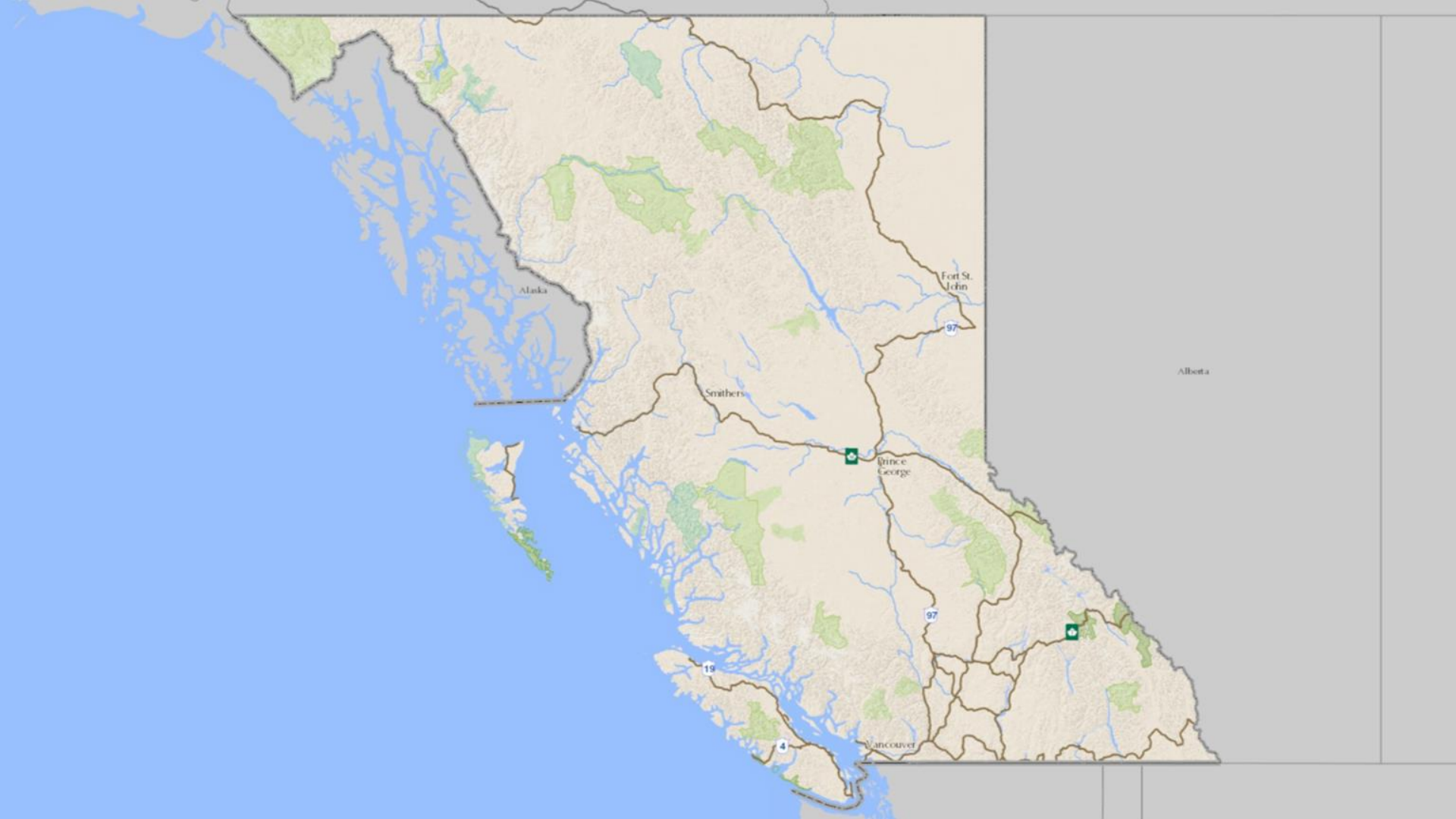
Exploring Hydrogen Opportunities for First Nations

Tricia Thomas and Kwatuuma Cole Sayers

June 28, 2023

BC First Nations Energy and Mining Council


Alaska
Fort St. John
97
Alberta
Smithers
Prince George
97
19
4
Vancouver

Facilitators

BC First Nations Energy and Mining Council

Kwatuuma Sayers
FNEMC Clean Energy Lead

Co-facilitator

Tricia Thomas
FNEMC Co-facilitator

Partners

FORESIGHT CANADA

BRITISH COLUMBIA | Ministry of Energy, Mines and Low Carbon Innovation

Contributing Partner

FORTIS BC™ Energy at work

Introductory Remarks

Agenda

9:05	Introductory remarks and *Hydrogen 101* review
10:00	**Session 1:** Evaluating hydrogen opportunities for BC First Nations
11:00	**Session 1 cont'd:** Hydrogen project decision-making pathway
12:00	Lunch and activities
1:00	**Panel:** First Nations hydrogen opportunities - Ask the experts
1:45	**Speakers:** Federal and provincial funding opportunities
2:00	**Session 2:** Capacity building for BC First Nations hydrogen projects
3:30	Closing remarks
4:00	End of workshop

Workshop Objectives

1. Explore what factors should be considered by First Nations when making decisions on hydrogen projects
2. Uncover what questions and barriers exist when it comes to First Nations opportunities in hydrogen
3. Discover what resources are needed to overcome barriers and move hydrogen projects forward for BC First Nations
4. Support the development of a BC First Nations Hydrogen Strategy

Review: Hydrogen 101

Indigenous Clean Energy Opportunities (ICEO)

ICEO 4.43 of DRIPA Action Plan 2022-2027

- Co-develop recommendations on strategic policies and initiatives for clean and sustainable energy.

- Identify and support First Nation-led clean energy opportunities related to CleanBC, the Comprehensive Review of BC Hydro, and the BC Utilities Commission Inquiry of the Regulation of Indigenous Utilities.

(Ministry of Energy, Mines and Low Carbon Innovation - EMLI)

BC First Nations Energy and Mining Council

British Columbia Assembly of First Nations

First Nations Summit

BRITISH COLUMBIA Ministry of Energy, Mines and Low Carbon Innovation

Existing Hydrogen Strategies: Relevant Commitments to First Nations

The BC Hydrogen Strategy (2021)

Policy Actions themes:

- How we'll grow hydrogen production
- How we'll regulate hydrogen production
- How we'll support industry to increase hydrogen use
- How we'll advance hydrogen as a source of clean energy in communities
- How we'll develop B.C.'s export market for hydrogen

A primary purpose of our BC First Nations Hydrogen Strategy is to ask ourselves, how should First Nations be part of the above to increase our economic opportunities?

Existing Hydrogen Strategies:

The Hydrogen Strategy for Canada (2020)

Table 3 – Stakeholder Roles and Responsibilities by Recommendation

● Responsible ◐ Informed/Consulted		Governments	Industry	Utilities	Academia	Indigenous	NGOs
Strategic Partnerships	Intergovernmental collaboration	●				●	
	Public/private partnerships	●	●	●		●	
	Cross-sector collaboration	●	●	●	●	●	●
	International collaboration	●	●	◐	●	◐	
De-Risking of Investments	Long-term policies	●					◐
	Multi-year programming	●					
	Domestic deployment HUBs	●	●	◐	◐	◐	◐
	Facilitate co-funding opportunities	●	◐	◐			
Innovation	Strategic research priorities	●	●	◐	●		
	Dedicated funding for RD&D	●	●	●	●	◐	◐
	Regional research HUBs	◐	●	◐	◐	◐	◐
	Consortium-based projects	◐	●	◐	●	◐	◐
Codes & Standards	Canadian Codes & Standards	●	◐	◐			◐
	Codes & Standards working group	●	●	●	◐		
	Performance based standards	●					◐
	International standards/certification	●	●	◐	◐		
Enabling Policies & Regulation	Hydrogen's role in new policies, programs, & regulations	●	◐	◐	◐	◐	◐
	Modernize existing policies, programs, regulations	●	◐	◐	◐	◐	◐
	Hydrogen in clean energy roadmaps	●				◐	◐
	Technology-neutral & performance-based	●					
Awareness	Awareness outreach in HUB regions	◐	●	◐	◐	●	◐
	Awareness on safety, uses, benefits	●	◐	◐	◐	◐	●
	Hydrogen tools and resources	●	●	◐	◐	◐	◐
	Industry/academia collaboration	◐	●	◐	●		
Regional Blueprints	Develop regional blueprints	●	●	●	◐	●	◐
	Identify regional HUBs	◐	◐		●	●	
	Diversify stakeholder input	●	●	●	●	●	●
	Alignment across regions/provinces	●	◐	◐	◐	●	◐
International Markets	Canadian brand	●	●	◐	◐	◐	
	Infrastructure Investments	●	●	●		◐	
	Domestic flagship projects	●	●	●	●	◐	●
	Leverage international relationships	●	●	◐	●	◐	◐

Pillars # 1, 7, and 8 require particular attention:

#1 Strategic Partnerships

A. Intergovernmental collaboration
B. Public/Private partnerships
C. Cross-sector collaboration
D. International collaboration

#7 Regional Blueprints

A. Co-lead the development of Regional Blueprints in BC
B. Identify regional hubs
C. Diversify Stakeholder input

#8 International Markets

A. Canadian Brand
B. Infrastructure investments
C. Domestic Flagship projects

What is Hydrogen (H_2)?

Molecule

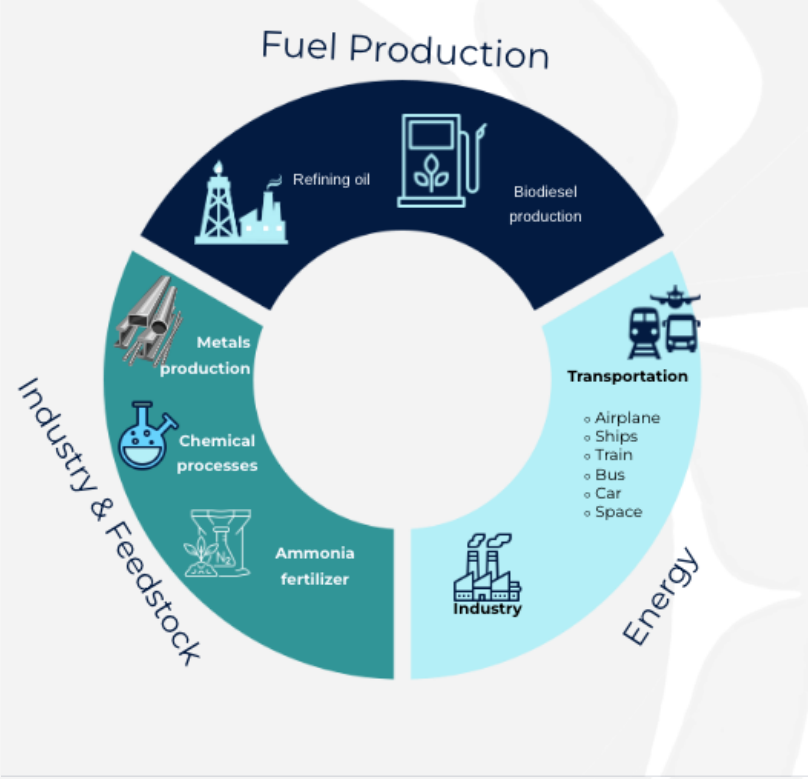
H_2 is commonly used in industrial processes today

Ex. petroleum refining, metals, chemicals, fertilizers, food processing

Energy Carrier

H_2 can be used as a low-carbon fuel for various applications

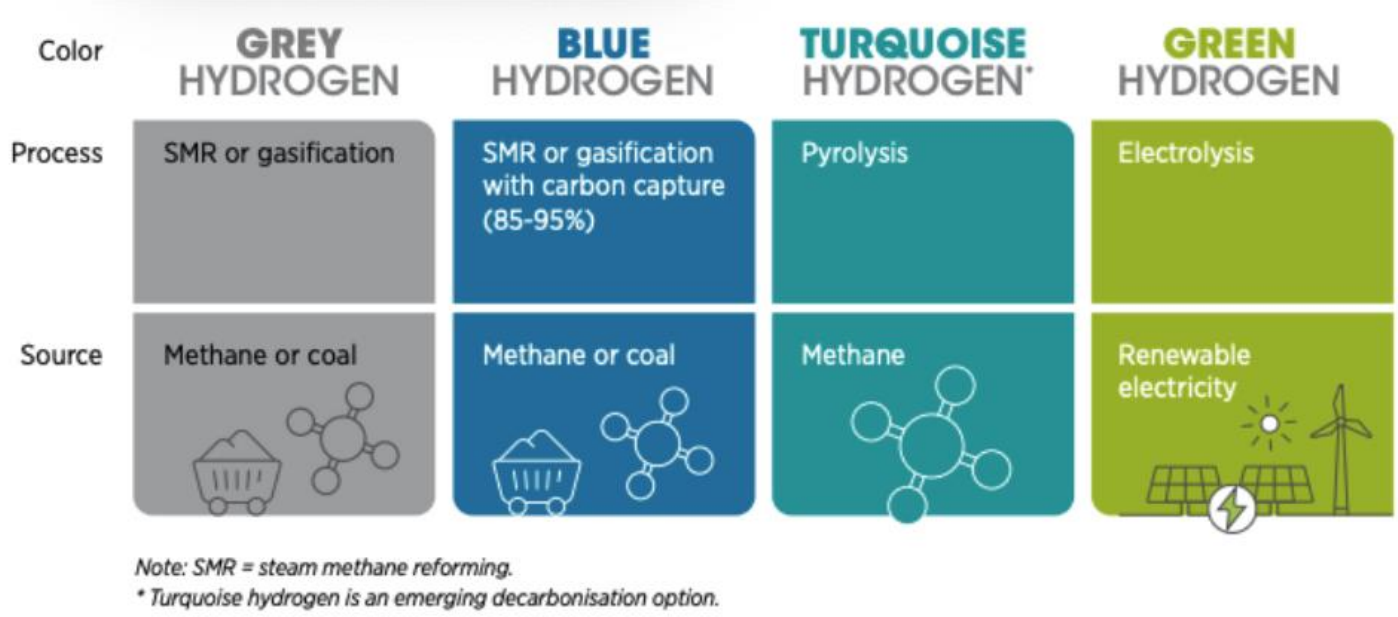
Ex. transportation, utilities



The Potential of Hydrogen

- **Can complement electricity**
- **Unique advantages**
- **Low carbon footprint**

Making Hydrogen



Grey, blue, green and more – the many colours of hydrogen. Image: International Renewable Energy Agency

From Natural Gas: Blue, Turquoise H_2

“Blue hydrogen”

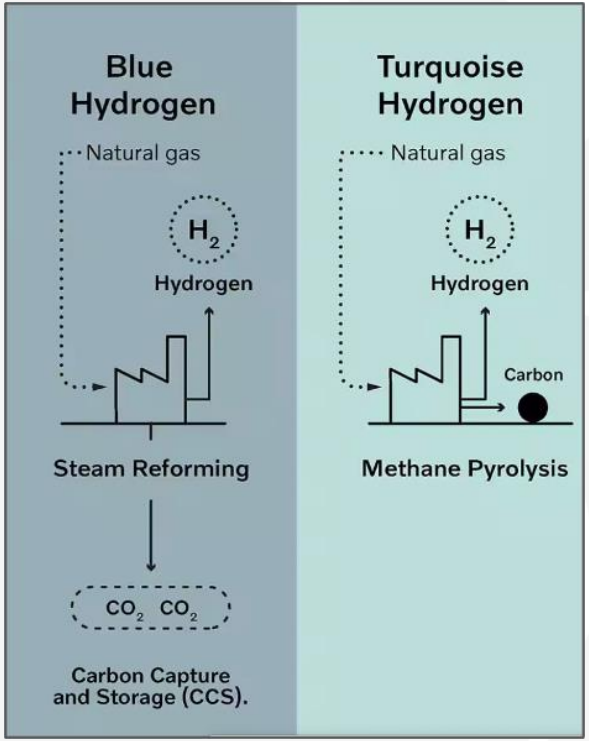
- Produced from natural gas/methane (CH_4) through **reformation + carbon capture,** utilization, and storage (CCUS)
- 2 kWh of electricity to produce 1 kg of H_2 (blue)

“Grey hydrogen” (Not a low carbon fuel)

- Without CCUS

“Turquoise hydrogen”

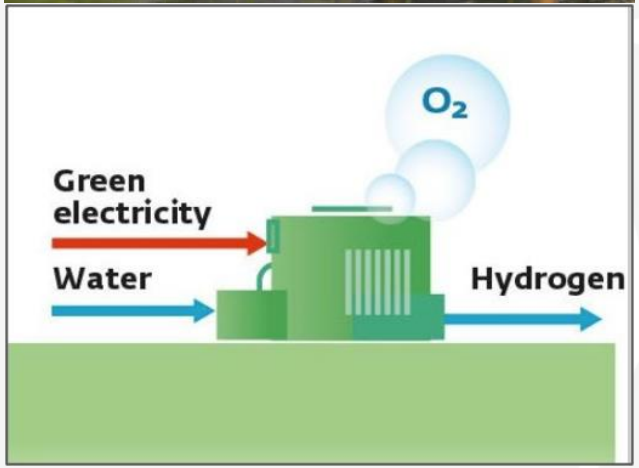
- Produced from natural gas/methane (CH_4) through **pyrolysis**
- Some electricity is needed



From Water: Green H_2

“Green hydrogen”

- Produced by splitting water into hydrogen and oxygen using clean, renewable electricity through **electrolysis**
- Grid connection is NOT a requirement
- Requires more electricity than reforming/pyrolysis
  - 55 kWh of electricity to produce 1 kg of H_2 in 2019
- Every 1 kg of H_2 produced needs 9 L of water



Using Hydrogen

- **Fuel cell:** transportation
- **Combustion**: building heating
- **Industrial processes:** petroleum, metals, chemicals, etc.
- **Renewable energy storage:** remote power generation
- **Synthetic fuels**: methanol, ammonia, SAF
- **Export**