BCH2 Project: Hydrogen to Decarbonize Port Operations

Alaska Clean Transportation Leadership Roundtable

13th September 2023

Laura Quinlan

Project Manager – Transportation Solutions

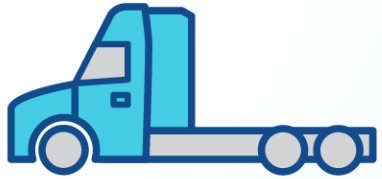
HTEC

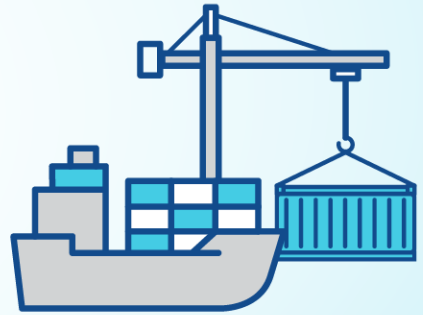
FUELING THE DRIVE TO HYDROGEN

www.htec.ca

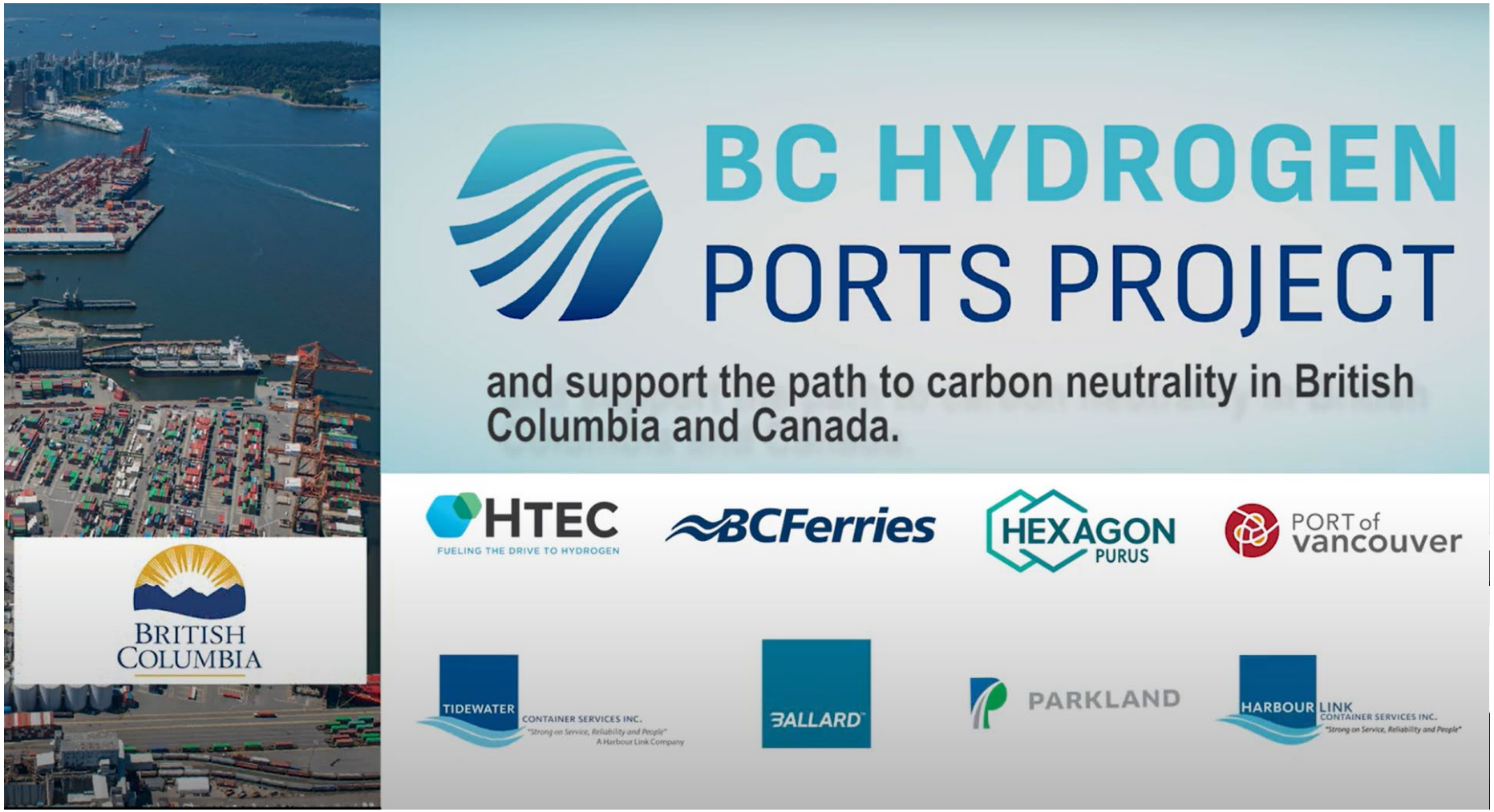
BC HYDROGEN PORTS PROJECT

FUEL CELL





Hydrogen Provider	Station Host	Fuel Cell Developer	Drayage & Yard Truck Developer	Port & Container Drayage Operations
HTEC FUELING THE DRIVE TO HYDROGEN	PARKLAND Station Owner HTEC FUELING THE DRIVE TO HYDROGEN	BALLARD	HEXAGON PURUS	HARBOUR LINK CONTAINER SERVICES INC. TIDEWATER CONTAINER SERVICES INC. BCFerries PORT of vancouver



https://www.youtube.com/watch?v=wOOcCOZscMU&ab_channel=HTECCanada

HTEC and the Clean Hydrogen Value Chain

HTEC By The Numbers

120+
Employees

5
Open H_2 stations

$237M
Equity raised

>75,000
KG of hydrogen delivered & dispensed
avg 80kg/day

>1,000
Tonnes of CO_2 abated

300
FCEVs supported

Why Hydrogen Electric Vehicles?

FAST FUELING

LONG RANGE

25-90% FEWER GREENHOUSE GAS EMISSIONS

ZERO TAILPIPE EMISSIONS

HTEC's Major Projects Supporting HD H2FCEV Adoption

Clean Hydrogen Supply:

- 2 TPD Production Facility - Burnaby
- 15 TPD Production Facility - North Vancouver
- 2 TPD Production Facility - Nanaimo

Expansion of Hydrogen Fueling Station Network:

- 5 LD stations in operation in BC with 1 HD online next year
- >20 LD/HD vehicle stations under development or construction
- Up to 4,000 kg pd capacity GH2 & LH2 Supply

Vehicle Adoption Support:

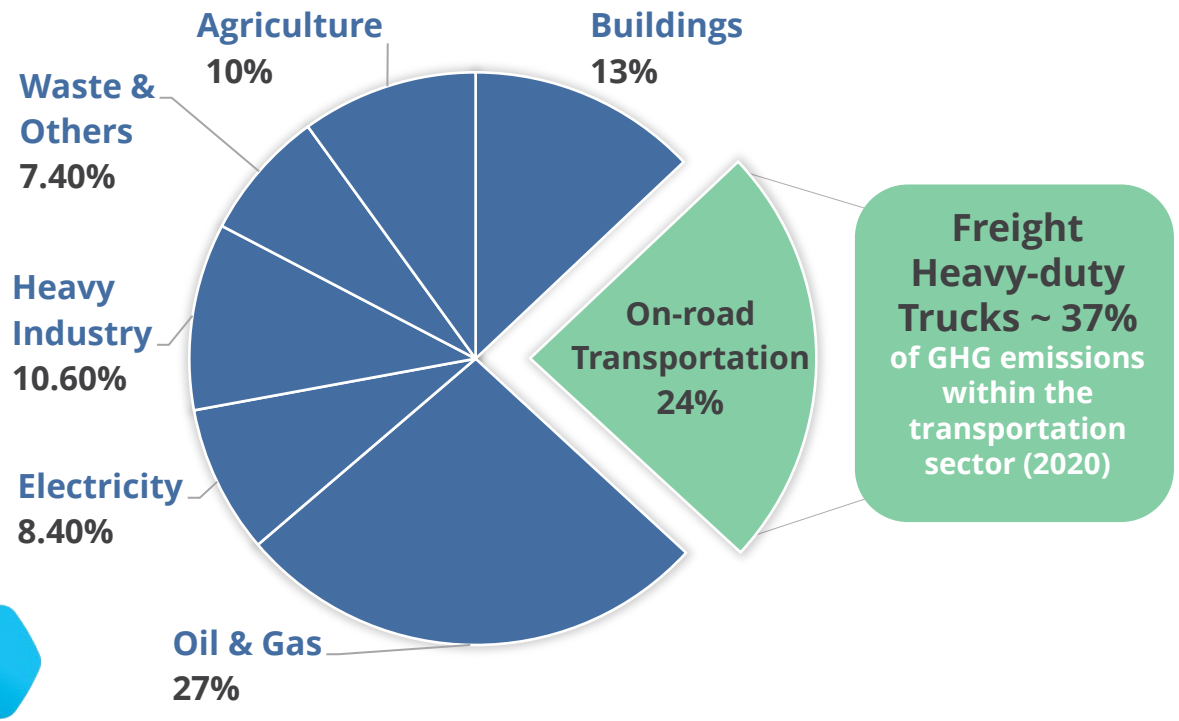
Adoption support for yard trucks, drayage trucks, long haul trucks, and transit buses in:

- BC, Alberta, Quebec, Nova Scotia
- California, Oregon, Washington

Why Hydrogen Electric Trucks?

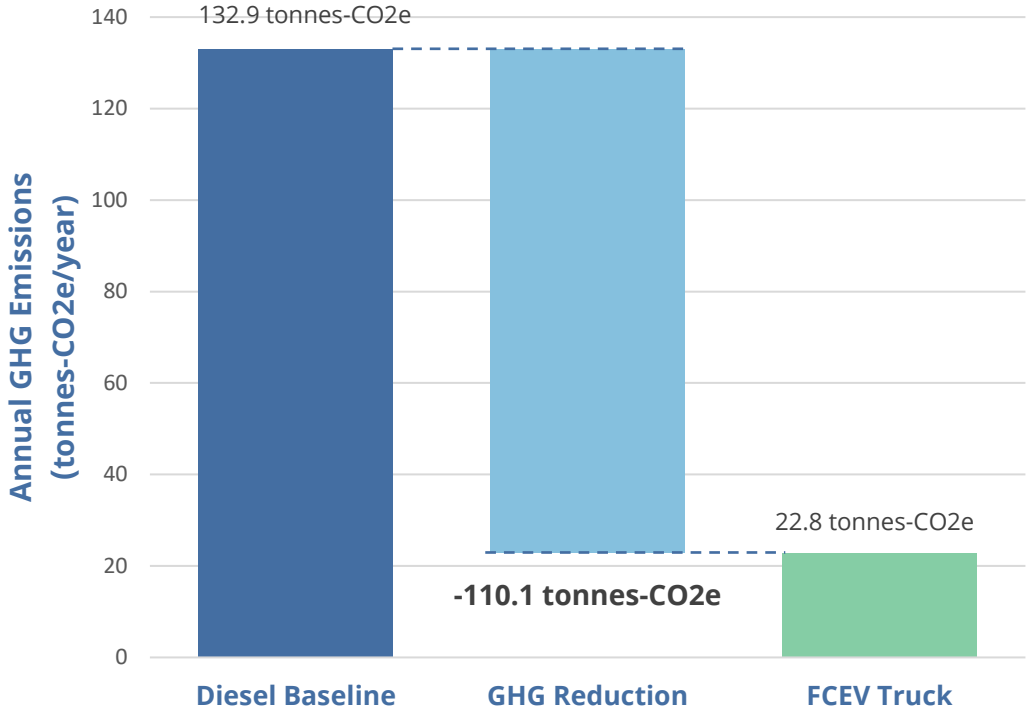
Canada's 2020 GHG Emission Breakdown by IPCC Sector

The on-road heavy-duty transportation sector is a large contributor to nationwide GHG emissions



GHG Reduction Potential from Port based FCEV Trucks

When using low carbon intensity produced hydrogen, FCEV trucks can emit ~83% fewer emissions per year than standard diesel trucks



BCH2 Ports Project Scope

Hydrogen Yard and Drayage Trucks

1. Procure and lease **four** fuel cell electric Yard trucks
2. Procure and lease **two** fuel cell electric Drayage for container service and **HTEC fuel delivery**
3. Gather data and feedback

Hydrogen Production and Supply

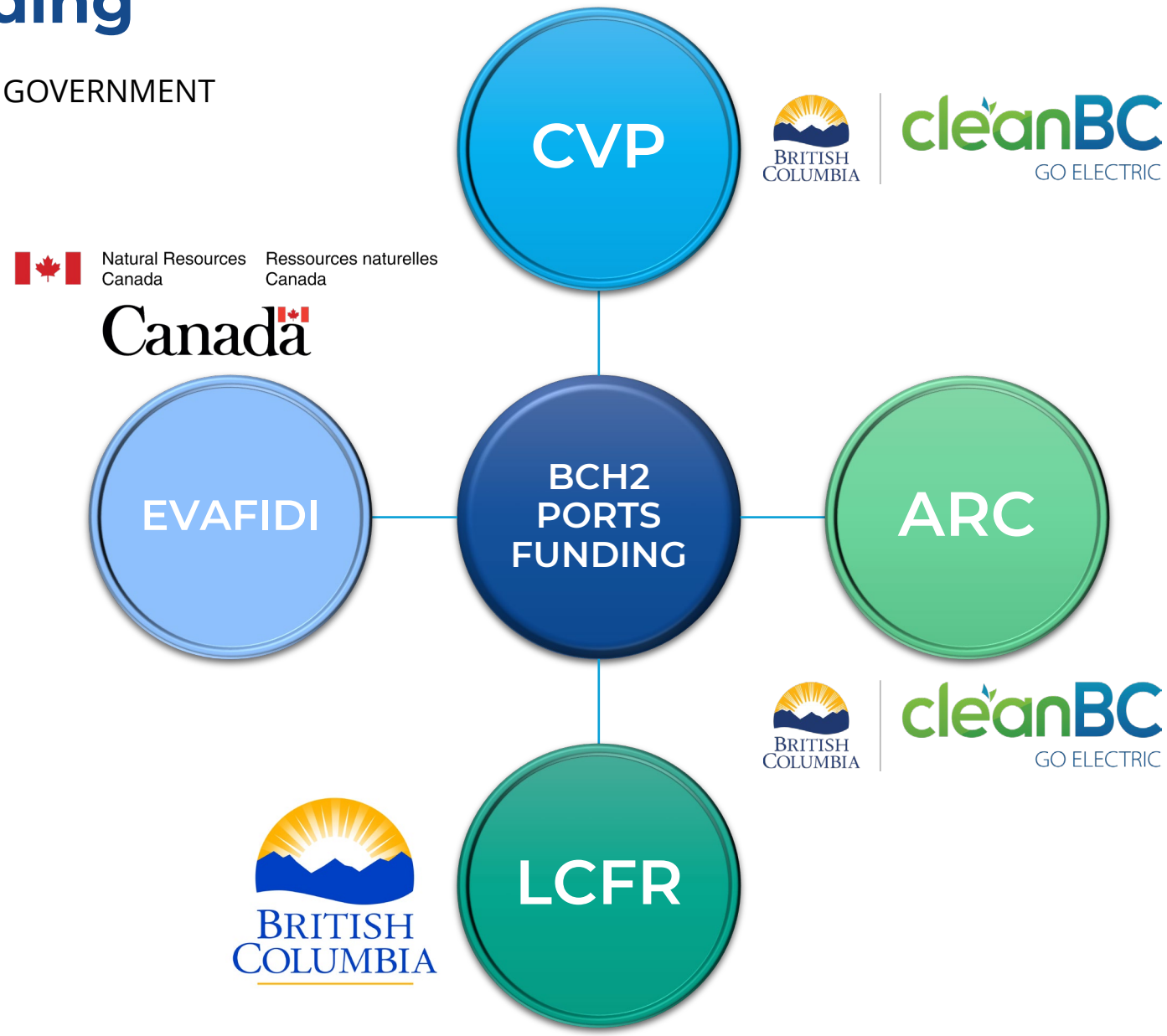
1. Design, Build and Operate the Trapp Avenue **Green Hydrogen production** facility
2. Production of **1 tonne** of hydrogen per day
3. Electrolyser, two hydrogen compressors, and high-pressure ground storage tanks
4. Hydrogen compressed and distributed throughout the network using PowerCubes

Hydrogen Fuelling Station

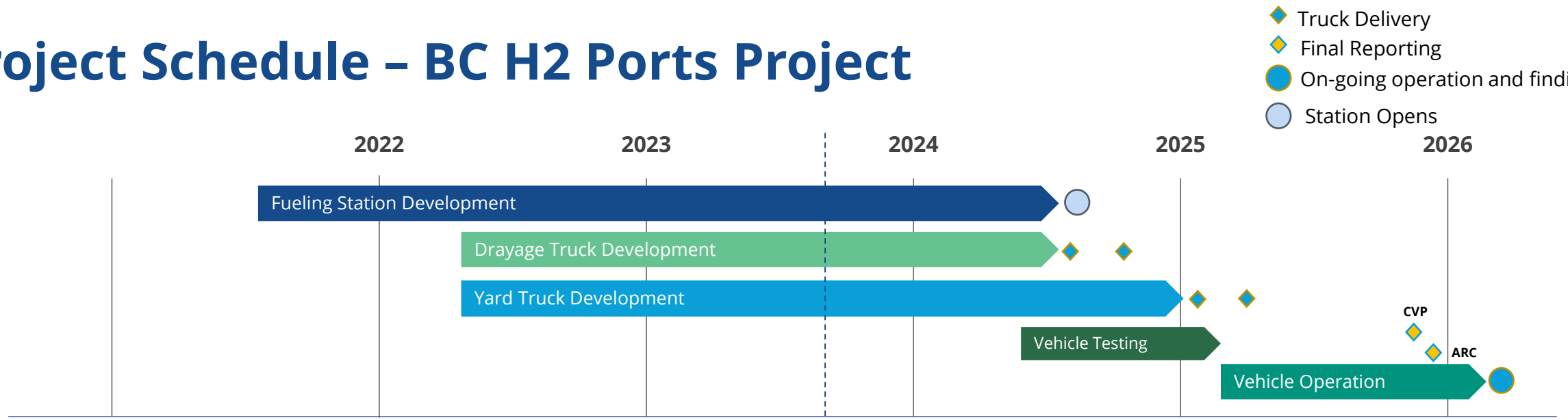
1. Partnership with Parkland and Tsawwassen First Nation
2. 350 and 700-bar pressure rated station with dual dispensing capability
3. Station design, equipment procurement, construction and commissioning managed by HTEC

Project Funding

PROVINCIAL AND FEDERAL GOVERNMENT
PRIVATE/EQUITY
IN-KIND CONTRIBUTIONS



Project Schedule – BC H2 Ports Project



Phase 01

Identify and secure project funding; secure partnerships; preliminary vehicle and station design

Status

COMPLETED

Phase 02

Vehicles ordered; site license secured with Parkland and TFN; permitting applications submitted; detailed station design

Status

IN-PROGRESS

Phase 03

Vehicle assembly completion; vehicle validation (Kelowna); station construction; station commissioning; vehicle delivery to HL and BC Ferries; operator training

Status

IN-PROGRESS

Phase 04

Vehicle and station operations; ongoing data collection and reporting

Status

PLANNING

Updates:

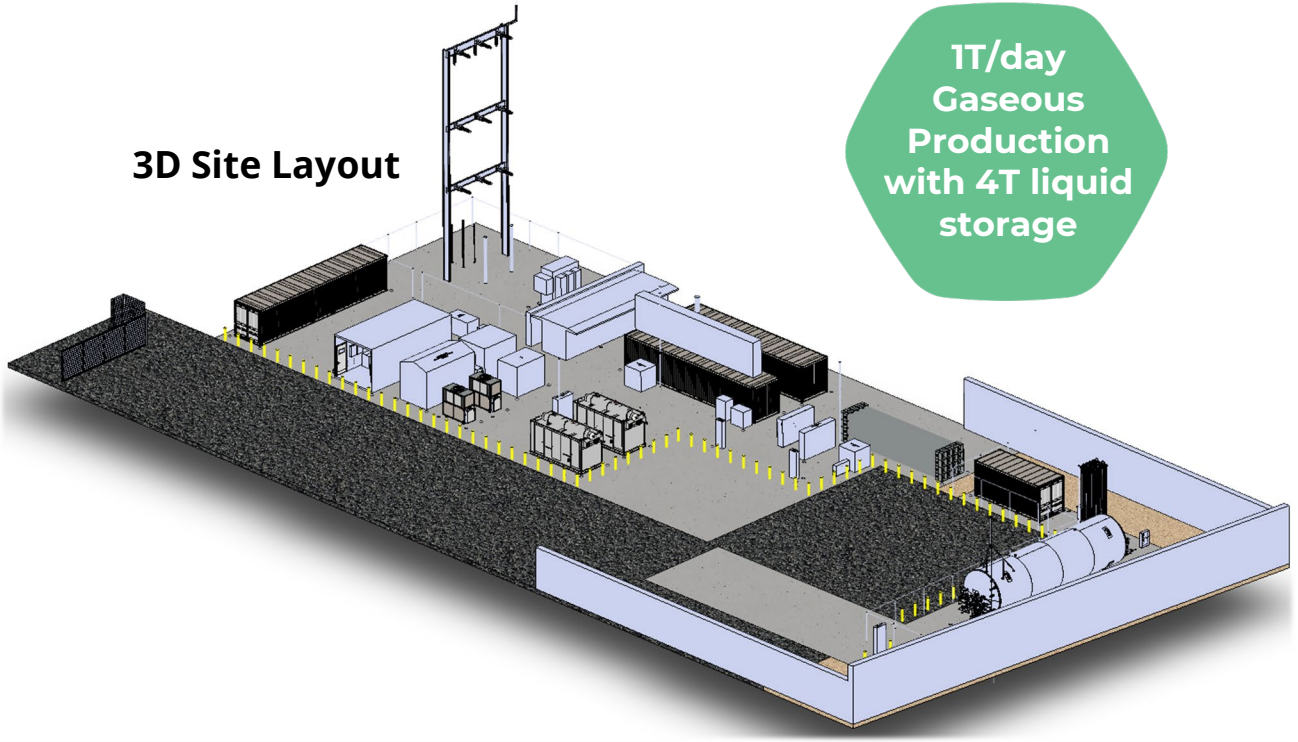
- Drayage truck 1 & 2 to be delivered July and Oct 2023 – Design review complete Nov 28th, 2022
- Yard trucks 1 & 2 on track for End of 2024 delivery
- YT 3 & 4 delivery Q2 2024
- Development Permit for Station on TFN land Approved

Hydrogen Production Site Selection

Trapp Avenue site – Groundbreaking June 2023

Burnaby Site Location: 6120 Trapp Avenue

3D Site Layout



1T/day Gaseous Production with 4T liquid storage

Advantages of new Burnaby site:

- Central to HTEC's hydrogen refueling station network
- Zoning more suitable for electrolysis + compressed gas storage (M3a)
- 12.5kV and 60kV power lines available, giving HTEC a backup Electrolyser power option
- Initial 1-year lease agreement with option to extend for 10 years
- HTEC's control of the site is expected to speed up development compared to being hosted at an industrial facility

Fuelling Station - Tsawwassen

- Station to feature First Nation Artwork by Local TFN Artist

- A combined commercial & light duty H2 fueling station with 350 bar/700 bar capability
- 400kg low pressure storage
- Cascade filling
- Anticipated daily usage to support 150-200kg/day

Concept artwork

Challenges & Opportunities

Codes and Standards for HD fueling protocols

Availability of high flow components & sub-systems

Development of Green Hydrogen Production

Station footprint and setback distances

Component availability for key vehicle sub-systems

Thank you!

HTEC

FUELING THE DRIVE TO HYDROGEN