix A. Ecology is also developing tools to help guide developers and agencies to apply the PEIS in their project reviews. Guidance will be available on Ecology’s PEIS website.[14]

[14] https://ecology.wa.gov/regulations-permits/sepa/clean-energy/programmatic-eis

Communication code	Organization/Commenter	Comment	Draft response
12-A	Ashley Mocorro Powell	In the environmental justice and overburdened communities section of the draft PEIS, I would encourage you to consider ratings on the WA EHD [Environmental Health Disparities] Map that are lower than ratings of 9 and 10 for communities; as not all areas of the state have as robust data for their communities which could result in an unintentional gap. I appreciate the cross reference with CEQ's created Climate and Economic Justice Screening Tool. This tool was used to identify communities eligible for benefits from federal investments in critical sectors. However, CJEST but it's since been taken down by the new federal administration (Jan 2025). What additional databases would WA Ecology use to ensure we are looking beyond WA EHD limitations?	Appendix C conducted an analysis based on census data and the Overburdened Communities of Washington State dataset, which includes the Environmental Health Disparities 9-10 rankings and CJEST determinations. Ecology does not have discretion over the components of this dataset. The identification of overburdened communities is consistent with state-level applications and the state's Environmental Justice Task Force recommendations for using the Environmental Health Disparities Map. Appendix C, *Environmental Justice*, provides a list of measures to avoid, reduce, and mitigate impacts, including using available information and mapping tools and the latest Washington State guidance.
12-B	Ashley Mocorro Powell	Geospatial tools are designed to integrate different kinds of health, social, environmental, and economic data to identify disadvantaged communities and to aid policy and investment decisions that address the pervasive, persistent, and largely unaddressed problems associated with environmental disparities in the United States; however do not always capture the full picture at the community level and the multi-faceted layers of considerations we should take. One example is I do not believe this PEIS considers risks in the study areas and their proximity to schools, family resource centers, childcare centers or head start programs and/or recreational areas (ie parks, sports fields, others) where multigenerational and/or youth would be present. I am concerned about the disproportionate impacts that could result of us not looking more closely at where these sited facilities could be located in proximity to these community spaces.	Appendix I, *Environmental Health and Safety*, provides an analysis of the probable EHS impacts. Appendix P, *Public Services and Utilities*, includes an analysis of impacts on public services, including health care facilities and public schools. Appendix M, *Recreation*, discusses probable impacts on recreational resources such as parks, schools, swimming pools, and water access points. Appendix K, *Land Use*, provides an analysis of land use conflicts. Appendix C, *Environmental Justice*, provides an analysis of the potential impacts to environmental justice communities, including EHS and public services and utilities impacts to those populations, and refers to the analyses in other technical appendices. Additionally, Appendix C provides a list of measures to avoid, reduce, and mitigate impacts, including using available information and mapping tools and the latest Washington State guidance.
13-A	Confederated Tribes of the Colville Reservation	"If a project requires federal permits or affects federal lands, mitigation measures would be developed in consultation with Tribes under Section 106 of the NHPA to avoid, reduce, or mitigate the potential for adverse impacts on significant cultural resources, if present. Section 106 consultations between the federal agencies, DAHP, affected federal treaty Tribes, and other consulting parties would be required." The more appropriate and legally correct term is "federally recognized tribes".	This section in the Final PEIS was revised to use the term “federally recognized Tribes.”
14-A	Quinault Indian Nation	**Early and Meaningful Tribal Consultation** Future proposed projects and infrastructure for green hydrogen energy may be located within Quinault's Usual and Accustomed Area (U&A). The Quinault Indian Nation requests early and meaningful engagement and consultation in assessing potential impacts and determining the significance or non-significance of such projects in relation to our treaty rights. As stated in the Draft PEIS, "The impact assessment and determinations of significance or non-significance would be done with engagement and in consultation with potentially affected Tribes at the project level" (p. 68). We expect this commitment to be upheld throughout all stages of project planning and implementation. **Siting and Cultural Impacts** The location of any green hydrogen energy facilities or associated infrastructure is a critical consideration for future projects. Infrastructure may include facilities, storage, rail lines, or pipelines, each of which could have cultural and environmental implications. We request a clear commitment from the Department of Ecology to engage in early consultation with QIN regarding potential projects within our U&A to assess and mitigate any potential cultural or environmental impacts.	If Ecology is the SEPA lead agency, our policy is to consult with all potentially affected federal Tribes following our consultation process. As described in Appendix B, *Tribal Rights, Interests, and Resources*, any determinations of significance or non-significance would be done with engagement of and in consultation with each potentially affected Tribe at the project level by the appropriate lead agency. This would be done through the SEPA process or the federal Section 106 process. Project-level analysis of impacts would need to occur during project-level review, and engagement and consultation with each potentially affected Tribe would need to occur at the project level.

Communication code	Organization/Commenter	Comment	Draft response
14-B	Quinault Indian Nation	**Water Quality and Quantity Considerations** The preservation of water quality and quantity is paramount, particularly concerning salmon habitat and broader ecological integrity. The Programmatic EIS lacks specific details on water sourcing for green hydrogen projects, which creates uncertainties about potential water withdrawals and wastewater management. Future project-level reviews must thoroughly assess water use, wastewater treatment, and compliance with water quality standards to protect fish habitat and uphold treaty protected resources. We recommend that Ecology include cumulative water use assessments in future project-level reviews to ensure there is accounting for multiple projects and activities in the same watershed.	Appendix F, *Water Resources*, describes water resources within the study area and assesses potential impacts associated with the types of green hydrogen facilities evaluated, including surface and groundwater quantity. When siting a green hydrogen production facility, both physical water availability and legal water availability would need to be considered in relation to potential water quantity needed. Physical water availability would include, but not be limited to, an assessment of drought and water scarcity in relation to potential water quantity needed. Potential cumulative impacts on water resources are discussed in Appendix Q, *Cumulative Impacts*.
14-C	Quinault Indian Nation	**Transportation and Infrastructure Impacts** Hydrogen transportation logistics must be carefully evaluated, as necessary equipment and infrastructure may vary depending on whether hydrogen is transported as a gas or liquid, and where it is transported. The PEIS should ensure that infrastructure is adequately assessed and updated as necessary to prevent adverse environmental and safety risks. SEPA requires a thorough consideration of "the range of probable impacts, including short-term and long-term effects" (WAC 197-11-060(4)(c)), as well as "direct and indirect impacts caused by a proposal" (WAC 197-11-060(4)(d)). The Department of Ecology must ensure that transportation-related risks, including potential rail system upgrades, are comprehensively reviewed in future project-specific assessments.	The scope of the PEIS is analysis of production and storage facilities. The transportation of green hydrogen to end users can vary greatly for projects and would need to be evaluated at the project level. General information on transportation systems is provided in PEIS Section 2.2.6 for context. Information on infrastructure associated with facility shipments for the production and storage of green hydrogen is discussed in PEIS Section 4.14 and Appendix O, *Transportation*. Project-level impacts would need to be analyzed and mitigated appropriately at the project level.
14-D	Quinault Indian Nation	**Safety Concerns and Fire Risks** Given that hydrogen is a highly combustible material, safety considerations in communities near green hydrogen facilities must be a priority. Proper separation distances between equipment, infrastructure, and surrounding communities should be carefully considered to minimize risks. Additionally, as climate change leads to more extreme weather events and an increased number of hot days, ignition risks may rise, particularly in areas prone to wildfires. The PEIS should evaluate how changing climate conditions may affect fire risk and what mitigation measures would be implemented to protect nearby communities.	Appendix I, *Environmental Health and Safety,* provides an analysis of the probable EHS impacts associated with the types of facilities considered in the PEIS. Section 3.2.4 of Appendix I discusses risks of fire, explosion, wildfires, and air pollution, as well as climate change. The PEIS geographic scope of study is made up of industrial lands where impacts to community facilities would be anticipated to be minimized as a result of local plans and zoning standards, including implementation of setback requirements. Facilities would need to be sited and designed to include appropriate setbacks based on project-specific hazard analysis and risk assessment (required by NFPA 55).
14-E	Quinault Indian Nation	**Job Creation and Economic Opportunities** Additional details are needed on the potential job opportunities associated with specific green hydrogen projects. For any future proposal, Quinault would request specific data on the number and types of jobs that would be created, including how many positions would be permanent versus temporary, as well as how many positions would require specialized skills. Additionally, we urge Ecology to ensure that Quinault Nation and other Tribes have opportunities to participate in workforce development and that hiring practices include outreach to Tribal communities to provide equitable access to employment in these projects.	The scope of the PEIS review, as directed by RCW 43.21C.535, is “limited to the probable, significant adverse environmental impacts in geographic areas that are suitable for the applicable clean energy type.” The Draft PEIS evaluates potential impacts and mitigation at a broad level and was prepared in compliance with SEPA, which does not require analysis of benefits. The PEIS includes proposed mitigation related to impacts to develop Community Benefit Agreements, Tribal Benefit Agreements, community investments, or other agreements in coordination with potentially affected communities and Tribes to address impacts.

Attachment 1. Coded Commenter Index

Commenter Code Index Table

This attachment includes a complete record of all commenters who submitted comments during the Draft PEIS comment period. To aid in locating responses to comments, numbering was added to the page margins of comments that corresponds with the comment codes in the concern summaries in Section 3 of the Response to Comments report.

Commenter Code Index Table

Commenter code	Commenter (as submitted in comments)	Date comments received	Comment submittal method
Tribes			
4	Confederated Tribes of the Colville Reservation	2/5/25	Email
13	Confederated Tribes of the Colville Reservation	2/28/25	Email
14	Quinault Indian Nation	3/6/25	Email
Agencies			
1	City of Hoquiam, WA	1/28/25	Verbal
Organizations			
7	Front and Centered	2/6/25	Online
10	Joint Environmental Organizations: • Washington Conservation Action • Columbia Riverkeeper • Friends of the San Juans • Communities for a Healthy Bay • Washington Physicians for Social Responsibility	2/6/25	Online
11	Renewable Hydrogen Alliance	2/6/25	Online
Businesses			
5	NovoHydrogen, Inc.	1/31/25	Online
8	Puget Sound Energy	2/6/25	Online
9	AltaGas	2/6/25	Online
Individuals			
2	Atul Deshmane	1/28/25	Online
3	Anonymous	1/28/25	Online
6	Lora Petso	2/6/25	Online
12	Ashley Mocorro Powell	2/6/25	Online

Attachment 2. Coded Comment Record

Coded Comment Record: Tribes

The Confederated Tribes of the Colville Reservation
P.O. Box 150, Nespelem, WA 99155
(509) 634-2200
FAX: (509) 634-4116

Tuesday, January 28, 2025

Washington State Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600
Cleanenergy@ecy.wa.gov

Subject: Re: Green Hydrogen Energy Facilities Draft Programmatic Environmental Impact Statement

Dear Washington State Department of Ecology,

I am writing to provide feedback on the Green Hydrogen Energy Facilities Draft Programmatic Environmental Impact Statement (DPEIS) on behalf of the Confederated Tribes of the Colville Reservation. While I understand that some aspects may not directly impact us, I believe it is important to address certain points within the document.

4-A Firstly, the statement "This will depend on the project and the federally recognized Tribes potentially affected" should be reconsidered. It is crucial to acknowledge that there are state-recognized tribes that may not be federally recognized, and their potential impact should not be overlooked.

4-B Section 4.1.3.2 "Actions to avoid and reduce impacts" is adequate and slightly above the norm in terms of protecting resources. However, I noticed similar language throughout the document for all tribal resources. In particular, I would like to highlight the cultural resources Key Finding in 4.13: "The significance of impacts to Tribal cultural resources can be understood only from within the cultural context of an affected Tribe. Accordingly, impact assessment and determinations of significance or non-significance would be done with engagement and in consultation with potentially affected Tribes and DAHP at the project level."

Although no specific cultural resource, project, or undertaking type is identified, Section 4.13.3.2 "Actions to avoid and reduce impacts" covers a comprehensive range of measures:

- Design and site projects to avoid impacts on cultural and historic resources. Begin with the use of the DAHP predictive model, then refine through the development of site-specific environmental and cultural context and Tribal coordination.
- Contact potentially affected Tribes early in the siting process, ideally before land is acquired for a project or before permit applications are developed.
- Consider potential impacts on Tribal treaty-reserved rights, Tribal reservations, off-reservation rights, trust lands, other Tribal-owned land, and other areas of significance to Tribes.

- Conduct a site-specific cultural survey to evaluate potential impacts. Offer DAHP and cultural experts from potentially affected Tribes the option to help develop the survey strategy.
- Consider requiring a Tribal monitor for survey crews.
- Provide cultural resources survey results to potentially affected Tribes for early review.
- Use previously disturbed lands and lands determined by archaeological inventories to be devoid of historic properties to the maximum extent possible.
- Where homesteading was a prevalent historic activity, contact the local assessor's office and historical museums to determine if the area includes known homestead sites. Conduct a cultural resources survey of the entire project site.
- Use training/educational programs for workers to reduce disturbances, vandalism, and harm to cultural resources. Incorporate adaptive management protocols for addressing changes over the life of the project.
- Address impacts to historic and cultural resources that follow the best available guidance and strategies developed by the federal, Tribal, and state governments, including, but not limited to, compensatory mitigation, formalized ongoing consultation between Washington state and Tribes to address new concerns and monitor long-term mitigation, and the development and maintenance of new technologies and geospatial analysis that help identify and avoid historic and cultural resources.

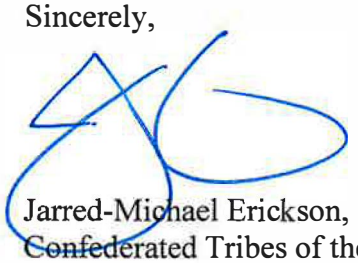
However, the document does not include appendices, such as Appendix N: Historic and Cultural Resources Technical Appendix. The presence of a link to another link makes accessing them complicated.

4-C Additionally, the list of preparers is not specific, with several state agencies and three contractors mentioned.

4-D Lastly, it is important to note that, as with all environmental impact analyses and statements, they are not legally binding, which means that a standard project-by-project review is still necessary.

Thank you for considering my feedback. I hope these comments contribute to the improvement of the Green Hydrogen Energy Facilities DPEIS.

Sincerely,



Jarred-Michael Erickson, Chairman
Confederated Tribes of the Colville Reservation

13-A "If a project requires federal permits or affects federal lands, mitigation measures would be developed in consultation with Tribes under Section 106 of the NHPA to avoid, reduce, or mitigate the potential for adverse impacts on significant cultural resources, if present. Section 106 consultations between the federal agencies, DAHP, affected federal treaty Tribes, and other consulting parties would be required."

Quinault Indian Nation
POST OFFICE BOX 189 • TAHOLAH, WA 98587 • TELEPHONE (360) 276-8211

March 6th, 2025

Diane Butorac
Clean Energy Coordination Section Manager
Shoreline and Environmental Assistance Program
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600
diane.butorac@ecy.wa.gov
cleanenergy@ecy.wa.gov

RE: State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State

Dear Ms. Butorac:

On behalf of the Quinault Indian Nation (Quinault), staff and our contracted consultant, Resource Synergy, we have reviewed the various technical studies provided related to the "*State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State*" formal comment period. We provide the following high level technical comments focused on potential impacts to Quinault's treaty-reserved fishing, hunting and gathering rights.

Quinault Indian Nation Interests

The Quinault Indian Nation is signatory to the Treaty of Olympia (1856) by which it reserved, among other things, the right of "taking fish, at all usual and accustomed fishing grounds and stations" and the privilege of hunting and gathering on open and unclaimed lands, among other rights, in exchange for ceding lands it historically roamed freely. In a landmark court case known as the "Boldt decision," a federal court confirmed Quinault's treaty fishing rights and established the Nation and other plaintiff tribes as co-managers of off-Reservation fisheries resources entitled to half of the harvestable number of fish returning to Washington waters. United *States v. Washington*, 384 F. Supp. 312 (W.D. Wn. 1974), *aff'd* 520 F.2d 676 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976). Based on the evidence provided, the court determined the usual and accustomed areas of the Quinault Nation include "the waters adjacent to their territory" and "Grays Harbor and those streams which empty into Grays Harbor." *Id.* at 374-75; *see also United States v. Washington*, 459 F.Supp. 1020, 1097 (W.D. Wn. 1978), *aff'd* 645 F.2d

749 (9th Cir.1981). It is these rights and interests that form the basis of these comments.

SEPA Requirements

SEPA is Washington's core environmental policy and review statute. SEPA broadly serves to provide both decision makers and the public "with information about potential adverse impacts of a proposed action." *Glasser v. City of Seattle, Office of Hearing Exam'r*, 139 Wn. App. 728, 732, 162 P.3d 1134, 1136 (2007). For decades, SEPA has served these purposes effectively, requiring full environmental reviews for projects with significant environmental impacts. See RCW 43.21C.030; *Lassila v. City of Wenatchee*, 89 Wn.2d 804, 813 (1978).

In adopting SEPA, the Washington legislature declared the protection of the environment to be a core state priority. RCW 43.21C.010. SEPA declares that "[t]he legislature recognizes that each person has a fundamental and inalienable right to a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment." RCW 43.21C.020(3). This policy statement "indicates in the strongest possible terms the basic importance of environmental concerns to the people of the state." *Leschi v. Highway Comm'n*, 84 Wn.2d 271, 279-80 (1974).

Technical Comments

14-A ***Early and Meaningful Tribal Consultation***

Future proposed projects and infrastructure for green hydrogen energy may be located within Quinault's Usual and Accustomed Area (U&A). The Quinault Indian Nation requests early and meaningful engagement and consultation in assessing potential impacts and determining the significance or non-significance of such projects in relation to our treaty rights. As stated in the Draft PEIS, "The impact assessment and determinations of significance or non-significance would be done with engagement and in consultation with potentially affected Tribes at the project level" (p. 68). We expect this commitment to be upheld throughout all stages of project planning and implementation.

Siting and Cultural Impacts

The location of any green hydrogen energy facilities or associated infrastructure is a critical consideration for future projects. Infrastructure may include facilities, storage, rail lines, or pipelines, each of which could have cultural and environmental implications. We request a clear commitment from the Department of Ecology to engage in early consultation with QIN regarding potential projects within our U&A to assess and mitigate any potential cultural or environmental impacts.

14-B ***Water Quality and Quantity Considerations***

The preservation of water quality and quantity is paramount, particularly concerning salmon habitat and broader ecological integrity. The Programmatic EIS lacks specific details on water sourcing for green hydrogen projects, which creates uncertainties about potential water withdrawals and wastewater management. Future project-level reviews must thoroughly assess water use, wastewater treatment, and compliance with water quality standards to protect fish habitat and uphold treaty-protected resources. We recommend that Ecology include cumulative water use assessments in future project-level reviews to ensure there is accounting for multiple projects and activities in the same watershed.

14-C ***Transportation and Infrastructure Impacts***

Hydrogen transportation logistics must be carefully evaluated, as necessary equipment and infrastructure may vary depending on whether hydrogen is transported as a gas or liquid, and where it is transported. The PEIS should ensure that infrastructure is adequately assessed and updated as necessary to prevent adverse environmental and safety risks. SEPA requires a thorough consideration of "the range of probable impacts, including short-term and long-term effects" (WAC 197-11-060(4)(c)), as well as "direct and indirect impacts caused by a proposal" (WAC 197-11-060(4)(d)). The Department of Ecology must ensure that transportation-related risks, including potential rail system upgrades, are comprehensively reviewed in future project-specific assessments.

14-D ***Safety Concerns and Fire Risks***

Given that hydrogen is a highly combustible material, safety considerations in communities near green hydrogen facilities must be a priority. Proper separation distances between equipment, infrastructure, and surrounding communities should be carefully considered to minimize risks. Additionally, as climate change leads to more extreme weather events and an increased number of hot days, ignition risks may rise, particularly in areas prone to wildfires. The PEIS should evaluate how changing climate conditions may affect fire risk and what mitigation measures would be implemented to protect nearby communities.

14-E ***Job Creation and Economic Opportunities***

Additional details are needed on the potential job opportunities associated with specific green hydrogen projects. For any future proposal, Quinault would request specific data on the number and types of jobs that would be created, including how many positions would be permanent versus temporary, as well as how many positions would require specialized skills. Additionally, we urge Ecology to ensure that Quinault Nation and other Tribes have opportunities to participate in workforce development and that hiring practices include outreach to Tribal communities to provide equitable access to employment in these projects.

We appreciate your consideration of these comments in accordance with SEPA. Please ensure that the Quinault Indian Nation is included in all future discussions, reviews, and project-level consultations regarding green hydrogen development within our U&A. If you have questions, please contact Lauren Macfarland, Environmental Protection Manager, at Lauren.Macfarland@quinault.org.

Sincerely,

Guy Capoeman, President
Quinault Indian Nation

Coded Comment Record: Agencies

Verbal Comment:

I'm Brian Shay, the City Administrator with the city of Hoquiam. I have a few comments. I have not read this programmatic EIS from cover to cover, but I read through the executive summary and I have a few comments. I think that the goal of a PEIS and the goal of the state on clean energy is to permit some of these facilities... that we would like to see these facilities be built in our state. When I read the executive summary, I don't know that this PEIS gets us closer to having those things become a reality.

1-A I think that a lot of things are pointed out in there, like this, substantial unavoidable impacts that I don't know that are backed in science. So you know, to be effective comments like we just talked about a second ago from the staff of ecology, I think if we're going to ever call out unavoidable impacts, they need to be backed in science as proof, and if there are unavoidable impacts, the PEIS should address how those unavoidable impacts can be addressed so that these projects could ultimately be built.

1-B I find flaws in the environmental justice section. It fails to look at the benefits of low income communities. I live in one of the most severely distressed communities, and work for one, and we would love to see clean energy facilities built in our community. So I feel like the environmental justice should also look at the benefits of these being built in communities like ours.

1-C Tribal consultations, I think that that should be done now to look at tribal treaty impacts for facilities that could be built near certain tribes, to streamline the projects possibly getting permitted if they are proposed in those areas.

1-D And, you know, I just think that there's, there's a lot more that can be done with the PEIS to try to make a future project go quicker. I mean if we're not going to look at transportation impacts now, we'd only do that on a case by case basis, well then let's run some scenarios, because we've all seen the challenges that go around with life cycle greenhouse gas emissions by transportation impacts and any of that that can be done now should be done. I mean if the goal is to build these facilities in our state to move towards clean energy, then the PEIS needs to be as thorough as possible so that it is a reliable tool for some project specific application later.

Coded Comment Record: Organizations

Front and Centered

[Attached] Re: Front and Centered Comments on Ecology's Draft State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State

Re: Front and Centered Comments on Ecology's Draft State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State

Department of Ecology
Clean Energy Coordination
P.O. Box 47709
Olympia, WA 98504-7709

February 6, 2025

Thank you for the opportunity to provide input on Ecology's Draft Programmatic Environmental Impact Statement (Draft PEIS) for Green Hydrogen.

Front and Centered is a climate justice coalition of organizations led by and serving communities of color in Washington. Our mission is to advocate for the interests of frontline communities, who are first and worst impacted by the climate crisis, in advocating for a just transition from an extractive to a regenerative economy.

Environmental and climate justice requires "equity, fairness, and transparency in distributing environmental benefits and burdens, ensuring all individuals and communities have equal access to a healthy and sustainable environment while advancing just solutions to the climate crisis."[1] While green hydrogen can have positive impacts when produced and used in ways that are equitable and safe, projects must be assessed critically using environmental and climate equity frameworks to prevent many of the same harms our most vulnerable communities experience from our current, fossil-fuel dependent systems.

As green hydrogen projects are developed in Washington, production methods that do not simultaneously protect frontline communities and reduce climate warming will have serious environmental and health impacts and should not be implemented. In this letter, we seek to elevate environmental and climate justice concerns for lead agencies to consider when making decisions about green hydrogen facilities, including decisions related to siting and design, environmental reviews, mitigation measures, and assessing probable significant adverse environmental impacts.

[1] Just Solutions, Hydrogen Energy - A Critical Review to Ensure Community and Climate Benefits (2023).

7-A

I. Washington's green hydrogen definition is not aligned with global and national industry-wide usage.

Washington state's definition of green electrolytic hydrogen is inconsistent with both national and global definitions of green hydrogen developed within similar timeframes,[2] which refer to hydrogen produced through electrolysis with entirely or "near 100%" renewable energy.[3] Washington's definition for "green electrolytic hydrogen" includes hydrogen produced through electrolysis and does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock.[4]

Despite the Draft PEIS stating that current laws will require an electricity supply free of GHG emissions by 2045[5], this discrepancy in definitions is misleading. This is especially so given that many of the most prominent impacts and harms resulting from green hydrogen production are derived from the type of electricity source used and recent uncertainty about the future of the Clean Energy Transformation Act potentially altering state decarbonization requirements.[6] While the term "renewable hydrogen" is more aligned with standard definitions of green hydrogen by explicitly requiring electricity inputs be renewable[7], failing to use industry standards for commonplace terms like "green hydrogen" increases the potential for harms stemming from the use of fossil fuels in production to be improperly assessed and mitigated in Washington.

7-B

II. There will likely be significant localized pollution impacts that are not discussed in the Draft PEIS.

The Draft PEIS concludes that there will likely be less than significant pollution impacts from green hydrogen facilities based on the assumption that laws regulating air and water pollution will be met and relevant permits will be obtained and abided by. However, given the way that existing laws and permit processes allow certain communities to bear the worst effects of pollution, pollution impacts cannot accurately be assessed solely from permit and regulation compliance. Therefore, it is inappropriate to determine the significance of any impacts on air quality and local water bodies based on the likelihood of mere compliance with existing legal requirements.

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[2] Washington State Department of Ecology, State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State (Draft PEIS) (2025) at 29.
[3] Green Hydrogen Organisation, Green Hydrogen Standard 2.0 - The Global Standard for Green Hydrogen and Green Hydrogen Derivatives (2023) at 5; *Hydrogen Production: Electrolysis*, U.S. Department of Energy, https://www.energy.gov/eere/fuelcells/hydrogen-production-electrolysis (last visited Jan. 27, 2025).
[4] RCW 80.50.020(15)(a)-(b).
[5] Draft PEIS at 23.
[6] Jerry Cornfield, WA State Standard, *Washington voters approve pro-natural gas measure*, https://washingtonstatestandard.com/2024/11/08/washington-voters-approve-pro-natural-gas-measure/ (last visited Feb. 4, 2025).
[7] RCW 80.50.020(22).

The Department of Health recognizes certain "essentials" to community health like access to healthy foods, clean air, quality schools, and job opportunities as being foundational to our ability to live a healthy life.[8] Given the way past polices have led to disparate distribution of resources in different communities across the state, true health and environmental equity cannot be achieved without understanding the ways that present day decisions around siting, even when made in ways that are aligned with current laws and permit requirements, often exacerbate existing disparities resulting from "discriminatory practices, structural racism, and deep-rooted inequities."[9]

When assessing the impacts of a project on air and water quality, Ecology should use existing data in the Environmental Health Disparities map, which includes a more detailed analysis for health and pollution indicators categorized by environmental exposures and environmental effects.[10] Socioeconomic and sensitive population indicators will also be crucial to determining how certain populations are being disproportionately affected by existing pollution that will likely be exacerbated by a new green hydrogen project.

7-C

A. Impacts from wastewater pollution cannot be determined through general compliance with relevant laws and permits.

The Draft PEIS identifies wastewater generated by electrolysis as a source of water pollution for both surface and groundwater, but concludes that as long as plants comply with existing regulations and mitigation measures, there will likely be "less than significant impacts."[11] While we recognize that a more in-depth analysis of project specific impacts will happen when individual sites are assessed for feasibility, the Final PEIS should include a more nuanced discussion of the potential impacts of this type of wastewater and why mitigation for concentrated brine streams are often unsustainable. The hidden burdens of treating wastewater generated by green hydrogen, both financial and pollution based, must be included in an assessment of wastewater impacts.

Many desalination processes and treatment technologies, including options identified in the Draft PEIS such as onsite treatment or discharge to publicly owned treatment works, can be incredibly expensive and energy intensive.[12] 1 kWh of electricity is needed for every m^3 of

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[8] *Race and Place*, Washington Department of Health, https://doh.wa.gov/community-and-environment/health-equity/race-and-place (last visited Jan. 21, 2025).
[9] *Id.*
[10] Washington Environmental Health Disparities Map, Washington State Department of Health & University of Washington Environmental and Occupational Health Sciences, https://fortress.wa.gov/doh/wtnibl/WTNIBL/ (last visited Jan. 22, 2025).
[11] Draft PEIS at 113.
[12] *Id*. at 47; Kori Williams, *The desalination process gives us freshwater - at a huge environmental cost,* World Economic Forum, https://www.weforum.org/stories/2022/12/desalination-process-freshwater-negative-environmental-cost/#:~:text=Bloomberg%20reports%20that%20desalination%20uses,our%20dependence%20on%20fossil%20fuels (last visited Jan. 21, 2025).

purified water produced through desalination and currently, “only 1% of desalination projects around the world are powered by renewable energy.”[13]

Further, while it can be assumed that brine discharge will be regulated through National Pollutant Discharge Elimination System permits for surface water, osmotic shock is a local pollution risk that can harm animals, algae, and marine ecosystems at large in sensitive environments.[14]

The Draft PEIS also fails to account for gaps in existing regulations and enforcement systems that illustrates how permit compliance is not adequately indicative of pollution impacts. For example, raised water temperature caused by climate change–which contributes heavily to ecosystem health–is not explicitly regulated by the Clean Water Act (CWA). Instead, thermal pollution is regulated through requirements for “best available treatment economically available”[15] and variance processes due to the unique properties of heat pollution, such as dissipation rates.[16] However, climate change induced warming can interact with existing heat pollution and create uncertainties for water quality in ways that states are currently not explicitly required to account for when creating TMDLs.[17]

In particular, the discharge allowance for brine is limited by the scope of other pollution specific standards (like those in the CWA). As a result, if factors like climate change induced rising water temperatures are not accounted for when pollution limits are created, the resulting pollution standards are less holistic due to “additional uncertainties to the data-based assumptions in TMDLs concerning hydrologic scenarios and influences on the pollutant being addressed.”[18]

Finally, during the period of 2012-2022, the Department of Ecology has been late in submitting its impaired water list by the required deadline.[19] Since NPDES permits are created based on the specific pollution levels and sensitivities of the individual water bodies on the impaired water list, not having the most accurate and updated information at the time of permit condition setting can make compliance with NPDES permits a significantly less effective measure for pollution impacts in Washington state.[20]

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[13] Leigh Collins, ReCharge, *Vast majority' of green hydrogen projects may require water desalination, potentially driving up costs*, https://www.rechargenews.com/energy-transition/vast-majority-of-green-hydrogen-projects-may-require-water-desalination-potentially-driving-up-costs/2-1-1070183 (last visited Jan. 21, 2025).
[14] Arjun Makhijani, Ph.D. & Thom Hersbach, Ph.D., Hydrogen: What Good Is It? A Technical Exploration of the Potential of Hydrogen to Contribute to a Decarbonized Energy System (2024) at 15.
[15] See, e.g., 33 U.S.C. § 1342(a)(1)(B); 40 CFR § 125.3(c)(3).
[16] *See* 33 U.S.C. § 316(a).
[17] *See* Climate Change and the CWA 303(d) Program - Practices and Ideas From Conversations Among States, Territorial, and Tribal Staff, Environmental Law Institute, (2022).
[18] *Id.* at 2.
[19] *See* Puget Sound: Further Actions Could Improve Efforts to Address Impaired Water Quality That Threatens Salmon, U.S. Government Accountability Office, GAO-24-105687 (2023).
[20] *Overview of Listing Impaired Waters under CWA Section 303(d)*, U.S. Environmental Protection Agency,

These fundamental flaws in the permitting process indicate that permit compliance cannot be the main determinate for whether water resources are likely to be impacted.

7-D

B. Impacts from air pollution cannot be determined through general compliance with relevant laws and permits.

While Washington currently meets criteria pollutant air quality standards for most areas within the state, "compliance with laws and permits"[21] should not result in a finding of less than significant impacts on air quality. The PEIS focuses on national ambient air quality standards (NAAQS) attainment as one of the major indicators that impacts from air pollution will not be significant.[22] However, even with current attainment designations across the state, Ecology has identified 16 overburdened areas which have communities facing "a higher death rate from air pollution than the state average" because of health conditions linked to anthropogenic particulate matter 2.5 pollution.[23] These areas also have higher rates of chronic respiratory, cardiovascular conditions, and lower average life spans than people in the rest of the state.[24] PM 2.5 is a criteria pollutant with an air quality standard that is accounted for when making a final designation for an area, which means that these health risks exist even when most of the state is in attainment for NAAQS.[25] This demonstrates the ineffectiveness of relying on compliance with air quality standards set by current laws to determine the scale of air pollution related impacts stemming from green hydrogen production. Even if a potential project site is within NAAQS attainment, existing pollution burden in an overburdened community could lead to significant air quality impacts and should be a part of the programmatic risk assessment.

The Draft PEIS also states that because electrolysis uses electricity, "it does not directly produce regulated pollutants such as NOx (nitric oxide and/or nitrogen dioxide) and SOx (sulfur oxides; sulfur monoxide, sulfur dioxide, and/or sulfur trioxide) or emit carbon dioxide (CO2)".[26] Despite not being within the scope of this assessment, air pollution impacts are almost entirely dependent on the source of electricity being used for electrolysis. The entire life cycle of hydrogen, from material extraction to distribution, must be included in an impact assessment for air pollution caused by different production methods. If electrolysis is powered via a carbon-intensive grid, this technology can result in large CO2 emissions.

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https://www.epa.gov/tmdl/overview-listing-impaired-waters-under-cwa-section-303d#:~:text=What%20is%20a%20Clean%20Water,the%20water%20is%20fully%20restored (last visited Jan. 21, 2025).

[21] DRAFT PEIS at 88.

[22] *Id.* at 89.

[23] *New report shows air pollution hits Washington's most vulnerable the hardest*, STATE OF WASHINGTON DEPARTMENT OF ECOLOGY, https://ecology.wa.gov/about-us/who-we-are/news/2023/dec-28-new-report-shows-air-pollution-hits-washington-s-most-vulnerable-the-hardest (last visited Jan. 21, 2025).

[24] *Id.*

[25] *Id.*

[26] DRAFT PEIS at 45.

For example, a green hydrogen plant in Texas using electrolysis powered by a fossil-fuel heavy grid would "have an average annual carbon intensity over 20 kg CO2 per kg H2.[27] In highly industrialized areas within the geographic scope of the Draft PEIS such as Yakima and South King County, these emissions will only compound the health impacts already being felt by communities who live and work near a multitude of air pollution sources. When accounting for potential emissions from electrolysis that uses electricity produced by fossil fuels in addition to existing air pollution conditions, is it unlikely that a finding of less than significant impacts on air quality can be justified.

7-E

III. Green hydrogen projects will likely burden natural resources and public utilities resulting in significant impacts.

Some of the most serious environmental justice concerns related to green hydrogen production stem from the potential to strain water and energy resources in communities that are already facing the consequences of water scarcity, overburdened energy grids, and unaffordable energy. Priorities for local water and energy use must be weighted heavily when making siting decisions. While a site specific analysis will occur during environmental reviews of sites, certain environmental and climate justice considerations must be an integral part of the broader assessment of resource impacts due to green hydrogen as a whole.

7-F

A. Additionality must be considered when analyzing impacts on public utilities and communities throughout the state.

Despite the Draft PEIS' limited scope, which prevents meaningful consideration of hydrogen production fuel sources, impacts on public utilities and the communities who rely on them cannot be properly assessed without considering issues surrounding additionality. Additionality is the concept that renewable energy used in hydrogen production must come from new renewable sources rather than existing ones to ensure that hydrogen projects do not detract from other decarbonization efforts.[28] This is particularly important given Washington's codified distinctions between green hydrolytic hydrogen, which can use electricity derived from fossil fuels in hydrogen production, and renewable hydrogen, which must be made with renewable resources.[29] Additionality must be one of the considerations used to make decisions about hydrogen projects.

The benefits of no direct emissions from hydrogen production are not material if facilities use electricity that originally went to other homes and businesses. Even if said electricity is generated with renewables, this diversion could create gaps in supply that are filled with electricity generated with fossil fuels. The Draft PEIS is clear that analysis depends on

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[27] Tessa Wiess, Chathurika Gamage, et. al., Rocky Mountain Institute, Hydrogen Reality Check: All "Clean Hydrogen" Is Not Equally Clean, (Oct. 4, 2022) https://rmi.org/all-clean-hydrogen-is-not-equally-clean/ (last visited Feb. 4, 2025).
[28] Zachary Byrum & Ankita Gangotra, World Resources Institute, What Is There To Debate About U.S. Clean Hydrogen Incentives?, https://www.wri.org/technical-perspectives/45v-hydrogen-production-tax-credit-guidance (2024).
[29] Draft PEIS at 29.

assumptions that hydrogen facility developers have "contracted for sufficient electricity" and that state decarbonization goals will be met within mandated timeframes.[30] However, without discussing the importance of electricity sources and current grid capacity to sustain future hydrogen projects, the Final PEIS will not include an adequate discussion of "probable significant adverse environmental impacts, and related mitigation measures."[31]

7-G

B. Energy affordability is not properly identified as a significant impact.

Rising costs associated with green electrolytic hydrogen production will likely exacerbate existing inequities that put lower and fixed income people at risk from high utility debt and disconnection, and any siting decisions must consider how these costs will be felt by communities who are already experiencing this energy burden.

Current cost estimates of energy production through electrolysis are $5-$6/kg.[32] For comparison, hydrogen produced using natural gas costs between $0.5-$1.7/kg.[33] A study that looked at U.S. grid-based hydrogen production found that failure to account for additionality, along with deliverability and hourly matching, could increase power prices in California by 8%.[34] These higher production costs, as well as increased competition for limited energy supply, raise questions about how these additional demands on the electrical grid will affect consumer electrical rates.This demonstrates that even if sufficient renewable electricity supplies exist to support hydrogen production, there are a wide range of impacts related to energy affordability that must also be a part of the framework for green hydrogen production.

Cost related impacts of hydrogen are not assessed in the Draft PEIS based on the assumption that impacts related to construction, operation, and decommissioning a green hydrogen plant using biomass fuels or renewable natural gas would not change despite high production costs because a plant would not be built where it was not cost-effective to provide these fuels.[35] Electrolysis is a highly energy intensive process, which can require 50 kWh for every 1 kg hydrogen produced.[36] Environmental justice concerns and cumulative impacts associated with green hydrogen must include an assessment of the potential cost burden associated with high production costs that could be felt by proximate communities.

7-H

C. Water scarcity is not accurately weighted as a limiting factor for green hydrogen projects that could have severe impacts on nearby communities and the local environment.

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[30] *Id.* at 22, 209.
[31] RCW 43.21C.535(1).
[32] Cost of Electrolytic Hydrogen Production with Existing Technology, U.S. Department of Energy (2022) at 1.
[33] Global Hydrogen Review, International Energy Agency (2021) at 7.
[34] *See* Wilson Ricks & Qingyu Xu et. al, Minimizing emissions From grid-based hydrogen production in the United States, 18 Environ. Res. Lett.1 (Jan. 6, 2023).
[35] Draft PEIS at 144.
[36] *Id*. at 213.

Availability of water resources is one of the most important factors to consider when making siting decisions for green hydrogen, as the amounts of water needed for these processes are staggering. A single SMF facility could use over 293 million gallons of water a year.[37] On a national scale, low-end estimates of green hydrogen production would require 140 billion gallons of water per year.[38] Even if the proper water rights and related permits were issued, confirming the underlying assumption in the PEIS' analysis that this ensures there is enough water to meet production demand, it is still highly unlikely that there will be no significant impacts on water availability for the broader area.

The Draft PEIS analyzes water resources impacts with the assumption that if enough water does not exist to support a green hydrogen project, it would not be built due to infeasibility.[39] Therefore if there is enough water to sustain a project, that must mean that "no significant and unavoidable adverse impacts related to water resources would occur."[40] Despite water resources being a highly site-specific issue that will be further analyzed in the environmental review stage, the Final PEIS should include a general assessment of the ways green hydrogen could impact water resources in different areas of the state. Raising these issues in the Final PEIS will provide agencies and local jurisdictions with better guidance and more information as they develop mitigation strategies and community impacts.

For example, some central Washington locations within the geographic scope of the study include cities within the Yakima River Basin, such as Sunnyside, Yakima, and Kennewick. When determining whether adverse impacts related to water could occur if a project were to be built in this area, some necessary context is missing. In 2023, Ecology declared a drought emergency in the Yakima River Basin that remained in effect into 2024.[41] Even outside of periods of drought, "water is a finite resource in the Yakima Basin."[42]

The geographic scope also includes potential project sites in Clallam and Whatcom counties, where communities have dealt with low surface water and groundwater availability and have had to truck in water to meet their needs."[43] For agricultural areas, junior water rights were curtailed to protect senior water rights and for private landowners, warnings were issued to prepare for reduced pumping from local shallow wells.[44] Given existing stressors on water resources already being experienced across the state and future climate trends indicating that

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[37] Draft PEIS at p. 114.
[38] Arjun Makhijani, Ph.D. & Thom Hersbach, Ph.D., Water Requirements □or Various Approaches to Hydrogen Production: Quantitative, Siting, and Resilience Considerations, Institute for Energy and Environmental research (2024) at 5.
[39] *See* Draft PEIS at 102.
[40] *Id.*
[41] *Supporting a drier Yakima Basin in 2024*, Department of Ecology, https://ecology.wa.gov/blog/march-2024/supporting-a-drier-yakima-basin-in-2024 (last visited Jan. 16, 2025).
[42] *Id.*
[43] *Drought Response*, Department of Ecology, https://ecology.wa.gov/water-shorelines/water-supply/water-availability/statewide-conditions/drought-response (last visited Jan. 16, 2025).
[44] *Id.*

our region will likely "see longer and more severe droughts in the future," it is unlikely that green hydrogen would have no significant and unavoidable adverse impacts related to water resources.[45]

Further, the true scale of water resources needed for green hydrogen cannot fully be realized without considering water usage for electricity sources used in hydrogen production. While outside the scope of the PEIS, gross water use rather than net water use must be included in decision making processes. For example, impacts on water resources will vary depending on whether renewable electricity or thermal electricity is used during electrolysis, the latter of which uses substantial quantities of water with an average of 15 gallons used to produce one kWh of electricity.[46] While this type of analysis will occur on a project specific level, it is crucial to identify these potential impacts at the PEIS level to avoid replicating the same harms and inequities perpetuated by current fossil fuel extraction and production methods.

7-I

IV. Broader transportation justice concerns must be properly identified at the programmatic level.

The Draft PEIS concludes that there will likely be less than significant impacts on transportation despite acknowledging an anticipated increase in heavy trucks, personal vehicles, rail shipments, trains, and barge transport that will contribute to traffic delays and congestion.[47] Given that many areas being considered for potential green hydrogen projects are already experiencing heavy traffic due to other industrial operations,[48] any transportation analysis must consider the ways green hydrogen projects could compound existing conditions. The Final PEIS should include a general framework for assessing transportation impacts, which can be done without getting into a more site specific analysis.

7-J

The PEIS also states that transportation of hydrogen is outside the scope of the document despite this technical challenge being at the core of many environmental justice concerns. The PEIS must include hydrogen transport to facilities in Washington as part of its program level impact assessment, because leaving this analysis to the individual project level could result in inconsistent and inadequate consideration of cumulative risk. For example, many of the risks associated with leaks occur at the transport phase of production due to hydrogen's light and flammable characteristics.[49] Hydrogen must also be compressed to be stored in vehicle tanks,

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[45] *Drought and Climate Change in Idaho, Oregon, and Washington*, U.S. Department of Agriculture, https://www.climatehubs.usda.gov/hubs/northwest/topic/drought-and-climate-change-idaho-oregon-and-washington (last visited Jan. 16, 2025).
[46] *Water Resources Mission Area - Thermoelectric Power Water Use*, United States Geological Survey, https://www.usgs.gov/mission-areas/water-resources/science/thermoelectric-power-water-use (last visited Jan. 15, 2025).
[47] Draft PEIS at 196.
[48] Areas within the geographic scope of the Draft PEIS include Spokane, Olympia, Tacoma, South Seattle, Vancouver, and Kennewick, all of which have a 7 or higher on the WA EHD map for the "Proximity to Heavy Traffic Roadways" environmental exposure indicator. *See WA Environmental Health Disparities Map*.
[49] Aurelien Bigo, *Hydrogen in transport: everything you need to know in 10 questions*, Polytechnique Insights,

which is an energy-intensive process.[50] The true risks associated with transportation cannot be fully accounted for without determining how far hydrogen must be transported to project sites in the state. Vehicle and tank size used for transport is highly dependent on transportation time frame, which will also impact strain on local infrastructure, which further proves the need to account for these potential scenarios at the PEIS level.[51] If green hydrogen projects are built in overburdened communities, increased use of and development of existing transportation infrastructure would increase the likelihood of disproportionate impacts on communities who are already experiencing environmental harms from living near heavy transportation corridors. This type of broader analysis must occur at the programmatic level to identify potential cumulative risks for overburdened communities.

7-K

V. Climate and warming impacts stemming from hydrogen leaks must be included in GHG emission evaluations.

The PEIS' assessment of GHG emissions only considers emissions from direct production. An accurate analysis of potential climate impacts stemming from green hydrogen production and operation must include leakage scenarios in addition to direct emissions. Leaks are highly variable and can occur at all stages of the hydrogen life cycle, the warming impacts of which could be significant.[52] Industry related green hydrogen leakage estimates can range from 0.48% to 10.62%[53] and in some scenarios, leakage can result in exceedances of the Department of Energy's guidance on clean hydrogen with an established target of 4.0 kgCO2e/kgH2 for life cycle emissions.[54] While total emissions will be project-specific and dependent on factors such as production energy sources and mitigation technologies, an assessment of potential impacts even at a "broad level"[55] must include a more robust analysis of climate impacts to avoid minimizing the severity of potential risks.

The Draft PEIS accurately states that hydrogen is included in GHG emission evaluations despite it not being a GHG itself due to its warming impacts.[56] However, none of the potential warming processes associated with hydrogen leaks are explained and it is unclear how potential reactions are accounted for in the impact analysis for any of the production processes or associated activities despite these interactions accounting for a substantial portion of hydrogen's total warming impact.[57] Hydrogen reacts with hydroxyl radicals which increases atmospheric

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https://www.polytechnique-insights.com/en/columns/energy/hydrogen-in-transport-everything-to-know-in-10-questions/#:~:text=As%20this%20gas%20is%20particularly,that%20make%20vehicles%20very%20heavy (Nov. 16, 2022).

[50] *Id.*

[51] *Id.*

[52] Arjun Makhijani, Ph.D. & Thom Hersbach, Ph.D., Hydrogen: What Good Is It? A Technical Exploration of the Potential of Hydrogen to Contribute to a Decarbonized Energy System (2024) at 15.

[53] *Id.* at 43.

[54] U.S. Department of Energy, U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Guidance (2023); *Id.*

[55] Draft PEIS at 4.

[56] *Id.* at 90.

[57] Makhijani & Hersbach, What Good is Hydrogen? at 14.

methane concentrations, tropospheric ozone, and stratospheric water vapor. So while hydrogen emissions alone do not have a warming impact, leaks can lead to increased warming through how hydrogen interacts with other common gasses in the air.

7-L

VI. The cumulative impacts analysis should be more integrated in the PEIS to better identify and assess potential harms to overburdened communities.

The Draft PEIS takes a siloed approach to assessing cumulative impacts that limits how risks and impacts are assessed by topic. For example, the cumulative impacts assessment lists reasonably foreseeable future actions (RFFAs) and considers them by looking at each impacted resource.[58] Cumulative impacts to public services and utilities will likely increase, but earlier in the PEIS it states that green hydrogen facilities would "likely result in less than significant impacts on public services and utilities."[59] By not integrating consideration of cumulative impacts into the greater analysis, discrepancies in identified impacts and findings of whether these impacts will likely be significant are less accurate and can lead to greater harms.

The cumulative impacts assessment also results in findings that are so broad that it will be difficult to meaningfully incorporate them into project specific assessments. When assessing potential cumulative impacts for water resources, a whole range of issues including spill of hazardous materials, ground disturbance, decrease in floodplain function, risk to habitat and wildlife projects, drought conditions, and water scarcity are listed.[60] Despite these being serious risks that would impact most facets of life for nearby communities and ecosystems, the section concludes by stating that "cumulative impacts to water resources from green hydrogen facilities and other RFFAs may increase or decrease, depending on the size, type, and number of activities within a given area."[61] While specific conclusions for each project cannot be determined at this stage of analysis, it is almost certain that cumulative impacts in an area will increase based on both RFFAs and highlighted impacts. A key finding of "impacts that range from less than significant to potentially significant" is similarly broad and leaves this crucial analysis, upon which many of the potential mitigation measures implemented hinges upon, to the discretion of individual project managers and local jurisdictions.

Assessing potential impacts for green hydrogen projects can only be done by considering the greater context of existing conditions. This can be done in a generalized way without getting into a site-specific analysis by being realistic about the ways impacts that have already been identified in the Draft PEIS would affect surrounding communities. Drawing clearer conclusions about the scale of potential impacts is not only more protective of frontline and overburdened communities, but would also benefit local jurisdictions by allowing for more impactful mitigation measures to be assessed on a project level.

[58] DRAFT PEIS at 218.
[59] DRAFT PEIS at 102, 232.
[60] *Id.* at 225.
[61] *Id.*

7-M VII. Conclusion

When environmental justice principles and community leadership are at the core of decisions made throughout the entire hydrogen supply chain, including production, storage, transportation, and utilization of hydrogen, there is potential for positive local impacts and technological advances in energy generation that are necessary to achieve a carbon-free energy future. Washington state has been a national leader of environmental justice through groundbreaking initiatives like the Clean Energy Transformation Act and the Healthy Environment for All Act and has the opportunity to build upon this legacy by creating equitable and comprehensive frameworks for green hydrogen implementation.

Since the impacts of green hydrogen are highly dependent on production methods, inputs, and end uses,[62] the programmatic level assessment of risks must include a high-level analysis of the entire supply chain. Failure to do so can perpetuate and even exacerbate existing harm in overburdened communities caused by exploitative resource extraction methods that prioritize capital gain over climate justice and public health. In order to fully experience the emerging benefits of green hydrogen, the PEIS should include a more robust analysis of potential impacts related to: (1) local pollution impacts including wastewater and air quality, (2) the potential burden on natural resources and public utilities with a focus on energy affordability, additionality, and water scarcity, (3) inequitable transportation impacts, (4) climate impacts from different warming scenarios, and (5) develop a more holistic and integrated cumulative impacts analysis.

We appreciate the opportunity to provide comments. Please do not hesitate to contact us if you have any questions.

Sincerely,

Jamie Hearn, Climate and Community Planning Lead
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Cameron Steinback, Climate Justice Program Manager
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Aurora Martin, Executive Director
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[62] *Hydrogen Energy: A Critical Review to Community and Climate Benefits*, JUST SOLUTIONS, https://justsolutionscollective.org/our-work/hydrogen-ej-framework/ (last visited Feb. 3, 2025).

Joint Environmental Organizations

Please see attached

Diane Butorac
Clean Energy Coordination
Department of Ecology
PO Box 47709
Olympia, WA 985-04-7709

Re: Draft Programmatic Environmental Impact Statement for Green Hydrogen Facilities in Washington State

Dear Diane Butorac:

Thank you for the opportunity to provide comments on the Department of Ecology's draft Programmatic Environmental Impact Statement (PEIS) on Green Hydrogen Energy Facilities. We appreciate Ecology's ongoing work to develop clean energy programs in Washington.

The undersigned represent organizations that work collaboratively on environmental issues in Washington to develop, advocate, and defend policies that ensure environmental progress and justice for our state. We are committed to working for an equitable transition to a clean energy economy, and we submit the following comments to inform the final draft of the PEIS for Green Hydrogen Facilities.

10-A **2.4 Development of green hydrogen facilities**

2.4.1 Site characterization

The PEIS should include consideration for permit compliance and/or proper decommissioning when a hydrogen facility is built as an expansion to a current facility or in the place of a former, decommissioned facility. As future green electrolytic and renewable hydrogen facilities are likely to be co-located with other types of facilities or constructed at the site of former industrial facilities, it is important that a hydrogen facility is not constructed on a site where an existing facility has any unpermitted prior projects and/or is out of compliance with existing permits, a site that shares infrastructure with an existing facility that has any unpermitted prior projects and/or is out of compliance with existing permits, or a site of a former industrial facility that was improperly decommissioned. This should be added to the list of activities in the site characterization process that would involve minimal or no site disturbance.

10-B **3.1 Geographic scope of study**

We are concerned that a parcel of the Hanford Site is included in the geographic scope of study. With the fire and explosion risks associated with hydrogen production and storage, the dangers of radioactive waste, and the ongoing leakage and cleanup at the Hanford Site, we ask Ecology to completely remove the Hanford Site from the study.

10-C **4.1 Tribal rights, interests, and resources**

We appreciate Ecology's work in the draft PEIS to respect Tribal sovereignty, rights, interests, and resources. While the siting and design considerations will be helpful to developers, it is important that impact assessment and determinations of significance or non-significance will be conducted in consultation with Tribes at the project level. This is necessary for respecting the sovereignty of each Tribe and the uniqueness of each potential location.

10-D **4.2 Environmental justice**

We appreciate Ecology's attention to environmental justice and adverse effects on overburdened communities. At the same time, we urge Ecology to include more robust discussion, recommendations for community benefits, and specific ways that a facility might provide benefits for communities in the final PEIS. Examples could include local hiring and living wage commitments, investments in affordable housing and community green spaces, and childcare and healthcare centers.

10-E **4.4 Air quality and greenhouse gases**

The PEIS should include more detailed information about the ways hydrogen can function as an indirect greenhouse gas. While the potential global warming effects are noted later in section 5.3.4, hydrogen's significant long-term global warming potential should be discussed more in depth in *Chapter 4: Affected Environment, Potential Impacts, and Mitigation*.

10-F *4.4.3.1 Impacts*

As noted in 2.5.1.4, bio-gasification facilities could potentially use several different biomass feedstocks, including field and forest residue, wood, and dedicated crops. Each of these feedstocks would have a different level of carbon intensity and lifecycle greenhouse gases. Table 2-3 delineates between forest residue, wood pellets, and switchgrass, but Table 4-7 does not

separate the various biomass feedstocks. We urge Ecology to expand the data on lifecycle emissions for bio-gasification and delineate between forest residue, wood pellets, and switchgrass.

10-G Carbon capture is briefly mentioned in 4.4.3.1, as a likely means of lowering greenhouse gas emissions, but the PEIS does not cover the impacts of carbon capture and storage. Carbon capture and storage has its own unique risks and threats to the environment and public health. If carbon capture technology is a commonly anticipated aspect of hydrogen production, the PEIS should make it clear that carbon capture will require separate studies and permitting.

10-H **4.5 Water**

We are concerned that the draft PEIS declares only "less than significant impacts" throughout the section on water and water quality. In each case, the finding of less than significant impacts is explicitly dependent on compliance with laws and permits. However, there is already significant over-appropriation of water in Washington, and complying with laws and permits does not guarantee that there will be less than significant impacts to water. This is especially important to note with regard to the Yakima River Basin, which has several plots within the geographic scope of the study. As Washington continues to experience warmer temperatures than ever and droughts become more frequent, water will only become more over-appropriated than it already is. Over the course of a hydrogen facility's decades-long life, less than significant impacts today could be very significant in the future. We urge Ecology to reassess impacts to water in light of expected climate change trends, expand recommended actions beyond compliance with laws and permits, and require projects to specify the water sources that will be used in addition to the quantity of water.

10-I **4.15 Public services and utilities**

4.15.3.1 Impacts

In considering impacts on emergency response services, significant impacts should be considered in more than just remote areas. Some cities in Washington may also have limited response capabilities to attend to possible disasters at a hydrogen facility without significantly investing in local emergency response services. We urge Ecology to consider impacts on emergency response services to all areas.

10-J **Consistent definitions across state and federal agencies**

The PEIS should use language that is consistent with terms and definitions used by other state and federal agencies. It is misleading to use the term *green hydrogen* to collectively refer to both green electrolytic hydrogen and renewable hydrogen made from renewable hydrocarbons. In most state, federal, and international documents, the classification of *green* only applies to green electrolytic hydrogen. On an international level, the United Nations defines *green hydrogen* as hydrogen produced through electrolysis, adding that "To be considered green hydrogen, the electricity required for its production should mostly come from renewable power sources, such as solar, wind and geothermal."[1] Federally, Section 45V of the Inflation Reduction Act collectively refers to low-emission hydrogen production as *clean*, rather than *green*. It is especially confusing that the Washington State Department of Commerce report on green electrolytic hydrogen and renewable energy "focuses exclusively on green hydrogen production, which uses renewable electricity to convert water to hydrogen using an electrolyzer."[2]

Because Commerce's study, which was published before the scoping process for the hydrogen PEIS began, has a clear definition of *green hydrogen* that refers only to green electrolytic hydrogen, Ecology should not use a contradicting definition in the PEIS. In order to make such documents accessible and understandable for the public, readers should not be expected to alternate between agency- and jurisdiction-specific definitions that contradict each other. Both green electrolytic hydrogen and renewable hydrogen may be referred to as *clean*, but should not be referred to as *green*. As a specific goal of Clean Energy Environmental Impact Statements is to "provide consistent information,"[3] the PEIS for green electrolytic hydrogen and renewable hydrogen should use a common set of definitions across the many documents and reports that developers and agencies are likely to consult. Consistent, shared language is necessary for transparency and better public understanding in the rapidly changing landscape of emerging fuel technologies.

Thank you for considering these comments.

Sincerely,

Keith Curl-Dove
Fossil Fuel Campaign Manager
Washington Conservation Action

[1] https://www.un.org/africarenewal/magazine/july-2022/green-hydrogen-viable-option-transforming-africas-energy-sector
[2] Washington Department of Commerce, "Green Electrolytic Hydrogen and Renewable Fuels," p.85.
[3] https://apps.ecology.wa.gov/publications/documents/2306013.pdf

Audrey Leonard
Staff Attorney
Columbia Riverkeeper

Lovel Pratt
Marine Protection and Policy Director
Friends of the San Juans

Logan Danzek
Policy Manager
Communities for a Healthy Bay

James Moschella
Climate and Health Program Manager
Washington Physicians for Social Responsibility

RENEWABLE HYDROGEN ALLIANCE

Attn: Diane Butorac
Section Manager
Clean Energy Coordination
Department of Ecology
PO Box 47709
Olympia, WA 98504-7709

RE: Public Comment Period for Draft Green Hydrogen Programmatic Environmental Impact Statements

Dear Diane:

Thank you for the opportunity to provide comments on the Draft Programmatic Environmental Impact Statement for Green Hydrogen Facilities in Washington State (PEIS).

The Renewable Hydrogen Alliance (RHA) appreciates the thoughtful approach to the development of this PEIS, and the hard work put into the draft by Ecology staff. The draft appropriately acknowledges the important role that green hydrogen will play in Washington's economy and clean energy transition, and the real-world experience that early-stage producers in the state are already having regarding safety, benign environmental effects and positive community impacts.

RHA supports the high-level findings of the PEIS.

RHA supports the findings that impacts to water availability and resources, electric and RNG availability, and hazardous exposures will be less than significant, with the appropriate caveat that this is the case if all compliance, mitigation and required conditions have been met in the SEPA permitting process.

11-A RHA also supports the finding that GHG emissions from non-fossil sources will have less than significant impacts on lifecycle GHG emissions. With that noted, RHA would encourage narrow use of lifecycle GHG emissions so as not to overcount upstream or downstream emissions in ways that are inconsistent with emissions accounting for other clean energy technologies such as wind and solar. Hydrogen emissions are appropriately accounted through well-to-gate emissions for hydrogen production facilities and well-to-wheel emissions for road transportation applications such as LCFS.

11-B RHA appreciates the attention by Ecology for safety considerations in "remote locations with

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limited response capabilities". By their nature, many hydrogen projects are located in rural, industrial, or remote areas, and RHA would encourage state and local governments to continue to coordinate to ensure sufficient support and resources for the communities that will be hosting the first round of hydrogen projects.

11-C RHA appreciates the considerations by Ecology to understand and mitigate impacts to communities located in and around hydrogen projects. RHA encourages Ecology to continue to clarify potential compliance and mitigation activities for developers, especially for developers who have established "community benefit plans" or similar community due diligence activities.

11-D Especially, RHA would encourage clarity on how the Hydrogen EJ Toolkit under development by Commerce would align with the program of mitigations outlined by Ecology.

11-E **RHA encourages the PEIS to consider a wider range of potential green hydrogen projects.**

Given that this PEIS is a high level, guidance document meant to inform the individual project permitting process, RHA believes that it appears to treat the green hydrogen industry fairly relative to other industrial development in the state. However, RHA would encourage Ecology and this PEIS to broaden the established project parameters to encompass a wider spectrum of projects. More specifically, RHA members recommend that Ecology consider a wider range of potential hydrogen projects and environmental impacts, including expanding the expected footprint, range of water outcomes, employment numbers, electricity requirement and construction timeline.

11-F The PEIS assumes a range of 1-10 acres of land use for hydrogen. However, there is a national trend towards larger hydrogen production facilities to achieve economies of scale and drive down the $/kg price. RHA would recommend that the PEIS consider projects of up to 100 acres to be consistent with trends expected by local developers.

11-G The PEIS assumes a range of 1-3 years for project construction. However, hydrogen production facilities can come in a variety of sizes, and some of the smaller near-term projects under development may be able to complete construction in as little as 6 months. RHA would recommend that the PEIS consider construction ranges accordingly to be consistent with trends expected by local developers.

11-H The PEIS identifies approximately 200 siting, design, and mitigation considerations. Many of these considerations are discretionary and may not be fully achievable depending on the project. If a project was to 'Tier' off the PEIS as is the intent, the need for discretionary review by the lead agency could extend the environmental review process. Therefore, RHA would recommend that the PEIS establish mechanisms that clarify guidelines for agency review to ensure applications are processed efficiently within a reasonable timeframe.

Thank you again for your work on this and the opportunity to comment. If you or other Department of Ecology staff have any questions, please do not hesitate to reach out to us.

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Regards

Erin Childs
Executive Director
Renewable Hydrogen Alliance

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Coded Comment Record: Businesses

NOVO HYDROGEN

NovoHydrogen, Inc.

NovoHydrogen ("Novo") is pleased to provide comments to the Washington Department of Ecology ("Ecology") regarding the draft Programmatic Environmental Impact Statement ("PEIS") for Green Hydrogen Energy Facilities in Washington State. We appreciate the opportunity to engage with Ecology staff during this process.

NOVO HYDROGEN

February 6, 2025

Clean Energy Coordination
Department of Ecology
PO Box 47709
Olympia, WA 98504-7709

RE: Public Comment Period for Draft Green Hydrogen Programmatic Environmental Impact Statements

Dear Ecology staff,

NovoHydrogen is pleased to provide comments on the draft PEIS with recommendations for green electrolytic and renewable hydrogen production and storage facilities in Washington State. We appreciate the opportunity to engage with Ecology staff during this process.

Novo is a green hydrogen project developer based in the United States with several decades of combined renewable energy development and oil and gas experience throughout North America. Novo brings this expertise to the difficult-to-decarbonize industrial, transportation, and power sectors through the development and supply of green electrolytic hydrogen. Novo's core areas of focus include the origination, procurement, project development, financial structuring, construction, and operation of green hydrogen production facilities. Washington is a key market for Novo.

We commend efforts made to improve siting and permitting of green hydrogen projects in Washington in support of the state's decarbonization goals. We urge Ecology to consider the following comments in advance of finalizing the PEIS.

5-A

1. **Separately assess green electrolytic hydrogen and renewable hydrogen projects in the PEIS**

According to section 1.3 of the draft PEIS, the study assesses several types of "green hydrogen" production facilities such as those that use electrolysis, steam methane reforming, pyrolysis, and bio-gasification. However, different methods of hydrogen production are not assessed individually but rather grouped together throughout the study. By grouping these types of projects together, green electrolytic hydrogen producers are unfairly burdened by negative environmental impacts associated with other methods of production.

This is inconsistent with the Washington state tax code as well. According to RCW 36.57.140, green electrolytic hydrogen is defined as "hydrogen produced through electrolysis, and does not include hydrogen manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock." While this definition is mentioned in section 2.1, the study does not separately analyze electrolytic production pathways from those that produce "renewable hydrogen" which covers a broader range of projects including those that use steam methane reforming, pyrolysis, and bio-gasification.

Moreover, the U.S Department of Treasury recently released final regulations for the Section 45V Clean Hydrogen Production Tax Credit ("45V"), which incentivizes the use of hydrogen production pathways that demonstrate a well-to-gate carbon intensity of less than 0.45 kg CO_2/kg H_2. Since electrolysis powered by renewable energy sources is the only feasible way to achieve this emissions threshold, electrolytic hydrogen pathways will increasingly be the preferred method of production. It is therefore imperative that Ecology distinguish the different environmental impacts associated with green electrolytic hydrogen and renewable hydrogen production in all parts of the PEIS.

5-B **2. Include sourcing power for hydrogen production in the scope of the PEIS**

Section 2.3 of the draft PEIS makes clear that end uses and power sources are not factored into the scope of the analysis as these factors can be project-dependent. While that can be true, we urge Ecology to consider evaluating the most common project constructs that are likely to be deployed in Washington State.

5-C Given the versatility of hydrogen as an energy carrier, we understand and agree with Ecology's conclusion to not analyze end uses in the study. However, the power supply for electrolysis can be more predictable. According to the final regulations for 45V, Washington State received an exemption from a provision known as "incrementality", a requirement for hydrogen producers to source power from newly built or incremental renewable energy resources. Having an exception to this requirement means that green electrolytic hydrogen production in Washington is likely be powered by local electric utilities through a grid connection. If the intent of the PEIS is to "capture the types of facilities and technologies most likely to be proposed based on current and best available information", then Ecology should include the most common forms of sourcing power which, in this case, should include projects that connect to local electric utilities for power supply.

5-D **3. Increase the acreage assumptions for green hydrogen projects**

In section 2.3, the PEIS assumes a range of 1–10 acres for land use requirements of all hydrogen production facilities based on the size of similar industrial facilities. We urge Ecology to expand this size range to account for the growth of the hydrogen industry and construction of larger facilities beyond what is currently deployed.

Most of the green hydrogen production facilities currently deployed or announced are smaller scale projects or potentially even pilot projects. According to the U.S National Clean Hydrogen Strategy and Roadmap, the U.S expects to produce 10 million metric tons ("MMT") of clean hydrogen annually by 2030, 20 MMT annually by 2040, and 50 MMT annually by 2050. As the green hydrogen industry grows, projects will likely increase in size to accommodate growing demand for low carbon feedstocks and fuels. NovoHydrogen is currently developing a project in Texas that can produce up to 175 metric tons per day, which may require up to 100 acres for the hydrogen facility alone, in addition to tens of thousands of acres for large-scale wind and solar power generation infrastructure. In contrast, our project in eastern Oregon is expected to produce 550 kg per day of green electrolytic hydrogen, (orders of magnitude smaller than the Texas project), and we are

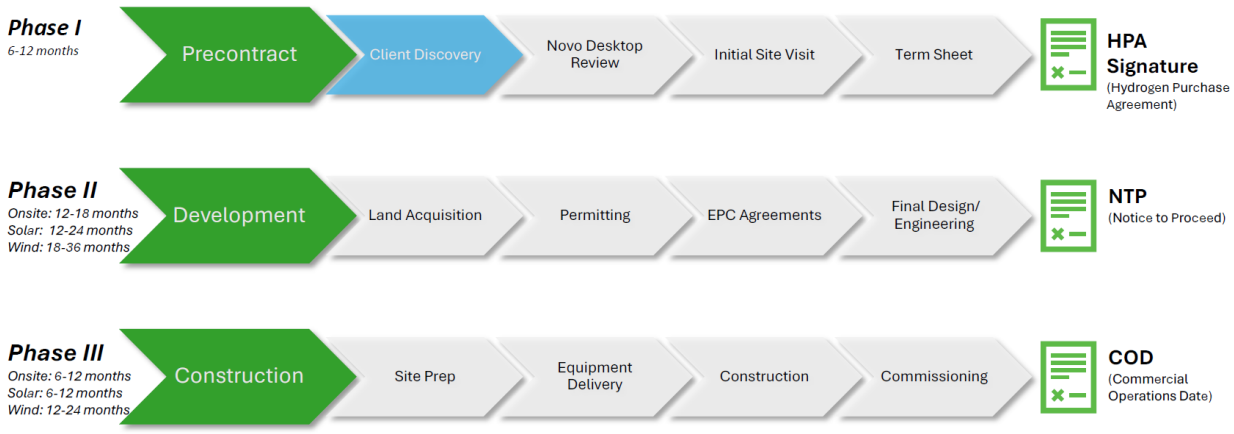
leasing about 10 acres which would align with the maximum bound used in the study. Therefore, a range of up to 100 acres is more suitable for the scale of projects that are currently being planned.

5-E

4. Reduce the construction timeline assumption for green hydrogen projects

In section 2.4 the PEIS assumes that the timeline for construction would be 1–3 years dependent on the size of the facility. This assumption is inconsistent with Novo's understanding of "construction" which we define to include site preparation, equipment delivery, facility construction, and commissioning. Using this definition, Novo expects to complete construction in 6–12 months for smaller, onsite projects (which would be the case for a 1–10-acre site that is modeled in the PEIS) that don't require the development a renewable energy generation facility.

Another way we think about the construction timeline is dependent on the energy source providing power for our production facility. As demonstrated in the graphic below, "construction" can take anywhere from 6–24 months dependent on the project including incremental solar/wind resources or an onsite project that connects to a local electricity grid. We urge Ecology to reduce the construction timeline and clarify the definition to include specific project development milestones.



5-F

5. Expand the staff assumptions for green hydrogen projects

In section 2.4, the PEIS assumes that 1–3 full-time employees would be sufficient to operate a hydrogen production facility on 10 acres of land whereas smaller facilities (e.g a project on a 1-acre site) would have limited staffing hours with remote operations. These assumptions are generally in line with the full-time operations jobs Novo expects to create for our smaller projects. However, we urge Ecology to expand the staff assumptions to account for both medium-to-large sized projects that create more operational jobs and the number of jobs created during construction.

For Novo's 550 kg per day project in eastern Oregon, we expect to create 20–30 construction jobs and 1–10 long-term operational jobs. The 175 metric ton per day project in Texas is expected to create 400–600 construction jobs and 10–20 well-paying, full-time jobs. This also includes jobs created through apprenticeship programs, a requirement to maximize the credit value for 45V.

NOVO HYDROGEN

5-G **6. Use a wider range for electricity and water consumption assumptions for green hydrogen projects**

In section 2.5, the PEIS assumes that 2–3 gallons (7.6–11.4 liters) of water is typically required to produce 1 kg of hydrogen using electrolysis and around 1 gallon would be discharged as wastewater. These assumptions are far too conservative and do not distinguish between "reacted" or "consumed" water versus water that is needed for the electrolysis process. Most PEM electrolyzer technologies utilize more than this amount as an input to produce 1 kg H_2, but only a portion is reacted electrochemically. The balance is processed water and comes out as effluent, or more concentrated mineralized water which could potentially be re-used, as an example, for agricultural use. It should not be categorized as wastewater in the PEIS. Typically, between 20–30 liters of water is needed to produce 1 kg H_2, but only 1/3rd on average gets reacted or consumed. The remaining 2/3^{rds} is left as a byproduct that can be used for other purposes with no or minimal treatment.

5-H Section 2.5 also makes assumptions about the electricity requirements for electrolysis which are shown to be about 50 kilowatt-hours (kWh) of energy to produce 1 kg H_2. We suggest using a wider range of electricity requirements to account for different electrolyzer technologies and future improvements to efficiency. An acceptable range for the PEIS should be between 50–60 kWh/kg H_2.

We thank you again for the opportunity to provide these comments, and we look forward to continued engagement with Ecology staff.

Sincerely,

Kate Hopkins

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PUGET SOUND ENERGY

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Re: PSE Scoping Comments regarding Ecology's Green Hydrogen PEIS

Dear Ms. Butorac.

Thank you for the opportunity to comment on the Department of Ecology's ("Ecology's") Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State ("Draft PEIS"). Puget Sound Energy, Inc. ("PSE") is deeply invested in the state's efforts to support a workable path forward on our energy future. PSE provides electric power service to approximately 1.2 million customers and natural gas service to 900,000 customers across ten counties in Western Washington. Complying with the Clean Energy Transformation Act and our own aspirational goals requires coordination and support. We greatly appreciate Ecology's diligence in the timely release of the Draft PEIS and the thoughtful analysis contained therein.

As a proud member of the Pacific Northwest Hydrogen Hub ("PNWH2"), PSE has been on the frontlines of green hydrogen development. Our experience has shown us that building a hydrogen economy is exceptionally difficult and requires governmental and financial support that, while moving towards a clean energy future, allows for flexibility in that development. We have seen that federal tax law and funding can breathe life into hydrogen development and—if removed— limit its viability. We have also seen that for off takers and end users to risk the substantial investment in new infrastructure (much of which also contains first-of-its-kind technology), there needs to be diversity in hydrogen production.

8-A Due to the tremendous hurdles faced by hydrogen developers and end users, PSE reiterates comments made in our previous comment letter on scoping. We understand that Ecology has made intentional choices as to the Draft PEIS's scope, but we would like to emphasize that by omitting key methods of hydrogen production and transport, Ecology limits the potential use of the document for future development. Because a key lesson from the last five years is that system level constraints (e.g., governmental incentives and production pathways) can fundamentally undermine this emerging economy, we respectfully reemphasize the benefits of increase the PEIS's scope before it goes final.

Most significantly, by excluding consideration of the potential impacts of building hydrogen pipelines between production facilities to end users (the nature of which are regularly limited and capable of being mitigated), Ecology misses an opportunity to provide meaningful analysis of facilities that are reasonably foreseeable to be required. Hydrogen production does not exist in a vacuum. There must be an economy of end users to buy that hydrogen. Including pipelines in the analysis of the Final PEIS would help end users to see a path in Washington for hydrogen development and use.

PUGET SOUND ENERGY

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8-B PSE also encourages Ecology to include an expanded discussion on hydrogen production through pyrolysis, including a discussion of using natural gas as a potential bridge fuel while a more reliable and robust supply of renewable natural gas and/or biomass is developed and reliably available in Washington. Today, end users throughout Washington— including PSE— are looking for reliable sources of renewable natural gas and biomass. The bottom line, however, is that the quantity of renewable natural gas that would be required to support a green hydrogen economy is not yet available. Moreover, there are serious questions as to whether it is prudent to prioritize the use of renewable natural gas for hydrogen production. In other words, if renewable natural gas were available in large quantities, would it make sense to convert that gas to another energy resource? From an energy generation perspective, renewable natural gas can be used directly for electricity production; converting renewable natural gas into hydrogen both takes energy and the resulting gas (green hydrogen) has less energy density on a volumetric basis.

Application of DOE's latest GREET H2 model demonstrates that pyrolysis of natural gas, when abating upstream emissions, can meet requirements specified in the National Clean Hydrogen Production standard. The economics of pyrolytic hydrogen are also substantially better than competing alternatives, which can stimulate market demand for clean hydrogen that will ultimately benefit all sources of low and zero carbon hydrogen. Incorporation of multiple production pathways that are based on carbon intensity will allow for faster adoption by industries that need clean hydrogen, while providing critical momentum to reach commercial liftoff. For these reasons, PSE requests that Ecology include analysis and consideration of pyrolytic hydrogen made with natural gas on an interim basis.

Again, PSE appreciates Ecology's efforts in completing this Programmatic EIS ("PEIS"), which we hope will ultimately support the development of a robust green hydrogen economy in Washington.

Sincerely,

Steve Schueneman

Andrea McNamara Doyle

Attached please find a comment letter from AltaGas on Ecology's Draft Green Hydrogen Programmatic Environmental Impact Statement.

AltaGas

February 6, 2025

Submitted Online

ALTAGAS COMMENTS ON STATE ENVIRONMENTAL POLICY ACT DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR GREEN HYDROGEN ENERGY FACILITIES IN WASHINGTON STATE

AltaGas Ltd. ("AltaGas") welcomes the opportunity to comment on the Washington State Department of Ecology's State Environmental Policy Act Draft Programmatic Environmental Impact Statement (the Draft PEIS).

AltaGas is a leading North American infrastructure company that connects customers and markets to affordable and reliable sources of energy for today and tomorrow.

AltaGas currently has two subsidiary business lines west of Ferndale, Washington, located in the Cherry Point Heavy Impact Industrial Zone of Whatcom County:

- ALA Energy, LLC serves today's domestic markets for propane & butane by truck and pipeline, and exports to Asian markets by marine vessels from the Petrogas (formerly Alcoa Intalco) pier; and
- ALA Renewable Energy, LLC is in early-stage planning for the Ferndale Clean Hydrogen Project that has been selected as an anchor project in the Pacific Northwest Hydrogen Hub (PNWH2). PNWH2 was selected by the federal Department of Energy's Office of Clean Energy Demonstrations (OCED) as one of seven regional Hubs from 79 competitive submissions nationally.

Following Alcoa's announcement of the permanent closure of the Intalco aluminum smelter operations in 2023, AltaGas acquired the rights to own and develop the Intalco site at Cherry Point. On this site, ALA Renewable Energy is now a subrecipient of federal grant funds to advance regional and national efforts to achieve market lift-off for this vital new energy sector, by creating a robust hydrogen ecosystem focused on some of the hardest-to-decarbonize sectors important to our region's economy.

> **The Pacific Northwest is an undisputed leader in the clean energy economy, and PNWH2's designation as a Hydrogen Hub—thanks to funding I helped to secure in the Bipartisan Infrastructure Law—will mean $1 billion in federal funding matched with billions more in private investment. PNWH2 is going to speed up our decarbonization efforts and the transition to a clean energy economy and [the] launch of Phase 1 marks a huge step forward in making this clean hydrogen ecosystem a reality. I'm thrilled to be a partner in this fight with PNWH2 and can't wait to see the incredible impact they have on our region.**
>
> U.S. Senator Patty Murray (D-WA)

ALA Renewable Energy plans to use part of the Intalco brownfield footprint to build a new facility to operate water electrolyzers to produce, store, and distribute 100 MT/day of clean, electrolytic hydrogen. A key distinguishing feature that makes our project a clean hydrogen project is our commitment to use renewable power to operate the electrolyzers. We're currently planning for a portion of our clean

hydrogen to be compressed and liquified on-site, and then transported by truck to fueling stations along the I-5 corridor to support Heavy-Duty (HD) transportation use for semi-trucks, port equipment, transit buses, and the like. In addition to HD transportation, we're planning to replace natural gas currently used to produce grey hydrogen in industrial processes like refining, and to help energize peaking power plants that stabilize our region's electricity grid.

Leveraging clean H2 to reduce greenhouse gas emissions from the hardest-to-decarbonize sectors of our economy, such as industrial processes, and heavy-duty transportation is part of what made our application so competitive nationally. Our project can help fill gaps where converting to electric vehicles is not as feasible from a technical or reliability perspective as it is for passenger vehicles.

Comments on the Draft PEIS

AltaGas provides the following comments as an interested partner in the development of clean hydrogen in Washington State. We look forward to constructive conversations on the development of regulatory processes and policies which will enable new and essential technologies such as hydrogen development in Washington State to the benefit of local residents and businesses.

9-A We appreciate the contents of the Draft PEIS and believe that the information included is a valuable resource to inform siting, planning and project design, analyze potential impacts and identify possible mitigations. However, we recommend the final PEIS more clearly articulate the limitations and scope of its findings. For example, **we suggest the following acknowledgement of the limitations of the Draft PEIS and its applicability to future decision-making.**

- The Draft PEIS, by design, studies only non-project-specific adverse environmental impacts and related mitigation measures for green hydrogen projects. **There are many avoidance, minimization, and mitigation measures, and best practices, applied based on project-specific needs, stakeholder engagement, and company practice that are not considered in this draft programmatic.** These measures are advanced through the natural course of project development and advancement as well as through existing regulatory and engagement processes. Being overly prescriptive of mitigations at a non-project level does not adequately account for local geographic, stakeholder, and environmental needs unique to each project. Flexibility and adaptive management in the assessment of potential impacts, avoidance and minimization measures, and mitigations is essential to being responsive to each project and community's needs. Acknowledgement of project-specific measures is required to allow for flexible impact management catered to project and stakeholder needs.

9-B
- The scope of the Draft PEIS represents broad impacts and mitigations based on a limited scope of general regulations that could apply **and does not consider all applicable regulatory processes and standards that may apply in project design and execution to reduce potential impacts below a "significant" level**. Specifically, we recommend correcting the inconsistent language used in the Summary so that it consistently reflects "potential" significant adverse impacts rather than "probable" significant adverse impacts (compare p. S-9 and Table S-1).

9-C

9-D
- We also recommend Ecology consider other states' experiences (such as the ACES Project in Utah) and federal regulations (Ex. OSHA, PHMSA), as well as international standards (such as ISO standards for electrolytic hydrogen), with respect to Health and Safety, Risk, Process Safety and

Pipeline safety for inclusion of guidance applicable to hydrogen systems. This is especially important given the early-stage development of the green hydrogen ecosystem in Washington**, and because global best practices, lessons, and learnings from elsewhere can and should inform regulatory decisions and processes in Washington State as well.** AltaGas would welcome the opportunity to work with Ecology over the coming months to identify relevant regulations and standards for incorporation into the final PEIS.

9-E

- **The Draft PEIS represents a snapshot in time** and given the rapidly evolving nature of the new and developing green hydrogen ecosystem in Washington state, acknowledgement should be made that project technologies and applications may evolve in ways such that the potential effects, avoidance, and minimization measures would result in different conclusions than those reached here concerning the potential "significance" of adverse impacts or appropriate mitigations.

9-F

- **The Draft PEIS does not adequately consider the No Action Alternative, which would have significant adverse effects on the state's ability to meet the Washington Legislature's limits on the emissions of GHGs.** We recommend the final PEIS include additional analysis of the long-term vision for clean hydrogen in Washington, and how clean hydrogen development aligns with the state's comprehensive clean energy strategy. The No Action Alternative should include discussion of how continued delays in environmental reviews and permitting processes sought to be addressed through this PEIS will significantly hinder clean hydrogen project developers from being able to fulfill the state's projected share of emissions reductions targets attributable to clean hydrogen. Specifically, we recommend including the analysis from Washington Department of Commerce's January 5, 2024 Report to the Legislature submitted to Chapter 292, Laws of 2022: Green Electrolytic Hydrogen and Renewable Fuels: Recommendation for Deployment in Washington, which concluded, among other things, that:

  > ***Robust siting and permitting processes for green hydrogen are needed, and siting and permitting of new renewables to support a hydrogen economy and economy-wide decarbonization poses even greater challenges…*** (emphasis in original)

9-G

- **The Draft PEIS does not adequately consider that the development of clean hydrogen facilities can bring socio-economic and other community benefits**, specifically localized air quality improvements, job creation and innovation, including to historically disadvantaged populations and communities. The PEIS should highlight these potential benefits and outline strategies to maximize them, including for communities and populations who are historically disproportionately impacted by prior industrial development.

9-H

- **Community Benefit Agreements.** To the extent the Draft PEIS recommends that developers should use Community Benefit Agreements in coordination with potentially affected communities to address impacts through mutually agreed upon mitigation, we encourage you to consider the January 20, 2025 federal Executive Order and related US Department of Energy's (DOE) Memo of January 28, 2025, directing the suspension of the following activities in any DOE cooperative agreements, contracts, contracts awards, including the PNWH2 Hub grant agreements:
  - Diversity, equity, and Inclusion (DEI) program and activities involving or relating to DEI objectives and principles;

- Community Benefits Plans (CBP); and
- Justice40 requirements, conditions, or principles.

Sub-recipients have been advised that continuing any of these activities, including Community Benefits Planning, even if we are not filing for federal cost-reimbursement under our federal grant agreements, puts us at risk of being in default of the federal Executive Order and having our federal grant funding terminated. We request that the final PEIS recognize that it may not be possible for projects such as ours within the PNWH2 Hub to use Community Benefit Agreements without jeopardizing federal grant funding.

9-I

- The PEIS only contemplates impacts from small scale projects and does not include auxiliary facilities or associated pipelines. This severely limits the utility of the PEIS, and we encourage inclusion of larger facilities and auxiliary associated infrastructure within a reasonable distance

AltaGas commends the hard work put into the Draft PEIS and believes, if modified, can be a useful tool to be included as part of broader regulatory and policy considerations for the development of green hydrogen projects in the state of Washington.

We look forward to continued engagement with regulators and policy makers to ensure that Washington state green hydrogen projects are supported by flexible, adaptive policies which recognize the need to enable and support new projects and rapidly evolving technologies and applications.

Sincerely,

Bruce Leonard
Senior Director, Emerging Ecosystems
AltaGas

Coded Comment Record: Individuals

Atul Deshmane

2-A I am concerned that the emphasis on maritime transportation and the challenges it might pose for a green hydrogen project. I am in Whatcom County and believe that substantial new maritime shipping associated with green hydrogen will not be well received by environmental and tribal organizations. To some extent a lack of preliminary work and engagement is what led to the termination of the Green Apple Renewable Diesel Project. I am hoping that if you bolster the maritime transportation impacts section 4.14 it might help a project proponent better assess the compatibility of their project.

Anonymous Anonymous

3-A The world has far less water than necessary to sustain life on the planet.
We should not be investing in anything that utilizes, pollutes, desalinates, or has potential to negatively affect water sources.

We should be investing in solar, wind, & possibly water wheels, not trying to create a dangerous gas by separating water molecules that could be used as drinking water.

Lora Petso

These comments are my own and not as a representative of any government or group.

6-A Please revise to include an analysis of the impact on the Washington Water equation (water for people + water for fish + water for ag + water for data/AI + water for hydrogen(?) + water for a million new homes LESS water lost to aquifer depletion, PFAS contamination, and climate).

6-B Please also revise to include an analysis of PFAS impacts. (H2 is PFAS dependant every step from inputs to manufacture, to distribution, to fueling, to use, to end of life). PFAS will certainly be in the wastewater streams (what types and concentrations?), but will it also be discharged via steam or air?

Finally, please revise to specify the "treatment" that will be provided for the various wastewater streams, and whether or not the "treatment" will remove metals, PFAS, and other contaminants. The heavy reliance in the report on municipal sewer treatment plant disposal of the contaminated water is a significant error since those plants are not designed to treat all contaminants. In addition, many municipal treatment plants have current capacity issues.

As noted above, these comments are my own and not as a representative of any government or group.

Ashley Mocorro Powell

12-A In the environmental justice and overburdened communities section of the draft PEIS, I would encourage you to consider ratings on the WA EHD Map that are lower than ratings of 9 and 10 for communities; as not all areas of the state have as robust data for their communities which could result in an unintentional gap. I appreciate the cross reference with CEQ's created Climate and Economic Justice Screening Tool. This tool was used to identify communities eligible for benefits from federal investments in critical sectors. However, CJEST but it's since been taken down by the new federal administration (Jan 2025). What additional databases would WA Ecology use to ensure we are looking beyond WA EHD

12-B limitations? Geospatial tools are designed to integrate different kinds of health, social, environmental, and economic data to identify disadvantaged communities and to aid policy and investment decisions that address the pervasive, persistent, and largely unaddressed problems associated with environmental disparities in the United States; however do not always capture the full picture at the community level and the multi-faceted layers of considerations we should take. One example is I do not believe this PEIS considers risks in the study areas and their proximity to schools, family resource centers, childcare centers or head start programs and/or recreational areas (ie parks, sports fields, others) where multigenerational and/or youth would be present. I am concerned about the disproportionate impacts that could result of us not looking more closely at where these sited facilities could be located in proximity to these community spaces.