All About Hydrogen in BC

Prepared for Clean Energy BC

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CHFCA
Clean. Efficient. Energy.

Outline

- About hydrogen
- BC's emissions profile
- Hydrogen helping with BC Hydro Challenges?
- Near-term: gas energy
- Mid-term: transport
- BC Hydrogen Strategy Summary

Why is hydrogen “hot” again?

pre-2019

Not really needed for
-20%, -40% or -60%
GHG targets

2019 to now

But is the Keystone of Net Zero commitments

Hydrogen % Final Energy Demand 2050

Clean hydrogen
as fuel or feedstock

(gas energy, heat, transport…)

Direct electrification, clean electricity

(wind, solar, batteries…)

up to 30%

up to 14%

20-35%

16-25%

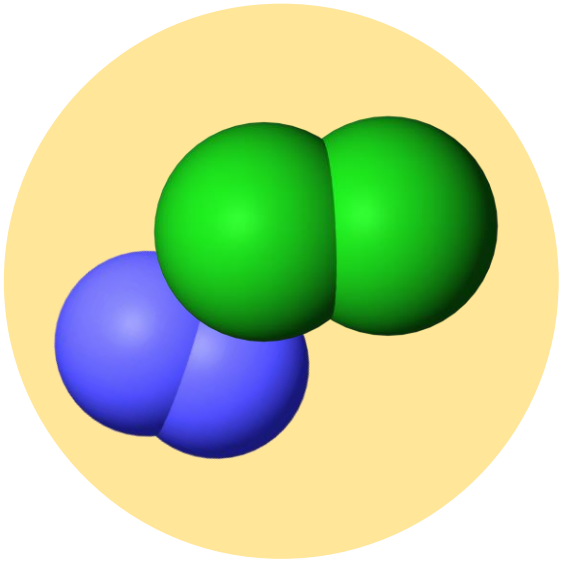
33%

BNEF: up to 24%

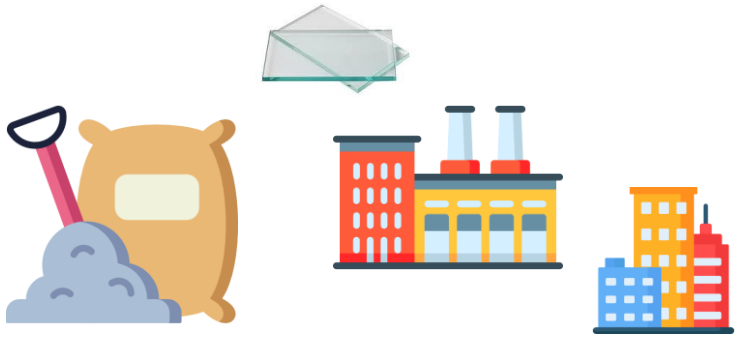
Sources: see slide notes

Hydrogen's Many Roles

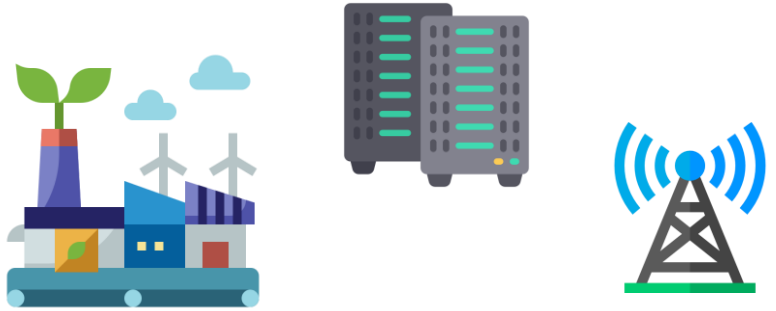
Feedstock



Transportation



Heat and Power

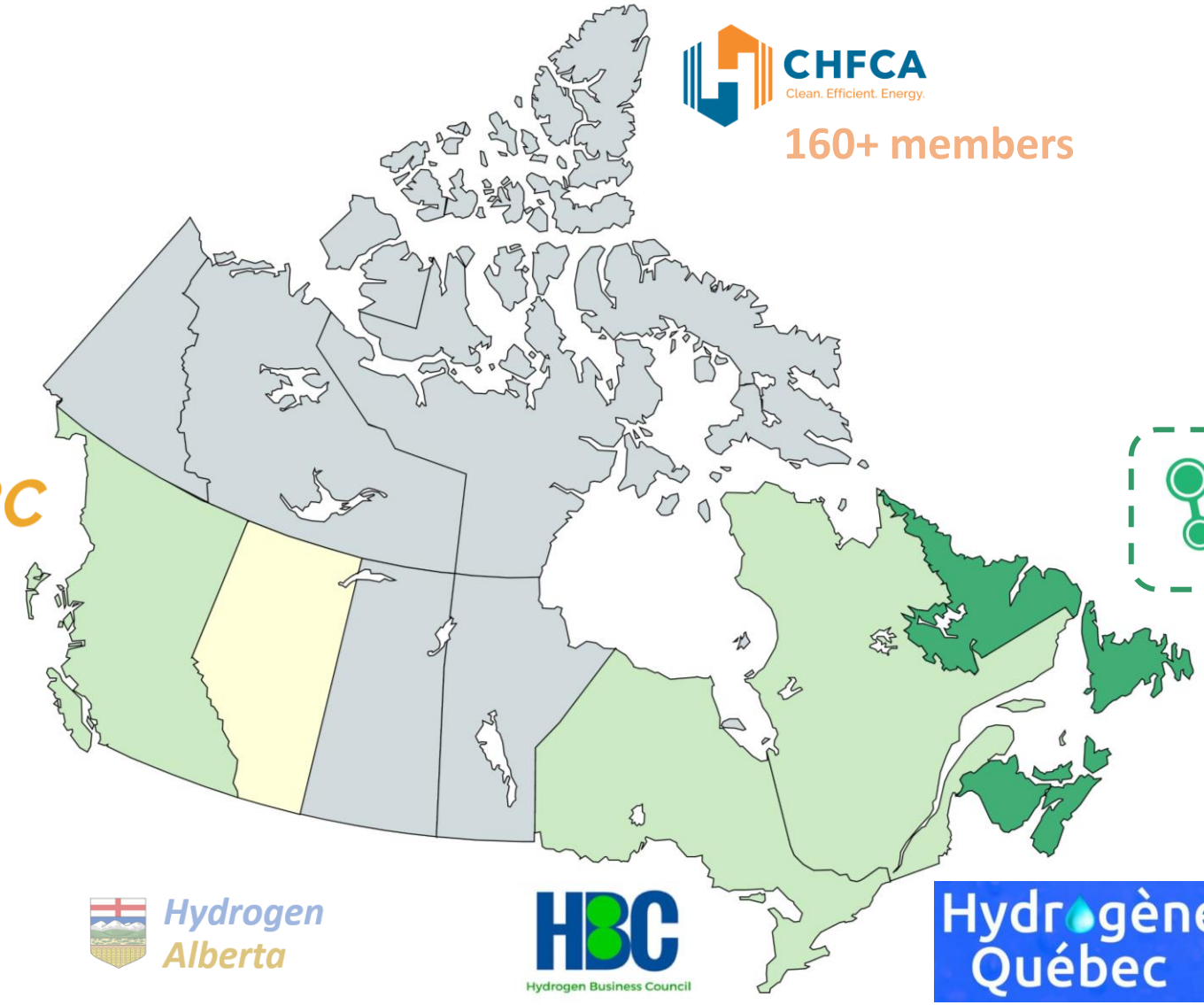


Icons: Jemis Mali, Phonlaphat Thongsriphong, Petai Jandrapoon (IconSout.com) and Pixel perfect and Freepik (FlatIron.com)

About CHFCA:
Canadian Hydrogen and Fuel Cell Association

CHFCA
Clean. Efficient. Energy.

160+ members



Hydrogen BC

atlantic hydrogen alliance

Hydrogen Alberta

HBC
Hydrogen Business Council

Hydrogène Québec

Clean Hydrogen Opportunity

Clean hydrogen industry (+ fuel cells)

Jobs 📈 GHGs 📉

(2018)

$200,000,000+ 💵

2,000+ 👷👷‍♀️

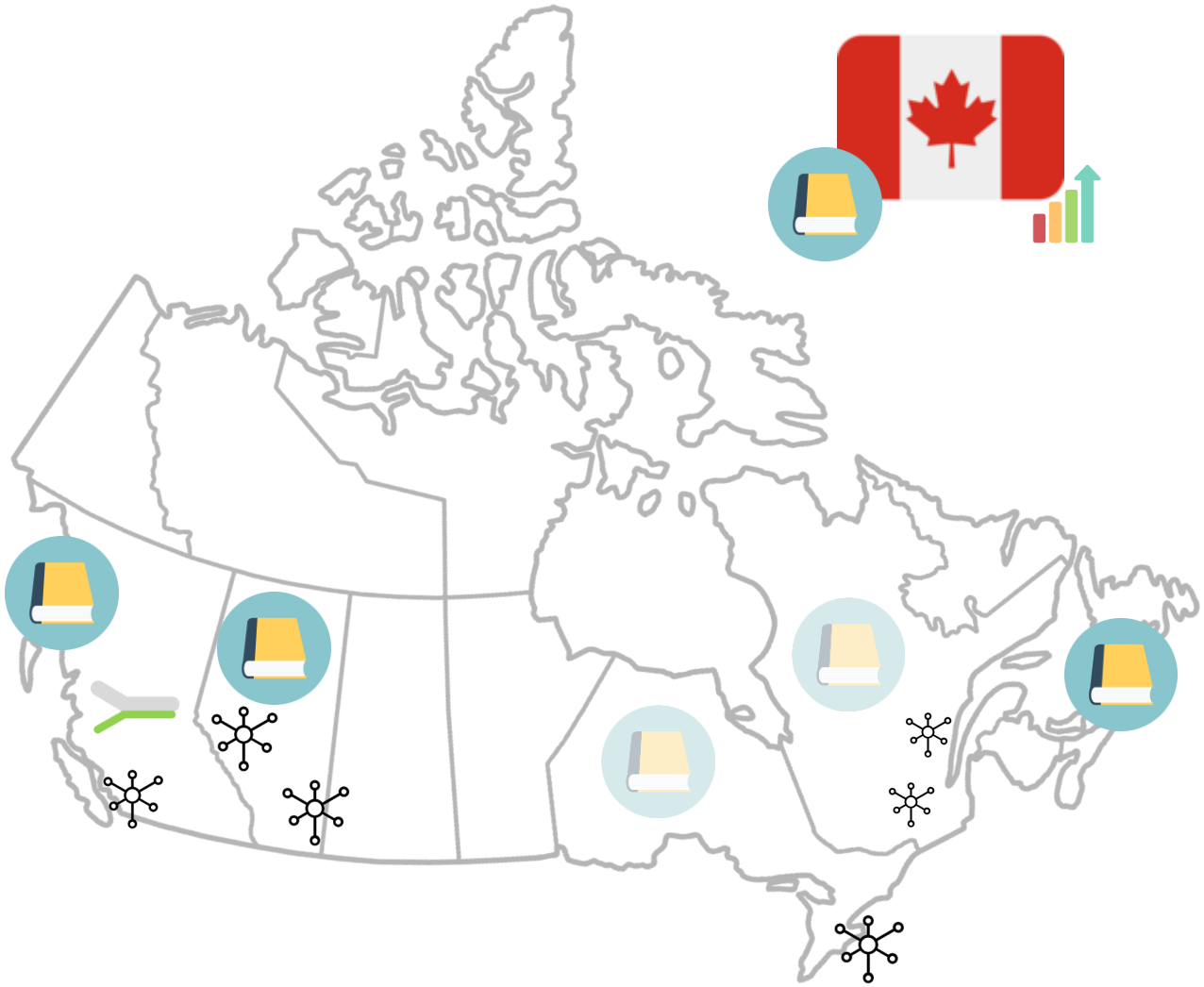
(2050)

up to $47,000,000,000 💵

up to 358,000 👷👷‍♀️

Revenue and Jobs figures as described in Notes.

Hydrogen Support in Canada



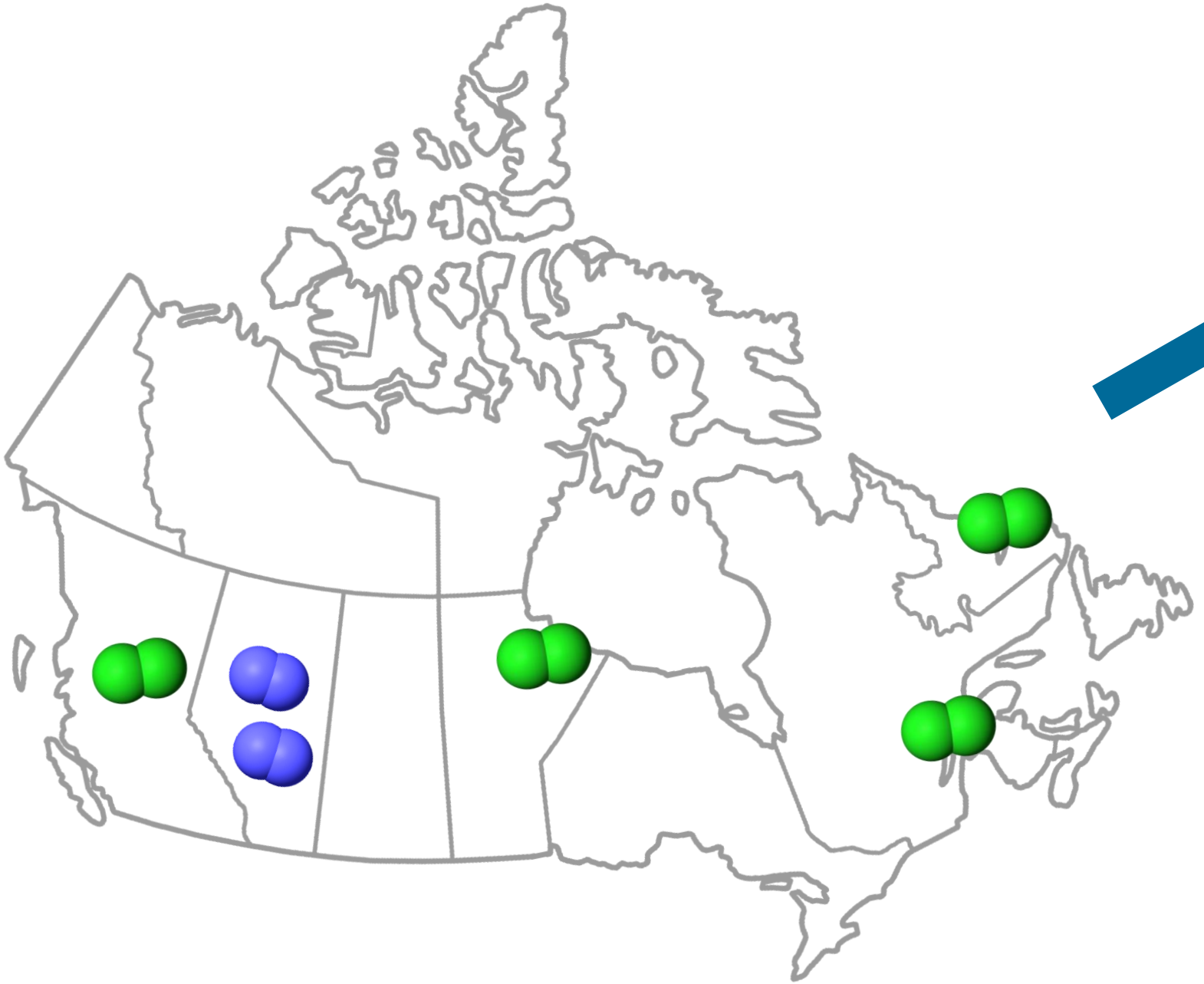
H_2 Strategy
or similar

Hydrogen Hubs
in development

Clean Fuel Standard
$1.5B Clean Fuel Fund
$12B Net Zero Funding
100% ZEV Target
Carbon Price

Gas Energy
Decarbonizing Policy

Exploring Hydrogen Exports



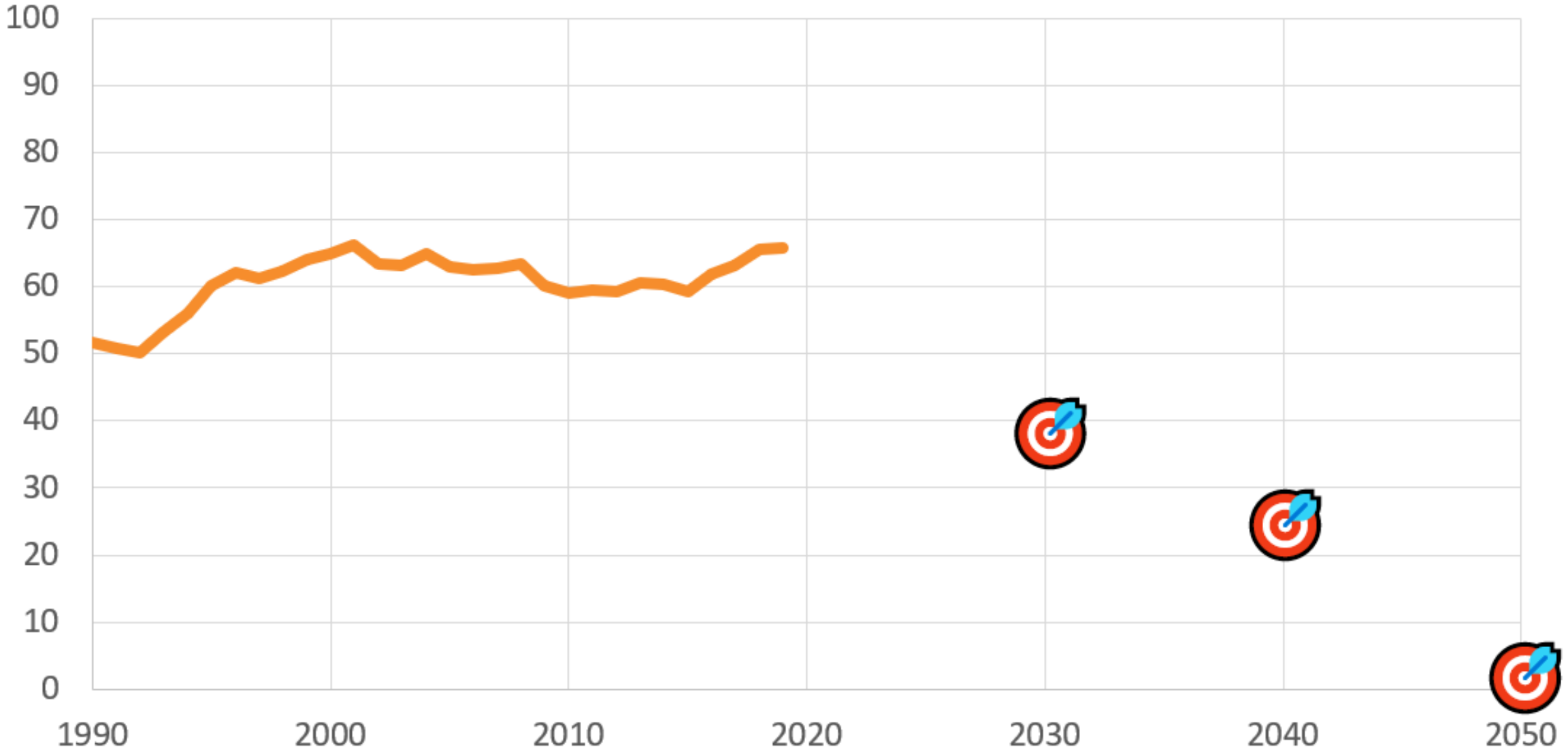
Europe

Indo-Pacific

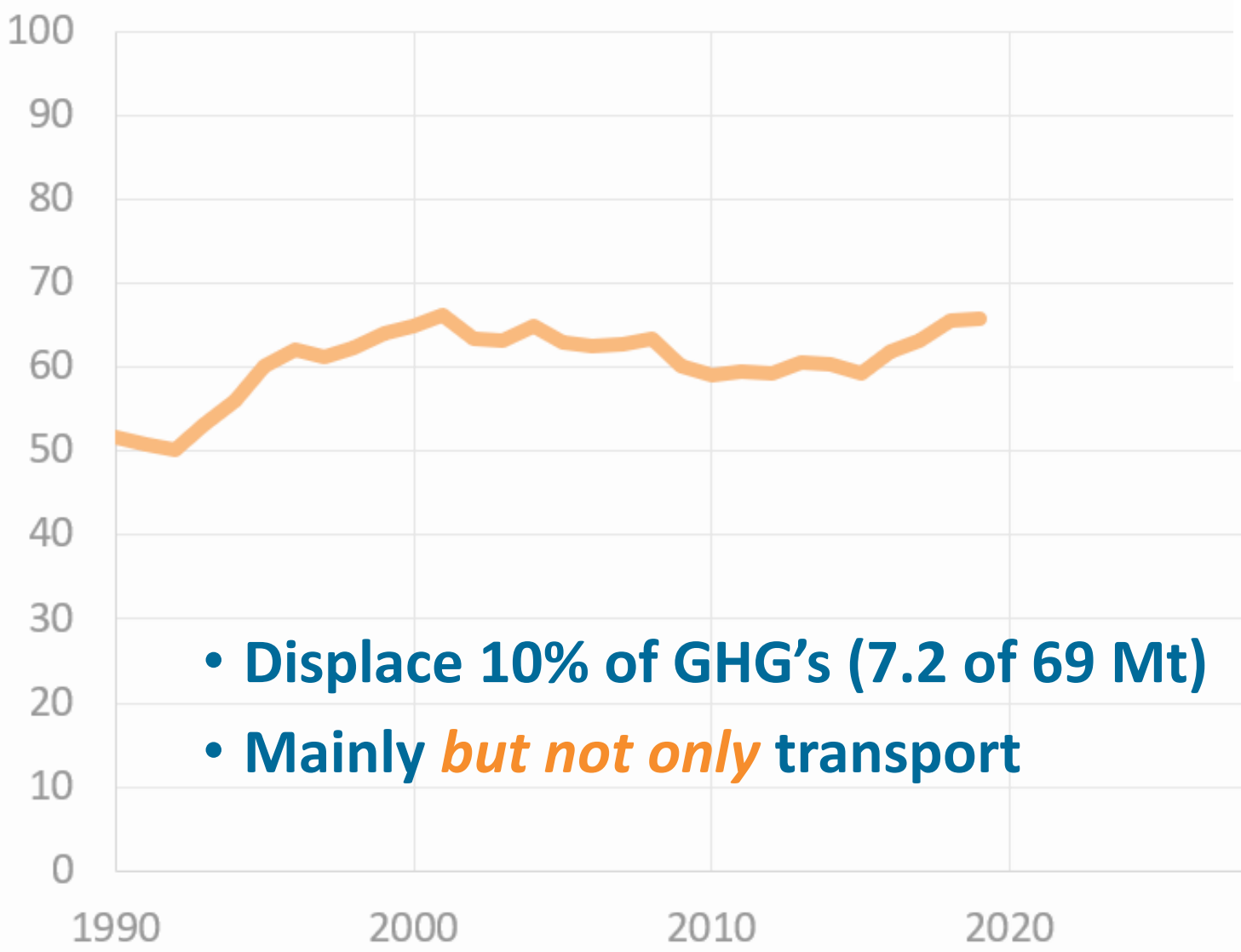
Safe, Reliable, Geographic Diversification

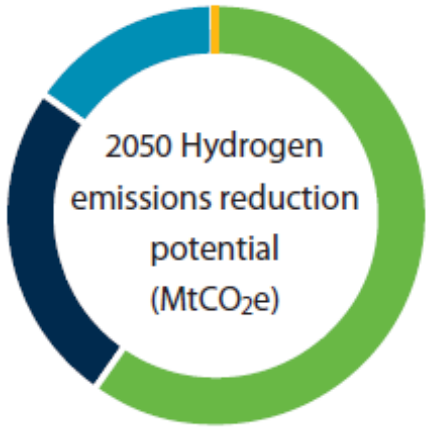
Emissions Profile

BC Emissions Profile (Mt CO_2e)



Hydrogen's Role in "Net Zero" BC





60% Transportation

25% Industry and synthetic fuels

15% Natural gas

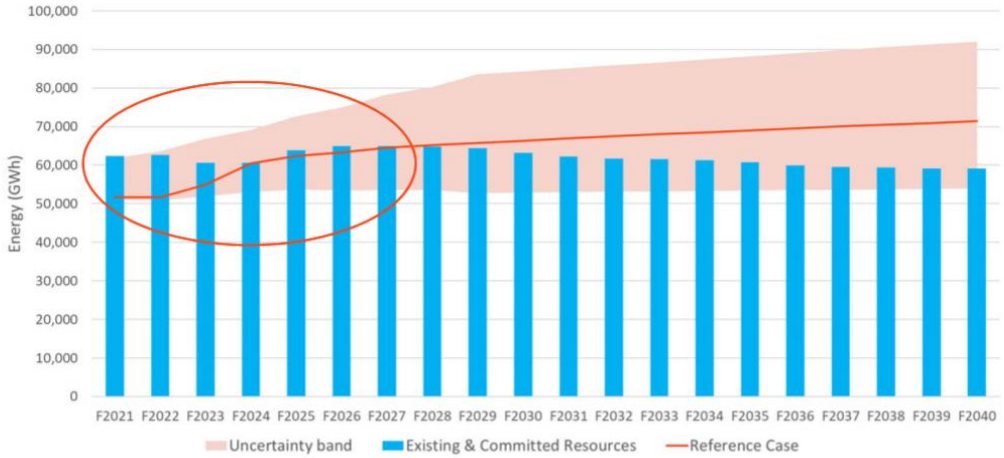
0.01% Remote communities

- **Displace 10% of GHG's (7.2 of 69 Mt)**
- **Mainly *but not only* transport**

BC Hydro Challenges

Load Resource Balance – Energy

We expect to have enough resources to meet B.C.'s energy needs for roughly a decade



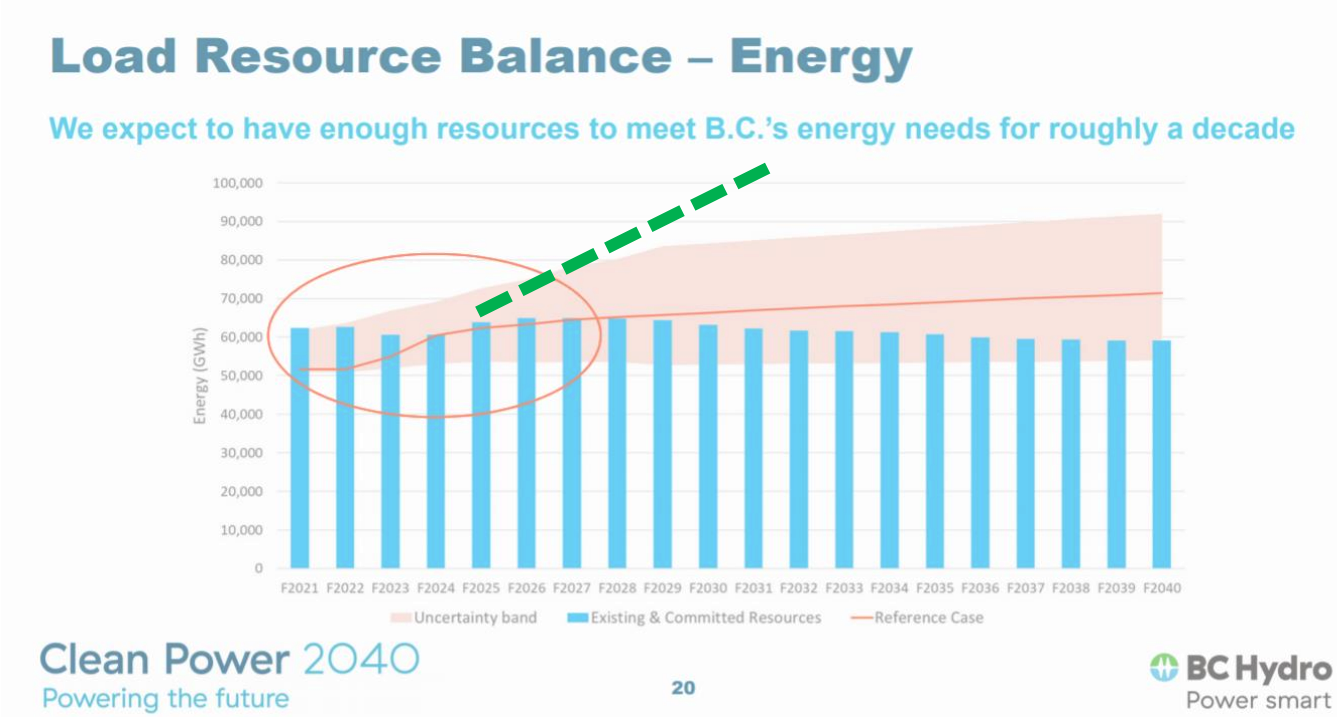
Clean Power 2040
Powering the future

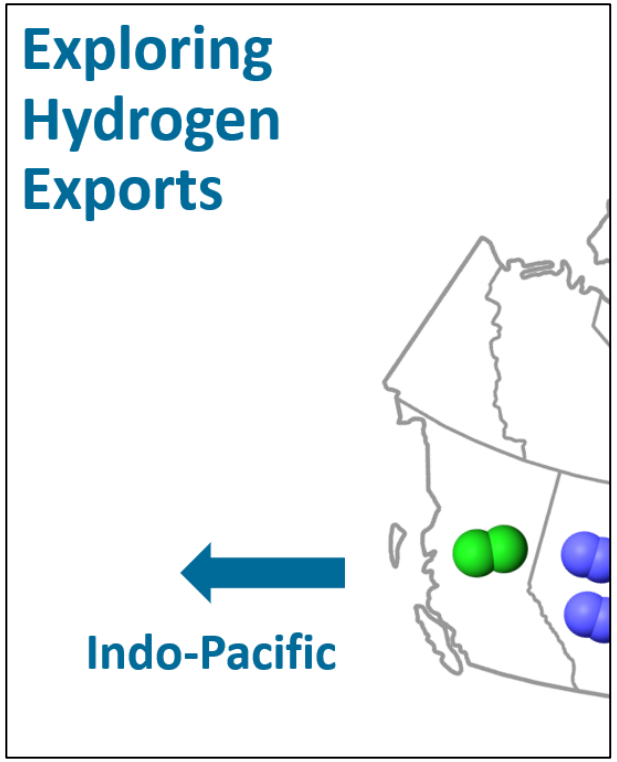
20

BC Hydro
Power smart

BC Hydro Integrated Resource Plan, Dec 2020

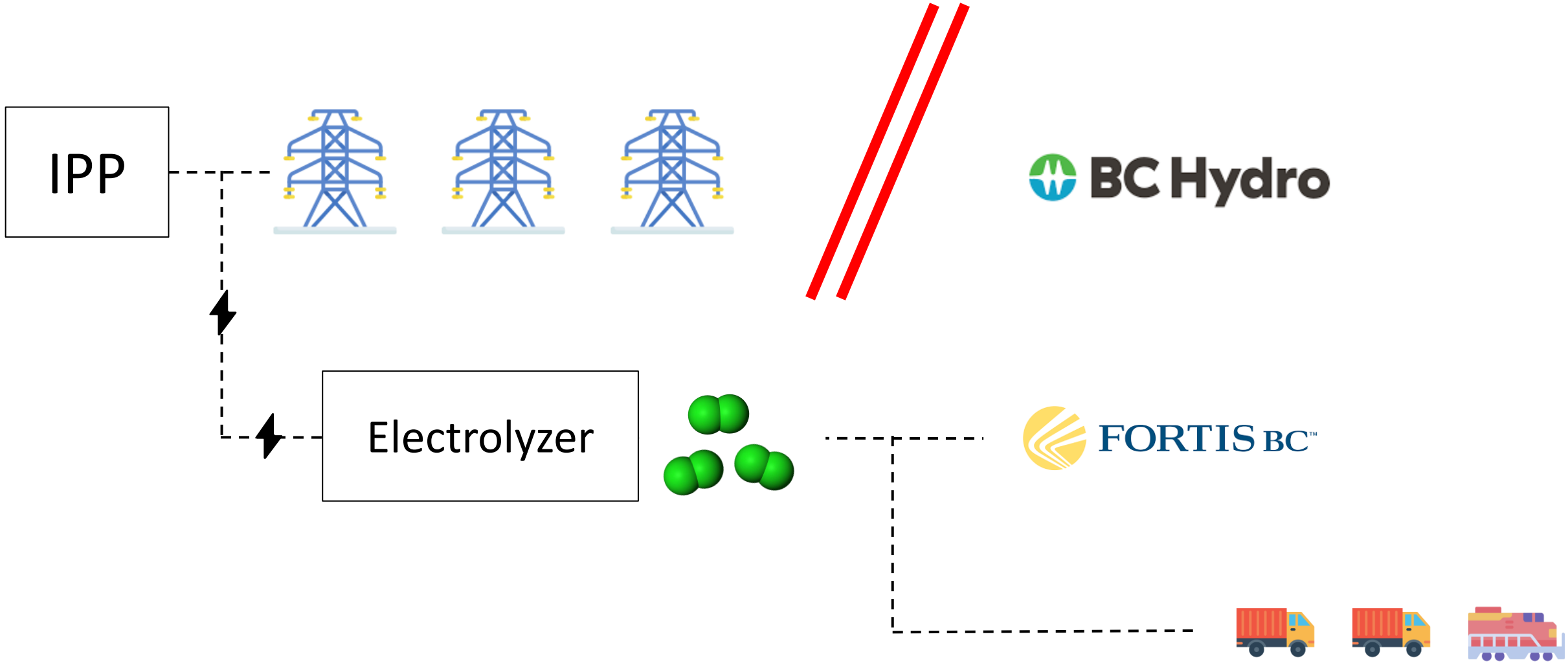
Hydrogen Helping With BC Hydro Challenges (I)





GW-scale hydrogen export projects would significantly increase electricity demand

Hydrogen Helping With BC Hydro Challenges (II)



Electricity icons created by Freepik - Flaticon

Near Term: Gas Decarbonization

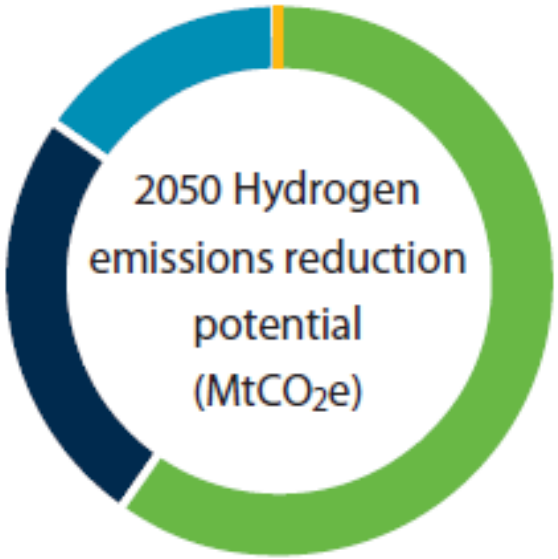
- BC Renewable Gas Mandate (15% RG by 2030)
  - boosts market for RNG and hydrogen-from-electrolysis
  - standing offer from FortisBC
- Gas energy GHGs **-47% by 2030**
  - studies beginning for retrofit-or-twinning to 100% H2 network

Blending (H_2 into natural gas) is no one's end-game.
But it can offtake H2 until other uses scale up.

Medium Term: Transport

Biggest GHG ↘ opportunity.
But needs time to scale up.

Build stations, pilot trials, coordinate fleets, etc.



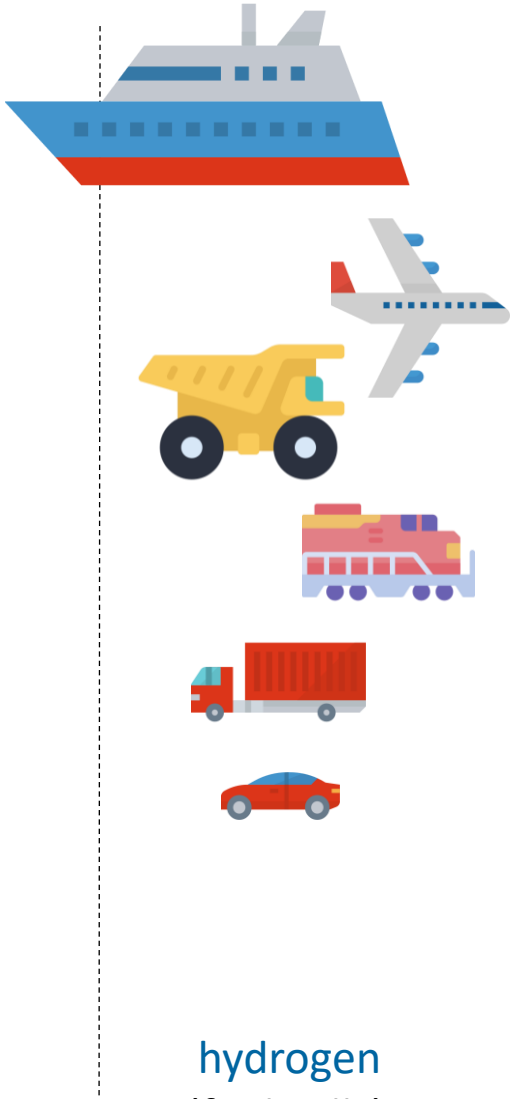
60%	Transportation
25%	Industry and synthetic fuels
15%	Natural gas
0.01%	Remote communities

$6/kg H2 LCFS credit
at current prices

Transportation

The Bigger the Better…

for endoskeletons and hydrogen



exoskeletons

endoskeletons

electricity
(batteries)

hydrogen
(fuel cells)

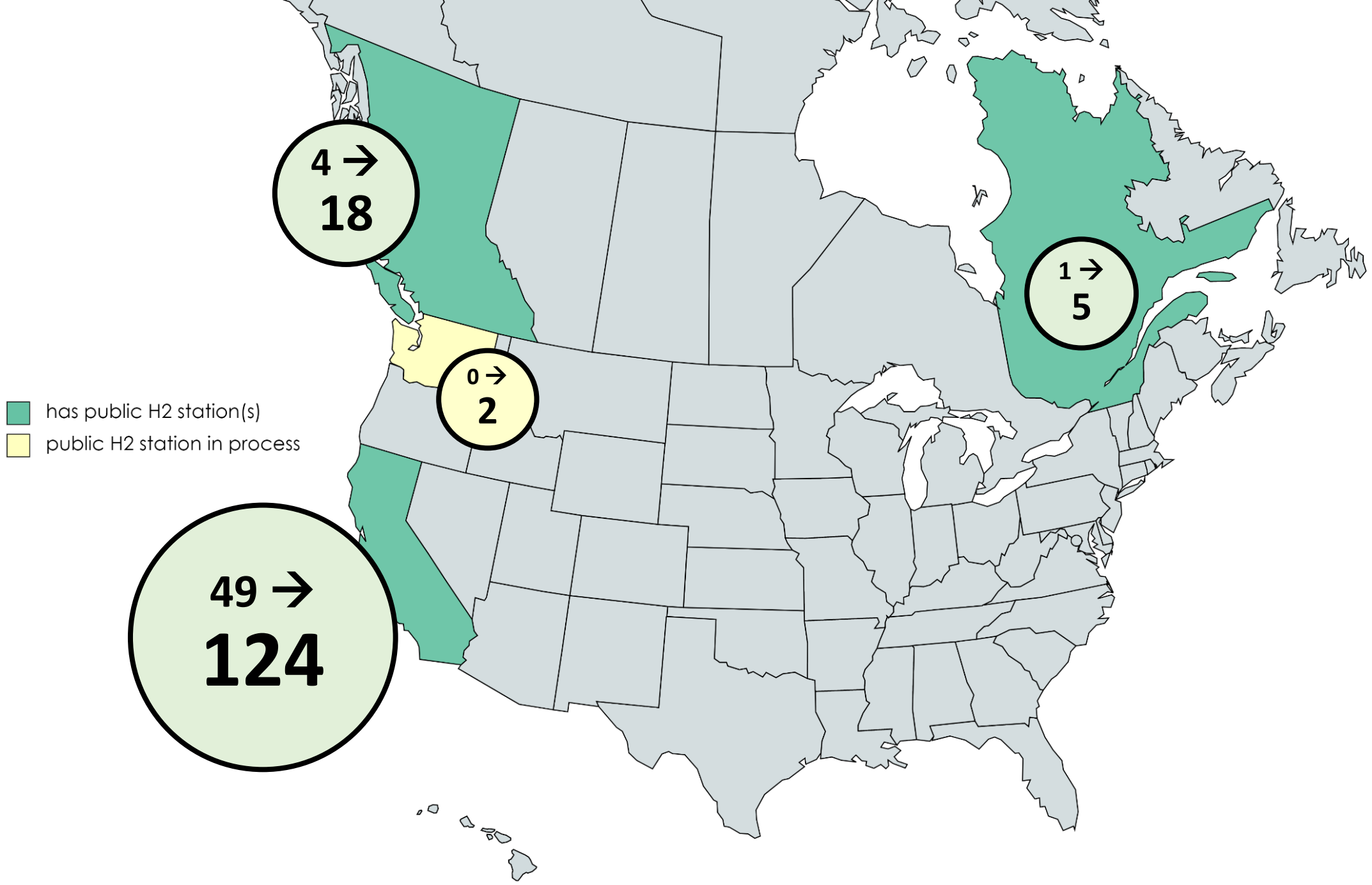
Hydrogen in … trucking

exoskeletons

endoskeletons

electricity (batteries)

hydrogen (fuel cells)


4 → 18
0 → 2
1 → 5
49 → 124
has public H2 station(s)
public H2 station in process

BC Hydrogen Strategy (2021)

#	Pillar
1	Grow H2 Production
2	Regulate H2 Prod'n
3	Blend H2 into Nat Gas
4	Grow H2 in Transport
5	Support Industry to Grow H2 Use
6	Grow H2 Use in Communities
7	Develop H2 Exports

Reducing GHGs →

scaling up hydrogen →

higher H_2 demand →

higher electricity demand →

good for Clean Energy BC members

There are some things in life where electricity is fine.

For everything else, there's Hydrogen

Thanks for your attention!

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