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EVERWIND

GHG Assessment of EverWind's Point Tupper Green Hydrogen Facility

Final Report

JUNE 2025

Study Context and Objectives

Context

EVERWIND FUELS (EVERWIND)
A North American independent green hydrogen developer

POINT TUPPER
An EverWind project in Nova Scotia which will harness 650 MW of wind energy, 150 MW of solar power, and battery energy storage (BESS), to produce approximately 240,000 tonnes of green ammonia per year in its first phase.

Study Objectives

To make sure the environmental benefits of the project are clear and credible, EverWind asked Dunsky to do an independent review of the project's greenhouse gas (GHG) emissions. The study focused on two main goals:

Global Emissions Impact

Conduct a critical review of existing life-cycle assessments (LCAs) and supplement them as needed to estimate the net global emissions impact associated with exporting green ammonia to Europe.

Local Grid Implications

Analyze the project's anticipated electricity consumption and associated renewable generation (wind, solar, storage) to assess its net impact on Nova Scotia's grid emissions, along with any potential co-benefits to the provincial electricity system.

Approach and Outcomes

This work was conducted over a three-month period, drawing on technical documentation provided by EverWind, third-party sources, and data from Nova Scotia Power (NSP). It was guided by Dunsky's internal expertise and rigorous analytical methods, and informed by dialogue with key stakeholders.

Key Ammonia Facts

Ammonia is one of the most carbon-intensive industrial chemicals.

2nd most-produced

chemical globally.[1,2]

180 million tonnes

is made approximately each year – mostly to create fertilizers.[1,3]

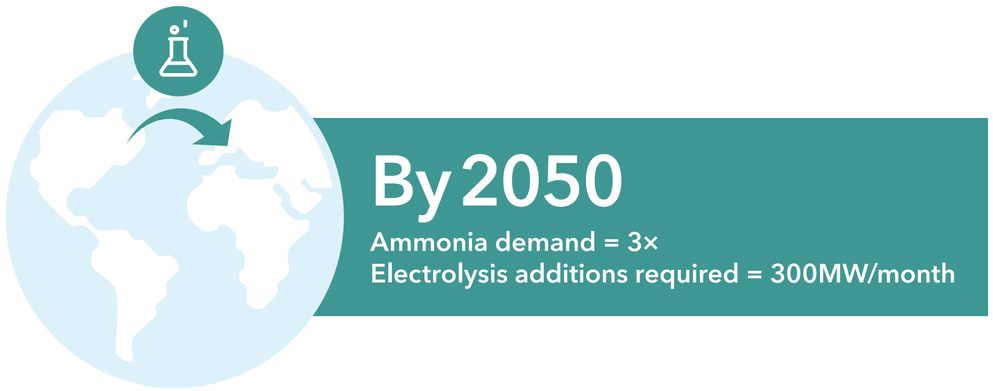
Fossil fuels

are used to make 97% of ammonia – mostly natural gas and coal.[4]

450 million tonnes of CO_2

is approximately emitted every year, accounting for 2% of global final energy consumption – nearly as much as all of South Africa's emissions.[3]

Europe's Demand for Green Ammonia



Europe's ambitious climate and energy targets will drive a surge in demand for green ammonia,

far beyond current domestic production capabilities. This will require substantial imports from other regions – including Canada – to meet the growing need.

- **Low-emission pathways, including electrolysis-based green ammonia**, are rapidly advancing. Announced projects could bring up to 8 Mt of near-zero-emission capacity by 2030, though this would still only meet a small portion of global demand.[3]

- **Global ammonia demand is projected to triple by 2050**,[4] spurred by new uses in shipping, hydrogen transport, and power generation. Meeting this demand while achieving net-zero goals will require a **rapid scale-up of clean energy and green hydrogen production.**

  - To meet this demand, the IEA calls for **more than 110 GW of electrolyzer capacity by 2050** – equivalent to adding ten 30 MW electrolyzers each month.[3]

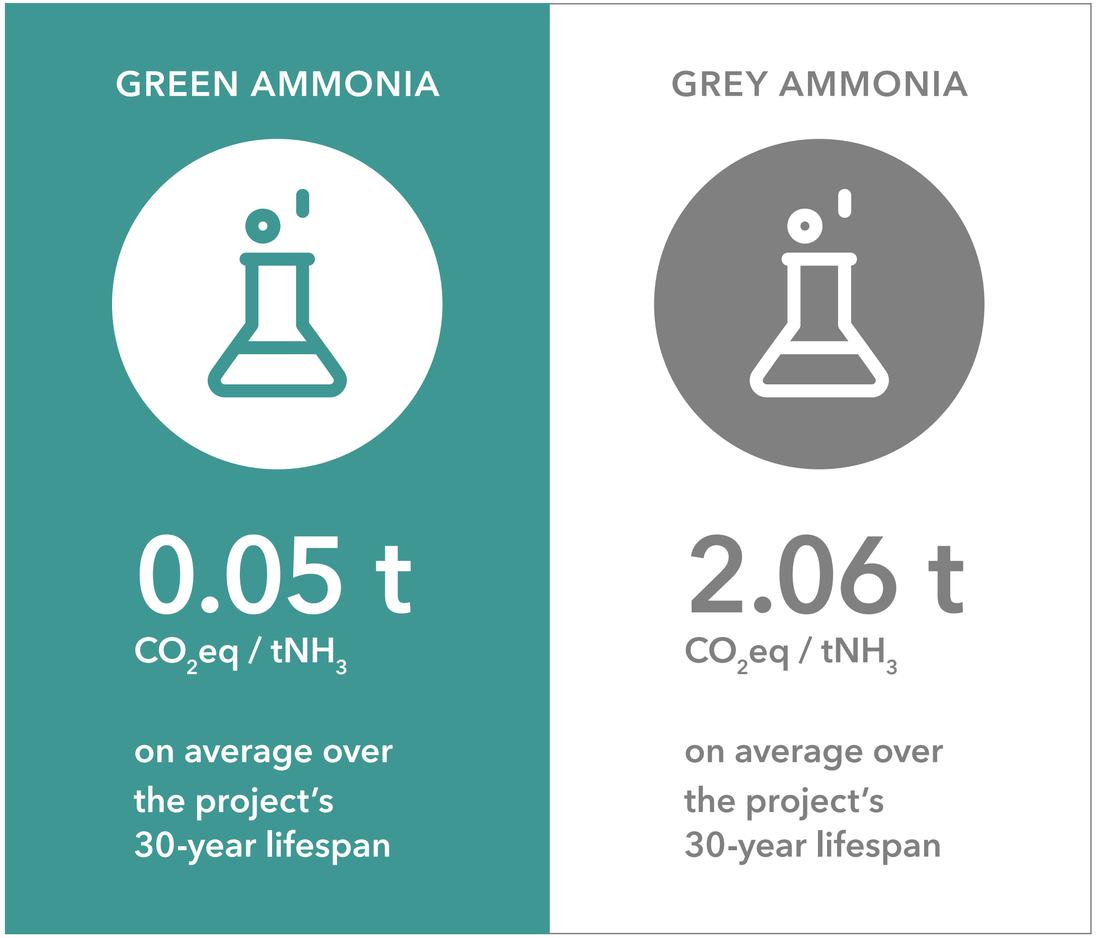
- **In the EU-27**, 32 ammonia facilities currently produce about **17.7 Mt annually**,[5] but this will not be sufficient. Europe's REPowerEU strategy aims to **secure at least 10 Mt of renewable hydrogen imports annually by 2030**, with **green ammonia playing a central role**.[6]

Results

Global Emissions Impact

Each tonne of green ammonia exported is assumed to displace one tonne of locally produced grey ammonia in Europe.

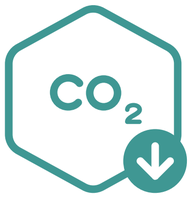
As Europe is the only market currently willing to pay a premium to decarbonize a high-emission sector, EverWind intends to export 100% of its production to the continent in the short term and make products available domestically as demand develops.



Results

Global Emissions Impact

The Point Tupper project could help cut global emissions by replacing high-emission grey ammonia with low-carbon green ammonia.



15 Mt of CO_2eq

could be avoided over the facility's 30-year operational life.

Or ~0.5Mt CO_2eq per year

98% lower carbon footprint

on average compared to grey ammonia produced from fossil fuels.

Equivalent to

2.8 million

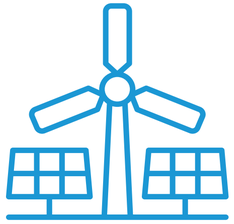
gas-powered cars removed from the road for an entire year.

Results

Local Grid Implications

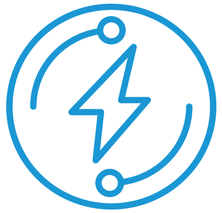
Once the EverWind resources are built and the facility is operational, their integration may provide additional system-level benefits.

The execution of the Point Tupper project does not meaningfully increase the carbon footprint of Nova Scotia's power system.



More Renewable Power on the Grid

Net increase in renewable energy available for the provincial grid – and for export to neighboring provinces and the U.S. – helping reduce reliance on fossil fuels. This requires an expansion of the export capability from NS to NB and beyond.



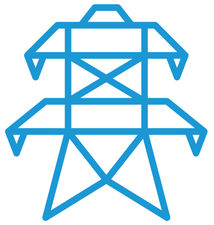
Flexible Load = Stronger Grid

Interruptible demand that supports system balancing and improves overall grid stability.

Results

Local Grid Implications

Dunsky's analysis* shows that minimal emissions in Nova Scotia are attributable to EverWind's anticipated production of ammonia.



Flexible Production

EverWind's ammonia production will be flexible and can be aligned with using electricity during times when the Nova Scotia grid has more renewable energy available.

Minimal Emissions*

With the combination of the planned wind and solar generation and the battery supporting the ammonia production, we see minimal emissions on the Nova Scotia grid that would be attributable to EverWind's production of ammonia.

* Dunsky analyzed the impact of the Point Tupper project on Nova Scotia's grid using Nova Scotia Power's IRP and PLEXOS® modelling. The study compared the Reference Case (CE1-E2-R2 with the 2030 Clean Power Plan) to a scenario with EverWind's additional wind and solar generation, a two-hour battery and 80% of the hours in the year with anticipated ammonia production. It included marginal emissions data from sample years provided by Nova Scotia Power. Emissions allocation aimed to minimize emissions, which differs from PLEXOS®, as it minimizes system dispatch costs. Cost optimization may consider emissions, but does not prioritize them. Dunsky emphasizes that differences between emissions-minimizing and actual dispatch should not be attributed to green hydrogen production, but instead to supporting system reliability and reducing costs in Nova Scotia Power's system.

References

[1] IRENA. 2022. *Innovation Outlook: Renewable Amonia.*

[2] Hafiz M. Irfan, Kashif Iqbal, Muhammad Ikhsan Taipabu, Chun-Yang You, Debayan Mazumdar, Wei Wu. 2024. Decarbonization frameworks to industrial-scale ammonia production: Techno-economic and environmental implications. *International Journal of Hydrogen Energy.*

[3] IEA. 2021. *Ammonia Technology Roadmap.*

[4] World Economic Forum. 2023. *Net-Zero Industry Tracker 2023.*

[5] Hydrogen Europe. 2023. *Clean Ammonia in the Future Energy System.*

[6] European Commission. *Energy, Climate change, Environment – Energy – EU's energy system – Hydrogen.*

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