Electrochaea Corporation (April Arbour)

Re: WSR-25-13-080: Updates to Chapter 173-424 WAC • Clean Fuels Program

Electrochaea is a provider of an industrial-scale process for synthesis of renewable synthetic methane. e-methane, a form of synthetic methane, is produced when electrolytic hydrogen and CO2 are used to synthesize methane in a process called methanation. When the CO2 comes from biogas or other biomass-based sources, synthetic methane is a subset of the gases called biomethane and a fuel that can be used for transportation. Electrochaea is advocating that the Washington State Clean Fuels Program (CFP) regulations clearly indicate that synthetic methane, produced from biomass-based CO2 and renewable hydrogen, is included as an eligible alternative fuel that may generate CFP credits in the program.

Synthetic methane production process. Synthetic methane, e-methane, is produced from CO2 and hydrogen using a biological or chemical catalyst. Electrochaea's technology uses a biological catalyst, a methanogenic archaeon. In the first step, renewable electricity, such as from solar, wind or hydropower, is used to produce renewable hydrogen by electrolysis (electrolytic hydrogen). In the second step, methane is synthesized from hydrogen and CO2. CO2 can be delivered to the reactor in different forms from different sources. Since biogas contains approximately 40% CO2 and 60% methane, biogas can be delivered directly to the reactor as a CO2 source. If a pure stream of CO2 is available, pure CO2 can also be delivered to the reactor. The reactor contains the archaea within a stirred nutrient solution which maintains the activity of the organism. The archaea take up hydrogen and CO2 and synthesize methane and water. The low carbon intensity (CI) e-methane leaves the reactor and goes through a post processing step to make it ready for gas grid injection or on-site use. If biogas was used as the CO2 source, the low CI methane leaving the reactor is a mixture of e-methane and the methane originally present in the biogas.

Benefits of synthetic methane use in transportation. Since biogas is approximately 40% CO2, methanation of the CO2 nearly doubles the amount of transportation fuel that can be obtained from a biogas source. Additional benefits include increasing decarbonization of the gas grid, support of the hydrogen market, and use and storage of electricity that might have to be curtailed.

Electrochaea's comments on the proposed regulations

Definition of biomethane.

Synthetic methane is included under the definition of biomethane. However, synthetic methane should be further defined to be certain that methane synthesized by a catalyst from biomass-based CO2 and renewable hydrogen is included in the definition of biomethane.

Use of electrolytic hydrogen as a feedstock for e-fuel production

It is clear that electrolytic hydrogen produced from renewable resources can be used in the program, if the hydrogen will be used directly as a transportation fuel. However, it is not stated that renewable electrolytic hydrogen can be used as a feedstock to produce an additional alternative fuel such as e-methane.

In the proposed rule section "WAC 173-424-610 Obtaining a carbon intensity (9)(n) Utility-specific carbon intensities for alternative jet fuel and alternative marine fuel", it indicates that electrolytic hydrogen can be used as process energy for production of alternative jet fuels and alternative marine fuels. It does not state that this method can also be used for production of e-methane that would be used as a general transportation fuel. A pathway for using renewable electrolytic hydrogen as a feedstock for e-methane synthesis as a general transportation fuel should also be included.

Use of book-and-claim to purchase renewable electricity for hydrogen

Synthesis of renewable e-methane requires the production of electrolytic hydrogen using renewable electricity. While it is clear that renewable electricity can be used for the purpose of hydrogen production1, and that book-and-claim accounting2 can be used to purchase electricity in the CFP, it is not clear that this applies for the production of hydrogen that would be used as a feedstock for biomethane production. Clarity in this regard would allow additional alternative fuels to be made available for use in the Washington transportation market.

Electrochaea appreciates the opportunity to participate in this rulemaking.

Electrochaea Corporation • 9921 Carmel Mountain Rd. #325 • San Diego, CA • 92129-2813

August 1, 2025

Submitted via Public Comment Form

Department of Ecology
Climate Pollution Reduction Program
300 Desmond Drive SE
Lacey, WA 98503

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Electrochaea's comments on the proposed regulations

1. *Definition of biomethane.*

Synthetic methane is included under the definition of biomethane. However, synthetic methane should be further defined to be certain that methane synthesized by a catalyst from biomass-based CO_2 and renewable hydrogen is included in the definition of biomethane.

2. *Use of electrolytic hydrogen as a feedstock for e-fuel production*

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3. *Use of book-and-claim to purchase renewable electricity for hydrogen*

Synthesis of renewable e-methane requires the production of electrolytic hydrogen using renewable electricity. While it is clear that renewable electricity can be used for the purpose of hydrogen production[1], and that book-and-claim accounting[2] can be used to purchase electricity in the CFP, it is not clear that this applies for the production of hydrogen that would be used as a feedstock for biomethane production. Clarity in this regard would allow additional alternative fuels to be made available for use in the Washington transportation market.

Electrochaea appreciates the opportunity to participate in this rulemaking.

Sincerely,

April Arbour

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[1] See definition of renewable hydrogen
[2] See definition of book-and-claim accounting