



NEL ASA – Acquisition of RotoLyzer®

24. august 2015

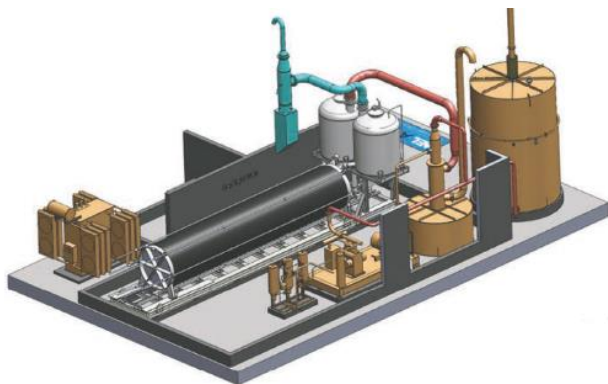


*NEL acquires RotoLyzer® - a potential game changer
within electrolyser technologies*

- Established in 1927 by Norsk Hydro
- World leading supplier of hydrogen production systems based on water electrolyser technology and hydrogen refuelling stations.
- Decades of competence in designing hydrogen energy systems and refuelling stations
 - More than 500 large scale electrolyzers sold to clients in more than 50 countries
 - 26 hydrogen refuelling stations delivered to 8 countries
- Significant opportunities for hydrogen as an energy carrier, serving as a 100% “clean battery” for solar and wind energy applications
- Strong financial position with a cash balance at approximately NOK 230 million after completion of the private placement launched on August 13th 2015 in conjunction with the acquisition of RotoLyzer®



NEL ASA – CORPORATE STRUCTURE



HYDROGEN PRODUCTION PLANTS



HYDROGEN REFUELLING STATIONS

RATIONALE FOR ACQUIRING ROTOLYZER®



1

By acquiring RotoLyzer®, NEL will potentially increase market share dramatically

2

Hydrogen refuelling stations increases demand for compact hydrogen production technologies

3

Hydrogen production from renewable energy sources increases demand for flexibility of electrolyzers

AXIS OF ROTATION IS THE NEW «UP»

Traditional electrolyser cell stack

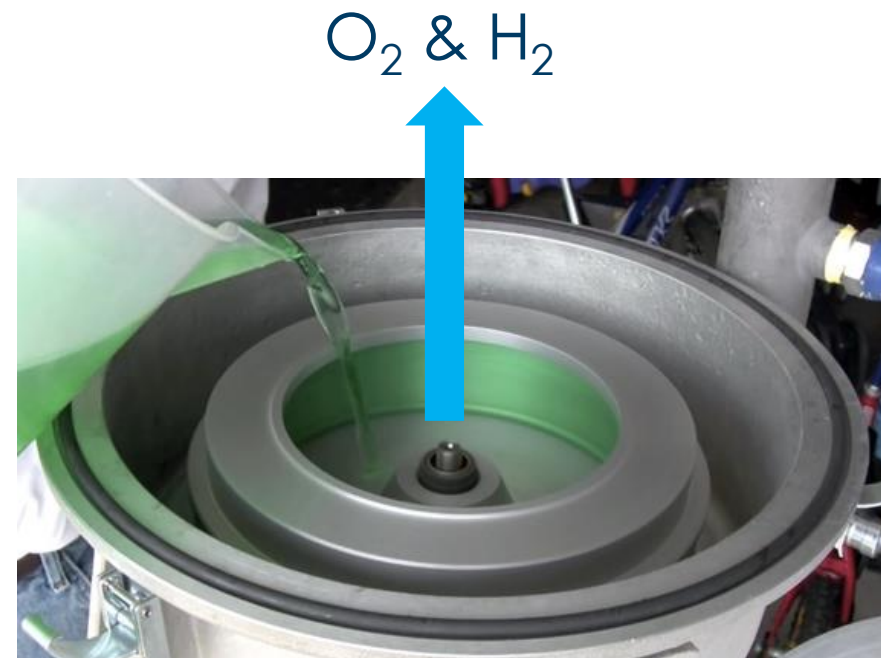


O₂ and H₂
bubbles
forming slowly
on electrode –
buoyancy
assisted release



AXIS OF ROTATION IS THE NEW «UP»

RotoLyzer principle:



O_2 and H_2 bubbles immediately released from electrode due to «high g» from spinning motion – gas travels to the center / in axial direction.

Spinning motion creates “high g” conditions:

✓ **Optimal production and flow of hydrogen and oxygen**

- Cost efficient & Compact
 - Dramatically increased active area on electrodes → less material needed → more compact
 - Increased gas-lye separation & less distance between electrodes → increased efficiency & more compact

✓ **Pressurized stack**

- Higher pressure → more compact & no need for 1st stage compression downstream
- The cell also works as a centrifugal pump – no need for lye pumps

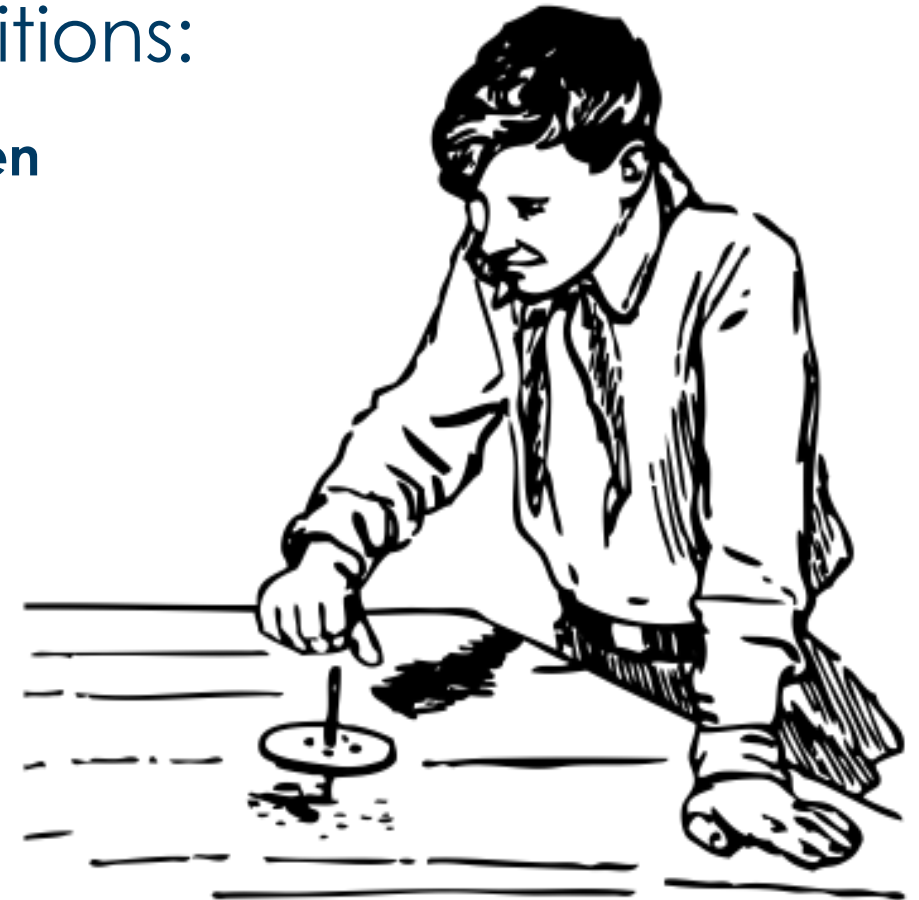


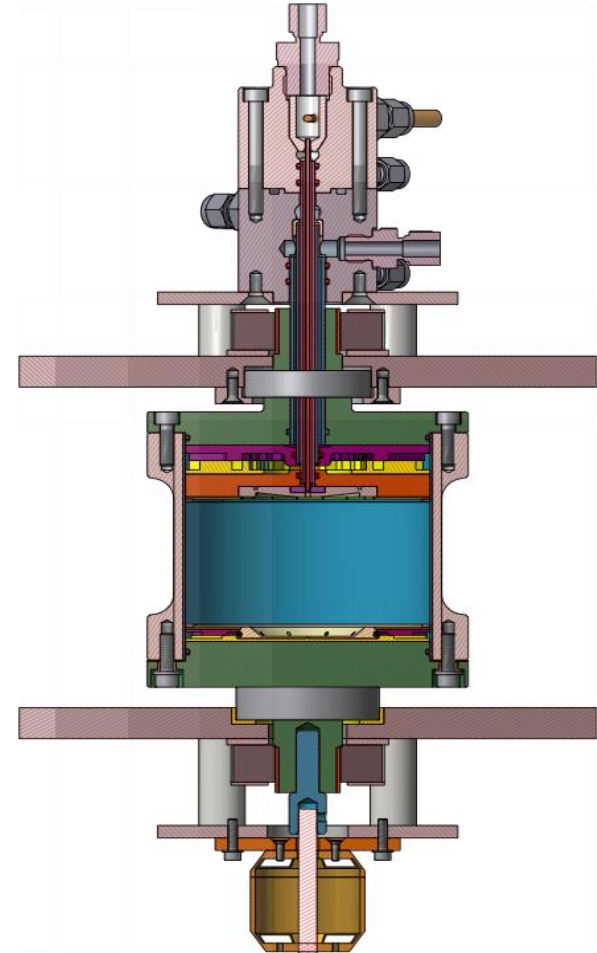
Image credit: Spinning A Top Clip Art from Vector.me (by johnny_automatic)

Working Prototype

100x

smaller*

**cell stack, compared to atmospheric alkaline*



Fits on a euro pallet

Ideal for hydrogen refueling stations / containerized solutions

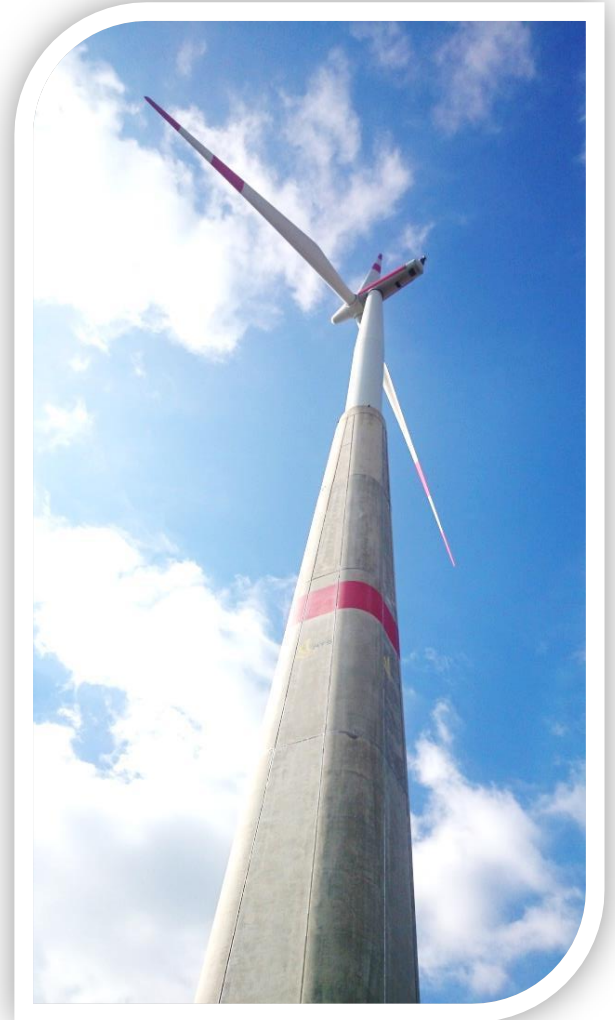
Product capacity can be customized during product life-cycle

Reduced service and maintenance costs



Immediate response

Ideal for hydrogen integration with renewable energy sources



PLANNED MARKET LAUNCH IN 2017



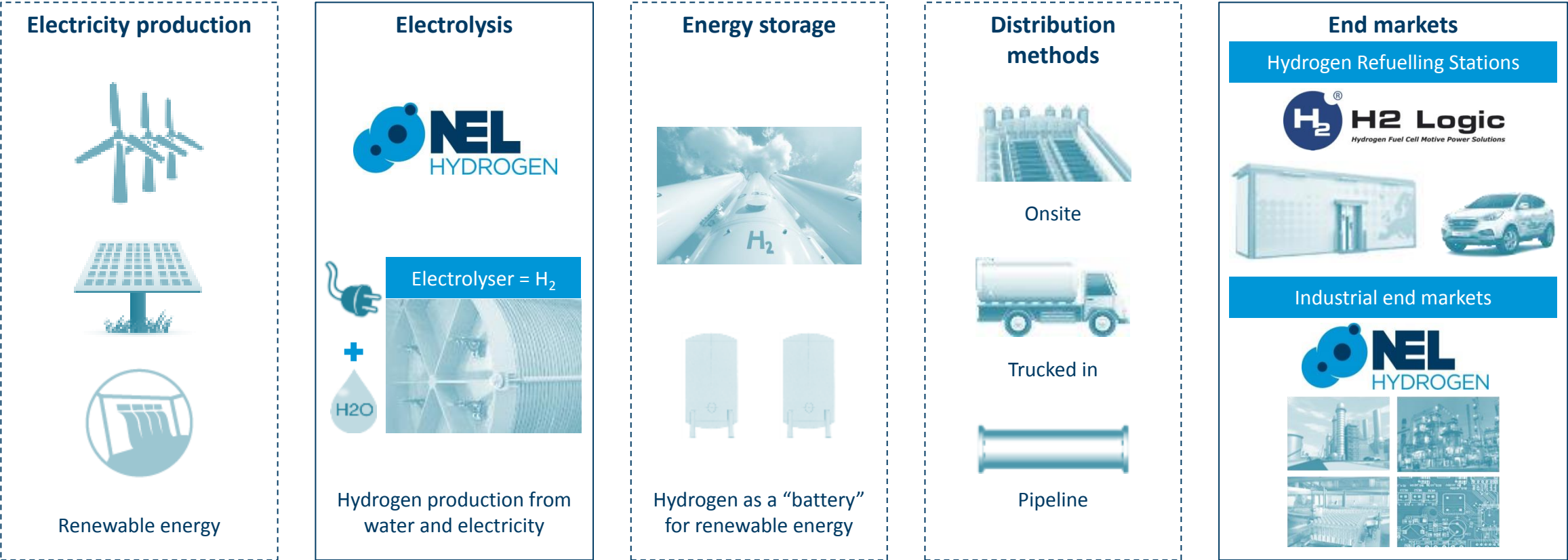
- Small unit ($\sim 10 \text{ Nm}^3/\text{h}$) in 2017
 - coincides with increased amount of FCEVs available
- Medium sized unit ($\sim 70 \text{ Nm}^3/\text{h}$) in 2018



NEL'S POSITION IN THE HYDROGEN VALUE CHAIN



Strengthening future position within the value chain



H2STATION[®] PRODUCTS



H2Station[®] CAR-100 for cars



H2Station[®] MH-100 for industrial vehicles

H2STATION[®] SERVICES

1. Planning & procurement
 - Station & network planning
 - Hydrogen supply handling
 - Site integration & planning
2. Delivery & installation
 - Handling of permitting process
 - Handling of installation and civil works
 - Project management
3. Operation & maintenance
 - Periodic maintenance
 - Monitoring of operation
 - Instant service response

PROJECT REFERENCES



- 26 HRS solutions delivered by NEL group since 2003.
- 20 H2Station® solutions delivered in 7 countries.
- Operational partners include Shell, Air Liquide and leading car manufacturers such as Daimler, Hyundai, Toyota, Honda, and BMW.
- Since 2008, H2 Logic stations have provided more than 12,000 refuellings and 21 tons of hydrogen



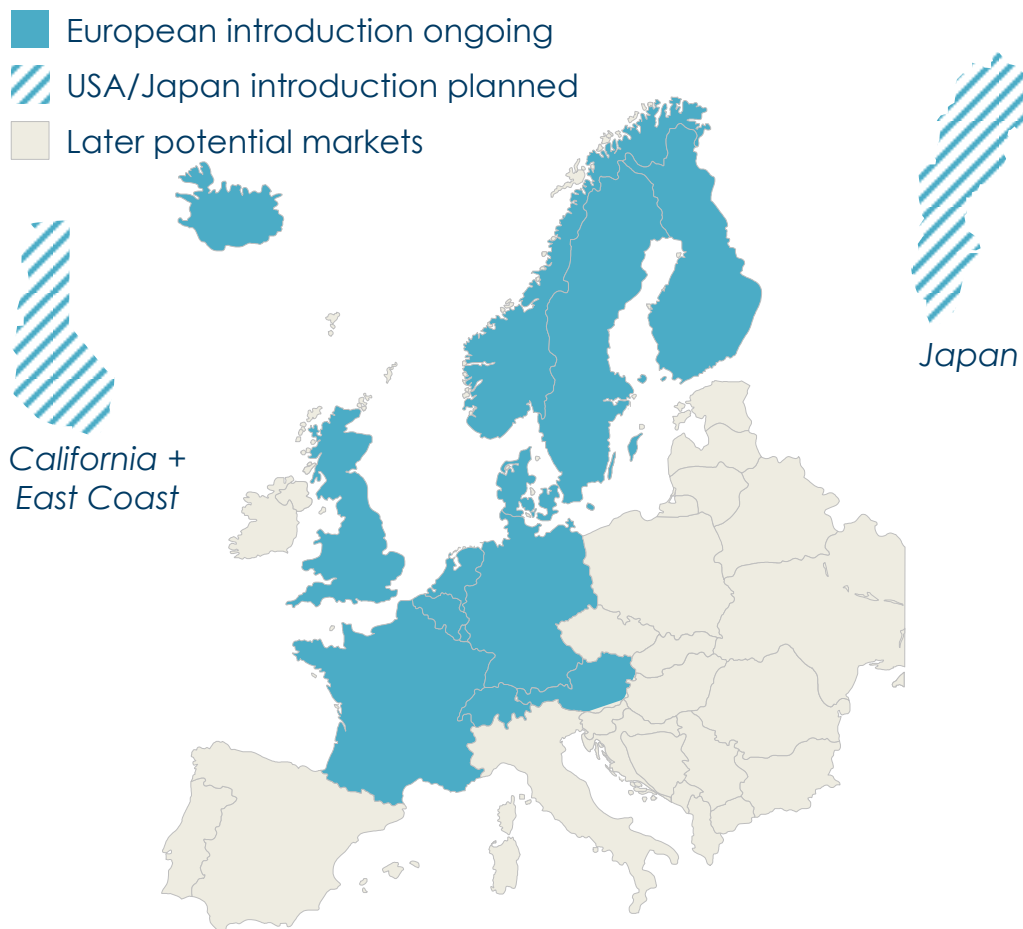
H2Station® in Køge Denmark, delivered and commissioned in July 2015 to Copenhagen Hydrogen Network A/S – a joint-venture with Air Liquide




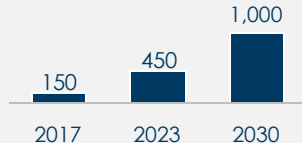

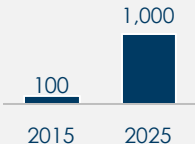

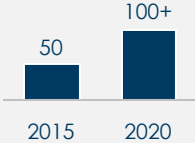




HRS MARKET DEVELOPMENT AND STRATEGY



H2 Logic is targeting markets where major car manufacturers are launching FCEVs



Market	Expected HRS roll-out	H2 Logic (NEL) activity / strategy								
Scandinavia 	 <table border="1"><thead><tr><th>Year</th><th>Expected HRS roll-out</th></tr></thead><tbody><tr><td>2015</td><td>15</td></tr><tr><td>2020</td><td>150</td></tr><tr><td>2030</td><td>300</td></tr></tbody></table>	Year	Expected HRS roll-out	2015	15	2020	150	2030	300	<ul style="list-style-type: none">• To date, NEL/H2 Logic has delivered 90% of all HRS in operation throughout Scandinavia• In a position or has secured contracts for ~75% of HRS's planned for 2015/2016
Year	Expected HRS roll-out									
2015	15									
2020	150									
2030	300									
Germany 	 <table border="1"><thead><tr><th>Year</th><th>Expected HRS roll-out</th></tr></thead><tbody><tr><td>2017</td><td>150</td></tr><tr><td>2023</td><td>450</td></tr><tr><td>2030</td><td>1,000</td></tr></tbody></table>	Year	Expected HRS roll-out	2017	150	2023	450	2030	1,000	<ul style="list-style-type: none">• H2 Logic has 3 H2Station® delivered for German customers• H2 Logic was the first to achieve CEP approval for HRS operation
Year	Expected HRS roll-out									
2017	150									
2023	450									
2030	1,000									
Japan 	 <table border="1"><thead><tr><th>Year</th><th>Expected HRS roll-out</th></tr></thead><tbody><tr><td>2015</td><td>100</td></tr><tr><td>2025</td><td>1,000</td></tr></tbody></table>	Year	Expected HRS roll-out	2015	100	2025	1,000	<ul style="list-style-type: none">• Design adaption of the CAR-100 for Japanese market ongoing• HRS introduction preparations ongoing		
Year	Expected HRS roll-out									
2015	100									
2025	1,000									
USA 	 <table border="1"><thead><tr><th>Year</th><th>Expected HRS roll-out</th></tr></thead><tbody><tr><td>2015</td><td>50</td></tr><tr><td>2020</td><td>100+</td></tr></tbody></table>	Year	Expected HRS roll-out	2015	50	2020	100+	<ul style="list-style-type: none">• Design adaption of H2Station® technology Californian market ongoing• Efforts currently focused on California, in particular Los Angeles and surrounding areas		
Year	Expected HRS roll-out									
2015	50									
2020	100+									
UK 	 <table border="1"><thead><tr><th>Year</th><th>Expected HRS roll-out</th></tr></thead><tbody><tr><td>2018</td><td>65</td></tr><tr><td>2020</td><td>270</td></tr><tr><td>2030</td><td>1,150</td></tr></tbody></table>	Year	Expected HRS roll-out	2018	65	2020	270	2030	1,150	<ul style="list-style-type: none">• First H2Station® for UK market is undergoing final commissioning at customer site• Continuous customer outreach with the aim to secure deliveries in the coming years
Year	Expected HRS roll-out									
2018	65									
2020	270									
2030	1,150									

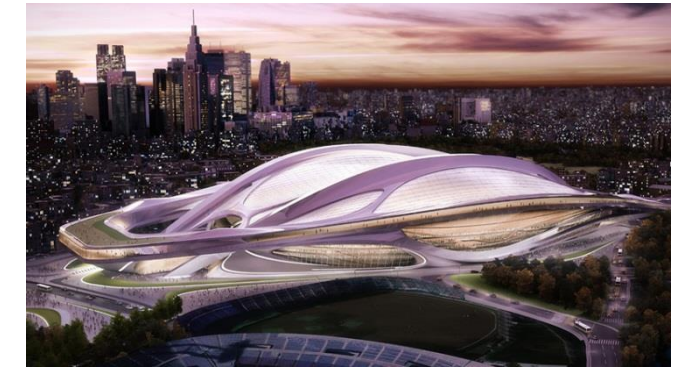
JAPAN, AN EARLY AND STRONG MOVER

Japanese market within hydrogen and fuel cells:¹

- 2030: \$ 10 billion
- 2050: \$ 80 billion

2020: Olympic Games

- Heritage from 1964 Olympic Games was the bullet train, “Shinkansen”
- **Heritage from 2020 Olympics will be hydrogen**
 - Hydrogen vehicles
 - “Hydrogen Olympic Village” for power & heat
- Japanese government pledged \$385 million support for FCEVs and HRSs until 2020²

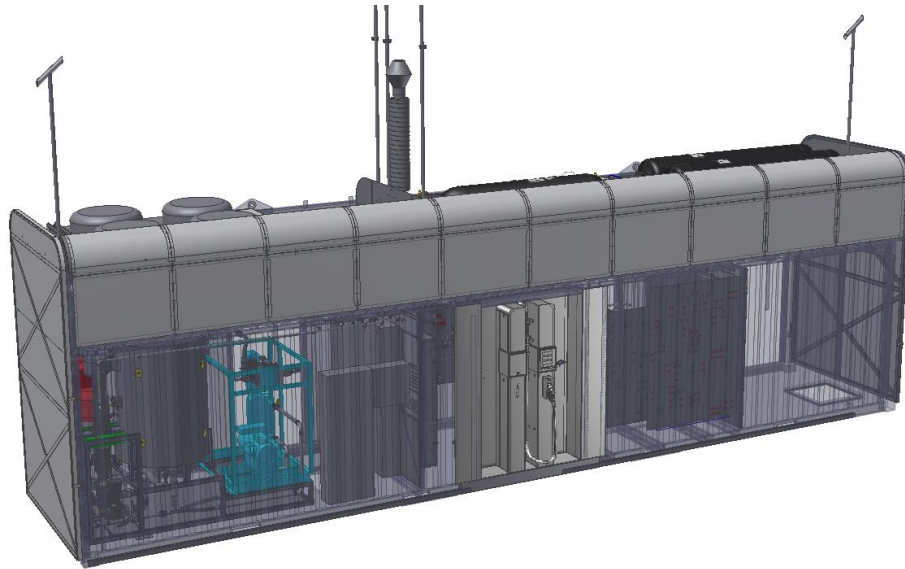


“It’s time to introduce a hydrogen era.” – Prime Minister Shinzo Abe, Jan. 15, 2015

Note (1) Estimates by NEDO (New Energy and Industrial Technology Development Organization)

Note (2) http://www.japantimes.co.jp/news/2015/01/20/business/tokyo-to-spend-%C2%A545-billion-on-hydrogen-stations-subsidies-ahead-of-olympics/#.VV7wo_mqpBc

H2Station® CAR-100 technology



 **MITSUBISHI KAKOKI KAISHA, LTD.**



- H2 Logic collaboration with Mitsubishi Kakoki Kaisha, Ltd. announced July 2015.
- Includes a technology transfer and adaption of the H2Station® CAR-100 product for use and marketing in Japan.
- With CAR-100 Mitsubishi aims to become a major player in HRS construction in Japan.
- The aim is to achieve the first adapted CAR-100 HRS in operation during 2016.
- For H2 Logic the collaboration provides an effective market access to Japan.

HYDROGEN REFUELLING STATIONS IN CALIFORNIA

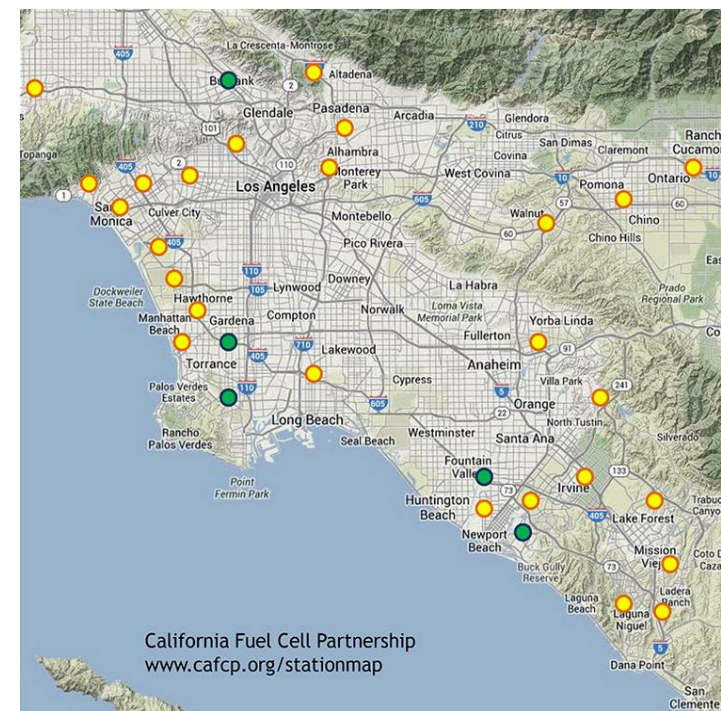
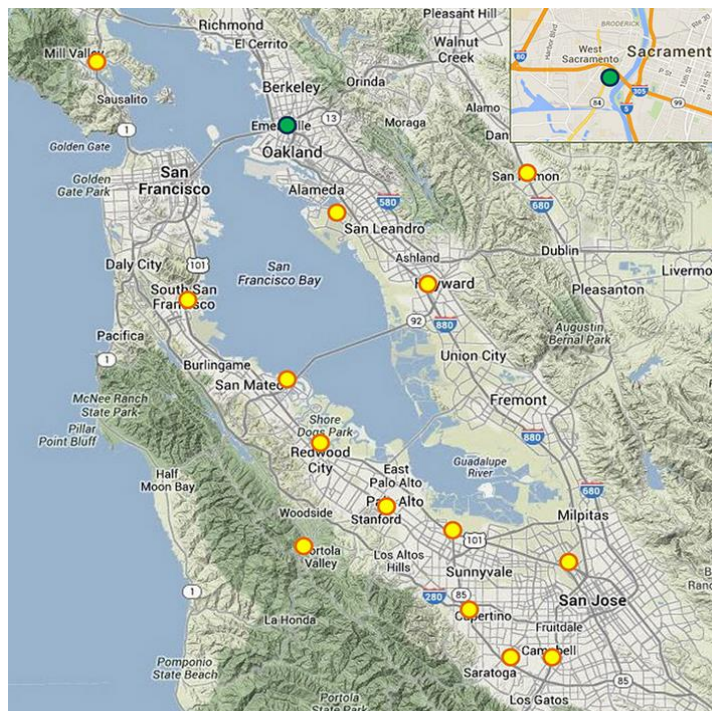


More than 51 hydrogen stations are under construction in California – target is 100 by 2021.
State of California has set aside up to \$100 million to support the construction & operation.

Focus areas: San Francisco & Los Angeles

Key testing ground for hydrogen vehicles for decades.

Hyundai and Toyota already started sales in California – more will follow in coming years.

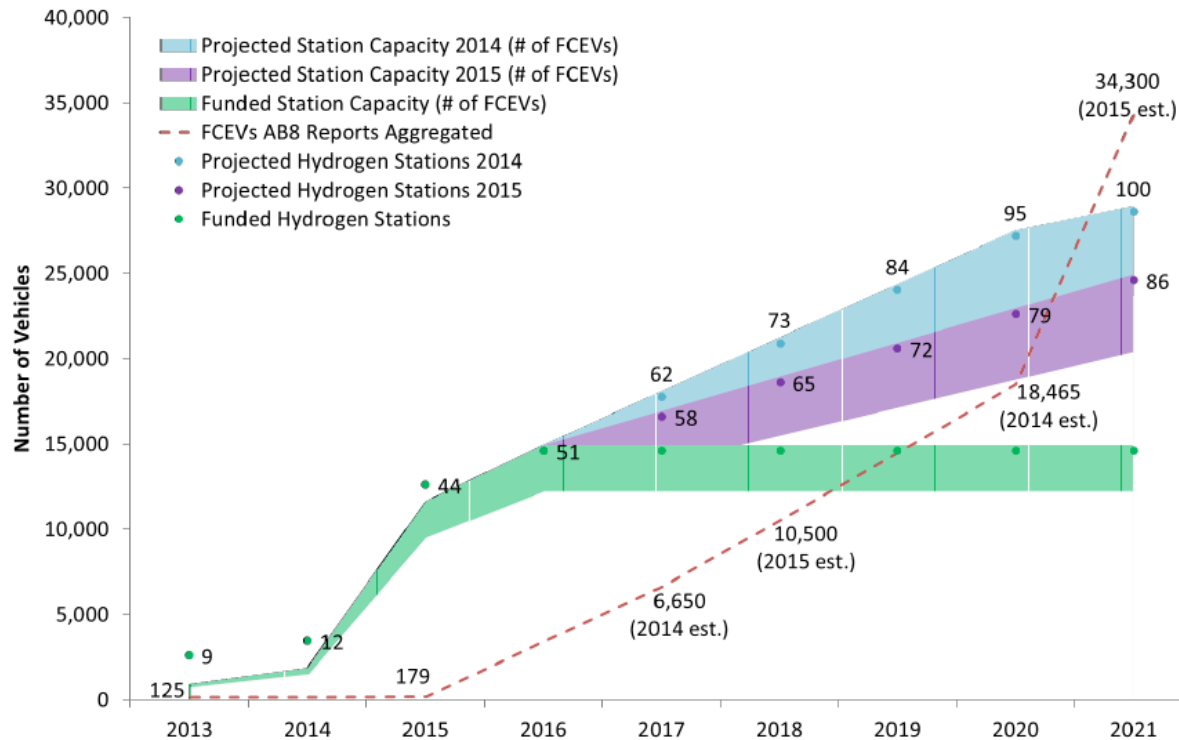


California Fuel Cell Partnership
www.caafcp.org/stationmap

OUTLOOK AND H2 LOGIC'S ACTIVITIES



FCEV & HRS Outlook California → 2021



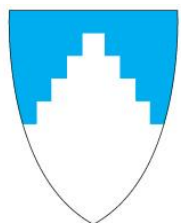
- H2 Logic recently joined as member of the “California Fuel Cell Partnership” – a public private collaboration initiative since 1999.
- H2 Logic continues to monitor & evaluate the market perspectives in California.



Source: California Air Resources Board (ARB): “2015 Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development”

Ensuring commercial introduction of hydrogen in the Oslo-region

- 2014 – 2018: 400 MNOK (high public funding: Oslo/Akershus/Enova/EU)
- 2019 – 2025: 1,000 MNOK (gradually lower public funding)
- Government proposed national strategy for hydrogen in Norway (Feb. 2015)
- Enova responsible for governmental support to make transport sector more energy efficient and environmentally friendly



AKERSHUS
fylkeskommune



Oslo kommune



NEL & Akershus County with joint hydrogen project, supporting national ambitions

- Support grant from Akershus County for 1 HRS in 2016
 - High capacity station with on-site, pressurized electrolysis
- First step on the road to full coverage of HRS in Oslo/Akershus
- Supporting the national ambitions for hydrogen as a zero emission fuel

«The parliament requests the government to establish a national hydrogen strategy, and to ensure the support for hydrogen is maintained through Enova.»

Proposal 147, Feb. 2015

