

HTEC's North Vancouver Clean Hydrogen Plant

2023



HTEC respectfully acknowledges that its head office operates on the traditional, ancestral and unceded territory of the Skwxwú7mesh (Squamish), xʷməθkʷəy̓əm (Musqueam) and səliłwətał (Tsleil-Waututh) Nations.

Topics

Section 01 About HTEC

Section 02 Hydrogen Overview

Section 03 HTEC's North Vancouver Clean Hydrogen Plant



01.

About HTEC



Meet the HTEC Team



COLIN ARMSTRONG
President & CEO



SABINA RUSSELL
VP, Clean Fuels



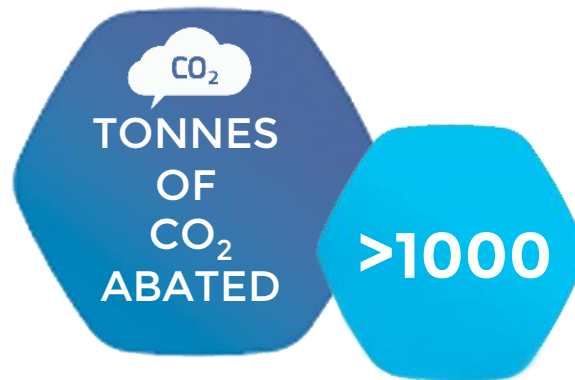
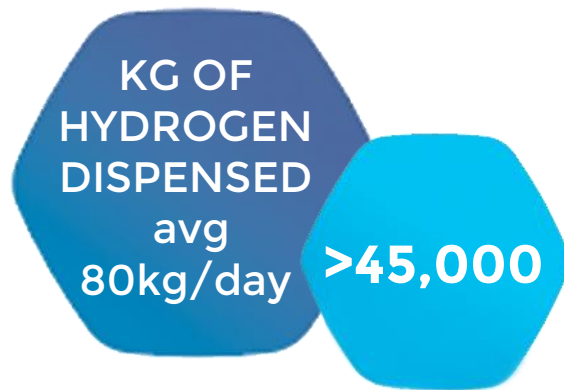
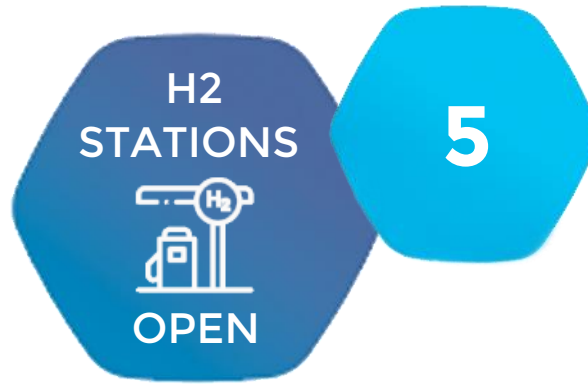
MELISSA MCKINNON
*Director, Liquefaction
Assets*



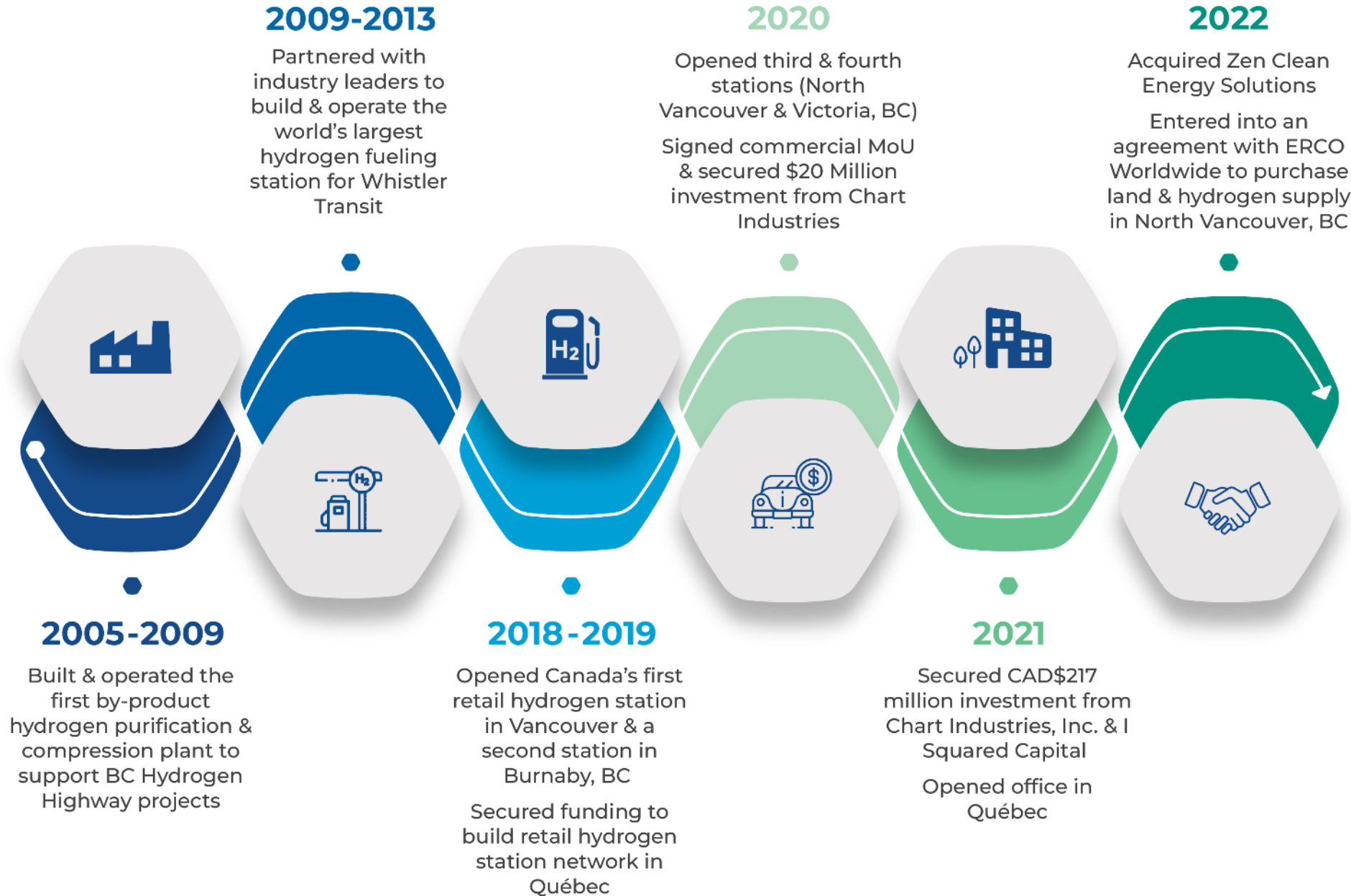
HTEC and the Clean Hydrogen Value Chain



HTEC by the Numbers



Milestones



HTEC's Assets

HTEC established and operates **Canada's first** hydrogen refueling station network.



2018 - 2019

- Opened HTEC's and Canada's first retail hydrogen station in Vancouver (at a Shell station)
- Opened second BC station in Burnaby (at a Shell station)

2020

- Opened a third BC station in North Vancouver (at a 7-Eleven station)
- Opened the fourth BC station in Victoria (at a 7-Eleven station)

2021

- Stations dispensed **>11,000 kg** of hydrogen
- Announced HTEC's first clean H₂ production facility in Burnaby

2022

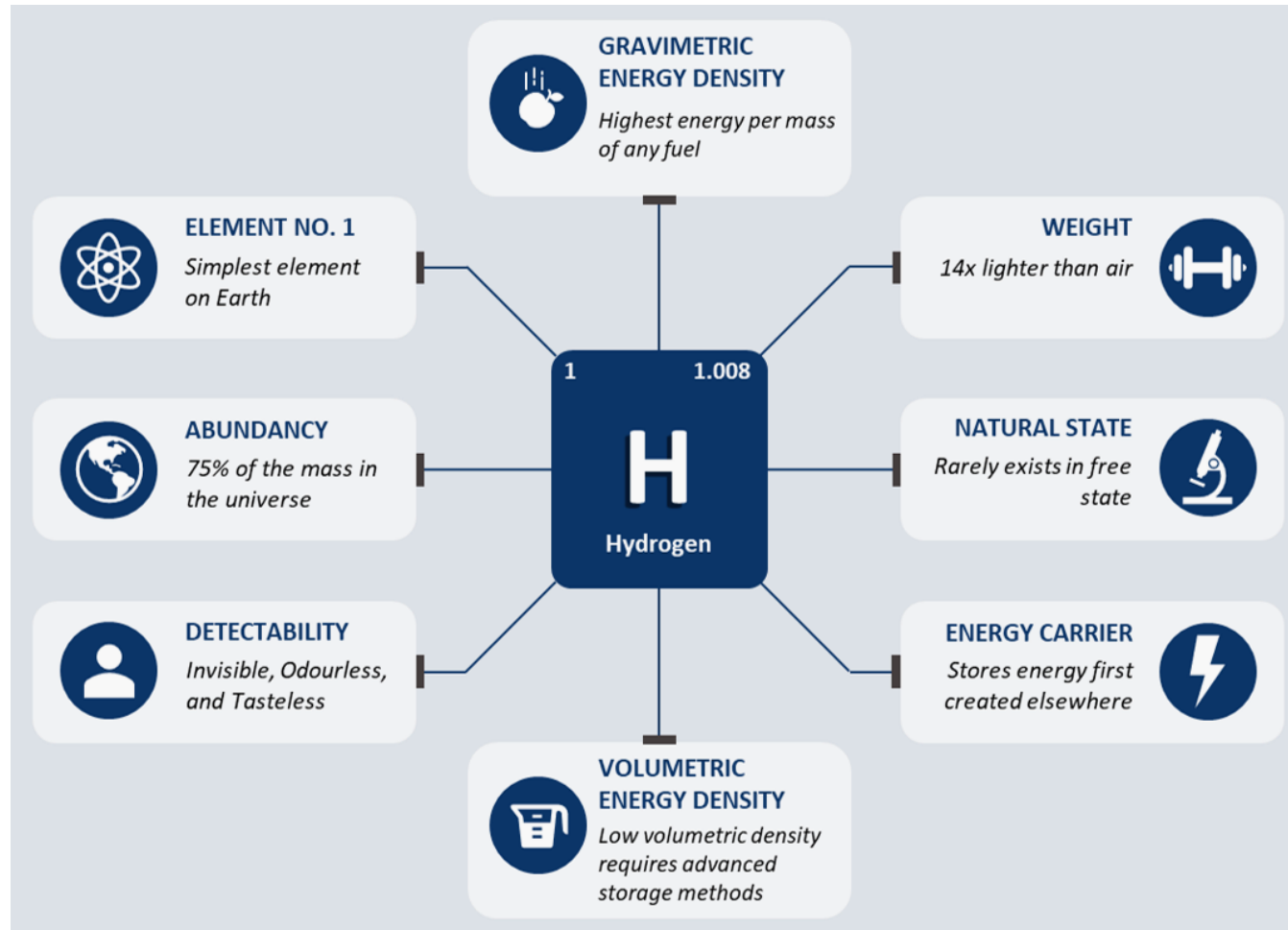
- Stations dispensed **>27,000 kg** of hydrogen
- Announced two more clean H₂ production facilities in North Vancouver and Nanaimo

02.

Hydrogen Overview



What is Hydrogen?



Benefits



Versatile energy carrier

- Electrochemical conversion to produce power
- Combustion to produce heat
- Use directly as feedstock



Carbon free at point of use

- Important decarbonizing vector



Can be produced from a variety of feedstocks



Can be transported for long distances, stored indefinitely

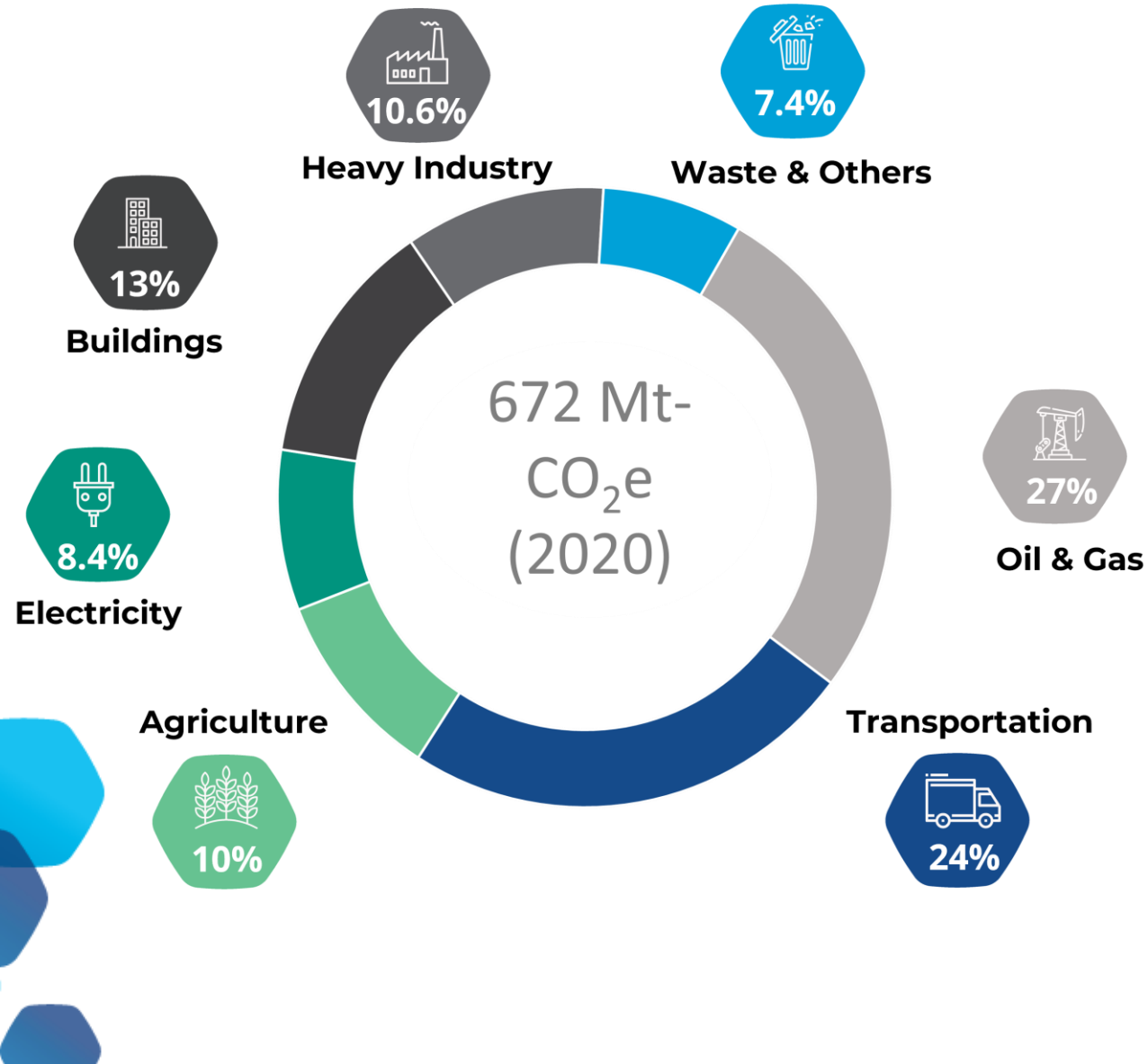
- Produced when and where most convenient
- shipped by pipeline, road, rail, or water



High energy density = well suited to intensive duty cycles

Hydrogen's Role in Decarbonization

Canada's Emission Profile

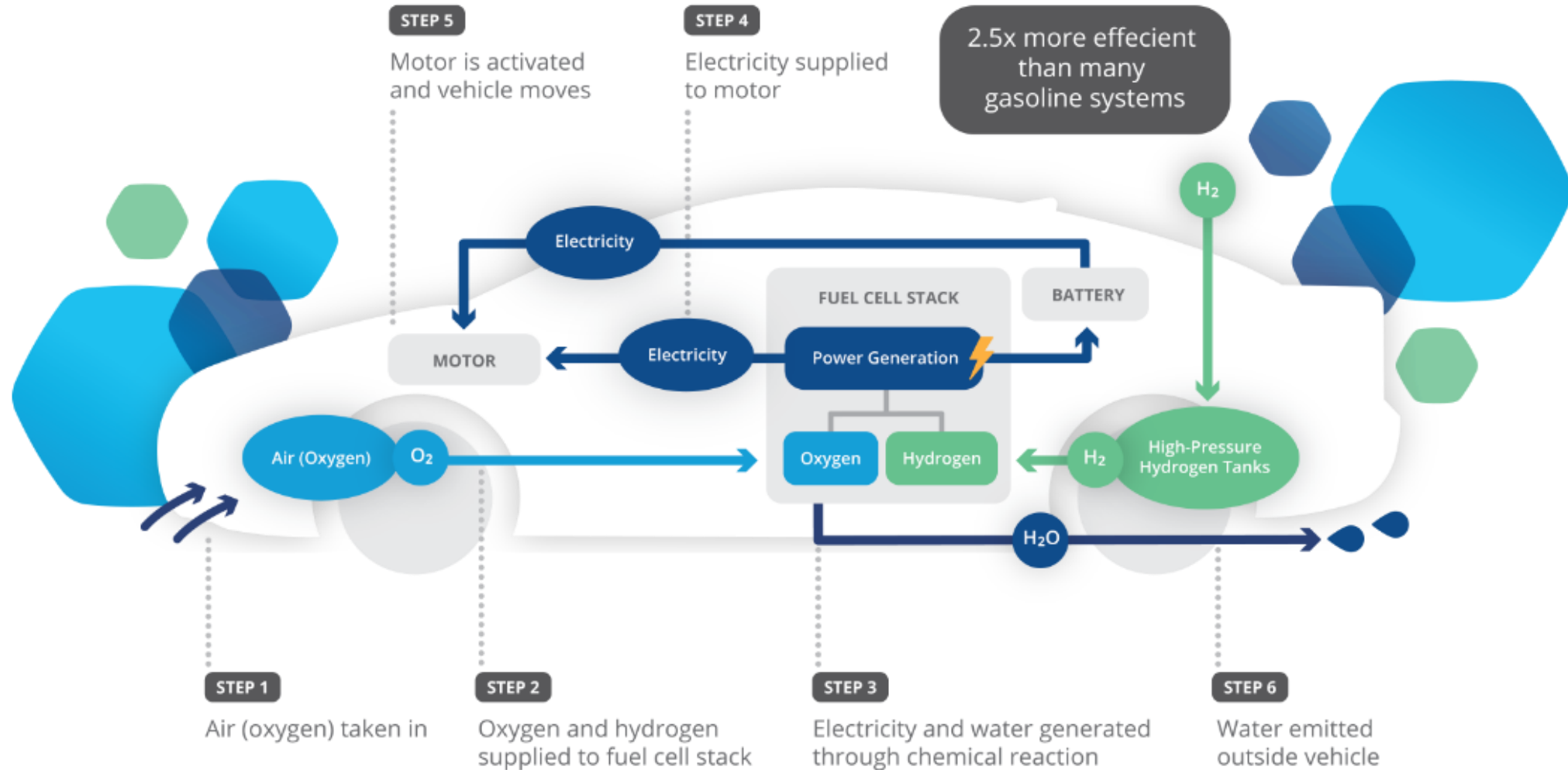


Transportation is a significant portion of Canada's CO₂e emissions profile:














- Reduce GHG emissions by 30% below 2005 levels by 2030 – Paris Climate Agreement
- Canada introduced bill in November 2020 to legislate net-zero emissions by 2050
- What does net zero mean?
 - *Radical transformation of our energy system*

Hydrogen deployed at-scale is needed to meet Canada's commitment to net-zero

How Does a Hydrogen FCEV Work?



Hydrogen vs Fossil Fuels

	Gasoline/ Diesel	Hydrogen
 Produces CO and CO ₂ when burned		
 Causes Global Warming		
 Produces NO _x and SO _x (smog)		
 Produces particulate pollution		
 Lingers after a spill, posing a fire danger		
 Flammable		

Applications of Hydrogen



Transportation



Homes



Workplaces



Industries

Hydrogen is Safe

- HTEC has completed more than 15,000 fills and delivered close to 100,000 kg of hydrogen safely over the last ten years.
- Hydrogen, like diesel and gasoline, is a flammable fuel and we handle it with the utmost respect using industry-proven safety measures.
 - *Hydrogen's unique characteristics make it one of the safest energy sources when compared to fuels, such as gasoline, diesel, or natural gas.*
- Hydrogen EVs have millions of miles of safe, on-road experience
 - *15,000 H2 EVs in US, 66 Hydrogen Buses*
 - *>190 H2 EVs on Canadian roads*

Hydrogen has been used as an energy carrier for decades.

- Hydrogen is not new - it's been in widespread industrial use for more than 100 years in Canada. Codes, standards, and design practices have been developed to enable safe use.
 - Hydrogen technology solutions are designed in accordance with established safety standards.
-

03.

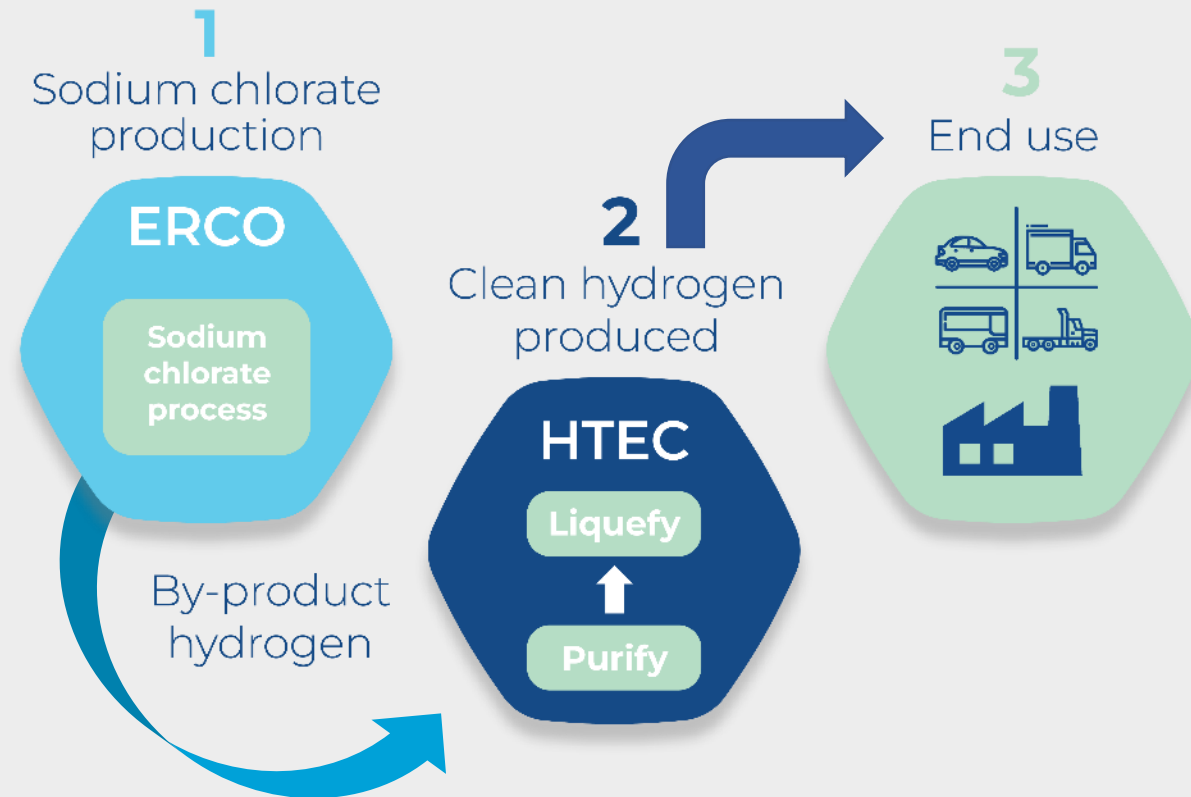
HTEC's North Vancouver Clean Hydrogen Plant



Recycling waste hydrogen to meet net-zero targets

- HTEC will co-locate a clean hydrogen production facility at an existing ERCO Worldwide sodium chlorate plant.
- Sodium chlorate process produces low-carbon hydrogen as a by-product.
- Today, most of this hydrogen is vented into the atmosphere.
- HTEC will capture, purify, and process this industrial hydrogen to produce 15 tonnes per day of clean liquid hydrogen.

- Western Canada's first hydrogen liquefier plant.
- HTEC plans for the facility to be operational by 2026.



Current Project Status

- HTEC and ERCO Worldwide have entered into an agreement to purchase the existing industrial site
- The land purchase agreement is undergoing a due-diligence period
- HTEC is also simultaneously working on a rezoning amendment to facilitate the liquefaction of the hydrogen gas



Project Timeline



Benefits of the Project

- Generate and keep nearly **100 jobs** in BC.
- Reduce GHG emissions up to **141 kilotonnes CO₂e per year**, helping BC reach its CleanBC GHG emission reduction targets.
- Development of the Province's hydrogen industry in accordance with the **BC Hydrogen Strategy**.
- Generate municipal and provincial **tax revenues**.
- Supply hydrogen **for >30,000 hydrogen electric vehicles** fuel.



Impact on Local Community

- Impact on **traffic** changes through the site during normal operations: minimal.
 - Impact on **noise**: none outside the site.
-
- Impact on local **transit system**: minimal.
 - Engagement with **First Nations** and the neighbouring community is underway.



HTEC puts safety first, always

- **Potential project risks** do not extend beyond the existing facility perimeter and will not impact the Maplewood district.
 - **Project** will be designed to the most recent and relevant codes and standards from organizations such as Canadian Standards Association, American Society of Mechanical Engineers, American Petroleum Institute, International Organization for Standardization, and National Fire Protection Association.
-

Liquid Hydrogen is Safe

- Liquid hydrogen facilities, like the one HTEC is proposing, are **not new**.
- Liquid hydrogen facilities have been operating safely and successfully in **Canada and the USA since the early 1960s**, including in urban areas.
- Today, there are **14 hydrogen liquefaction plants operating in Canada and the USA**, which produce approximately **300 tonnes** of liquid hydrogen per day.



In Summary

1

Hydrogen is safe, and versatility makes it an important part of the low-carbon future.

2

HTEC has been leading the clean hydrogen industry for more than 20 years in Canada.

3

HTEC's proposed clean hydrogen plant in North Vancouver will process currently 'wasted' by-product hydrogen to produce a clean transportation fuel.

4

This proposed facility will help the District of North Vancouver, British Columbia and Canada attain its climate goals.

5

The proposed project's potential risks will not impact the Maplewood community, as assessed by an Independent Qualified Professional.

Thank you!

