



# NextHydrogen

*Innovation in Water Electrolysis™*

## Corporate Presentation

October 2021

NXH:TSXV  
NXHSF:OTC



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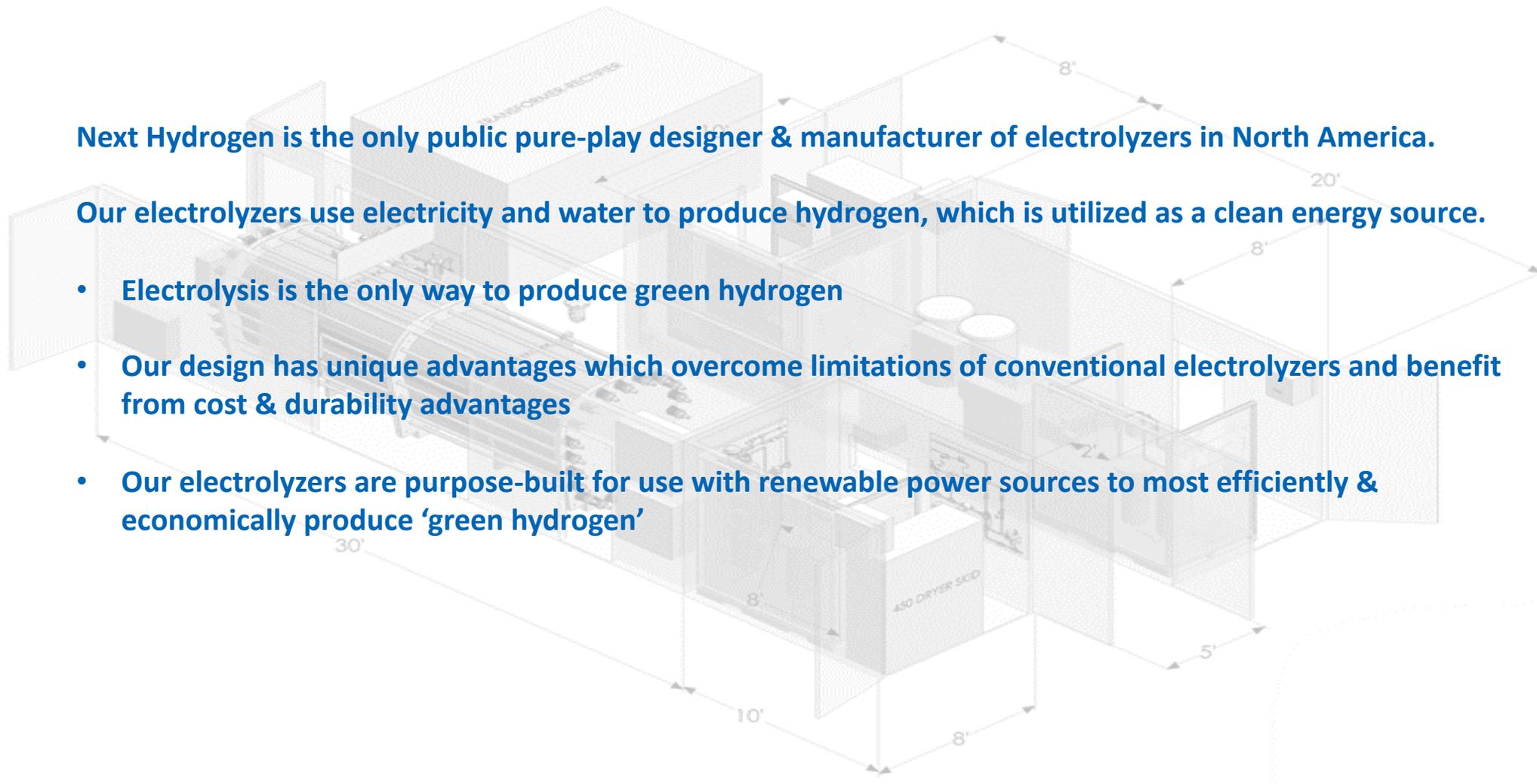
The forward-looking statements contained in the Presentation Materials are made as of the date hereof or the dates specifically referenced in the Presentation Materials, where applicable. Except as required by law, Next Hydrogen undertakes no obligation to update publicly or to revise any forward-looking statements that are contained or incorporated in the Presentation Materials. All forward-looking statements contained in the Presentation Materials are expressly qualified by this cautionary statement. No securities commission or similar regulatory authority has passed on the merits of the securities to be offered by Next Hydrogen or reviewed this Presentation and any representation to the contrary is an offence.

# What is Next Hydrogen?

**Next Hydrogen is the only public pure-play designer & manufacturer of electrolyzers in North America.**

**Our electrolyzers use electricity and water to produce hydrogen, which is utilized as a clean energy source.**

- **Electrolysis is the only way to produce green hydrogen**
- **Our design has unique advantages which overcome limitations of conventional electrolyzers and benefit from cost & durability advantages**
- **Our electrolyzers are purpose-built for use with renewable power sources to most efficiently & economically produce 'green hydrogen'**





## Hydrogen Economy Tailwind

- **US\$80B Addressable Market and less than 10 notable electrolyzer players** globally
- Applications in materials handling, heavy mobility and industrial processes, which **cannot be electrified**
- **Unprecedented government budgets, grants and subsidies** driving investment

## Scarcity Premium

- **Only publicly listed pure play water electrolysis company in North America** and one of few globally
- **Climate change initiatives & investors' push towards ESG** have increased market interest in clean tech companies

## Pioneers in Water Electrolysis

- **12+ years of IP development** with proven track record at Stuart Energy and Cummins (Hydrogenics)
- Combined **60+ years** of experience in designing hydrogen generation systems
- **Tremendous bench strength:** Technical, Operational, Manufacturing & Board

## Advanced Electrolyzer Design

- **Significant advancement in electrolyzer design architecture** validated by AECL, Canadian Tire and Hyundai
- Combines the attractive features of PEM and alkaline systems to **reduce the levelized cost of green hydrogen**

## Extensive IP Portfolio

- 38 patents to cover **multiple alkaline and PEM product roll-outs** to expand value proposition
- **Commercialization** of 1, 2, 3 MW alkaline electrolyzer product line underway
- **Technology development roadmap** includes 3, 6, 9 MW alkaline electrolyzers and PEM product line in the next 3+ years

# Hydrogen Economy Tailwind



To stabilize or reduce concentrations of CO<sub>2</sub> in the atmosphere, the world needs to **reach net-zero emissions as soon as possible**



Governments globally support the growth of **hydrogen as a clean energy source** for the future

Significant push from corporations, investors, and society to **decarbonize the economy**



Hydrogen is a well-established, **\$120B annual global** existing market



The cost of renewable hydrogen production is expected to **fall drastically by up to 60% over the coming decade** driven by **declining costs of renewable electricity generation** and the **scaling up of electrolyzer manufacturing**

**96% of countries** are committed to the Paris Agreement

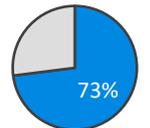
81% of society feel that **companies have a vital role to play in meeting environmental targets**

Global **sustainable funds saw inflows of \$152.3B** in the final quarter of 2020

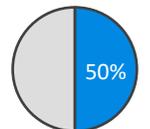
**Electrolyzer costs have decreased by 40%** during the last 5 years, and **costs of solar and wind power have decreased by 89% and 70%** during the last 10 years

% of Global GDP covered

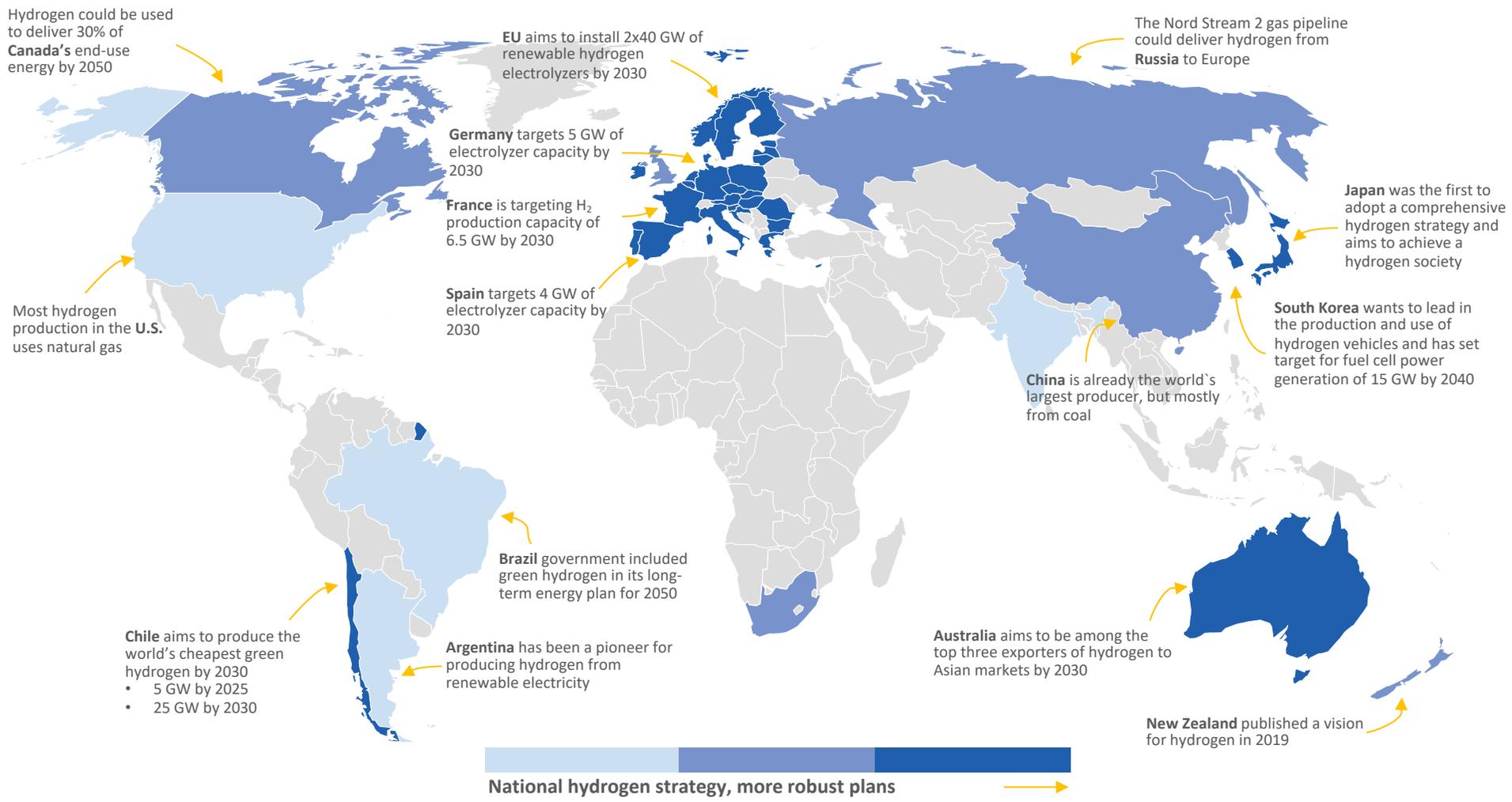
**31 Countries** have **hydrogen-specific strategies**



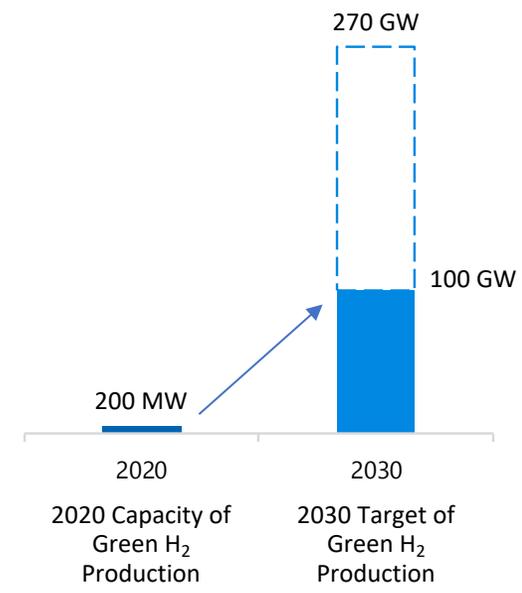
**75 Countries** have **net zero carbon ambitions**



# Unprecedented Commitment on Green H<sub>2</sub> from Countries Globally



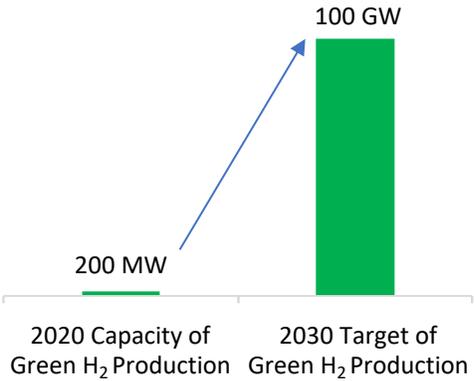
**270 GW** of electrolyzers will be needed by 2030 to **keep the global temperature increase under 2°C**



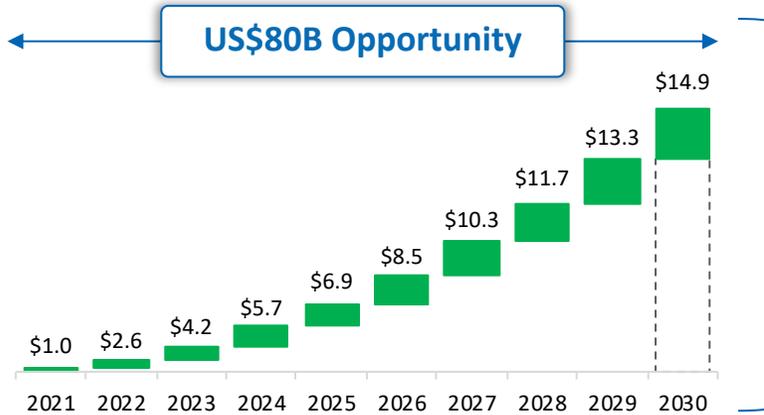
Source: Bloomberg, IRENA, Next Hydrogen, Hydrogen Council, press releases, and publicly available information.

# Significant Electrolyzer Market Opportunity

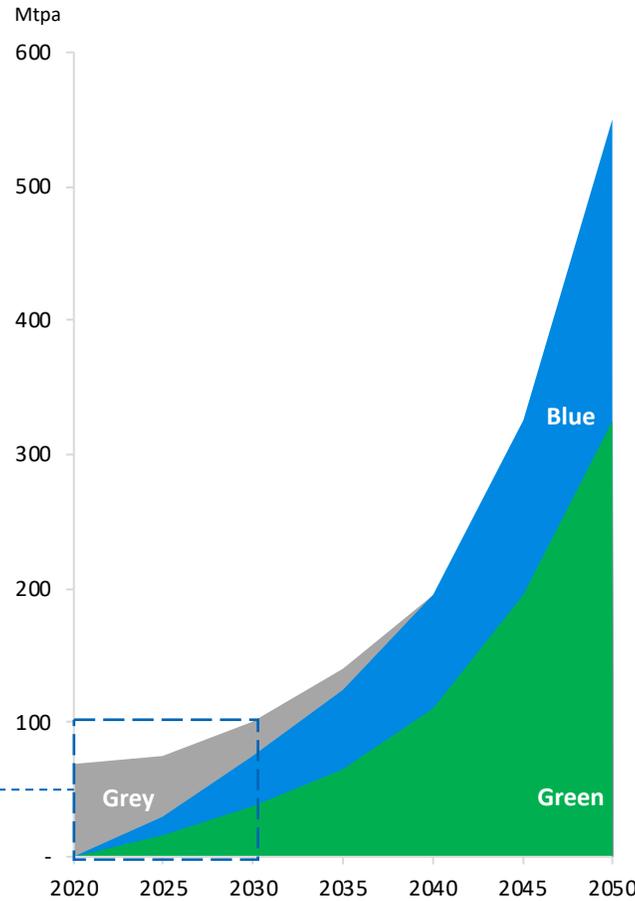
## Market Opportunity by 2030



### Serviceable Addressable Market

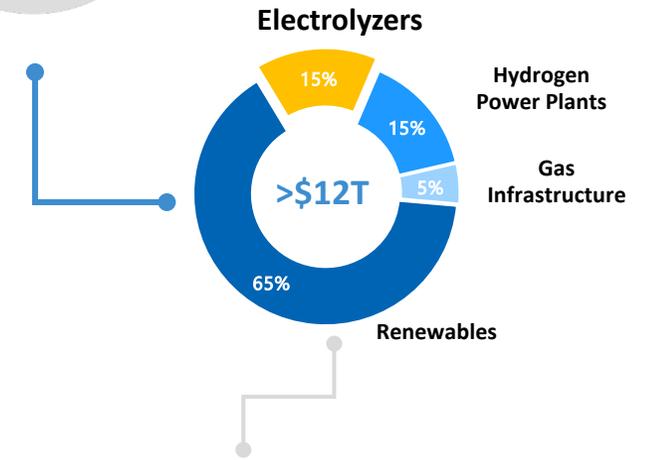


## Global Hydrogen Production Scenario



## Market Opportunity by 2050

>\$12T  
 TOTAL ADDRESSABLE MARKET  
 Hydrogen Opportunity by 2050



Electrolyzers expected to represent ~15% of the Addressable Hydrogen Market<sup>(2)</sup>

>\$1.8T Serviceable Addressable Market

Note: All figures in USD. EUR/USD rate of 1.20862.

Source: IRENA, Hydrogen Council, Goldman Sachs, September 2020, "Green Hydrogen: The Next Transformational Driver of the Utilities Industry", and publicly available information.

1. Illustrative pricing provided by Next Hydrogen.

2. Share provided for European market – Assumed that these figures held relatively stable for Rest of the World.

# Next Hydrogen's Focus on Green Hydrogen Applications



## Solutions to Power and Green Industrial Operations

- 95% of hydrogen used for industrial purposes is derived from fossil fuels and is responsible for 830 million tons of CO<sub>2</sub> annually
- Hydrogen produced from green energy can dramatically lower carbon emissions and enhance reliability of supply
- **Solutions that cannot be electrified** – hydrogen is the most viable clean alternative



Ammonia



Cement



Steel

## Solutions for Clean Materials Handling and Heavy-Duty Transport

FCEV are better suited for heavy mobility than battery EV

- FCEV have much greater range and carry more weight than EV since long distances and heavy payloads require larger and heavier batteries which leads to diminishing performance and efficiency
- Much faster refueling time (minutes vs hours)
- H<sub>2</sub> has much higher energy density so fuel tanks are more compact and lighter than an array of fully charged batteries
- Ability to operate in cold climates



Mining



Distribution



Trucking



# World Class Hydrogen Experience



**Vice Chairman**  
MSc, DBA

## Matthew Fairlie

- 20+ years in hydrogen industry including CTO and Executive VP at Stuart Energy
- Other experiences include Vice Chair of the US National Hydrogen Association and Chair of the Hydrogen Business Council of Canada



**Chief Technology Officer**  
PhD

## Michael Stemp

- 20+ years of designing and developing hydrogen systems including Director of Advanced Engineering for Stuart Energy
- Received PhD from the Swiss Federal Institute of Technology



**Chief Operating Officer**  
PhD

## Jim Hinatsu

- 25+ years commercial experiences with hydrogen and electrochemical systems including senior roles at Hydrogenics and Stuart Energy
- Received PhD from the University of Toronto



**VP Engineering**  
MS, MBA

## Jim Davies

- 19 years experience developing hydrogen generating systems for fuel cell industry
- Engineering experience incl. functional management, technical leadership with emphasis on cost reduction, reliability improvement
- Ops experience incl. supplier development, process development, optimization



**VP Manufacturing**  
BS, MS

## Jim Franchville

- 25 + years experience in manufacturing, operations, supply chain, quality, and process improvement in 4 different industries (automotive electronics, medical, aerospace, and oil & gas)
- Extensive experience working with regulating agencies such as ISO, API, FAA, and the FDA



**VP Operations**

## Shane Day

- 25 + years experience managing the installation of > 60 H2 systems and integrated > 200 fuel cells in multiple applications
- The first to be certified by TSSA as an H2 technician in Ontario
- Director Hydrogen Business Council



HYDROGENICS

HYDROGENICS



HYDROGENICS



CleanFuel Systems Inc.

# Producing Hydrogen: The Electrolyzer Landscape

## Pure Play Electrolyzer Manufacturers



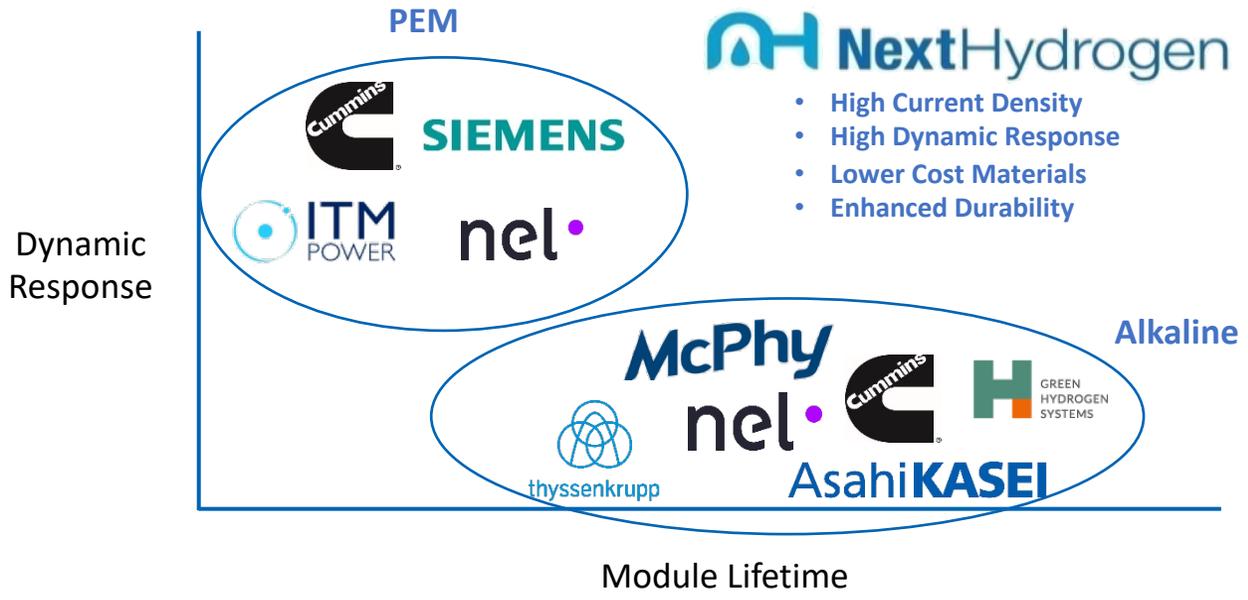
## Electrolyzer Manufacturers



## Fuel Cell Manufacturers



Next Hydrogen captures key benefits of both electrolyzer technologies



# Competitive Differentiators

## Higher Current Density



**Up to 2.5x current density**, leading to **2.5x more hydrogen produced** while using the same commercially proven raw materials as other commercial systems which drives lower up-front capex

## Superior Dynamic Response



Superior dynamic response enables Next Hydrogen's electrolyzers to **capture fluctuations in energy at 5% per second** compared to conventional alkaline systems with capabilities of up to 5% per minute

## Scalable Design



With approximately the same footprint, Next Hydrogen's electrolyzers are able to **scale up its power by a factor of 300%** which drives significant economies of scale

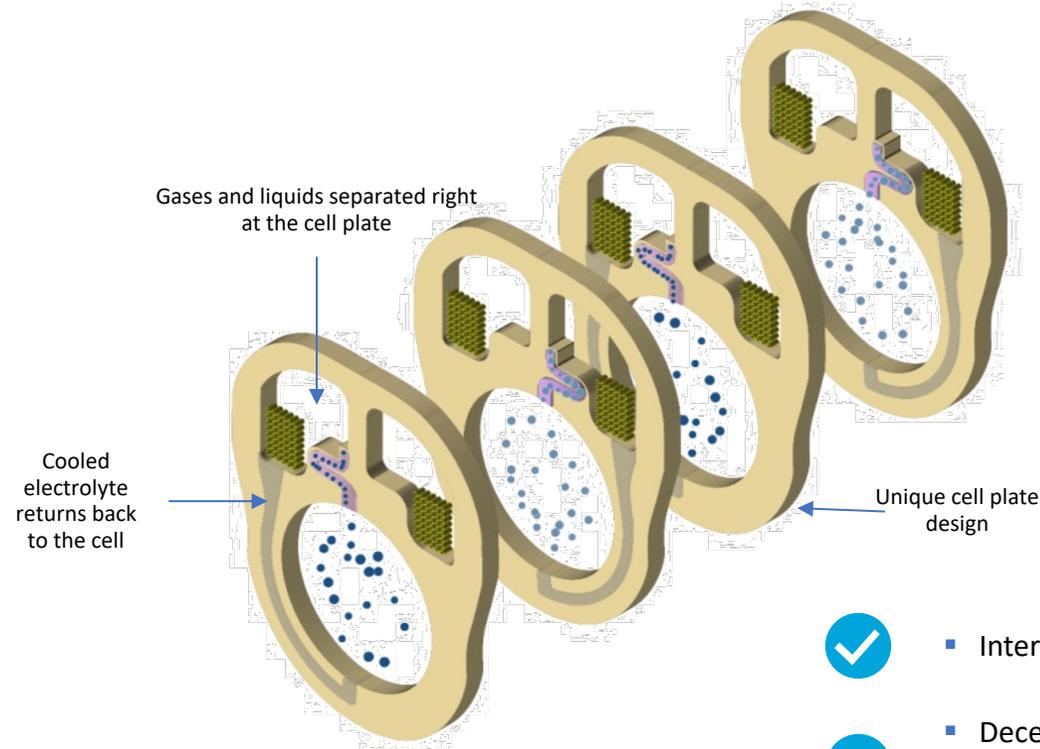
Next Hydrogen's electrolyzers can produce more hydrogen per capex dollar spent when compared to other leading systems<sup>(1)</sup>

1. When compared against competing alkaline electrolyzer technology.

# Significant Advancement in Electrolyzer Design

## NextHydrogen Electrolyzer Design

*All electrolyte and gas-liquid separation occurs at each cell plate, removing limiting design features of conventional electrolyzers*



- Internal gas-liquid separators in each half cell



- Decentralized gas-liquid separator ensures no fluid and gas flow restrictions across the system for higher current densities and multi-MW scale



- Superior dynamic response as gases and liquids are separated right above the cell plate

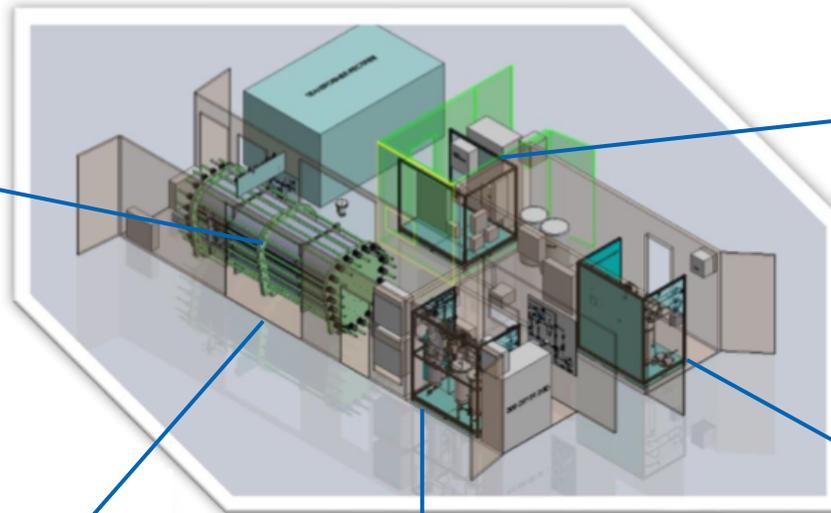
# System Overview

## NH-300 Hydrogen Generation System Schematic



**Electrolyzer Module**

Patented cellular architecture removes fluid-gas flow restrictions which limit traditional electrolyzer performance



Electrical and Controls Container



Electrolyzer Container



Hydrogen Container



Oxygen and Feedwater Container

- ✓ Open architecture with the best commercially available cell components
- ✓ Compact units, pre-assembled and ready to drop in at sites
- ✓ Current alkaline electrolyzer product line with significant product roll-out planned:

	NH-100	NH-300
Capacity (MW)	0.6	1.8



## Successful Pilot Project

*"The team successfully demonstrated the continuous operation of the cell with the required quality of hydrogen stream from the electrolyser in a liquid phase catalytic exchange system." - AECL MD&A*



## One of the Largest On-site H<sub>2</sub> Generation Project for Materials Handling Applications Globally

The first "green hydrogen system" – hydrogen powered fork lifts and electrolysis fuel production using Next Hydrogen electrolyzers

- Canadian Tire commissioned an NH60 (0.4 MW) unit for a pilot project at their Brampton, Ontario distribution centre
- Subsequently ordered 2 NH300 (1.8 MW) units since the first demonstration unit for their Bolton, Ontario facility. Total hydrogen production capacity of 1.5 tonnes/day



Bolton, Ontario

## Hyundai and Kia Partnership



Hyundai Motor Company, Kia Corporation and Next Hydrogen Corporation recently signed an MOU to jointly develop an alkaline water electrolysis system and its related stack for economically generating green hydrogen and exploring new business opportunities and technological applications.

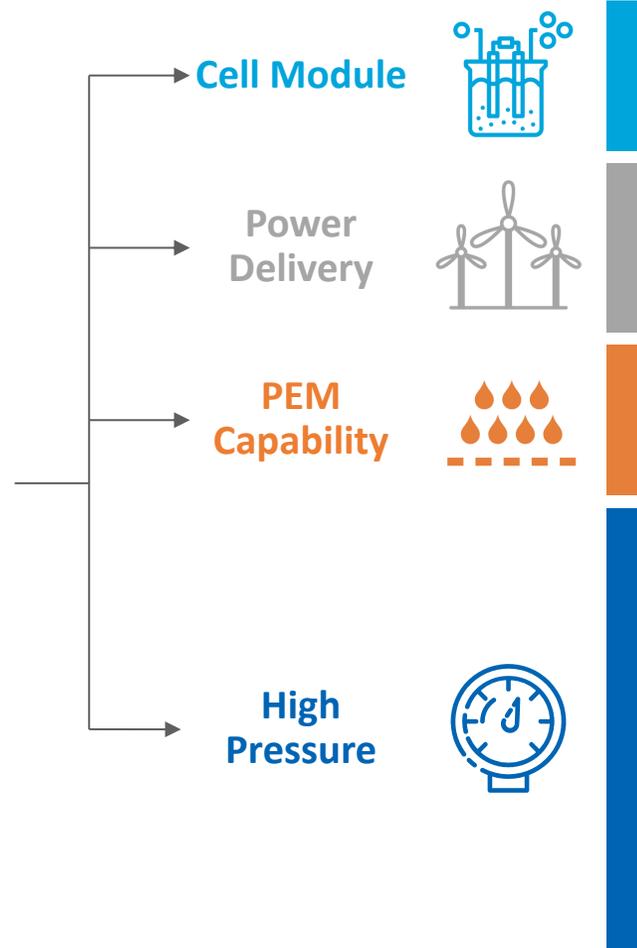
*"We are pleased to partner with Next Hydrogen specializing in state-of-the-art water electrolysis technology. This partnership is another leap forward for our hydrogen business and will be our first step into the alkaline water electrolysis market," said Jae-Hyuk Oh, Vice President and Head of Energy Business Development Group at Hyundai Motor Group. "We believe our technology will be an excellent match for Next Hydrogen's technology, and this synergy will help achieve our goal to provide our customers with cost-effective green hydrogen."*

# Patent Portfolio Geared Towards Green Hydrogen from the Beginning



**NextHydrogen**

- 38 Patents
- 21 European Registrations
- 2 Pending Applications



## Electrolyzer Module

- Core water electrolyzer module design

## Power Dispatch System for Electrolytic Production of Hydrogen from Wind Power

- Connection of water electrolyzers to wind farms

## Polymer Electrolyte Membrane Water Electrolyzer Cell Module

- PEM water electrolyzer module design

## Externally-Reinforced Electrolyzer Module

- High pressure water electrolyzer design

## Internally-Reinforced Electrolyzer Module

- High pressure water electrolyzer design

## End Pressure Plate for Electrolyzer

- End pressure plates for electrolyzer modules and stacks

Priority

Filing Location<sup>(1)(2)</sup>

July 2008

US (3), PCT, CA, EP, CN, IN

October 2008

US (3), PCT, CA (2), EP (2), CN, IN (2)

August 2009

US (2), PCT, CA (2), EP, CN, IN (2)

September 2012

US, PCT, CA, EP, CN, IN

September 2012

US, PCT, CA, EP, CN, IN

March 2013

US (2), PCT, CA, EP, CN, IN

1. Inclusive of patents and registrations in different stages (issued and pending).

2. US – United States; CA – Canada; EP – Europe; CN – China; IN – India; PCT – Patent Cooperation Treaty.

# Near-Term Commercial and Operational Focus

Product Development	Strategic Partnerships	Deployment of Systems	Assembly Capabilities	People
<p>Incorporate upgrades to existing design</p> <p>Freeze design of 1, 2, 3 MW systems</p> <p>Develop 3, 6, 9 MW systems</p> <p>Focus on improvements to:</p> <ul style="list-style-type: none"> <li>• Current density</li> <li>• Energy efficiency</li> <li>• Cost reduction</li> </ul>	<p>Expand strategic partnerships that can scale operations, bring large end-markets and serve as go-to market partners:</p> <ul style="list-style-type: none"> <li>• Transportation</li> <li>• Industrial (Ammonia, Steel, Refining)</li> <li>• Power infrastructure</li> <li>• New applications</li> </ul>	<p>Add two more demonstration systems to existing backlog of three for 2022</p> <p>Target large volume commercial sales for 2023</p> <p>Build out scope of services and integration business line</p>	<p>Expand upon low capex assembly capabilities (20-40+ MW/year) in existing facility</p> <p>Explore low cost country location strategy</p> <p>Exploit ERP system functionality</p>	<p>Continue to build out depth of high quality operational, engineering and management talent</p> <p>Targeting 60 employees by end 2022 from 38 in Q3/21</p>

# Financial Highlights

## Share Capitalization

Issued & Outstanding	22,883,432
Board & Management	4,654,297
Percent Board & Management	20%
Options	3,106,626
Fully Diluted Shares	25,990,058
Percent Board & Management	26%

No single shareholder owns more than 15%

## Balance Sheet at June 30, 2021

<b>Assets</b>	
Cash	\$ 52,833,069
Trade and other receivables	913,423
Prepaid expenses and deposits	1,057,097
Current income tax recoverable	-
Inventory	265,906
<b>Total Current assets</b>	<b>55,069,495</b>
Equipment	346,415
Patents	796,051
Intangible assets and goodwill	413,641
<b>Total Assets</b>	<b>\$ 56,625,602</b>
<b>Liabilities</b>	
Bank indebtedness	\$ 60,000
Trade and other payables	1,015,783
Contingent liability	14,968
Deferred Revenue	2,443,982
Provisions	1,453,439
Long-term debt	101,625
Loan payable <sup>1</sup> .	5,105,256
Deferred share unit liability	-
<b>Total Current Liabilities</b>	<b>10,195,053</b>
Contingent liability	48,216
Deferred Revenue	331,354
Provisions	1,300,948
Long-term debt	233,084
<b>Total Liabilities</b>	<b>12,108,655</b>
<b>Total Shareholders Equity</b>	<b>44,516,947</b>
<b>Total Liabilities and Shareholders Equity</b>	<b>\$ 56,625,602</b>

1. Loan payable was repaid subsequent to the reporting period



**US\$80B Addressable Market** with Next Hydrogen being **one of 10 notable electrolyzer players globally**



**60+ years of combined hydrogen experience** with proven technical expertise from Stuart Energy



**Validated & differentiated electrolyzer design** offers **higher current density**, inherently **scalable design with superior dynamic response**



Extensive patents to cover multiple **product roll-outs and commercialization activity over the next 3 years**



Continue to achieve **significant milestones in 2021 and 2022**



# Appendix

# Senior Leadership



**President & CEO**  
CFA, B.Math, B.Econ

## Raveel Afzaal

- 10+ years capital markets experience as an equity research analyst and venture capitalist
- Most recently led Canadian Sustainability & Special Situations verticals for Canaccord Genuity



**Chief Financial Officer**  
CPA, CA, CPA(IL), MAcc

## Kasia Malz

- 10+ years financial leadership experience
- 5+ years public company CFO and start-up experience, most recently with Titanium Transportation Group where she took the company public and grew the business from \$40M to \$200M in revenue



**Chair of the Board**  
BSc, BA, MBA

## Allan Mackenzie

- Owner and principal of Disruptive Ventures
- 15+ years of total investing experience, previously, a partner of Octane Venture Partners
- Has served as Chairman of two software technology companies, Tynt and Optessa



**Board Director**  
M.Eng, MBA

## Walter Howard

- Extensive career spanning operations, business development, finance, and M&A in the utility industry
- 35+ years in senior executive positions in related syngas, wind energy, and cogeneration firms

cg/Canaccord  
Genuity

xpV

**TITANIUM**  
Transportation Group Inc.

EY

**Optessa**  
Intelligent Planning & Scheduling

**OCTANE**  
VENTURE PARTNERS

 Westinghouse

 **ZeGen**  
Accelerating The Transition

 **Noble**  
ENVIRONMENTAL POWER

 **GE Capital**

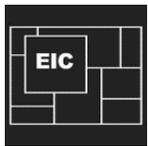
# Board Contributes Invaluable Leadership Experience



**Board Director**  
BA, MBA

## Michael Pyle

- CEO of Exchange Income Corporation and previously President of The Arctic Glacier Income Fund
- Director of CentrePort Canada Inc. and of the Winnipeg Blue Bombers Football Club



**Board Director**  
BSc, MSc

## JP Clausen

- VP of Engineering - Data Center Advanced Technology Innovation at Google
- Has held executive roles in manufacturing, engineering, and operations at LEGO Group, Tesla, and Zymergen



**Board Director**  
CPA, CA, MAcc, EMBA

## Susan Uthayakumar

- 25 years experience in finance and executive management
- President of Schneider Electric Canada since 2018
- Executed global growth strategies and acquisitions across North America, Europe and Asia previously at McCain



**Board Director**  
BA, MBA

## Anthony Guglielmin

- Previously SVP and Chief Financial Officer of Ballard Power Systems
- Also board member of Westport Fuel Systems, Information Services Corporation, and other private and not-for-profit organizations



# Alkaline and PEM Industry KPIs

Parameter	PEM			Alkaline			
	Unit	State of the art	FCH-JU Target		State of the art	FCH-JU Target	
		2020	2024	2030	2020	2024	2030
<b>Electricity Consumption at Nominal Capacity</b>	kWh/kg	55	52	50	50	49	48
<b>Capital Cost</b>	US\$/(kg/d)	2,500	1,800	1,200	1,500	1,200	940
	US\$/kW	1,100	820	590	700	560	470
<b>Current Density</b>	A/cm <sup>2</sup>	2.2	2.4	3	0.6	0.7	1
<b>Hot Idle Ramp Time</b>	sec	2	1	1	60	30	10
<b>Cold Start Ramp Time</b>	sec	30	10	10	3,600	900	300

Based on a 100MW system

Sources: EERA & Hydrogen Europe Research Multi-Annual Work Program, 06/08/2020, Key Performance Indicators (KPIs) for FCH Research and Innovation, 2020-2030, Version: 5.0.

Hydrogen Europe & Hydrogen Europe Research Strategic Research and Innovation Agenda Clean Hydrogen for Europe, Final Draft, October 2020

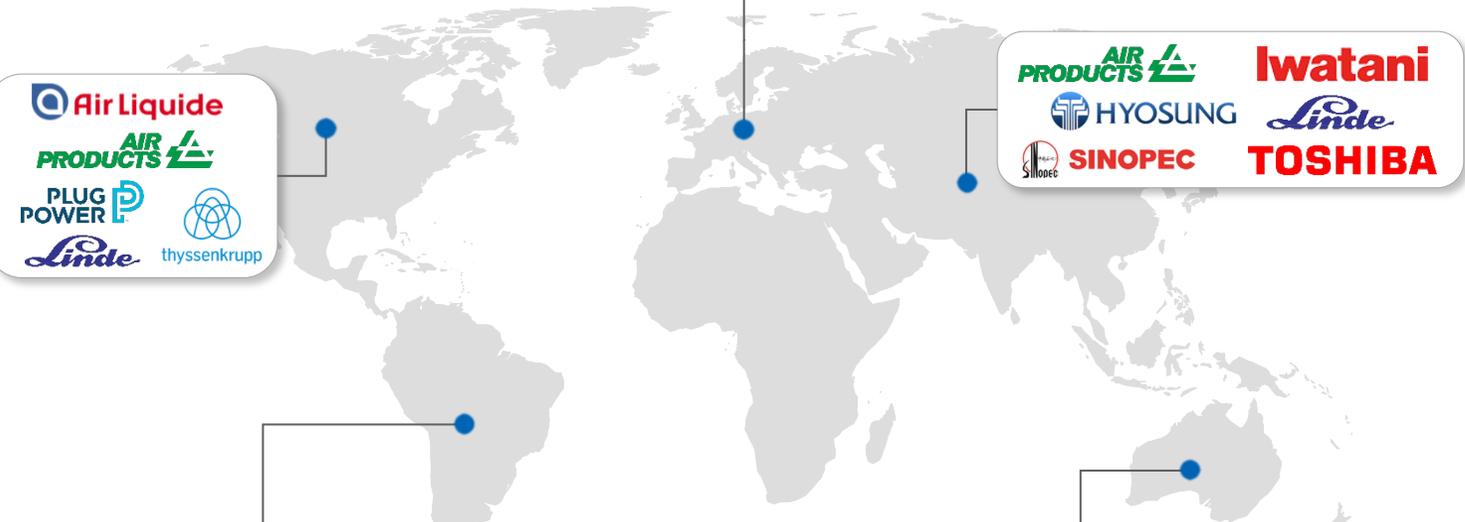
Clean Hydrogen Joint Undertaking Multi-Annual Work Plan 2021-2027, Working Draft Version 3, 29/07/2021

Exchange: 1 USD= 0.86 Euro

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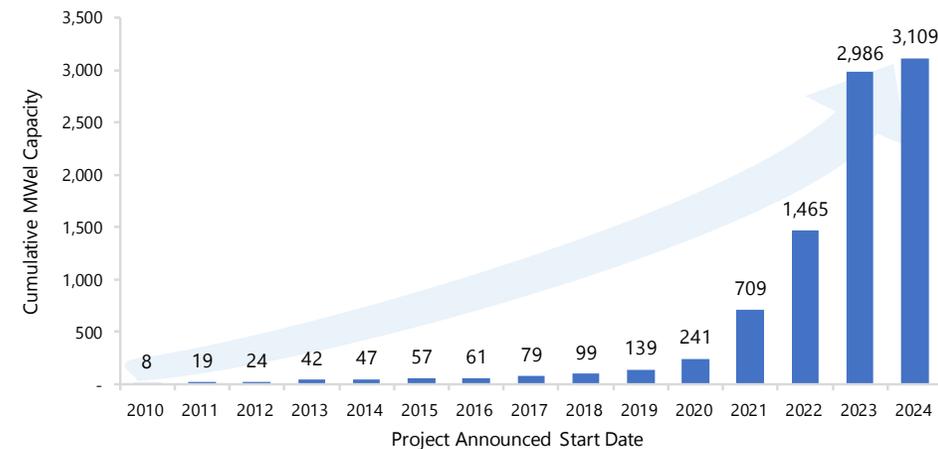
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# Corporate Led Hydrogen Projects Increasing Globally



Many large corporations have announced plans to operate green hydrogen production plants globally

## Electrolysis Produced Hydrogen Capacity Increasing Exponentially

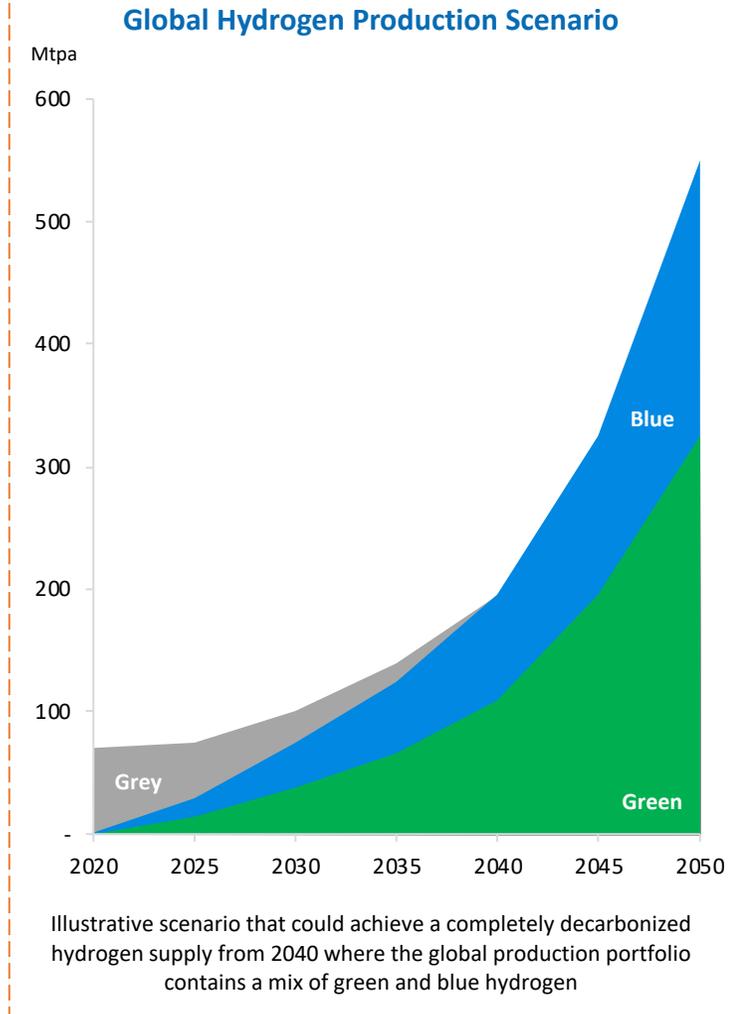
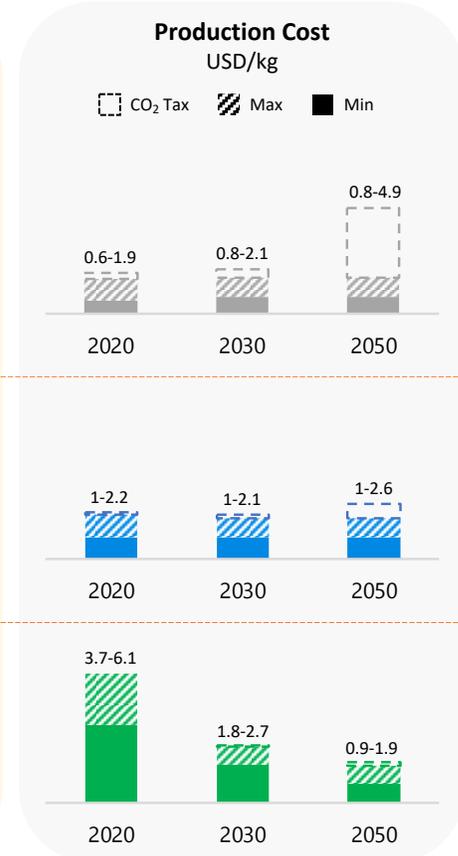
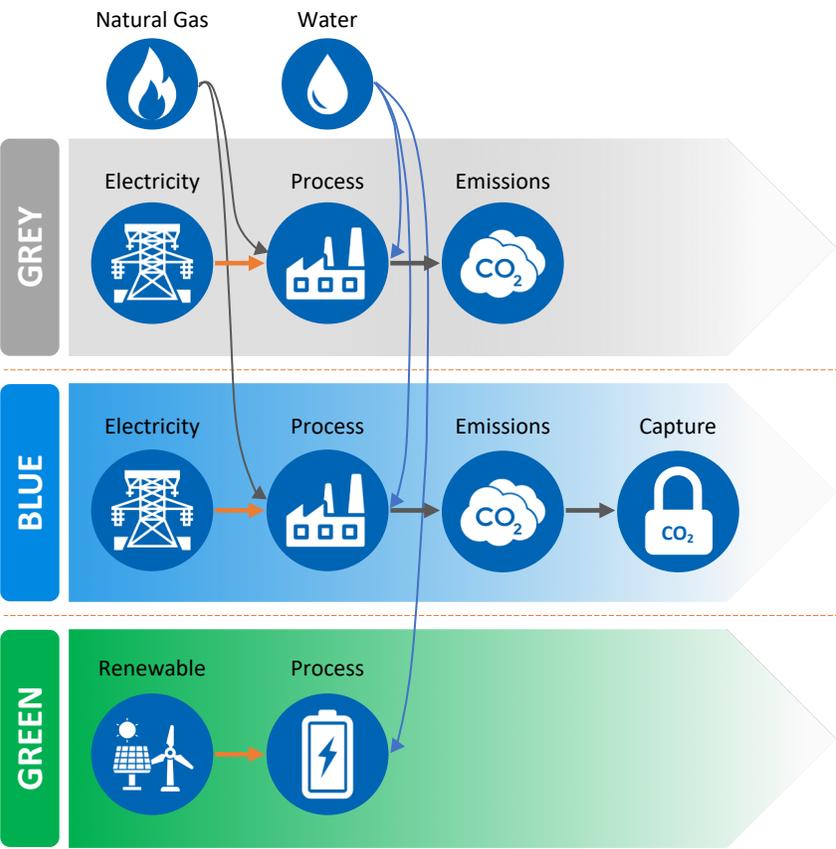


### Select Projects Expected to Come Online

Start Date	Project Name	Companies	Capacity
2020	Air Liquide Bécancour	Air Liquide, HYDROGENICS	20 MW
2021	Port Lincoln, Eyre Peninsula	H2U, thyssenkrupp	30 MW
2022	ECB Paraguay	thyssenkrupp	310 MW
2022	H2V France Phase 1	H2V, Air Liquide	100 MW
2023	H2V France Phase 2	H2V, Air Liquide	100 MW
2023	Hybridge Germany	amprion, OGE	100 MW
2023	Shell - Port of Rotterdam	Shell, Eneco	200 MW
2023	Hydro-Québec	Hydro Québec, thyssenkrupp	88 MW
2024	GreenHydroChem Central	SIEMENS, Linde	120 MW

Source: IEA Hydrogen Project Database, press releases, and publicly available information.

# Hydrogen's Supply Needs to be Decarbonized



Currently, green hydrogen makes up less than 0.1% of the world's hydrogen supply

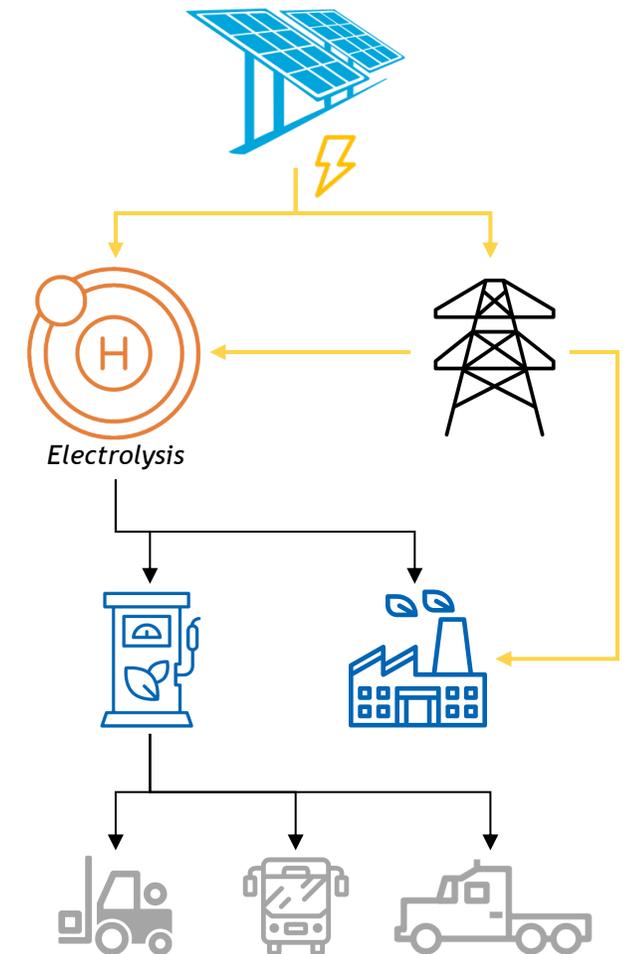
To take a central role in the energy transition, existing and new uses of hydrogen need to be met with decarbonized or clean hydrogen production sources

Source: Hydrogen Council reports, Green Hydrogen Coalition, Pembina Institute, press releases, and publicly available information.

# Illustrative Excess Solar Energy Capture for H<sub>2</sub> Production Scenario Assumptions

## Key Assumptions

- Solar Energy
  - Large solar installation that sells the first 50% of its name plate capacity through a Power Purchase Agreement
  - Electrolysis capacity to capture the remaining 50% of solar generation for hydrogen production
  - Excess power would often be wasted, therefore Next Hydrogen expects to be able to capture that energy at a cheaper rate of \$15/MWh
  - Overall solar plant capacity factor of 26%
- Electrolysis
  - Base case electrolysis is based on future electrolysis KPI targets published in the European FCH2JC 2020 Report
  - Next Hydrogen's electrolysis unit is based off being able to achieve the base case targets while running at 50% of our rated capacity due to the 2x higher current density
  - The cost reduction for a Next Hydrogen electrolyzer only applies to the cell stack cost, with external balance of plant costs being held constant
- Economics
  - Project is projected to be built in 2024
  - Discount rate and cost of acquiring capital at 8%
  - Project lifespan estimated to be 25 years

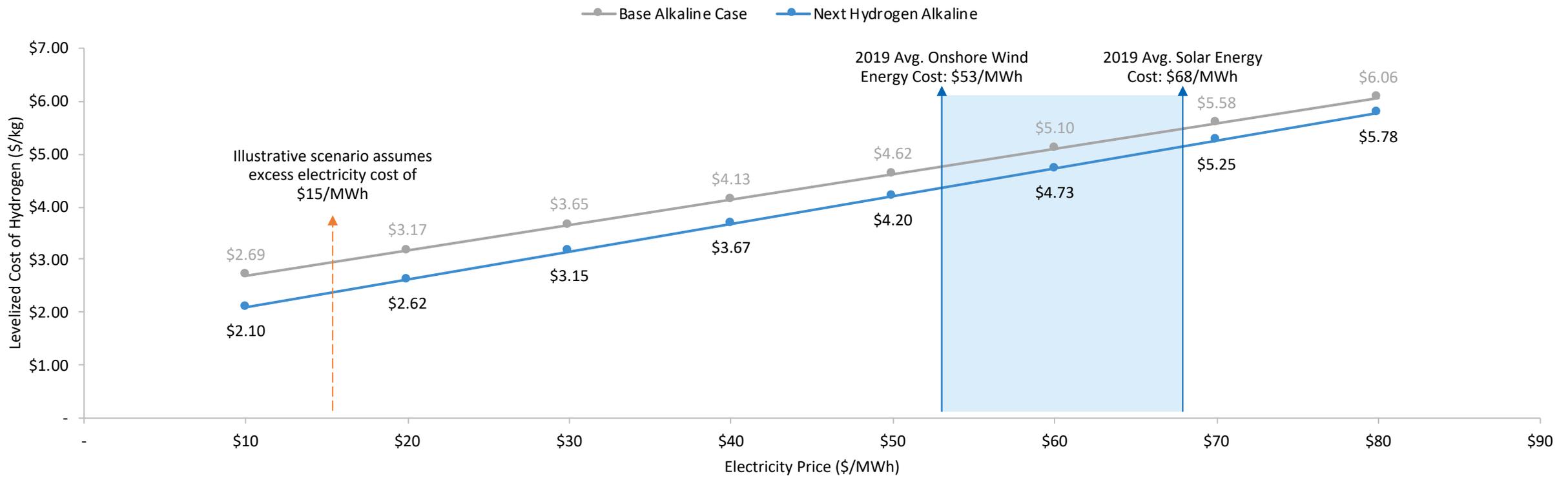


# Illustrative Excess Solar Energy Capture for H<sub>2</sub> Production Scenario Sensitivity

## Sensitivity Analysis – Impact of Electricity Pricing

- The lower the electricity price, the better Next Hydrogen's capital cost advantage becomes
- The low-capacity factor for capturing excess solar energy results in Next Hydrogen's capital cost advantage making it more economical for most electricity prices

2024 Excess Solar Energy Green H<sub>2</sub> Production - Electricity Price Sensitivity

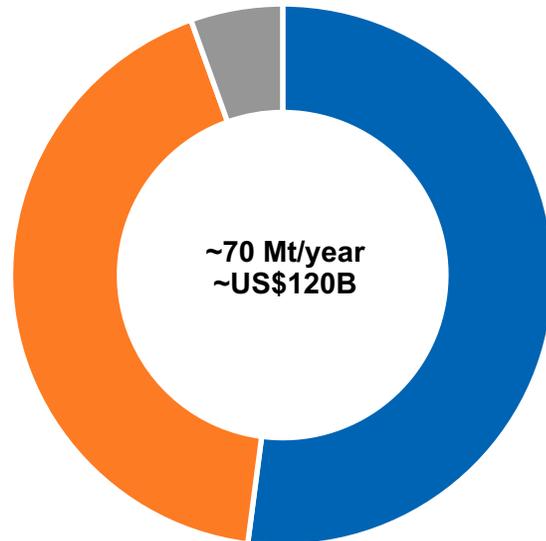


# The Green Hydrogen Opportunity

## Large Existing Market for Hydrogen – Green To Replace Grey

- 70 million tons per year = US\$120 billion annually
- 95% of hydrogen used for industrial purposes is derived from fossil fuels
- 830 million tons per year CO<sub>2</sub> emissions

Global hydrogen market by end use  
Mt H<sub>2</sub> per year



■ Refining ■ Ammonia ■ Other

## Hydrogen Market Set To Grow 8x

Global energy demand supplied by hydrogen, Mt

