



## 3. Video

<https://youtu.be/h7tpR3YRvzM>



Break



## 4. Use of hydrogen in mobility



**H<sub>2</sub>Platform**

OP WEG MET WATERSTOF

# DEMAND GATHERING & DEMAND CREATION

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*Robert Dencher*

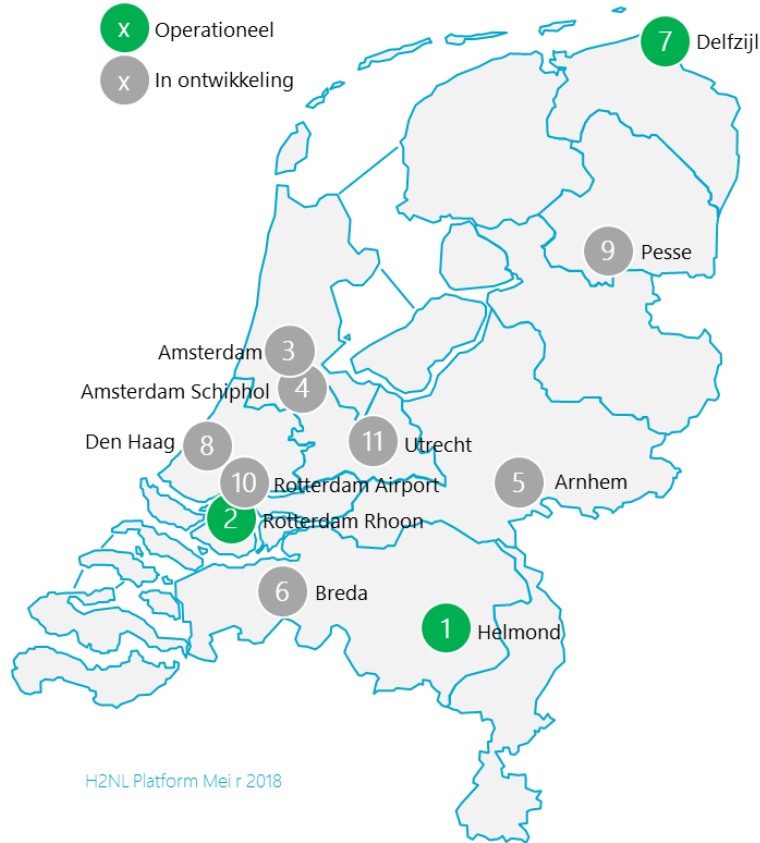
H2 - #No Bubble Symposium 23rd May 2018

[www.opwegmetwaterstof.nl](http://www.opwegmetwaterstof.nl)

# Hydrogen Refuelling Stations (HRS) in The Netherlands

*“Operational & Investment ready”*

- x Operationeel
- x In ontwikkeling

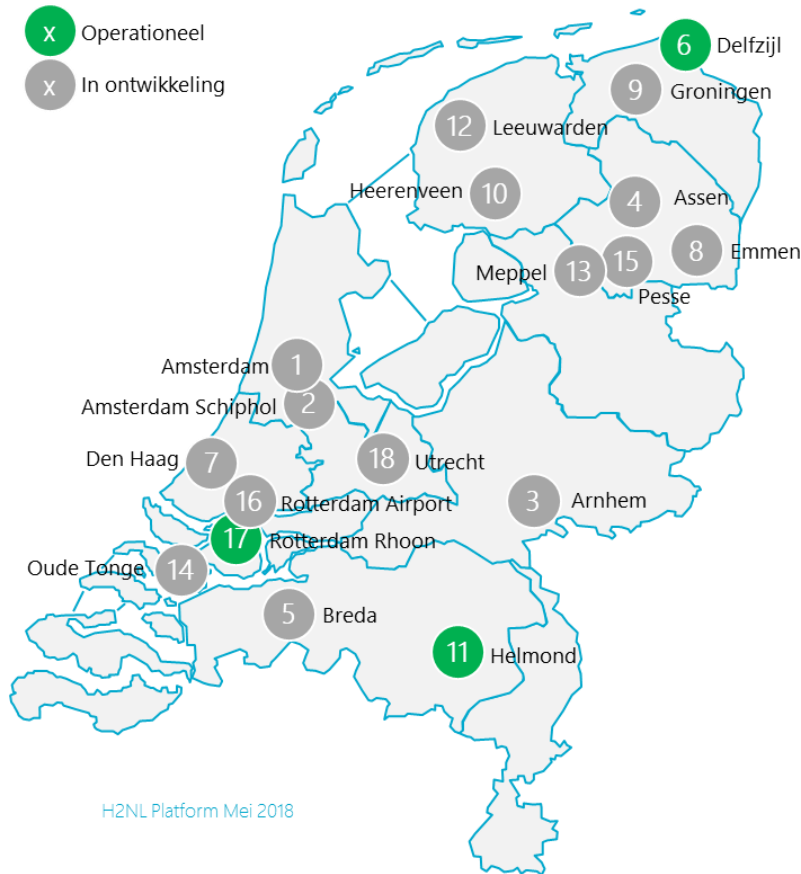


	Locatie	Exploitant	350/700 bar	Planning oplevering
1	Helmond	WaterstofNet	350/700	
2	Rotterdam Rhoon	Air Liquide	350/700	
3	Amsterdam	Shell	700	Q4 2019
4	Amsterdam Schiphol	Shell	700	Q4 2019
5	Arnhem	PitPoint	700	Q4 2018
6	Breda	PitPoint	350/700	Q2 2019
7	Delfzijl	PitPoint	350	
8	Den Haag	Kerkhof	700	Q4 2018
9	Pesse	Green Planet	700	Q4 2018
10	Rotterdam Airport	PitPoint	700	Q4 2019
11	Utrecht/Nieuwegein	PitPoint	700	Q4 2019

H2NL Platform Mei r 2018

# Hydrogen Refuelling Stations (HRS) in The Netherlands

**“Operational/Investment ready” & “Under Development”**



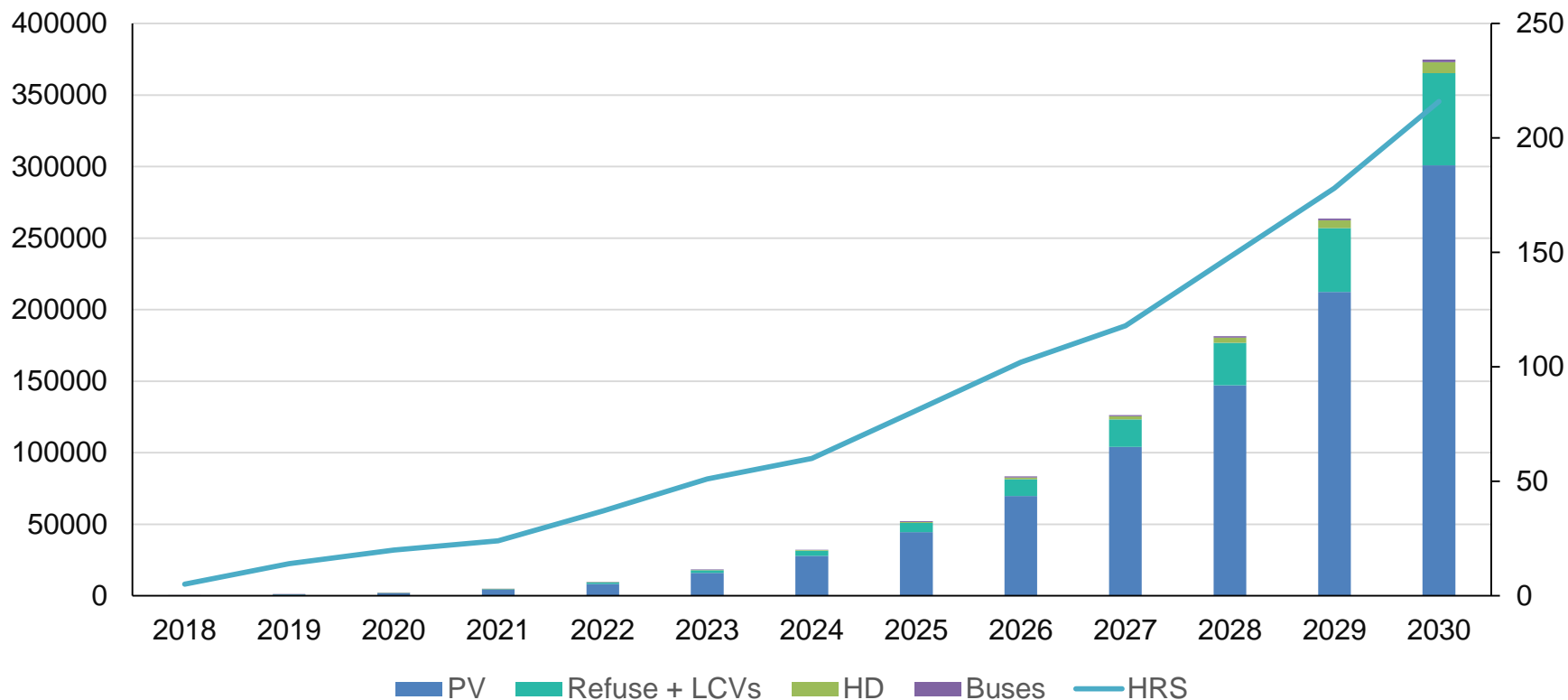
H2NL Platform Mei 2018

	Locatie	Operationeel	Exploitant	350/700 bar	Planning oplevering
1	Amsterdam	Nee	Shell	700	Q4 2019
2	Amsterdam Schiphol	Nee	Shell	700	Q4 2019
3	Arnhem	Nee	PitPoint	700	Q4 2018
4	Assen	Nee	Holthausen	350/700	Q1 2019
5	Breda	Nee	PitPoint	350/700	Q1 2019
6	Delfzijl	Ja	PitPoint	350	
7	Den Haag	Nee	Kerkhof	700	Q2 2018
8	Emmen	Nee	Holthausen	350/700	Q1 2019
9	Groningen	Nee	Holthausen	350/700	Q1 2019
10	Heerenveen	Nee	Green Planet	700	Q1 2019
11	Helmond	Ja	WaterstofNet	350/700	
12	Leeuwarden	Nee	Holthausen	350/700	Q1 2019
13	Meppel	Nee	Green Planet	700	Q1 2019
14	Oude Tonge	Nee	Greenpoint	350/700	?
15	Pesse	Nee	Green Planet	700	Q2 2018
16	Rotterdam Airport	Nee	PitPoint	700	Q4 2019
17	Rotterdam Rhoon	Ja	Air Liquide	350/700	
18	Utrecht/Nieuwegein	Nee	PitPoint	700	Q4 2019

# FCEV 's & HRS 2018-2030 – Medium Scenario

Vehicles

HRS



## H2 Platform Klimaatakkoord input May 2018

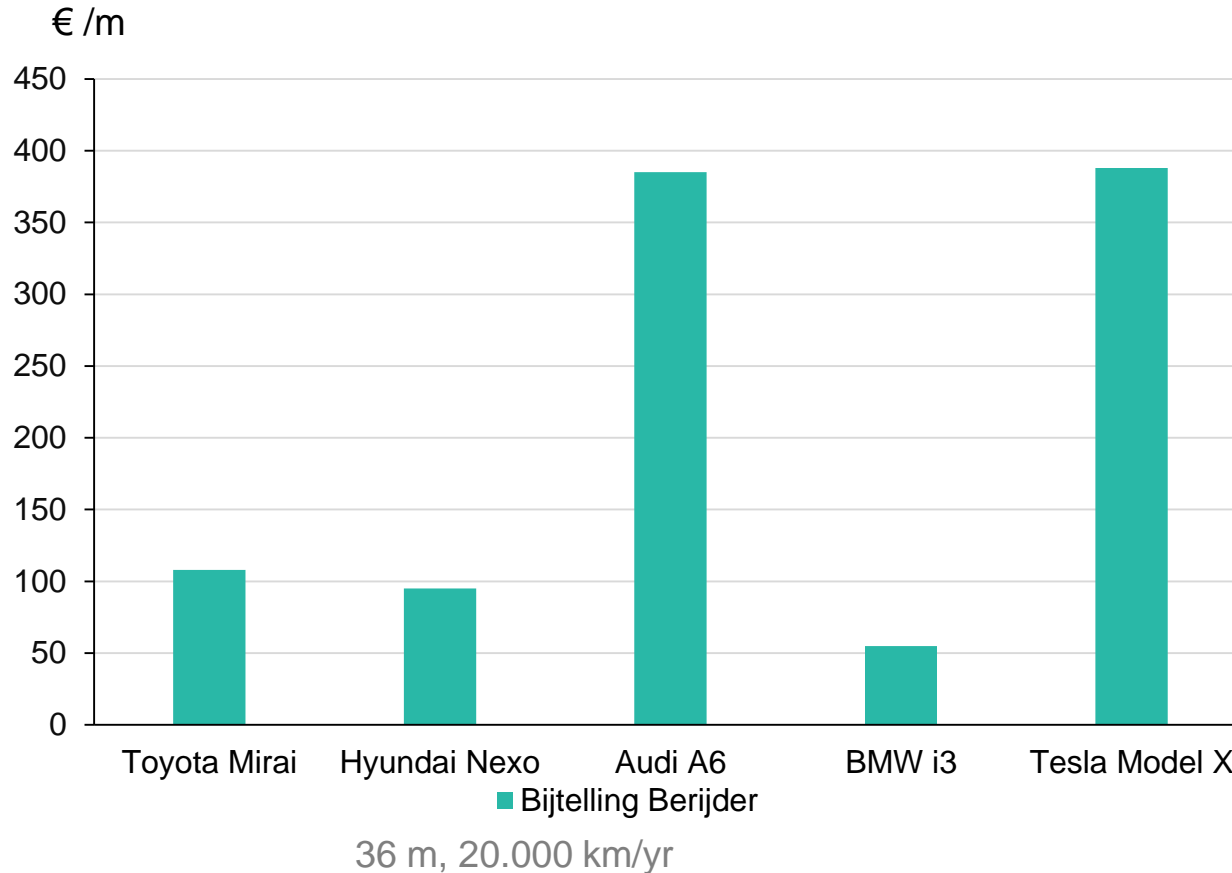
	Market share Sales 2030	Total Accumulated 2030	HRS 2030	CAPEX subsidy 2019 t/m 2026	CO <sub>2</sub> reduction	Cost /t CO <sub>2</sub> avoided
Passenger cars	22%	300.000	92	€ 96,7 mio	2,9 Mton	€ 33,=
LCV	25%	65.000	54	€ 41,2 mio	0,97 Mton	€ 42,=
Trucks /HD	8%	7.700	45	€ 26,7 mio	0,7 Mton	€ 38,=
Buses	50%	1.700	25	€ 11 mio	0,3 Mton	€ 36,=
<b>SCENARIO MID</b>		<b>375.000</b>	<b>216</b>	<b>€ 175 miljoen</b>	<b>4,9 Mton</b>	<b>€ 36,=</b>
<b>SCENARIO LOW</b>		<b>132.000</b>	<b>142</b>	<b>€ 90 miljoen</b>	<b>1,9 Mton</b>	<b>€ 47,=</b>
<b>SCENARIO HIGH</b>		<b>696.000</b>	<b>432</b>	<b>€ 243 miljoen</b>	<b>9,6 Mton</b>	<b>€ 25,=</b>

Govt. Subsidies end 2026, total Capex 2018-2030 € 725 mln +

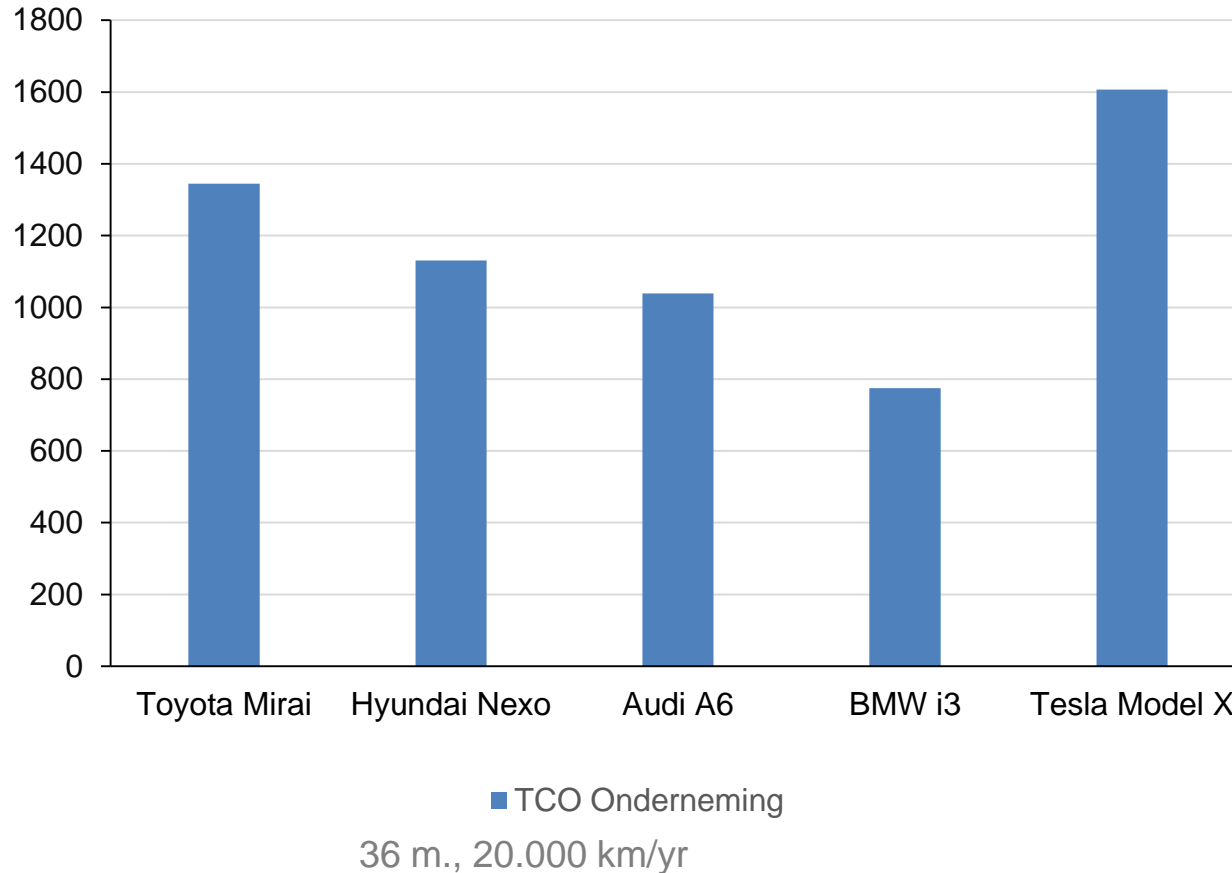


# “Demand Gathering” or “Demand Creation”

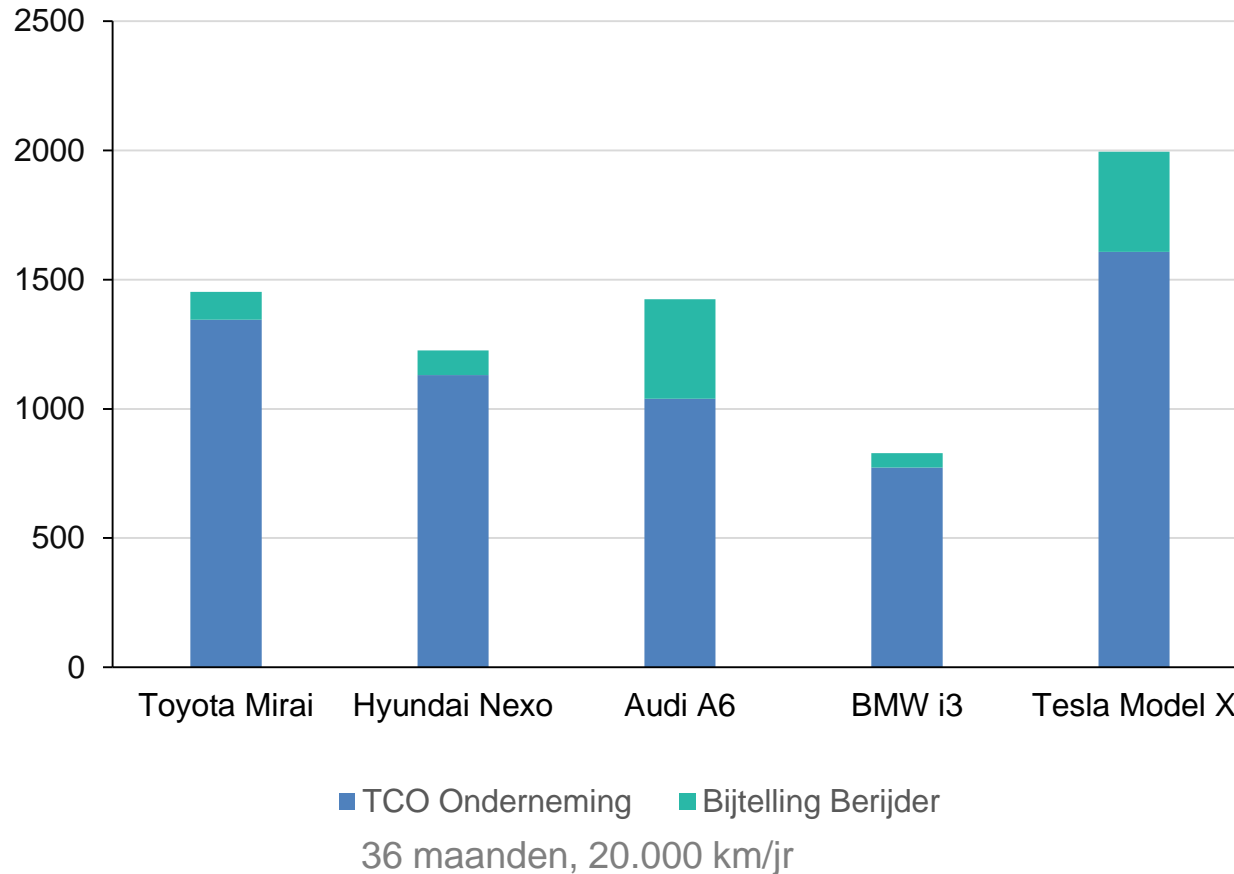
## Stimulating Zero Emission : The Lease Car – The Driver’s Perspective



# “Demand Gathering” of “Demand Creation” Stimulating Zero Emission : The Lease Car - The Fleetowner



# “Demand Gathering” or “Demand Creation” Stimuleer Zero Emissie : de Berijder & Fleetowner



## **“Demand Gathering” & “Demand Creation”**

**“Create” Zero Emission Mobility → Align the  
financiale / fiscal incentives Fleetowner and Driver.**

**Several tool are being considered/proposed, incl.**

- 1) increased taxes on fossile vehicles (EU Law  
w.e.f. Q1, 2019),**
- 2) insurance/garantuee scheme for 2<sup>nd</sup> hand value  
t/m 2022 (2024?) and/or**
- 3) first-buy support for first 8500 FCEV ‘s.**

# H2 Mobility 2018 – 2030 : Conclusions & Actions

## Conclusions

- “Chicken-Egg” breakthrough ~20 HR 's in 2020
- Klimaatakkoord : Scenario's give direction:
  - HRS (200+ in 2030) and FCEV's (300k+)
  - Financial incentives for Drivers, Fleetowners and Leasecompanies need to be aligned.

## Actions

Fleetowners, Lease-cie's, OEM 's and HRS 's need to align on ambitions required incentives.



## 5. Standardization, certification, testing

# Standardization, Testing and Certification for Hydrogen



Wolter Veenhoven, 30<sup>th</sup> May 2018

Trust  
Quality  
Progress

# Presentation Outline

- Introduction
- H2 Non-Automotive Products and Components
- H2 Automotive Products and Components
- H2 Future “transition”



# Introduction

## ■ The Netherlands

- Connected Buildings (A network of Gas pipelines).
- Efficient use of Resources
- Knowledge of Gaseous Fuels.

## ■ KIWA

- Kiwa is a knowledge institute and an international quality authority, with basis in the Netherlands.
- Kiwa plays a major role in testing, certification and standardization in water, energy and gas sectors.
- KIWA's contributions to building, industry and the automotive and transportation markets are equally significant.
- KIWA cooperates with Testing, Inspection and Certification organizations, to offer 1 stop shop
- In Japan for example, KIWA is represented by Hastex, and cooperates with domestic certification bodies, such as: JIA, KHK.
- KIWA has 5000 employees.
- KIWA 's employees with expertise in H2. actively participate in H2 standardization committees.

# Hydrogen: Non-Automotive Products and Components (1)

## ■ Standardization

- Directives & Regulations adopted by EU Parliament:
  - Gas Appliance Regulation (GAR) applicable for Appliances burning H<sub>2</sub>
  - Essential Requirements: Risk assessment, Design Rule, compliance with “State of Art”
- Examples of EN standards, used for H<sub>2</sub> Appliances:
  - EN 62282 series (stationary power systems)
  - EN 50465 (combined heating power systems)

## ■ Certification & Inspection

- GAR requires 3<sup>rd</sup> Party Conformity Assessment (Notified Body)
  - Type Approval
  - Audit of production and quality system
- KIWA cooperates with JIA for the Audits in Japan.
- CE Certificate

## Hydrogen: Non-Automotive Products and Components (2)

### ■ Test Facilities

- KIWA is accredited for ISO/IEC 17025, 17020, 17065 (for wide scope of requirements)
- KIWA is CAB, in accordance with the IECEE “CB Scheme”
- Testing of performance and functionality of Fuel Cells , Electrical Safety , Electromagnetic Compatibility etc..in accordance with the applicable standards (and client specifications)
- Test Results of Domestic laboratories can be used if requirements are met

### ■ Consultancy

- H2 Standardization Committees, Testing Proto Type, -Materials, H2 generation technology, cogeneration, blending of H2 in the gas grid, H2 combustion, electronic controls, etc.

### ■ References (Japan):

- CE Certification of Enefarm, Material Evaluation (H2 Compatibility, Durability, Corrosion), H2 Cylinder (proto type testing). FC Components (proto type testing)

# Hydrogen: Automotive Products and Components (1)

## ■ Standardization

- EC Dir 79/2009 (EU 406/2010), GTR13, UNECE (R134), KHK, ANSI HGV 3.1-2015, CSA/ANSI HGV 4.2-2013, ANSI HPRD 1-2013, ISO norms etc.
  
- **KIWA is participating in various H2 standardization committees and working groups, among others:**
  - ISO TC22SC41 Specific aspects for gaseous fuel (WG7 : all gaseous fuel systems. convener of the working group)
  - ISO TC197 Hydrogen technologies (WG5 Gaseous hydrogen land vehicle refueling connectors devices & WG18 Gaseous hydrogen land vehicle fuel tanks and TPRD's)
  - GRSG (European regulation), H2 directive / regulation delegate on behalf of the Netherlands
  - CSA standard commission (north America), HGV3.1 and HPRD1
  - GTR#13 Informal Working Group on GTR13 (HFCV) - Phase2. Member several taskforces like TF1 Heavy Duty Vehicles, TF3 Recommendations for test procedures

## Hydrogen: Automotive Products and Components (2)

### ■ Certification & Inspection

- KIWA is accredited for ISO/IEC 17025, ISO/IEC 17065
- KIWA is Technical Service, for Vehicle Authorities of The Netherlands (RDW) and Germany (KBA).  
-E1, E4 (Audits by KBA, resp.RDW),
- Notified Body for TPED (ADR)
- Japan: KHK, accepts the test results from KIWA
- USA: partnership with designated body for DOT,
- Canada/NA: ISO Certificates scope HGV 3.1
- China : partnerships with designated bodies

### ■ Test Facilities

- KIWA has large unique hydrogen lab (for real H<sub>2</sub>, high flow, high pressure H<sub>2</sub> testing: > 6g/sec, 1050 Bar), EMC, Electric Safety- , endurance - , leakage- , extensive environmental -, performance -and functionality testing, hydrostatic testing ~ 5500 Bar
- KIWA accepts test results from domestic laboratories if laboratories comply with KIWA requirements

# Hydrogen: Automotive Products and Components (3)

## ■ Consultancy

- FCV Standardization Committees, Proto Type Testing, Materials Testing, Electronic Controls, Development of Safety Systems (boil-of combustion (BMW)), Feasibility Studies, Demonstrations, etc.

## ■ References (Japan):

- HPRU
- H2 cylinder
- On Tank Valves, Valves, Regulators, Sensors, Receptacles, Fuel Lines, Couplings, Injection Systems, Controls, other components

# Hydrogen Future “transition”

## ■ Standardization:

- Standards expanding rapidly
- Connected driving, IoT

## ■ Certification & Inspection:

- Expand Designations for Conformity Assessment

## ■ Test facilities:

- Expand Facilities for Testing High Pressure, High Flow, etc.

## ■ Consultancy

- Feasibility - & Technical studies: performance, functionality, safety

## ■ References :

- Upgrading infrastructure to H<sub>2</sub>
- Vehicle, marine, train, aerospace
- H<sub>2</sub> appliances, H<sub>2</sub> components, H<sub>2</sub> storage tanks, etc
- Fuel Cells
- Electrolysers and SMRs
- H<sub>2</sub> Storage Media
- H<sub>2</sub> In power generation
- H<sub>2</sub> re-fuelling stations

## ■ Opportunities Japan:

- Project related to Tokyo 2020**
- Expand Cooperation with Authorities and Laboratories in Japan**
- Expanding into other transportation related applications (demonstration bus, train, marine)**
- H<sub>2</sub> storage**

# Contact

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