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.

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.

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.

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.

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.

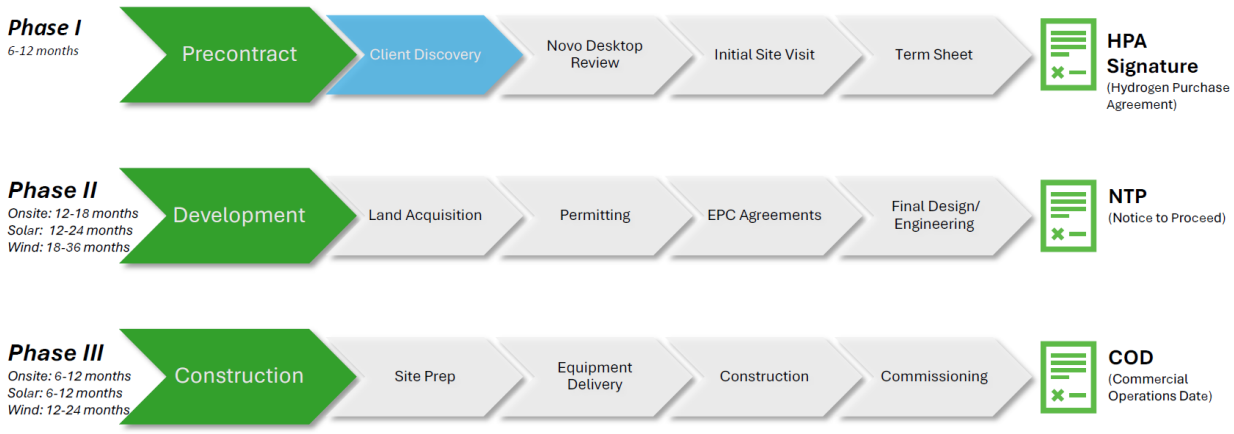
Most of the green hydrogen production facilities currently deployed or announced are smaller scale projects or potentially even pilot projects. According to the U.S National Clean Hydrogen Strategy and Roadmap, the U.S expects to produce 10 million metric tons ("MMT") of clean hydrogen annually by 2030, 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.

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. **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.

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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.

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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