NextHydrogen

Innovation in Water Electrolysis ™

Alan Tan

2022

NextHydrogen

Next Hydrogen was founded in 2007 by pioneers in water electrolysis with combined 60+ years experience in designing hydrogen generation systems

Water electrolysis is the major means to generate green hydrogen and Next Hydrogen offers a purpose built electrolyser to integrate with renewable energy sources

Significant advancement in electrolyzer design architecture and validated by:

AECL

CANADIAN TIRE

Next Hydrogen targets applications requiring on-site and large-scale green hydrogen generation in the industrial or transportation sectors and will seek to form partnerships with leading industrial and renewable companies globally

39 patents

on both alkaline and PEM designs issued globally

15+ years

of IP development to advance cell design architecture

$60+MM

NHC is fully capitalized heading into 2022

World class hydrogen expertise

Raveel Afzaal

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

10+ years capital markets experience as an equity research analyst and venture capitalist, former lead of Canadian Sustainability & Special Situations verticals for Canaccord Genuity

Kasia Malz

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

10+ years financial leadership experience, former CFO of Titanium Transportation Group, growing the business from $40M to $200M in revenue

Matthew Fairlie

Vice Chairman, MSc, DBA

20+ years in hydrogen industry, former CTO and Executive VP at Stuart Energy, served as Vice Chair of the US National Hydrogen Association and Chair of the Hydrogen Business Council of Canada

Michael Stemp

Chief Technology Officer, PhD

20+ years of designing and developing hydrogen systems, former Director of Advanced Engineering for Stuart Energy

Jim Hinatsu

Chief Operating Officer, PhD

25+ years commercial experiences with hydrogen and electrochemical systems, including senior roles at Hydrogenics and Stuart Energy

Robert McGillivray

BD Exec Advisor, P.Eng, MBA

20+ years experience in cleantech commercialization including 10 years in hydrogen product sales, marketing, business and corporate development

Jim Franchville

VP Manufacturing, MS

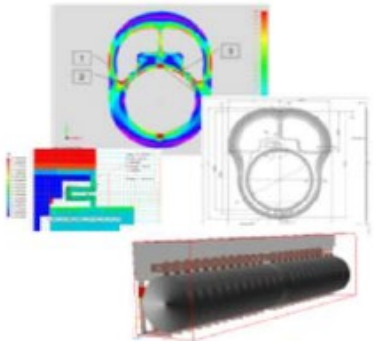
25 + years experience in manufacturing, operations, supply chain, quality, and process improvement across several industries

Shane Day

VP Operations

25 + years experience managing the installation and integration of > 60 H2 systems and > 200 fuel cells in multiple applications, first TSSA certified H2 technician in Ontario

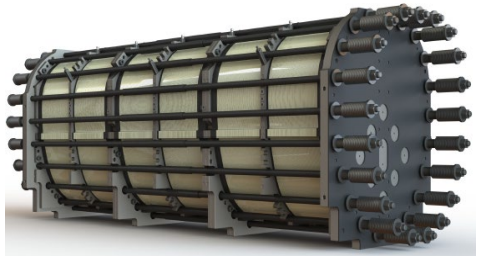
NHC Electrolyser Development Path



NH15 15 Nm^3/h

NH60 60 Nm^3/h

NH300 300 Nm^3/h



2008 to 2009

2010 to 2013

Prototype

AECL

2014 to 2018

Pilot

CANADIAN TIRE

2018 to 2022

Demo

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2022 to 2025

Large-Scale Green H_2 (3-4x Scale-up)

Commercial Testing and Validation

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_2 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

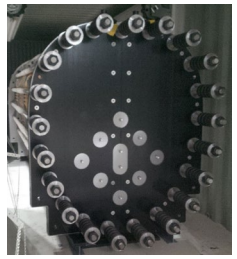
Hyundai and Kia Partnership

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.

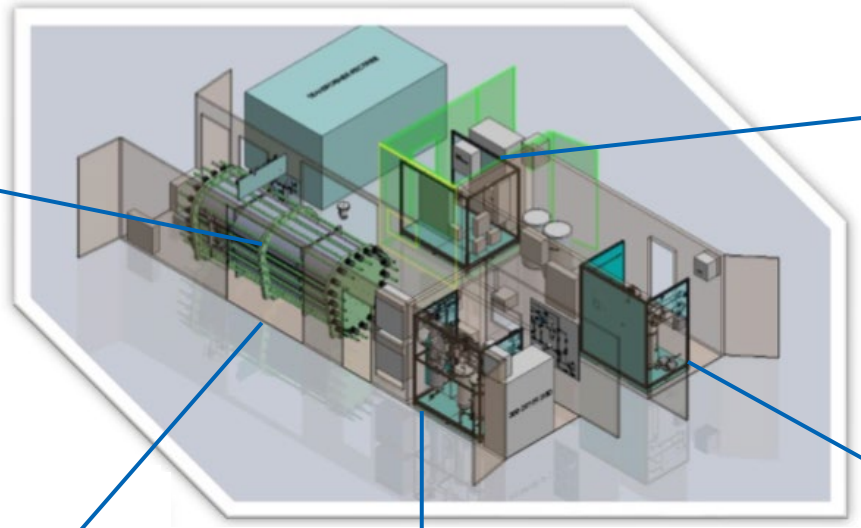
"We are pleased to partner with Next Hydrogen specializing in state-of-the-art water electrolysis technology. This partnership is another leap forward for our hydrogen business and will be our first step into the alkaline water electrolysis market," said Jae-Hyuk Oh, Vice President and Head of Energy 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."

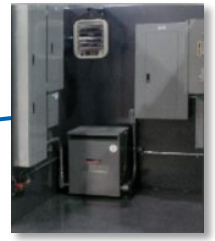
Product Offerings

NH-300 Hydrogen Generation System Schematic



Electrolyser Module
Patented cellular architecture removes fluid-gas flow restrictions which limit traditional electrolyser performance





Electrical and Controls Container

Electrolyser Container

Hydrogen Container

Oxygen and Feedwater Container

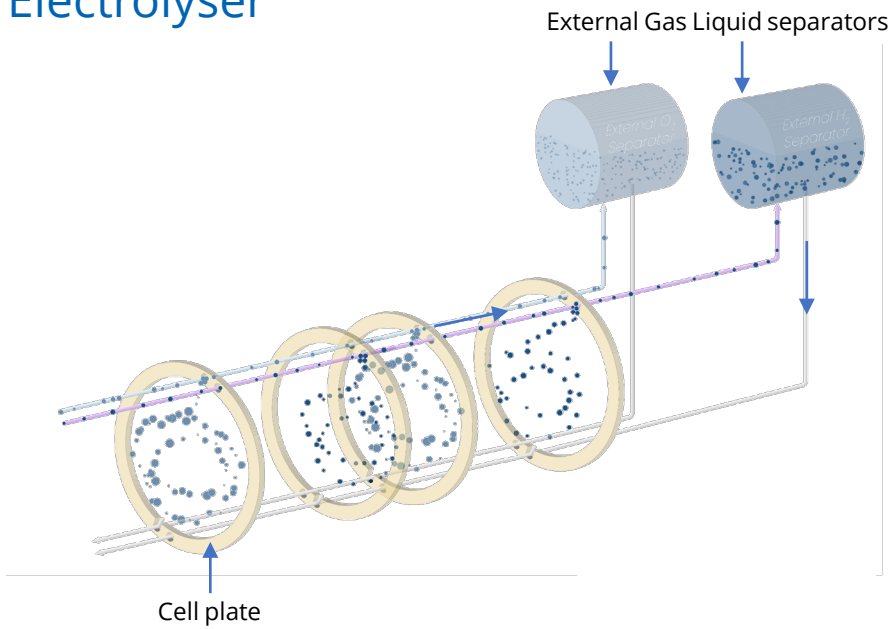
- Open architecture with the best commercially available cell components
- Compact units, pre-assembled and ready to drop in at sites
- Current alkaline electrolyser product line with significant product roll-out planned:

	NH-100	NH-300
Capacity (kg/day)	215	645

Significant Advancement in Electrolyser Design

Conventional Electrolyser Design

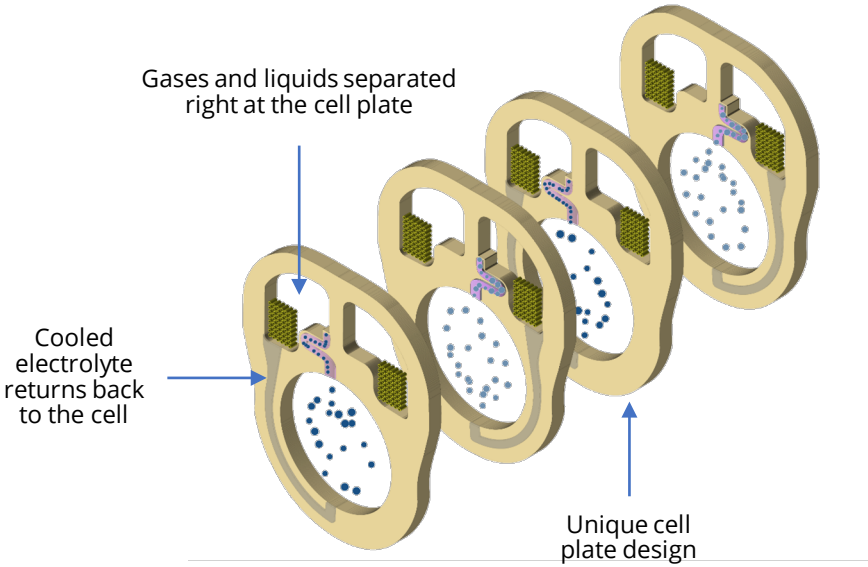
Electrolyte and gases are required to flow through pipes to external separators limit the performance of electrolysers



- External gas-liquid separators
- Potential for flow restrictions leading to uneven gas-liquid and temperature distributions at higher current densities and multi-MW scale
- Low dynamic response given distance from gas-liquid separators

NextHydrogen - Electrolyser Design

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



- 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

Cost Advantages

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

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%**

Next Hydrogen's electrolyzers can produce more hydrogen per capex dollar spent compared to other leading Alkaline systems

PEM performance at Alkaline cost and operating life

VALIDATED WITH:

AECL

CANADIAN TIRE

GE ALSTOM

WIDER OPERATING RANGE

- 15%~100%; easier and faster switch on/off

PLASTICS VS. METAL PLATES

- Plastics is cheaper, better to handle corrosion, and lighter

COMPACT DESIGN AND SMALLER FOOTPRINT

- Largest containerized Alkali Electrolyzer

ENHANCED SAFETY

- Reduced gas fractions at high operating points; minimize electrolyte outside module

OPEN ARCHITECTURE

- Our patented electrolyser design can use alkaline or PEM cells

Patent Portfolio for Green Hydrogen

NextHydrogen

- 39 Patents
- 21 European Registrations
- 3 Pending Applications

Cell Module

Power Delivery

PEM Capability

High Pressure

	Priority	Filing Location[1][2]
Electrolyser Module ▪ Core water electrolyser module design	*July 2008*	US (3), PCT, CA, EP, CN, IN
Power Dispatch System for Electrolytic Production of Hydrogen from Wind Power ▪ Connection of water electrolysers to wind farms	*October 2008*	US (3), PCT, CA (2), EP (2), CN, IN (2)
Polymer Electrolyte Membrane Water Electrolyser Cell Module ▪ PEM water electrolyser module design	*August 2009*	US (2), PCT, CA (2), EP, CN, IN (2)
Externally-Reinforced Electrolyser Module ▪ High pressure water electrolyser design	*September 2012*	US, PCT, CA, EP, CN, IN
Internally-Reinforced Electrolyser Module ▪ High pressure water electrolyser design	*September 2012*	US, PCT, CA, EP, CN, IN
End Pressure Plate for Electrolyser ▪ End pressure plates for electrolyser modules and stacks	*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.

Objectives driving our next generation technology

1. Decarbonize

Turning green electricity into green hydrogen to support on-demand applications

2. Minimize equipment cost

Reducing material usage, improving manufacturability

3. Lower cost of hydrogen

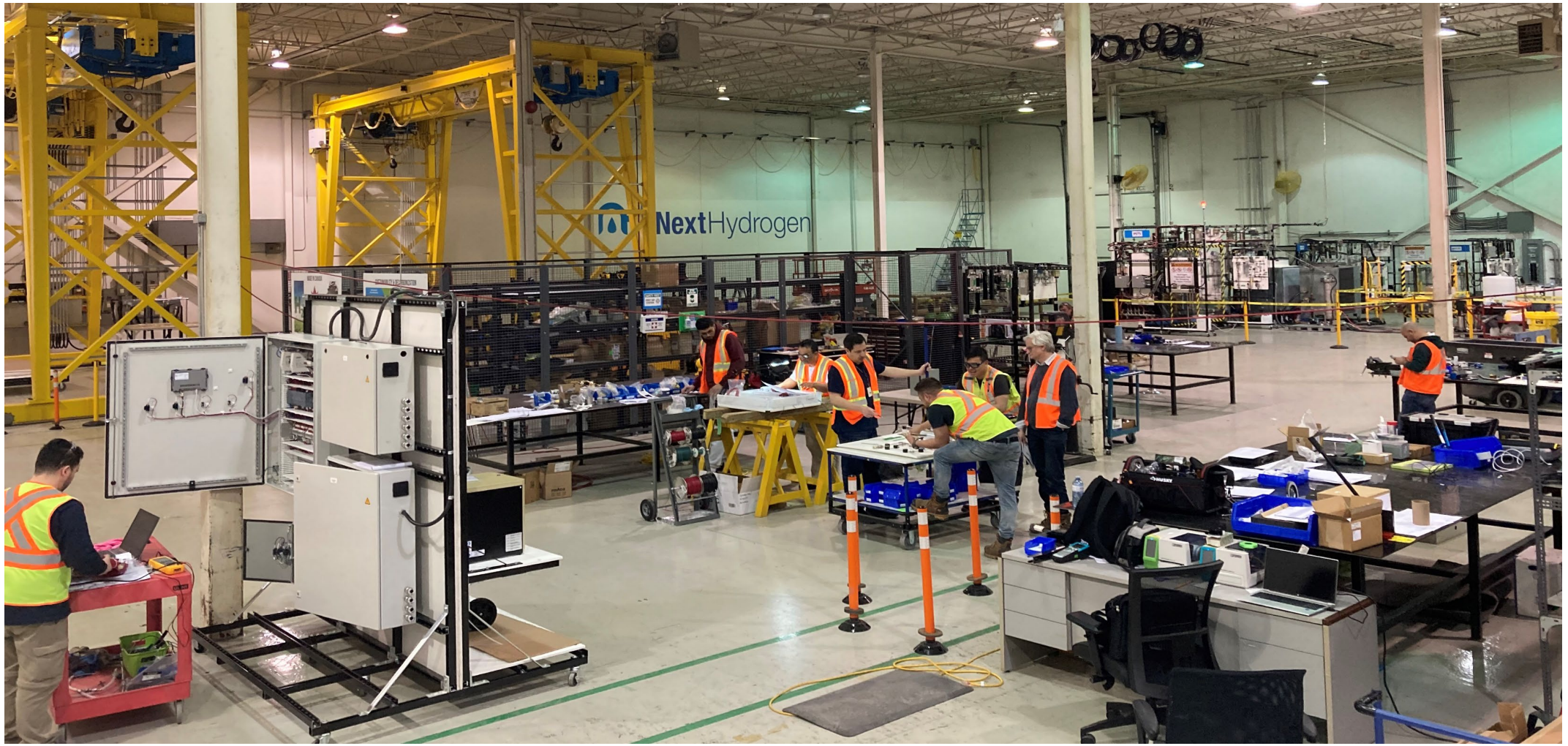
Scale-up and electrolysis cell performance improvement

Product Roadmap:

Achieving large-scale green hydrogen at a competitive cost

		2022	2023	2024	2025	2026	2027
Existing product line	NH150/300/450 Multi-stack installations	**Distributed generation, fuel cells (0.75 to 2.25 MW)**					
			Power, hydrogen hubs, and large fleet fueling applications (2.25 to 20 MW)				
Next gen product	Product development						
	Demonstration						
	Multi-stack installation				**Industrial feedstock, ammonia, green steel, methanol (20 to 100+ MW)**		

Centre of Excellence – 40MW's of Manufacturing capacity



Thank you

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