



Project Nujio'qonik

Harnessing Newfoundland and Labrador's
Wind Energy

April 2023



Land Acknowledgment

We respectfully acknowledge the land on which we gather as the ancestral homelands of the Beothuk.

We also acknowledge the island of Newfoundland as the unceded, traditional territory of the Beothuk and the Mi'kmaq.

We recognize all First Peoples who were here before us, those who live with us now, and the seven generations to come.

Agenda

- Project intro
- Project milestones and timeline
- Project design
- Wind farms
- Transmission
- Infrastructure
- Plant
- Port
- Environmental Assessment
- Q&A



Project intro

An aerial photograph of a coastal landscape. In the foreground, a road runs along a cliffside overlooking the ocean. A green golf course is visible on the cliff edge. The background shows a large forested hillside under a clear blue sky. The text 'Project intro' is overlaid in white on the left side of the image.

Project Nujio'qonik

The Mi'kmaw name for Bay St. George is Nujio'qonik. Pronounced 'new-geo-ho-neek,' it means 'where the sand blows.'

- Project Nujio'qonik aims to be Canada's first commercial green hydrogen/ammonia producer created from 3+ GW of renewable electricity through wind projects.



Hydrogen Plant



1: Entrance

2: Main Building

3: Water Purification

4: HV Transformers

5: Transformer-rectifiers

6: Pipe Rack

7: Gas-liquid Separators

8: Electrolyzer Buildings

9: Purification System

10: Hydrogen

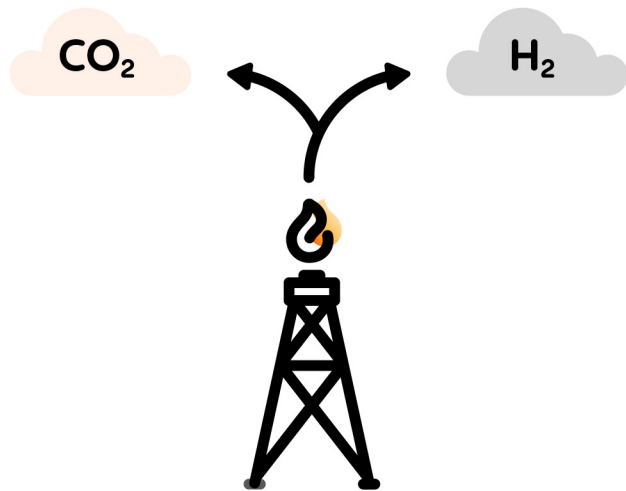
11: Heat Integration Ready

12: Cooling

13: Oxygen

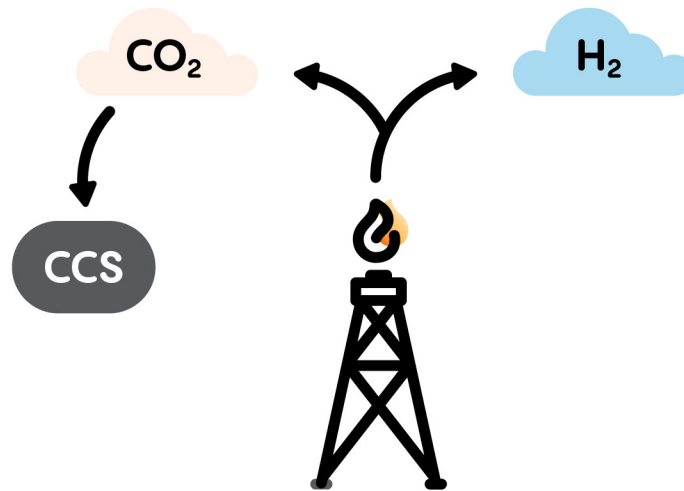
HYDROGEN TYPES

Grey hydrogen



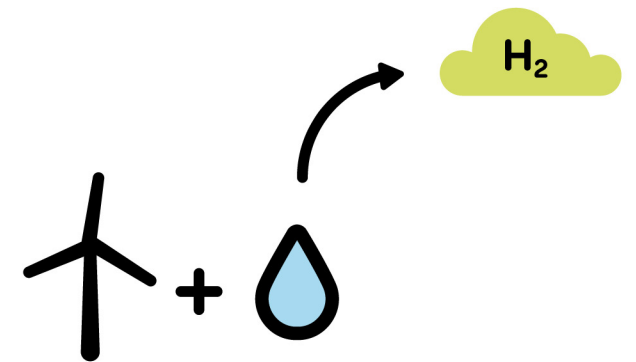
from natural gas

Blue hydrogen



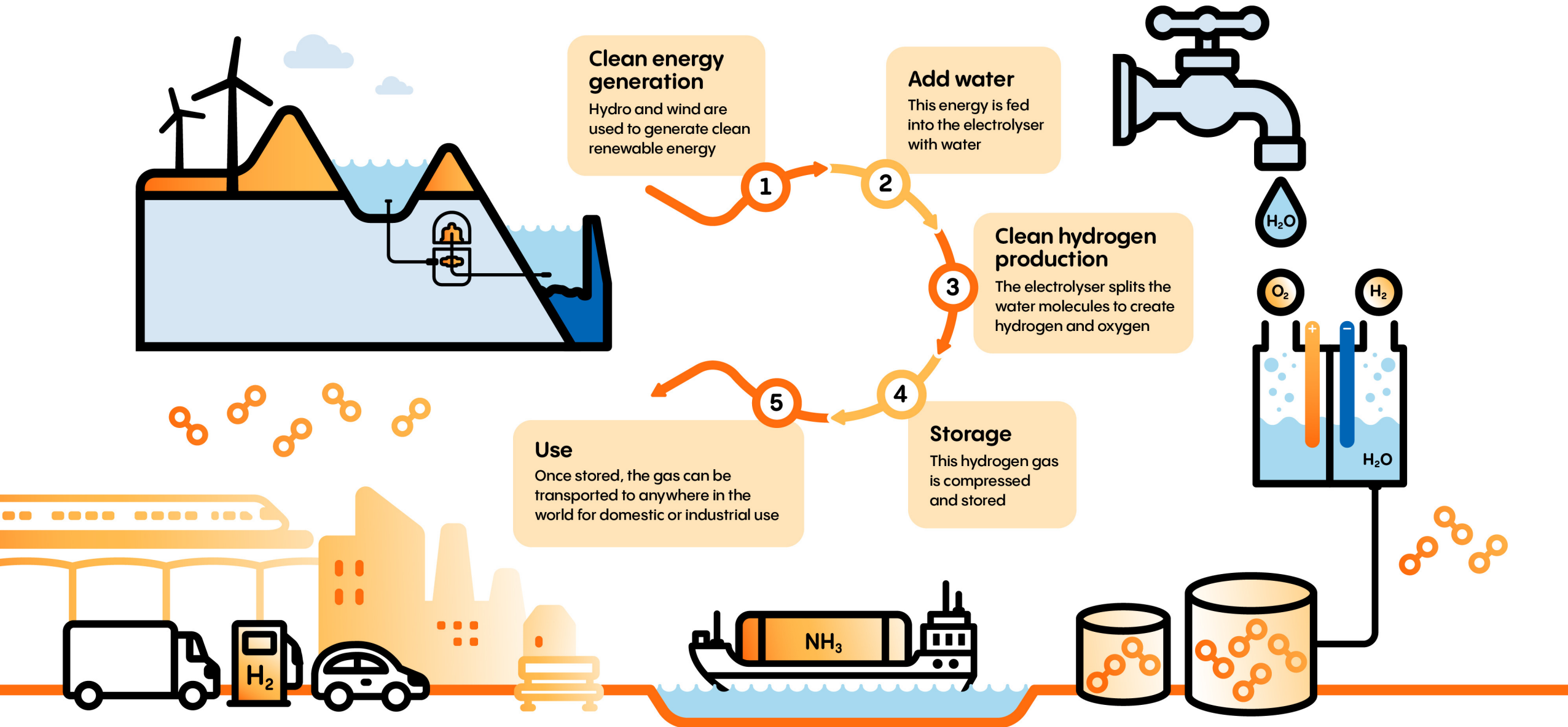
from natural gas
with carbon capture
and storage

Green hydrogen



from water
using zero-carbon
electricity

HOW IS GREEN HYDROGEN PRODUCED?



Why Our West Coast?

- Onshore wind speeds: 9.7-11.4
- Deepwater port
- Industrial water supply
- Former industrial site for plant
- Existing transmission corridors
- Community support and partnerships



Stakeholder Engagement & Regional Economic Benefits

- MOUs and partnerships
- Community Office
- Community Vibrancy Fund
- Tax Revenues (regional & provincial)
- Employment opportunities
- Paid training opportunities
- Significant increase in economic activity and spinoff



Community Vibrancy Fund



Fund Management

The Community Vibrancy Fund is focused on supporting communities as they develop and maintain assets and activities that will help contribute to community vibrancy. These assets and activities could include: land stewardship initiatives; developing/constructing regional recreational facilities; enhancing community services; improving municipal infrastructure; and other community-focused activities.

World Energy GH2 encourages the bodies in receipt of the funds to focus on investments that will directly benefit the people of the area and will help their communities thrive. Residents should see tangible improvements and/or initiatives in their region as a direct result of the Community Vibrancy Fund.

Project Areas

- **Project Area 1:** Stephenville port and plant
 - Funds to be managed by the Town of Stephenville
- **Project Area 2:** Port au Port wind farm, transmission line and infrastructure
 - Funds to be managed by a regional committee (Port au Port Regional Vibrancy Committee)
- **Project Area 3:** Bay St. George South – Codroy wind farm, transmission line and infrastructure
 - Funds to be managed by a regional committee (committee to be developed)

Community Vibrancy Fund

- **\$10 million Community Vibrancy Fund for the construction phase of three project areas**
 - **To be paid over three years, and equally divided across the project areas, commencing with construction.**
- **Community committees:**
 - **We're working with the Port au Port Regional Vibrancy Committee to allocate and administer the construction phase of the fund, and to negotiate the production phase of the fund.**
 - **A similar committee will be developed in the southeast project area (BSGS – Codroy), and discussions have begun with community leaders.**
- **Taxes and taxes in lieu: Production phase**
 - **Commitment to paying the same amount of taxes in lieu to the project areas that we will pay in taxes to Stephenville.**

Community Meetings & Drop-in Sessions

- Stephenville (May 2022)
- Lourdes (July 2022)
- Cape St. George (July 2022)
- Robinsons (July & Aug. 2022)
- DeGrau: Sept. 6, 1 – 7 p.m.
- Lourdes: Sept. 7, 1 – 7 p.m.
- Mainland: Sept. 8, 1 – 7 p.m.
- Piccadilly: Sept. 9, 1 – 7 p.m.
- Port au Port East: Sept. 10, 10 a.m. – 4 p.m.
- McKay's:
 - March 7, 1 – 4 p.m.
 - March 8, 9 a.m. – 12 p.m.
 - March 15, 10 a.m. – 4 p.m.
 - March 22, 10 a.m. – 4 p.m.
 - April 19, 10 a.m. – 4 p.m.
- Flat Bay: March 29, 10 a.m. – 4 p.m.
- St. George's: March 30, 10 a.m. – 4 p.m.

Share your comments

- Contact form on our website: worldenergygh2.com/contact
- Email: info@worldenergygh2.com
- Call: 709-757-0183
- Comment form (print version)
- Visit the Community Office: 13 Tennessee Drive, Stephenville

First Nations Partnerships

- Developing partnerships with First Nations communities is a priority
- MOU with Qalipu First Nation
- Partnership to develop wind industry training



Qalipu
FIRST NATION



Education partnership

College of the North Atlantic

Bay St. George Campus

- Commitment to pre-hire students accepted into the Wind Turbine Technician and Hydrogen Technician programs, and pay for their training
- Collaborating with CNA through the application/acceptance process to help evaluate candidates and make hiring commitments



Estimated Jobs



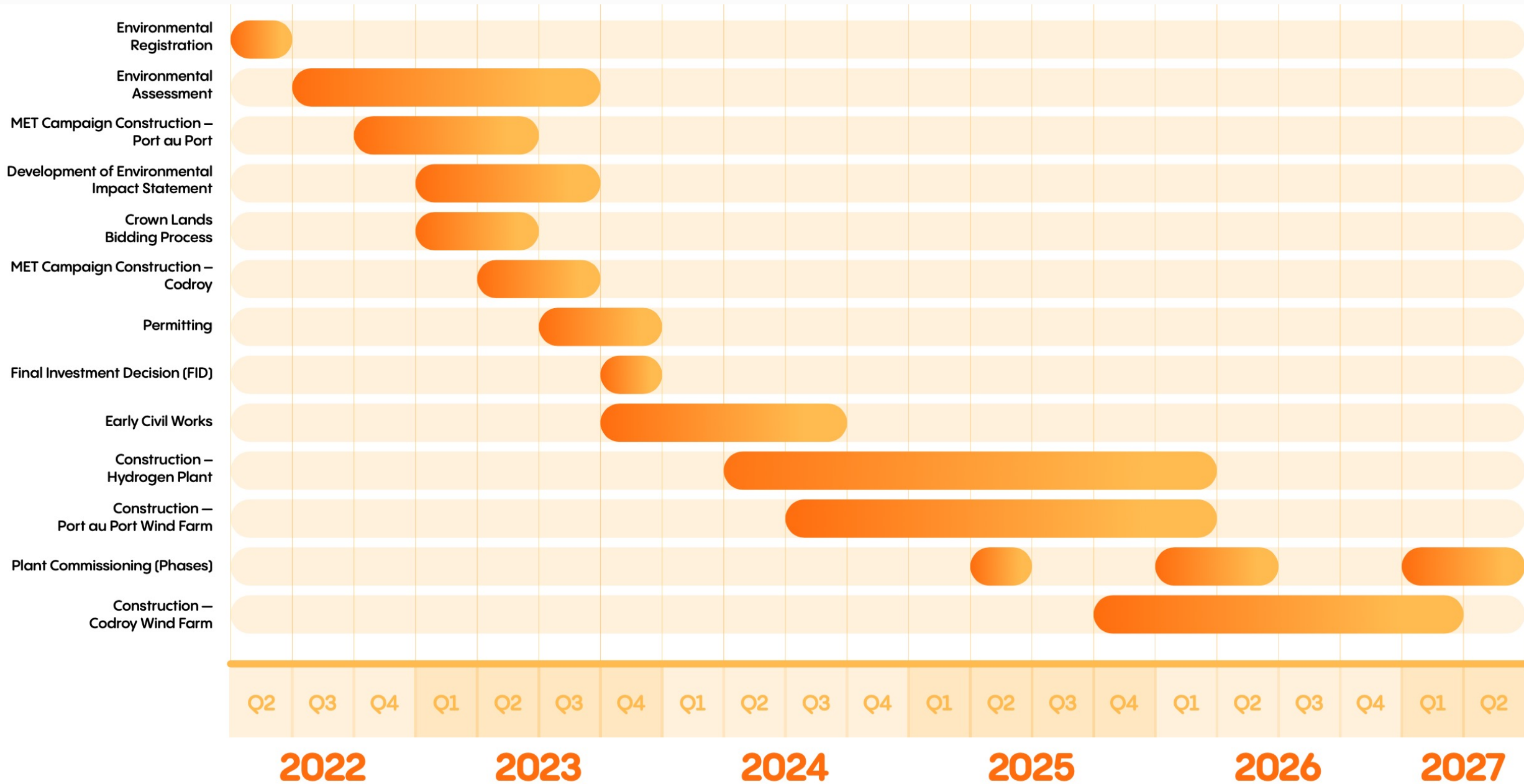
An aerial photograph of a coastline. On the left, a dark, forested hillside descends to a paved road that runs parallel to the shore. To the right of the road is a narrow strip of land, possibly a beach or dune area, before the ocean. The ocean is a deep blue-green color with white-capped waves breaking near the shore. The text "Project Milestones and Timeline" is overlaid in white on the left side of the image.

Project Milestones and Timeline

Project Nujio'qonik: Milestones

Key milestones before the project can proceed:

1. Crown land bid (submitted March 23)
2. Environmental approval (aiming for Fall 2023)
 - Environmental Assessment
 - Environmental Impact Statement (EIS)
3. Permitting (Fall 2023)
4. Final Investment Decision (Fall 2023)



Project Design



Wind Farms



Wind Farm – Typical Layout



O&M
Pad
(~ 100 x
100 m)

Primary Access Road

Secondary Access Road

Wind Turbine Construction: Foundation Area



Wind Turbine Construction: Tower & Blades

Lay down area



Blade lift



Wind Turbine Construction: Final Lifts



Transmission Interconnection/ Corridor Routing

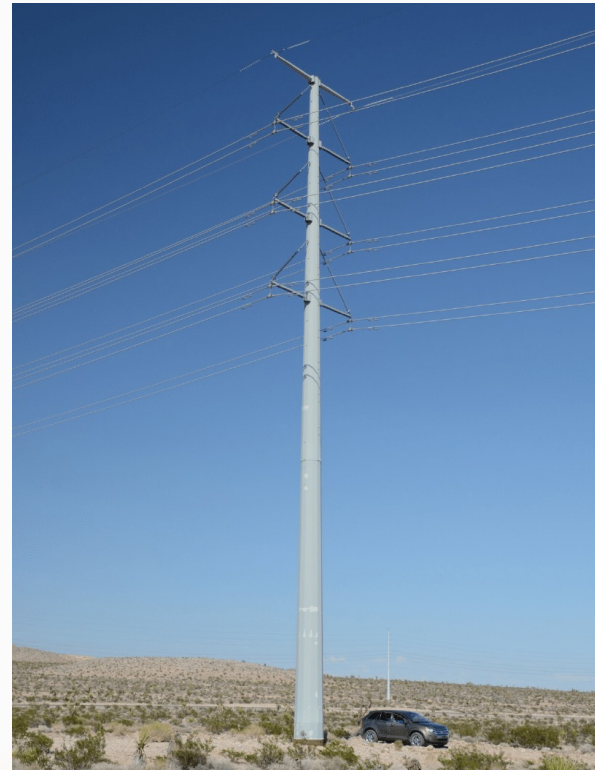


Collector and Transmission Line

34.5kV (Wind Turbines to Substation)

230kV (Substations to Plan)

Similar to most town structures



Infrastructure



Infrastructure

Main Components/Services:

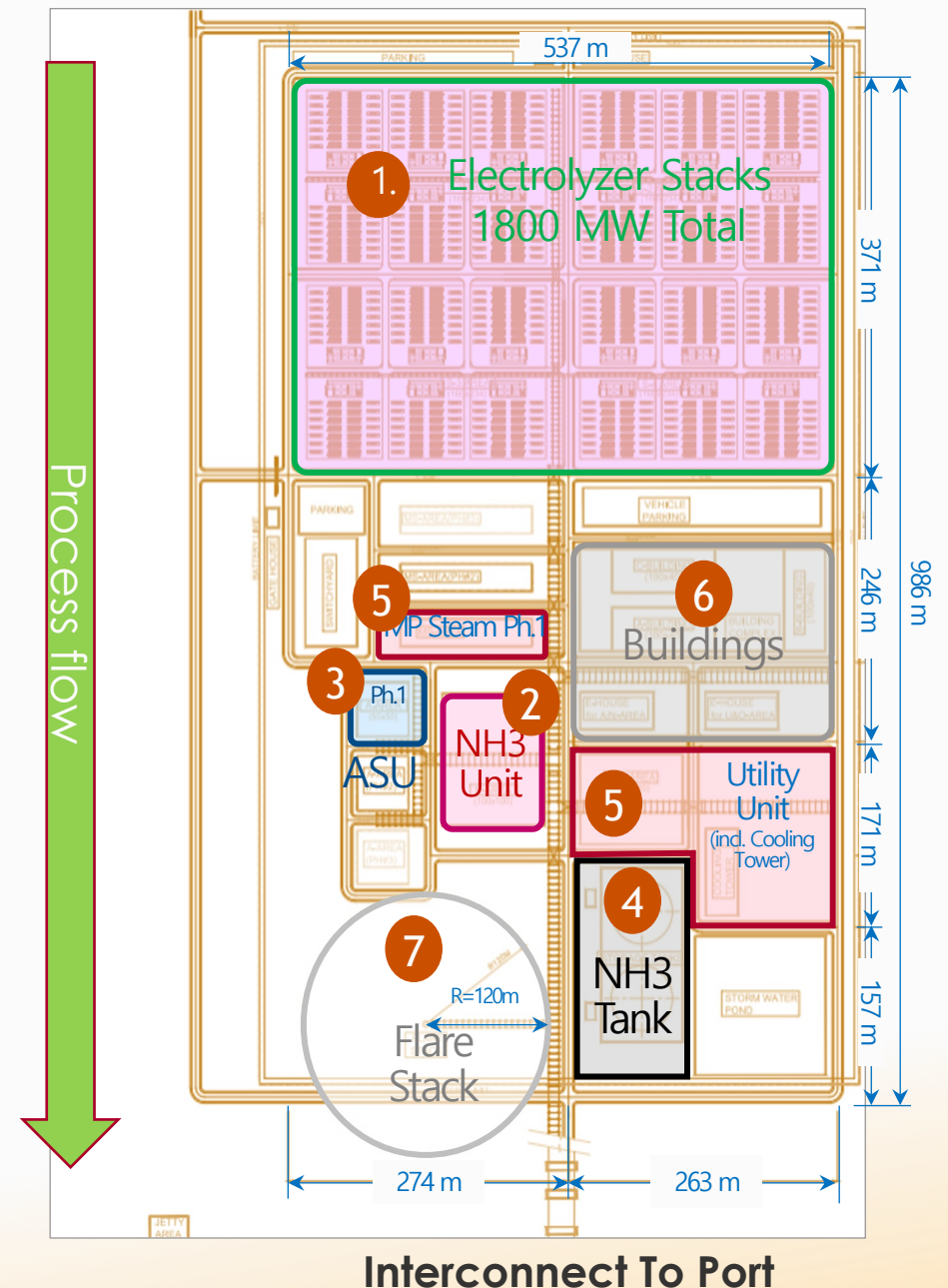
- Camp/accommodations
 - Looking at two locations: Stephenville and Codroy
 - Potential First Nations partnership
- Water supply and waste management
 - Port of Stephenville – water system that can be used for camp
 - In discussions with the Town of Stephenville
 - Codroy camp – location and details TBD

H₂/NH₃ Plant

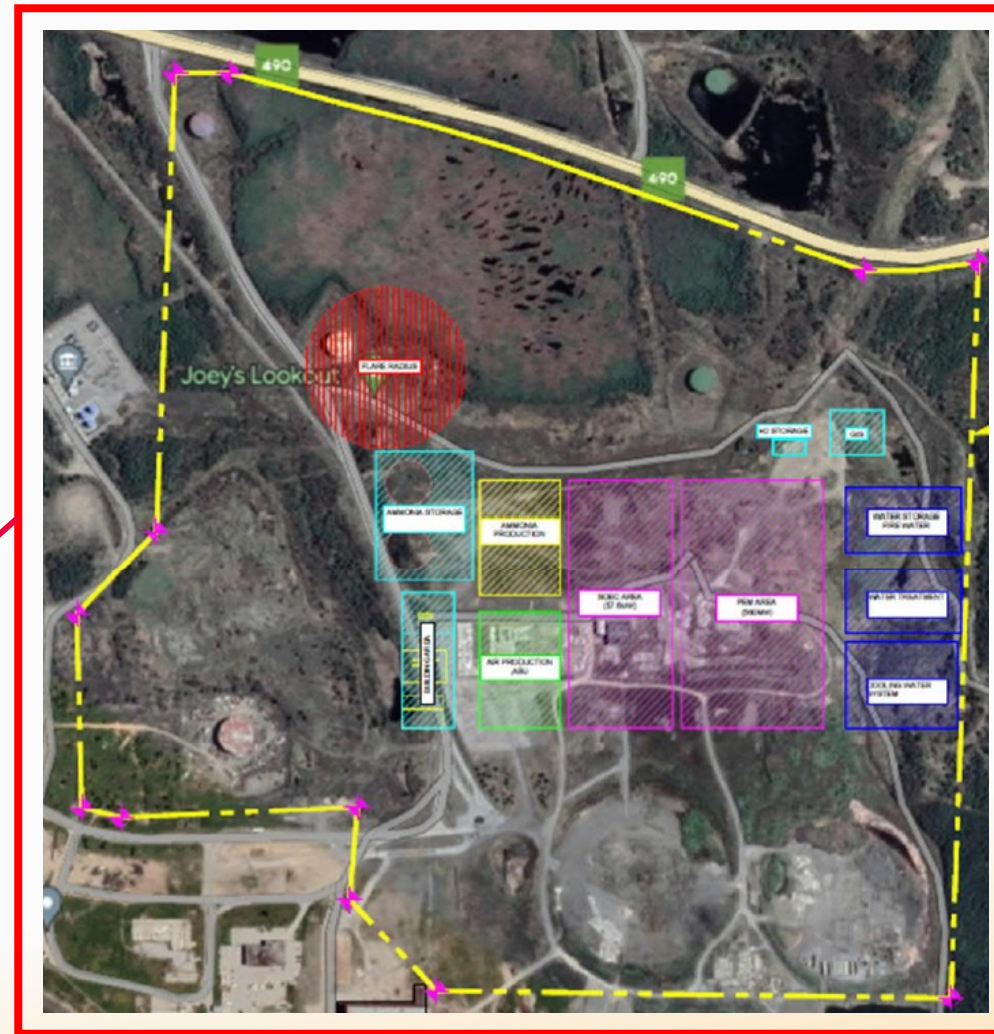
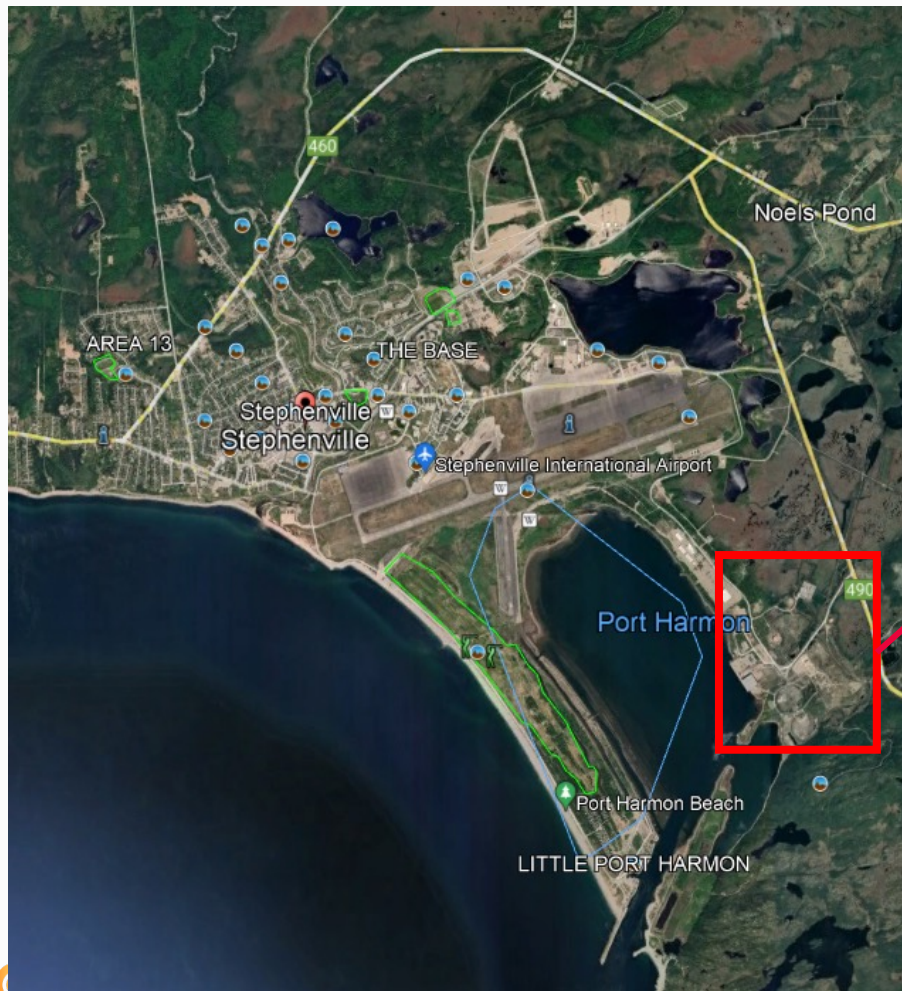


H2/NH3 Plot Plan

- Sized for 1800 MW electrolyzer capacity, installed in phases
- Process flow from uphill toward waterfront
- Electrolyzers to be enclosed in buildings
- Ammonia stored in double walled, insulated tank(s) with refrigeration
- Flare stack sized for controlled safety release of hydrogen, ammonia, and nitrogen exhaust in non-routine situations
- Plot to be optimized in engineering
- Designed for best-in-class safety
- Trained and equipped emergency response team onsite, working in tandem with emergency response teams in the Stephenville area



Plant Location



The Port of Stephenville



Overview of Upgrades

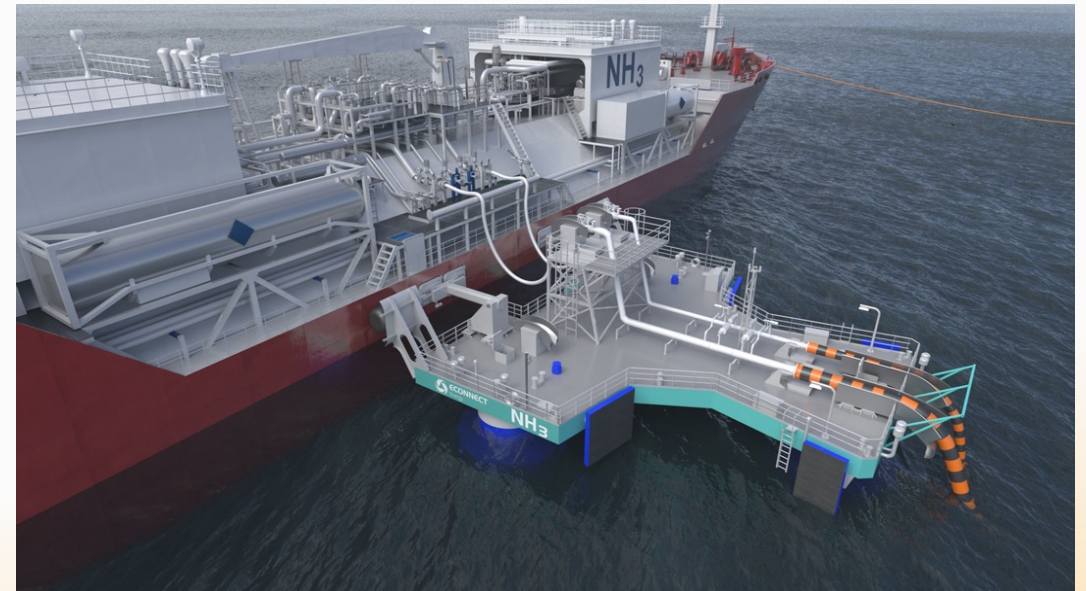
- 1. The Marine Terminal will likely require upgrades to reinstate the dock to its original load rating and condition.**
- 2. Detailed engineering analysis of the dock structure scheduled for Summer 2023**
- 3. Work Scope to be developed based on results; we anticipate :**
 - repairs or replacement to the pile supports – due to normal tidal erosion
 - strengthening requirements for loading arms, mooring and fendering systems



Port of Stephenville under construction 1951

Jettyless Mooring System Option

1. WEGH2 is considering a jettyless floating offloading system.
2. Popular system with increased export of green fuels worldwide.
3. With cryogenic hoses connected, these systems are floated to the vessel's side by tugs and secured to the vessels hull with a specialized mooring system.
4. Option could provide greater versatility to the port.



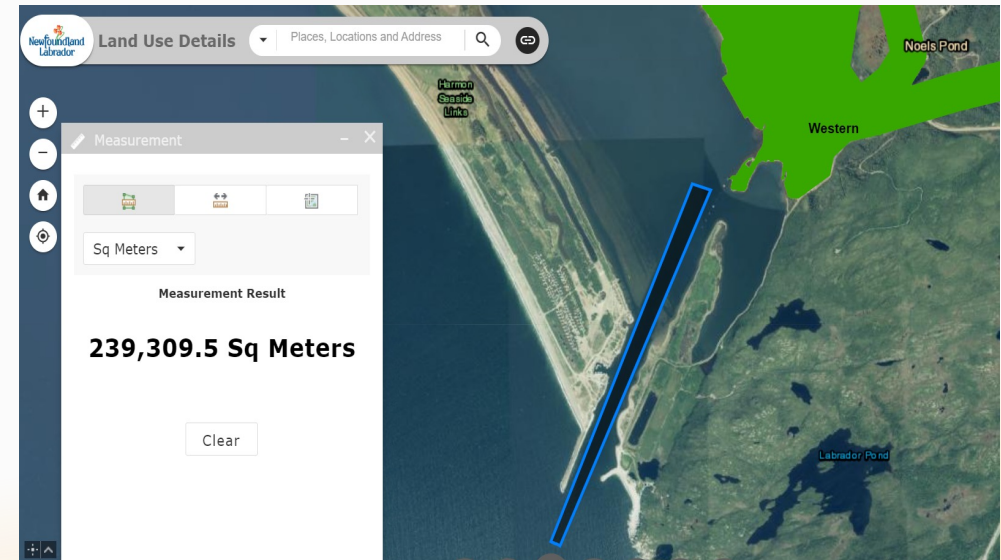
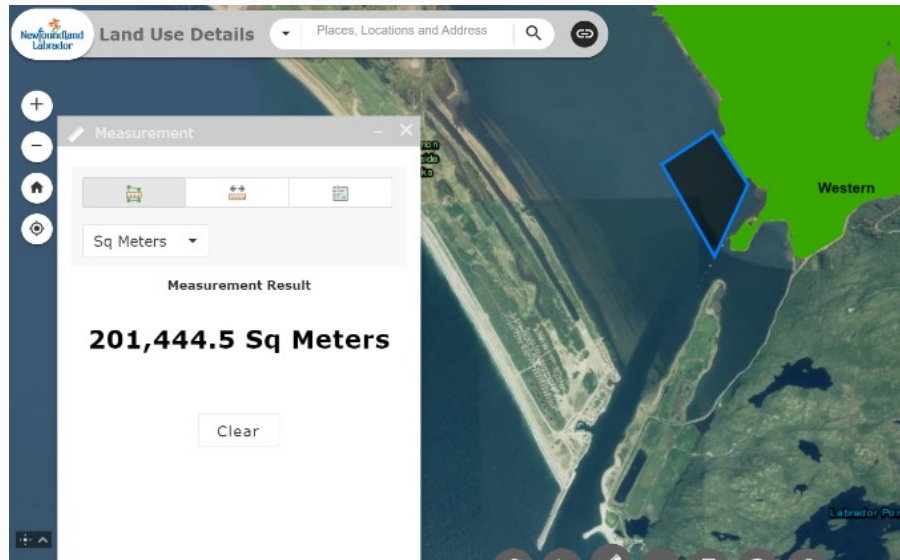
Floating Structure Constructed Locally

- Primary Systems components will be imported
- Potential for developing of new Technology and Skills locally
- Oversight and regulatory approvals; manufacture, WEGH2 & DNV



Project Requirements

1. A November 2017 storm resulted in displaced material migrating into the channel and reducing depths to 8.6 m near the mouth of the channel.
2. Detailed bottom survey using bottom sonar and sub-bottom profiling will commence this year to determine the composition of the seabed down to 5 m below the sea floor.
3. Area to be dredged is estimated as 442,000 m². Assuming an average depth of 10m at LLW and dredging to 12m , an estimated 900,000 m³ of dredging material will be generated.



Dredging-related Activities

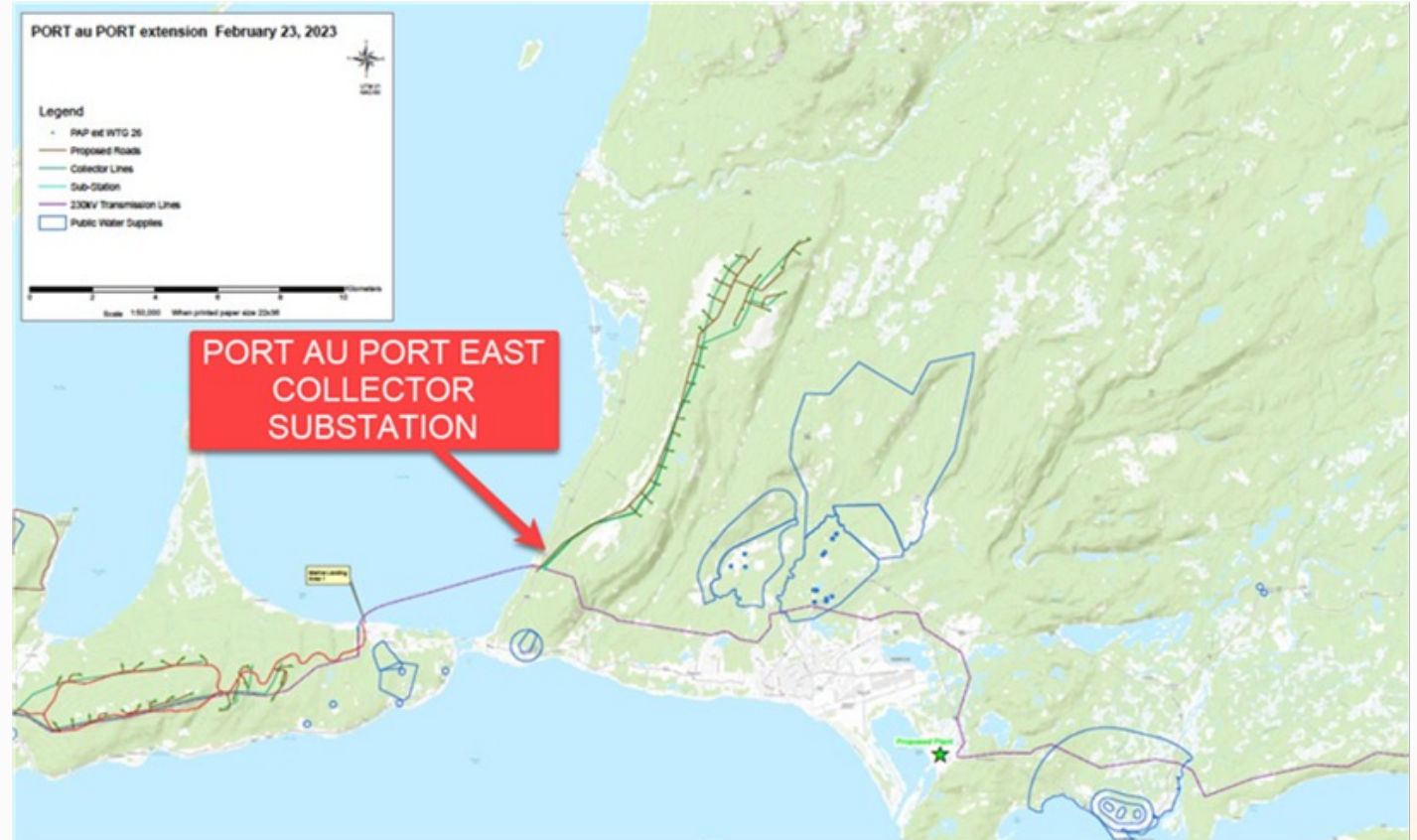
- Method of dredging has not been determined; however, it will most likely be a combination Trailing Hopper Suction Dredger (THSD) and clams shell bucket from a barge



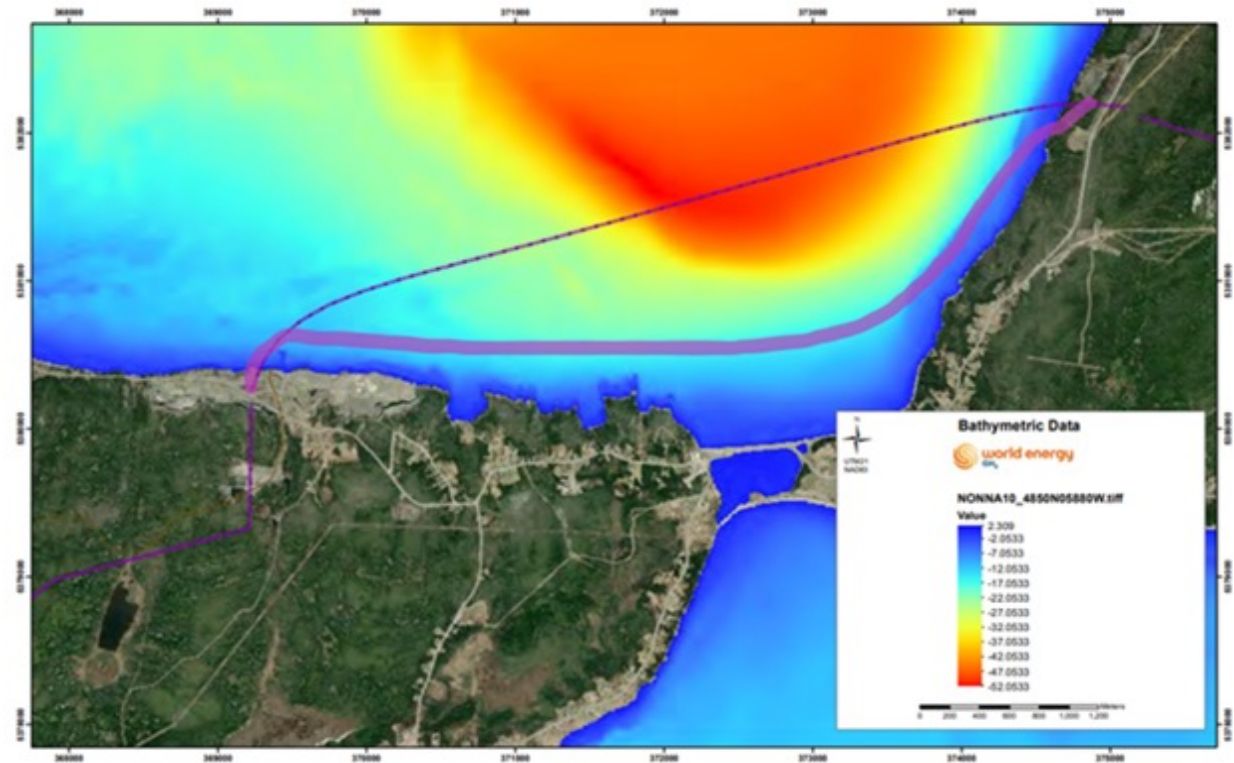
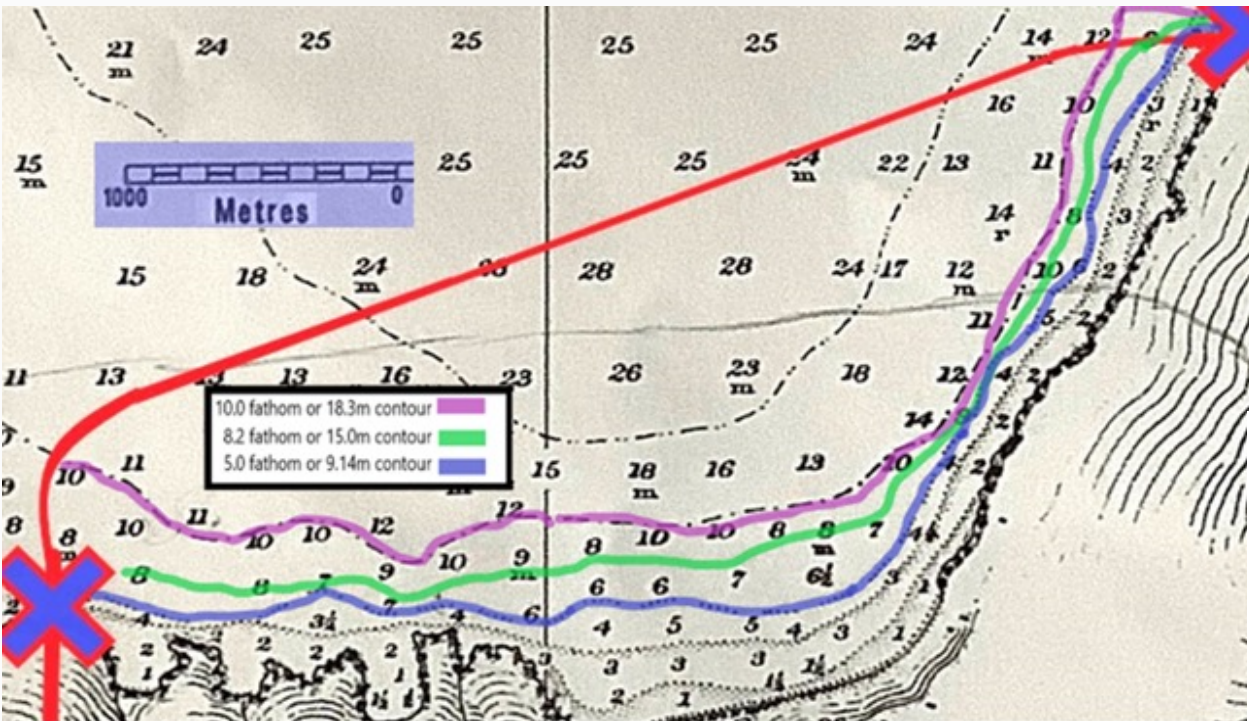
- Project time, four to eight weeks based on seabed composition and dredging depth.
- Bathymetric and sub-bottom profiling to commence this summer
- Disposal at sea is preferred option at this time.

Submarine Cable Crossing

1. High-voltage transmission lines include a subsea cable crossing at the isthmus from the Port au Port Peninsula
2. Approximately 6.4 km in length
3. Geotechnical survey will be required to determine installation method, e.g., trenching vs mattress
4. Routing



Submarine Cable Crossing



An aerial photograph of a vast forest landscape. The foreground and middle ground are dominated by a dense forest of evergreen trees, with a significant portion showing vibrant yellow and orange autumn foliage. The forest extends to the edge of a large, calm blue lake in the distance. The sky is a pale, clear blue with a few wispy white clouds. The overall scene is bright and scenic, suggesting a natural environment in a temperate region.

Environmental Assessment

EIS AND PERMITTING PROCESS

- Regulator deliverable
- WEGH2 Deliverable
- Public Involvement



Engagement

- Community Surveys
- Public Open Houses
- Monthly Newsletters
- Stakeholder and Regulatory Meetings
- Community Office

Valued Environmental Components

- Atmospheric Environment
- Acoustic Environment
- Groundwater Resources
- Surface Water Resources
- Fish and Fish Habitat
- Marine Environment and Use
- Wetlands and Vegetation, Including Rare Plants
- Avifauna
- Bats
- Other Wildlife
- Areas of Conservation Concern
- Economy, Employment and Business
- Communities
- Human Health and Quality of Life
- Land and Resource Use
- Land and Resource Use by Indigenous Groups
- Heritage and Cultural Resources

Desktop Studies

- Fate and Transport Model for Ammonia
- Quantitative Risk Assessment
- Transportation Impact Study
- Assimilative Capacity Study (Wastewater Discharge)
- Air Quality
- Noise Modelling
- Land Cover Classification
- Light Assessment
- Shadow Flicker
- Vibration Study
- Visual Impact Study
- Ice Throw Modelling
- Heritage Resources

2022/2023 Field Studies

- Air
- Noise
- Light
- Vibration
- Surface Water Quality
- Groundwater
- Fish and Fish Habitat
- Vegetation
- Bats
- Birds
- Arctic Hare
- Moose and Caribou
- Muskrat
- Heritage Resources

Desktop Studies

Project Description

- Transportation Impact Study
- Quantitative Risk Assessment
- Ammonia Fate and Effects Model

Atmospheric

- Noise Modelling
- Air Dispersion Modelling
- Shadow Flicker Study
- Vibration Study
- Light Assessment
- Visual Impact Assessment
- Ice Throw Study

Aquatic

- Assimilative Capacity Study

Terrestrial

- Ecological Land Classification
- Stage 1 Archaeological Assessment

Socio-economic

- Economic Model
- Labour Capacity Study
- Traditional Land Use Study

**** Other Environmental Protection and Monitoring Plans requested in the EIS Guidelines**



Environmental Field Studies

Terrestrial

- Rare Plant and Lichen
- Bats
- Avifauna
- Moose
- Caribou
- Muskrat
- Historic Resources

Including species at risk

Aquatic

- Fish and Fish Habitat
- Groundwater
- Surface Water

Atmospheric

- Light
- Noise
- Vibration
- Shadow Flicker
- Visual Impact
- Air Quality



Early Field Work (Fall 2022)

- **Vegetation** – assessments at potential turbine sites on the Port au Port for SAR / SOCC
- **Avifauna** – fall reconnaissance, opportunistic sampling for interior and coastal avifauna both Port au Port and Codroy
- **Bats** – Autonomous Recording Units (ARU) surveys both Port au Port and Codroy



2023 Field Schedule

- **Winter 2023** – winter resident coastal birds, moose and caribou studies
- **Spring 2023** – bird and bat migration studies, staging waterfowl, raptor nesting surveys, owls surveys, breeding birds, noise, light, vibration, air quality, and fish habitat
- **Summer 2023** – bats, forest songbirds, short-eared owls, nightjars, colonial nesting, vegetation, fish presence, historic resource assessment if necessary
- **Fall 2023** – bird and bat migration studies, muskrat, vegetation
- All available information will be applied to the EIS. Other studies will continue through the pre-construction phase



Thank you.

Please visit the tables to speak with subject matter experts and ask questions.

Share your comments

- Contact form on our website: worldenergygh2.com/contact
- Email: info@worldenergygh2.com
- Call: 709-757-0183
- Comment form (print version)
- Visit the Community Office: 13 Tennessee Drive, Stephenville