



Q3 - NEL ASA

Q3 - Company presentation, November 2014

PRESENTATION OUTLINE

Condensed Interim Financial Statement

NEL Hydrogen at a glance

Our technology and current business

The game changer: Hydrogen as energy carrier

Our value proposition

Condensed Interim Financial Statement

The table relates to the consolidated figures for Diagenic ASA.

	2014	2013	2014	2013
<i>(figures NOK million)</i>	Q3	Q3	9M	9M
Comprehensive income	-	0.04	-	0.13
Total operating cost	(0.76)	(9.54)	(6.11)	(30.52)
Pre-tax profit (loss)	(0.48)	(9.28)	(5.50)	(29.93)
Net cash flow from operating activities	(1.06)	(9.25)	(9.00)	(29.28)
Cash balance end of period	50.47	18.12	50.47	18.12

NEL Hydrogen AS

Income statement

	2014	2014
<i>(figures NOK thousands)</i>	Q3	9M
Total operating revenue	19 068	57 259
Total operating costs	13 983	42 866
Operating profit (loss)	5 085	14 393
Net financial income (expense)	-17	-17
Pre-tax profit (loss)	5 048	14 376

Balance sheet

	2014
<i>(figures NOK thousands)</i>	30 Sept
ASSETS	
Non-current assets	2 729
Current assets	40 201
Total assets	42 930
EQUITY AND LIABILITIES	
Equity	24 551
Liabilities	18 379
Total equity and liabilities	42 930

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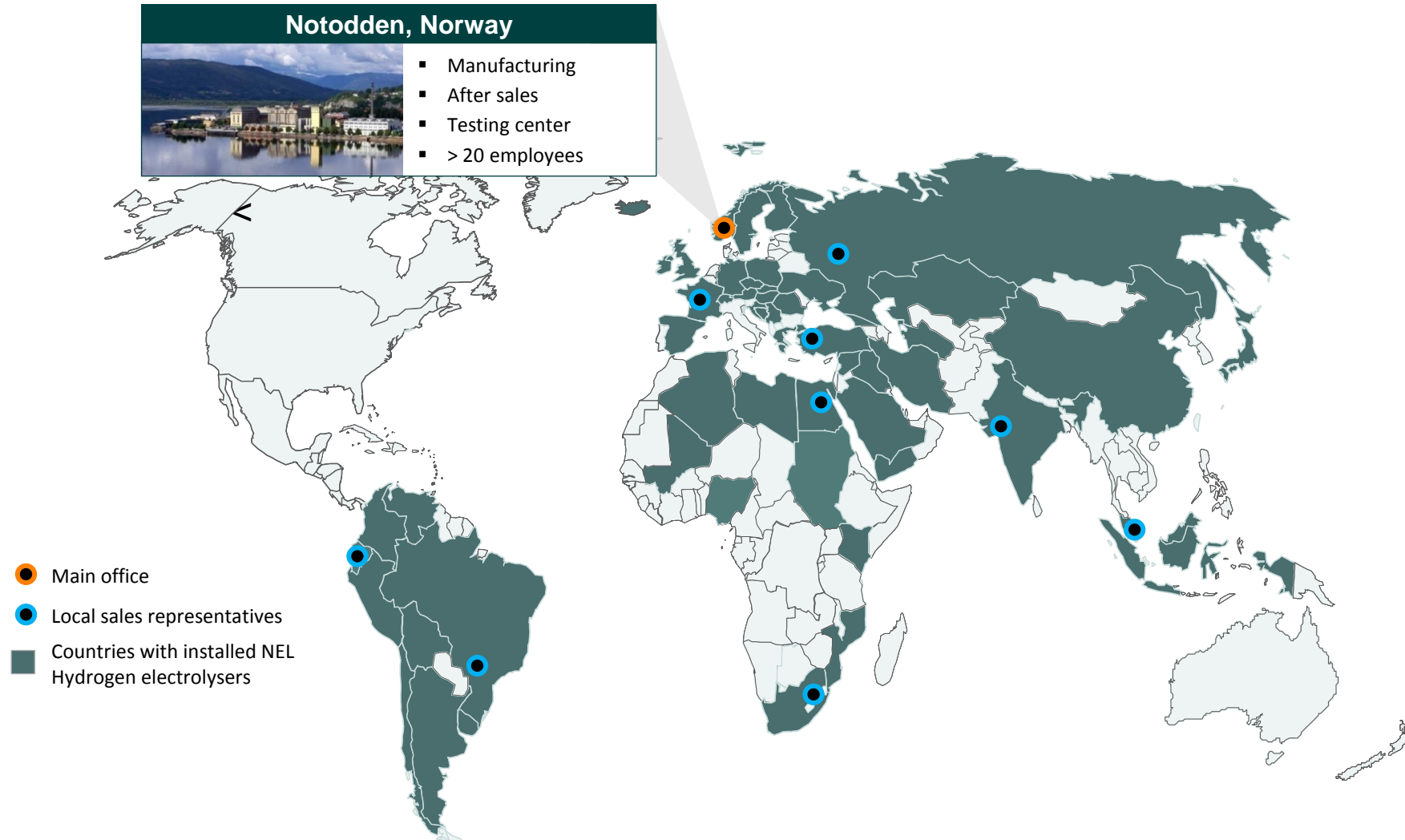
Our value proposition

THIS IS NEL HYDROGEN

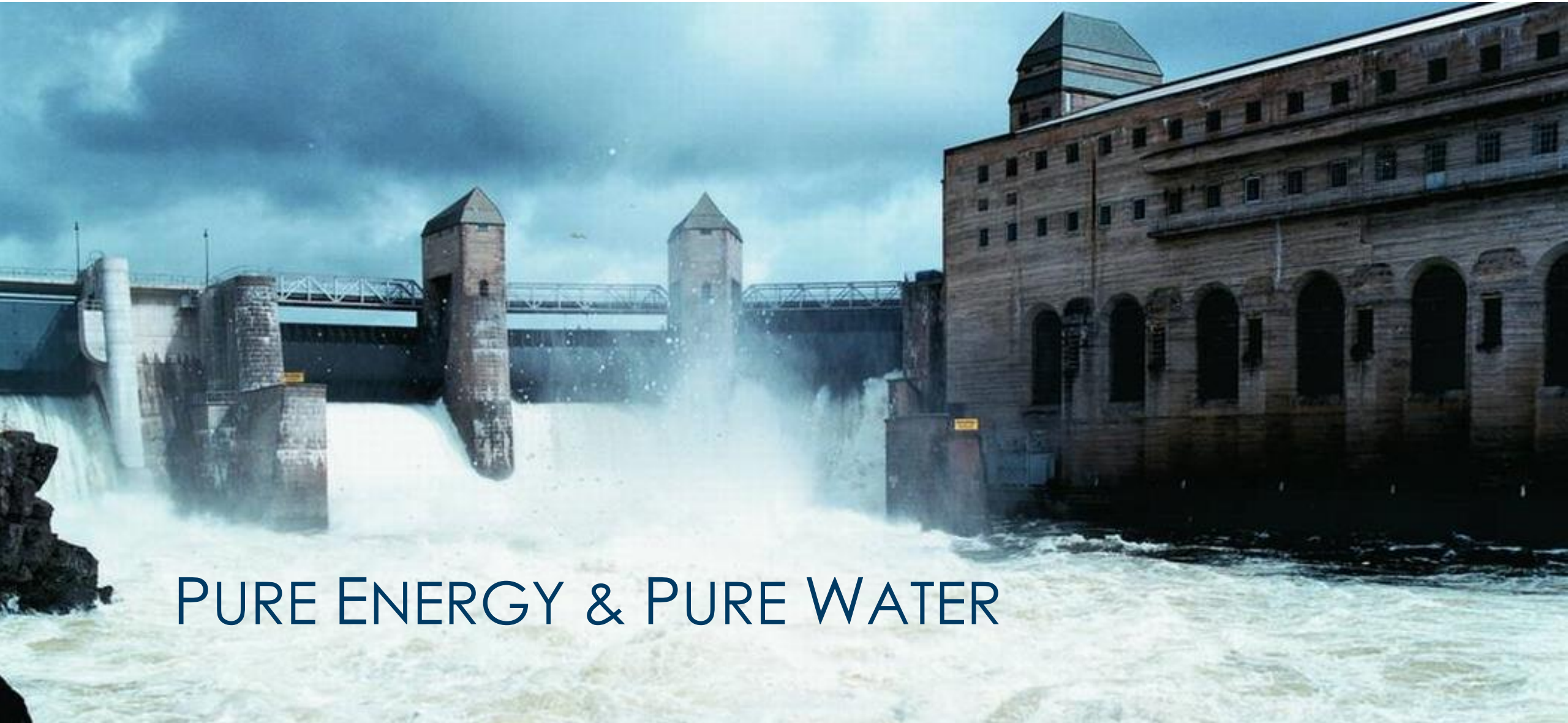
- Supplier of solutions for hydrogen generation
- Roots date back to 1927 (Norsk Hydro)
- In-house technology with superior energy efficiency
- Over 500 electrolyser units sold; over 100 in operation
- Production facility in Notodden, corporate office in Oslo, Norway
- Listed on the Oslo Stock Exchange (sept 2014)
- Positioned for an expected massive growth in the hydrogen market



LOCAL ROOTS, GLOBAL PRESENCE



INGREDIENTS...



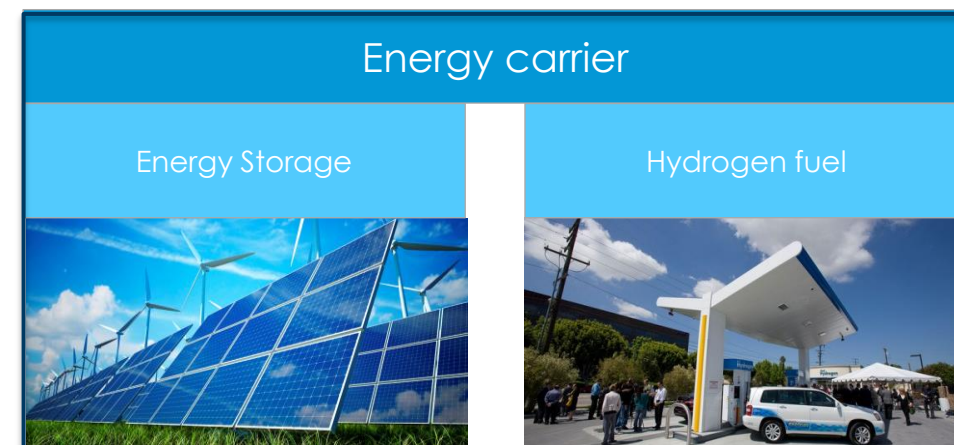
PURE ENERGY & PURE WATER

HYDROGEN - A MARKET IN TRANSITION:

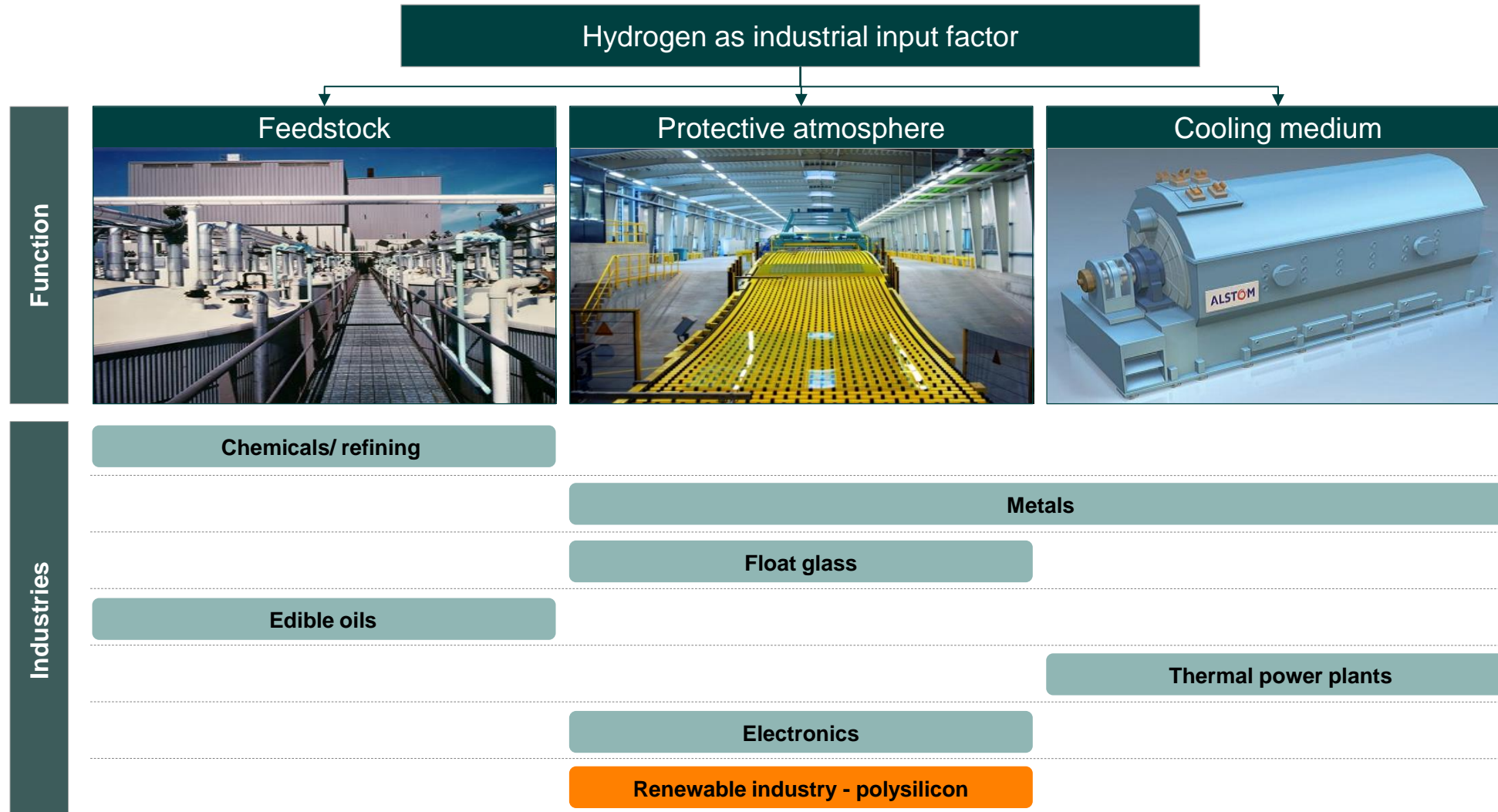


TODAY: *Hydrogen used as an input to industrial applications*

TOMORROW: *Hydrogen used as an energy carrier in the energy system*

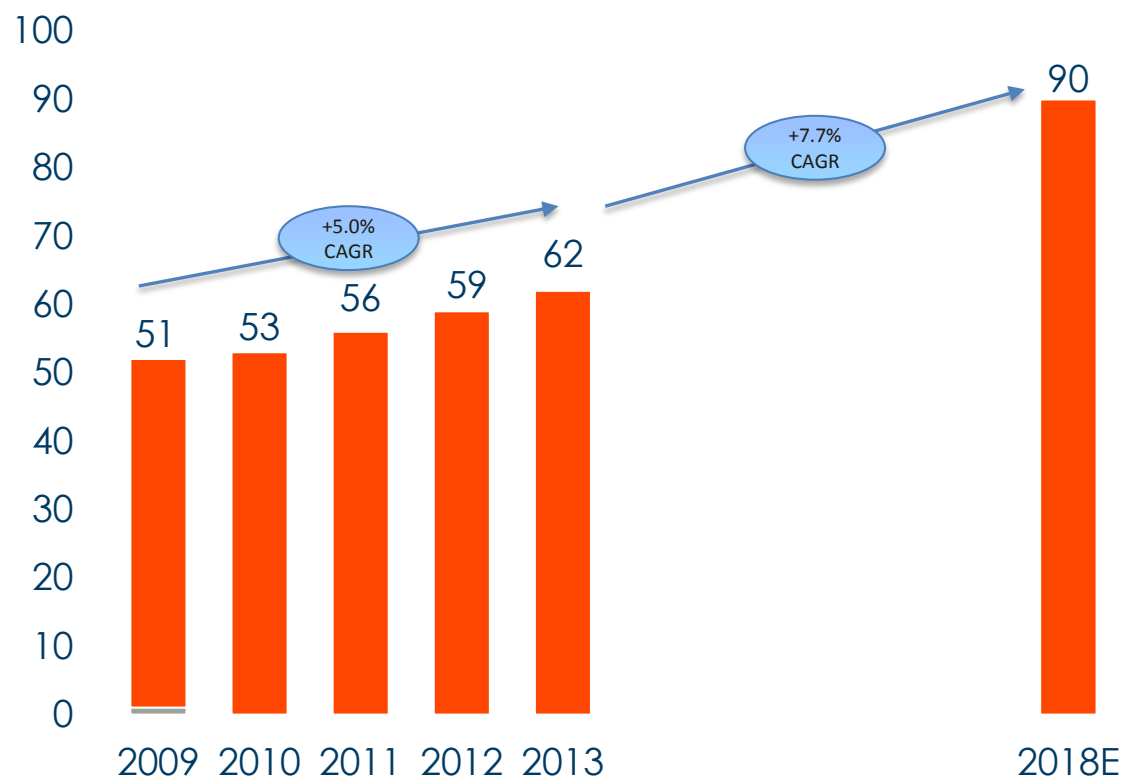


INDUSTRIES WE SERVE:



MARKET FOR HYDROGEN IS GROWING

Million tonnes



- 78% reforming, 18% gasification, 4% electrolysis
- ~1% is from water electrolyzers today
- Cumulative growth within energy segment until 2030: from ~100 MW to 5 GW*

Source: CryoGas International, MarketsandMarkets, Navigant Research. Compiled by Arkwright

*EU-report, 2014: Development of Water Electrolysis in the European Union

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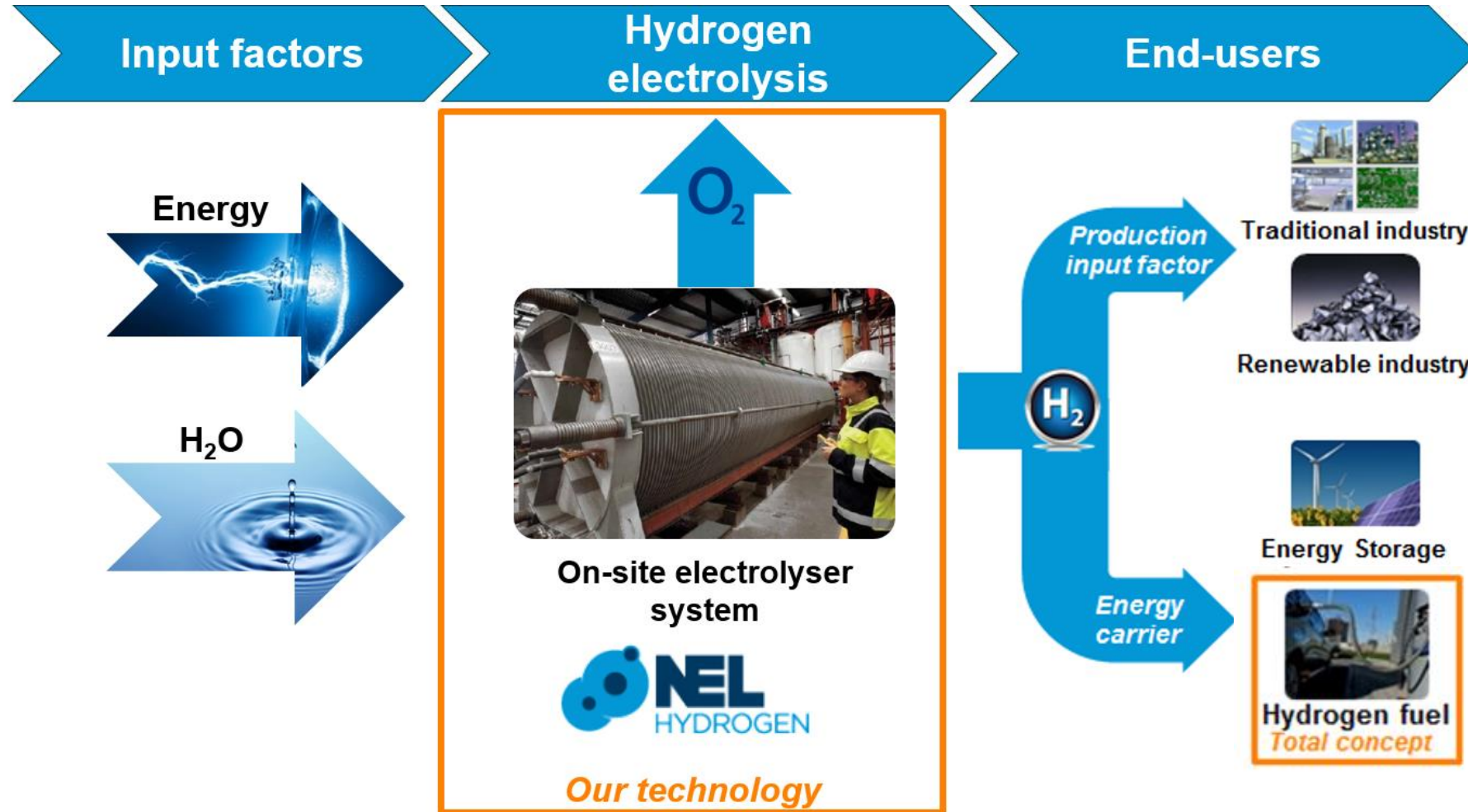
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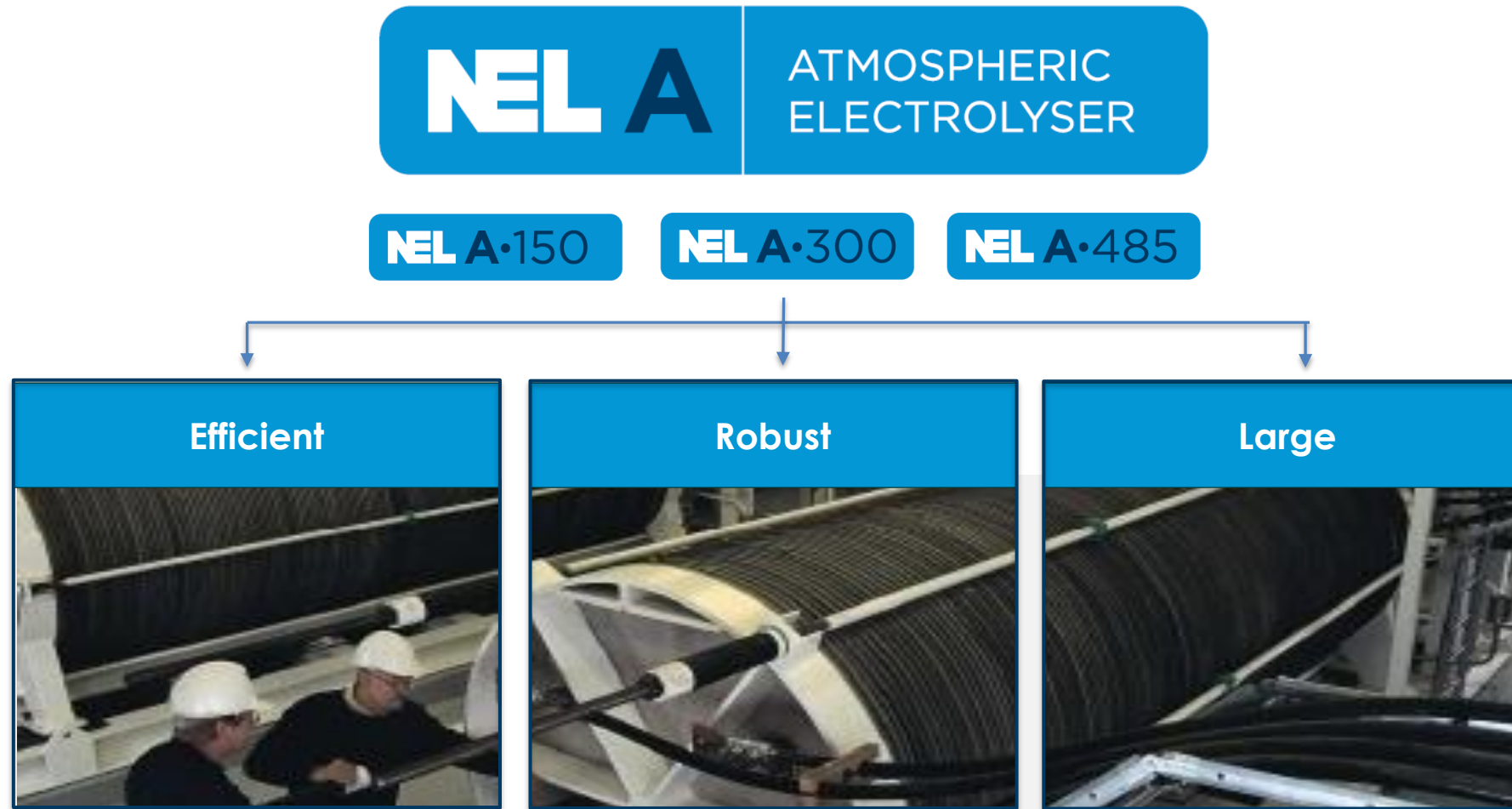
The game changer: Hydrogen as energy carrier

Our value proposition

LOWERING THE CARBON FOOTPRINT



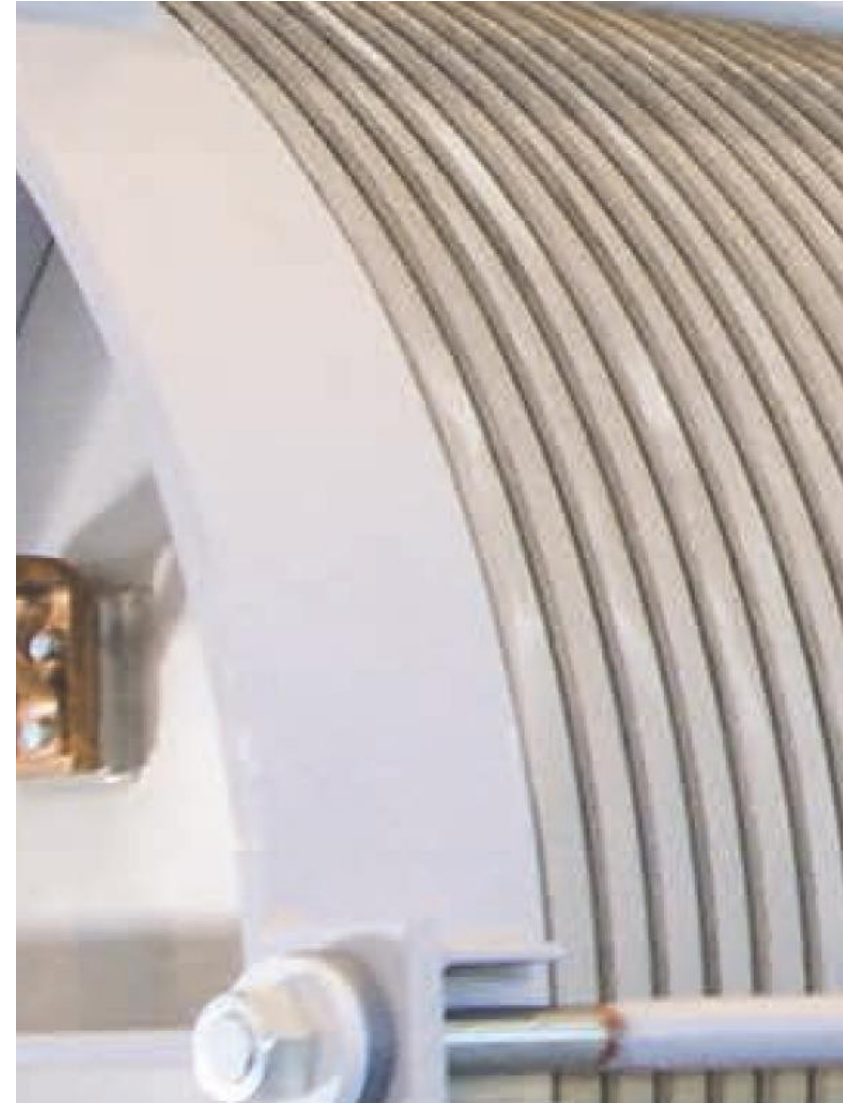
OUR 3 ADVANTAGES



1 EFFICIENT

- NEL has currently the most energy efficient water electrolyser in the market (3 – 15% better than competitors)*
- High efficiency due to design & non-patented active coating

*EU-report, 2014: Development of Water Electrolysis in the European Union



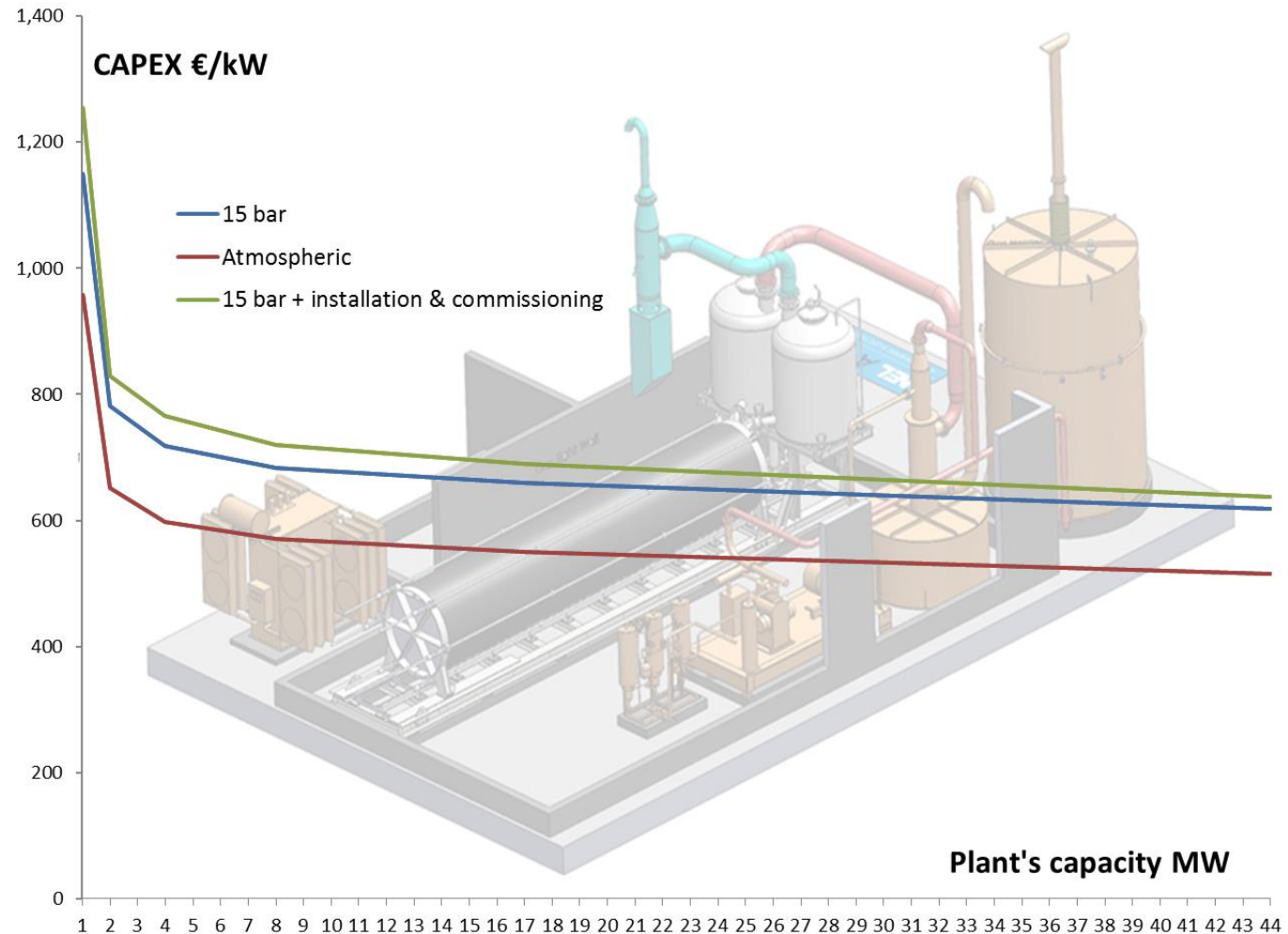
2 ROBUST

- Basis from 87 years of experience
- Uncomplicated and reliable operation
- Low need for maintenance shutdowns
- Cell stack replacement after 7 years, system lifetime 30+ years

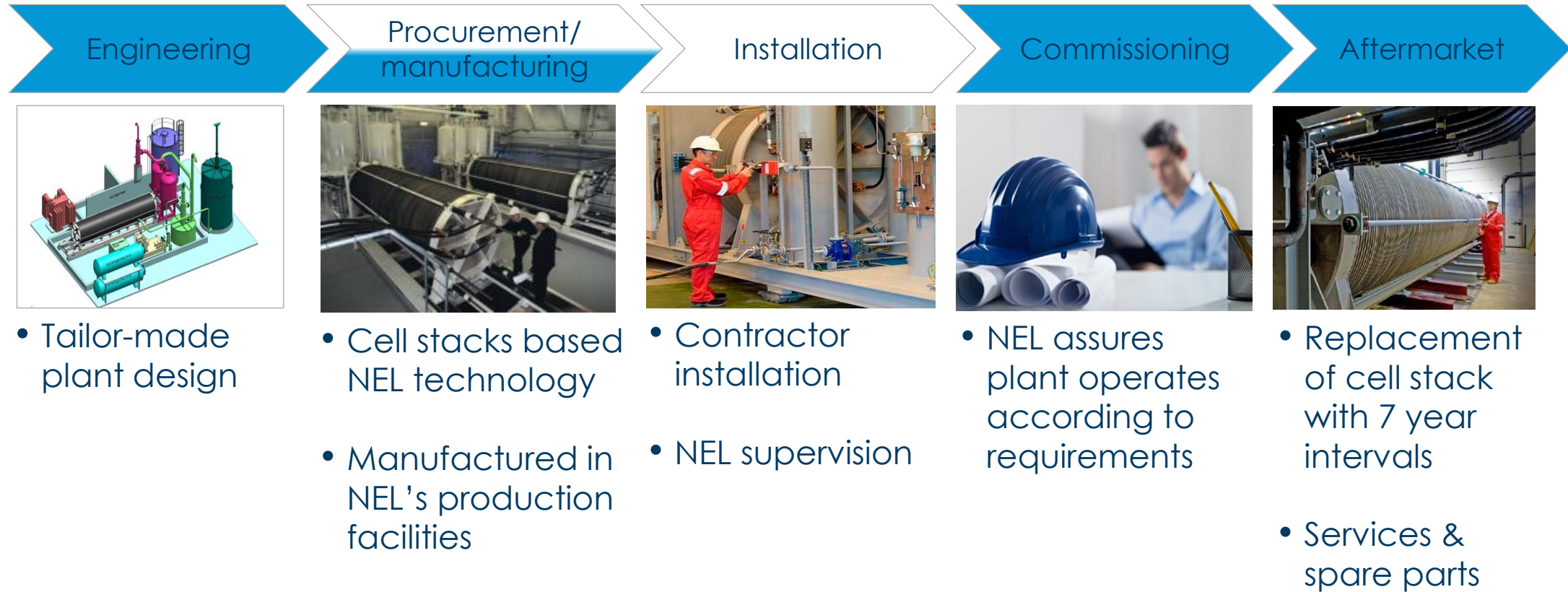


3 LARGE - SUPERIOR SCALABILITY

- By increasing plant size from 250kW to 2,5MW, capex for production capacity reduced by >60%.



HOW WE SERVE TODAY'S INDUSTRY MARKET



 In-house  Outsourced/partners

NEW PRODUCT FOR NEW MARKETS

Pressurized electrolyser

Pilot stage



- Pressurized electrolyser – currently developed at 60 Nm³/h
- Increasing market share & entering new markets
- Higher operation flexibility and smaller footprint



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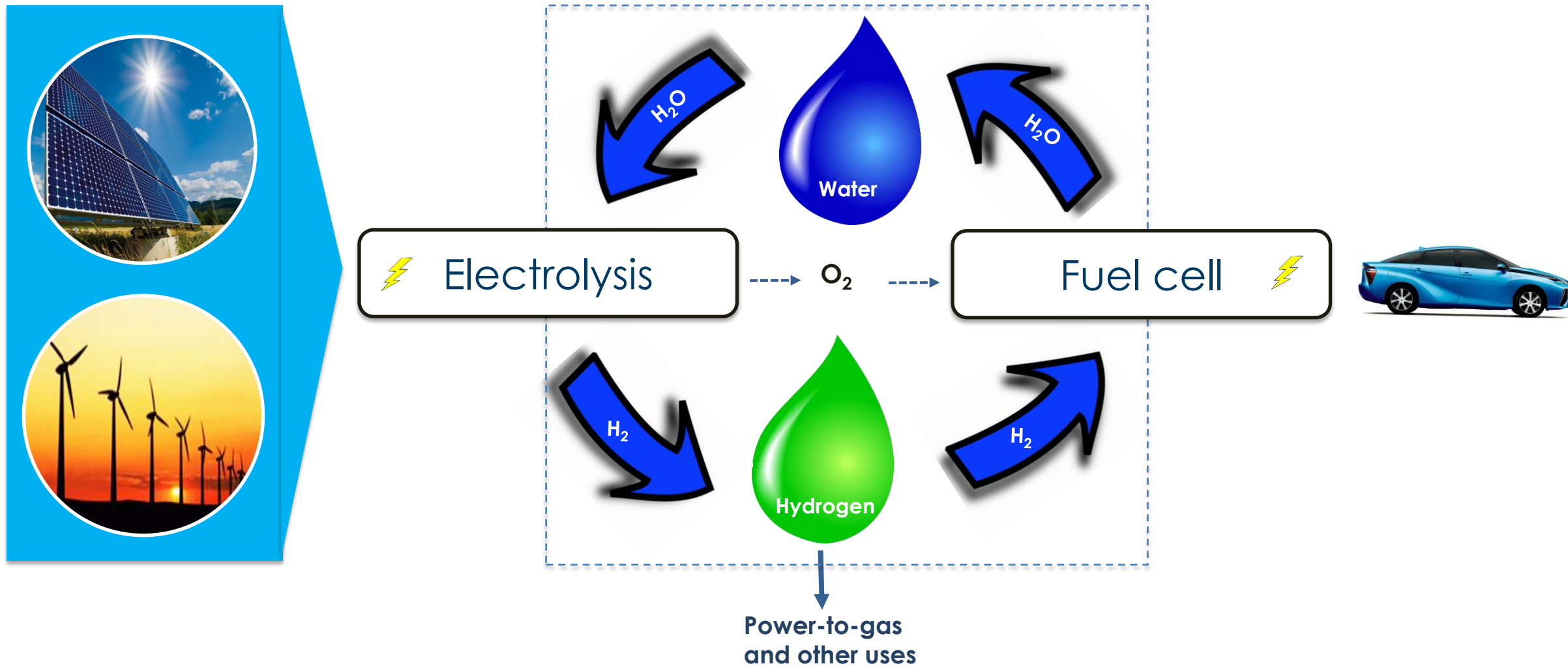
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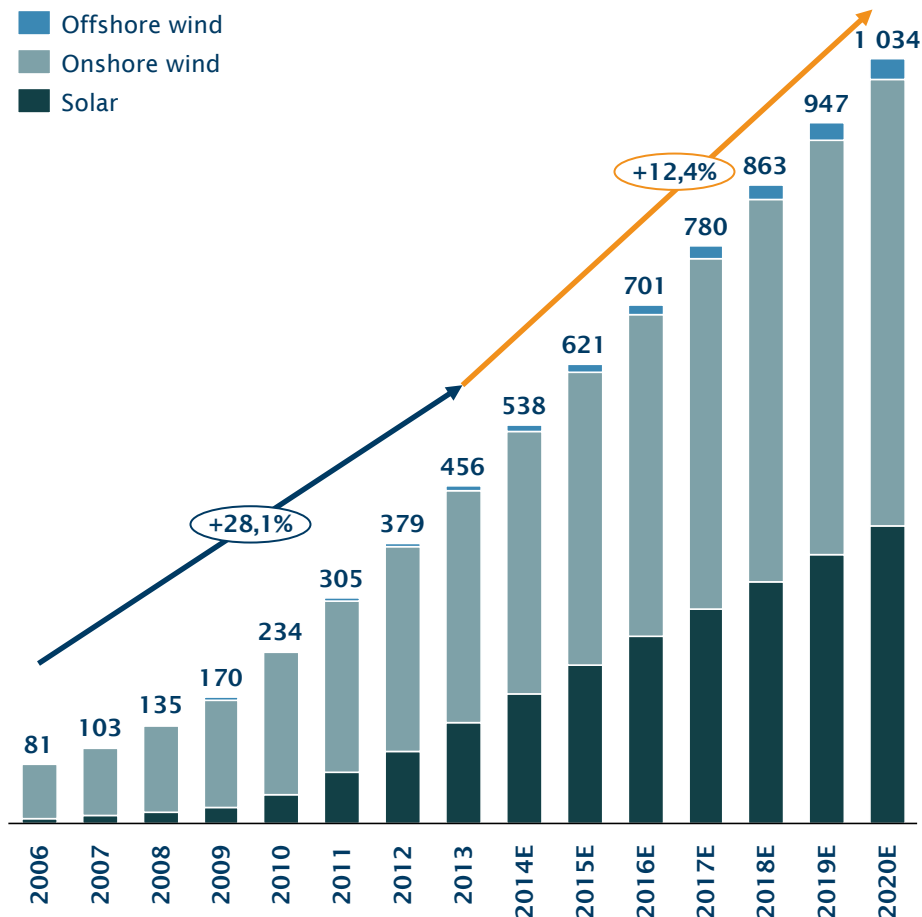
Our value proposition

HYDROGEN AS AN ENERGY CARRIER



GROWTH IN RENEWABLE ENERGY

Electricity generation from wind/solar (GW)



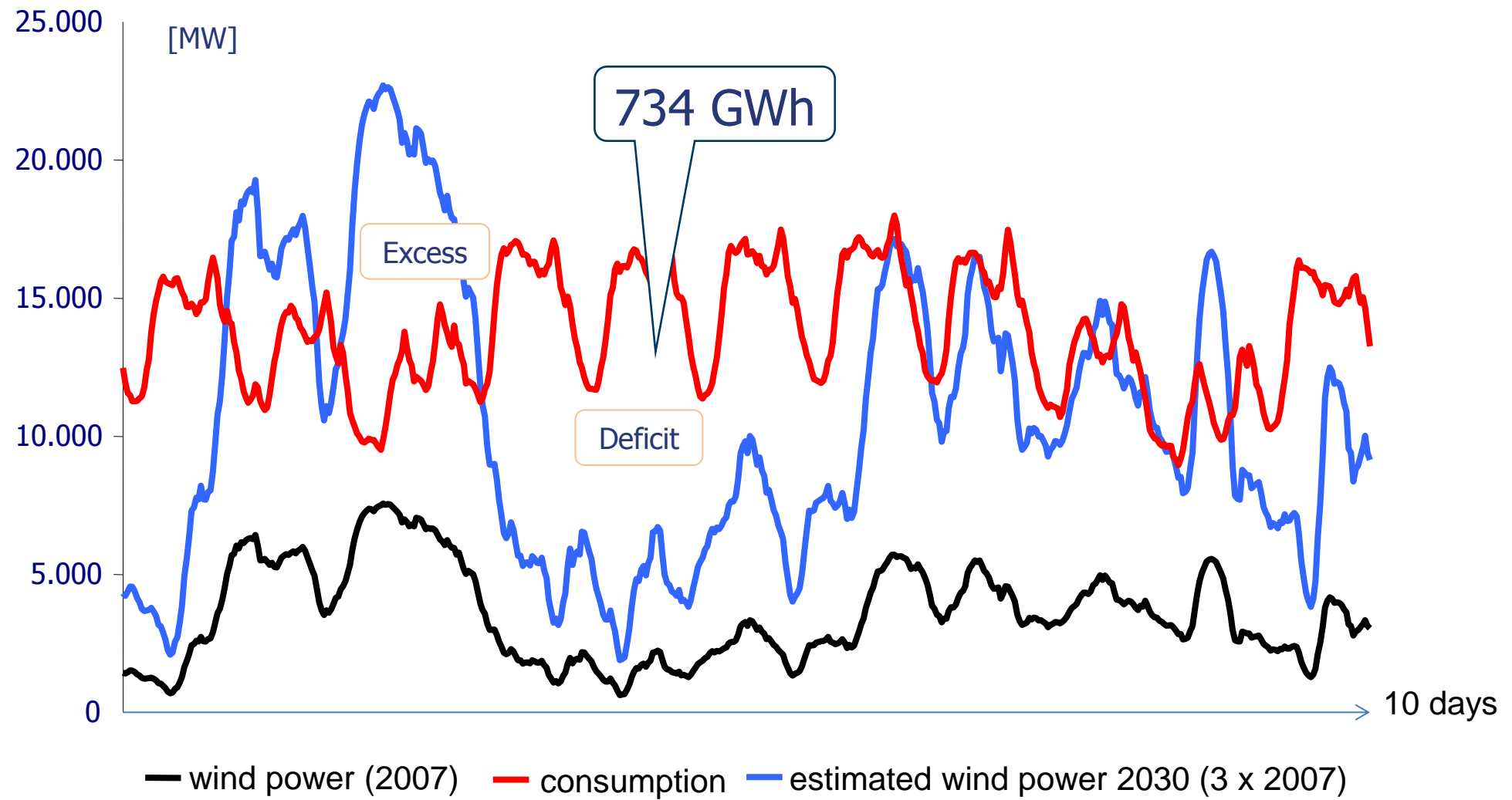
- 40% of renewable electricity in 2020 from wind and solar (27% in 2013; EIA)
- Cost competitive with conventional electricity generation in many locations
- Main driver for energy storage
 - Several energy storage projects initiated world wide

Source: EIA – “Medium-Term Renewable Energy Market Report 2014”

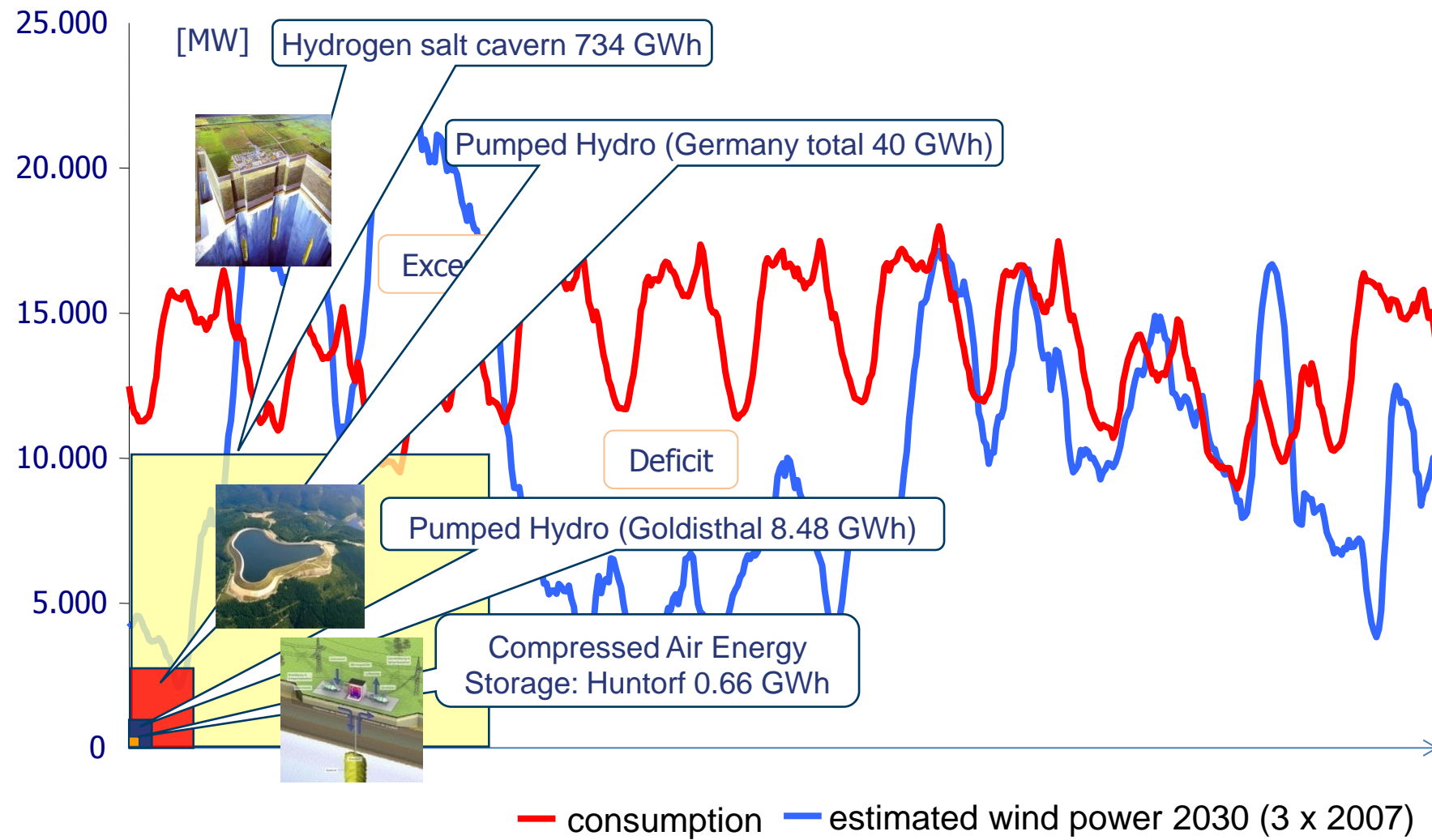
THE CHALLENGE OF RENEWABLES



INTERMITTANCY



HOW TO STORE 734 GWh?



734 GWh STORED IN BEVs



8,600,000 Tesla Model S P85



30,500,000 Nissan Leaf

734 GWh STORED IN BEVs (50% DISCHARGE)

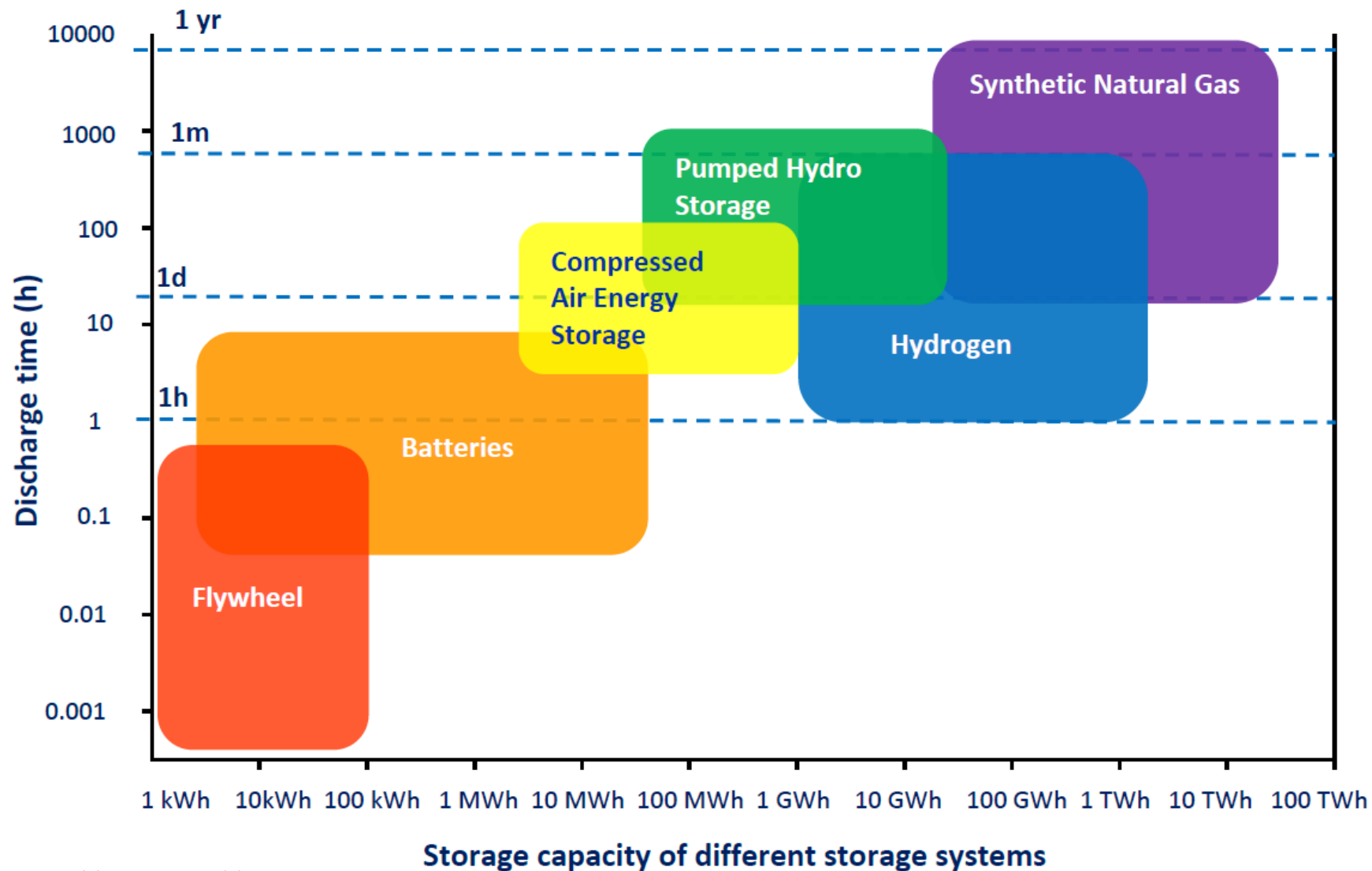


17,200,000 Tesla Model S P85

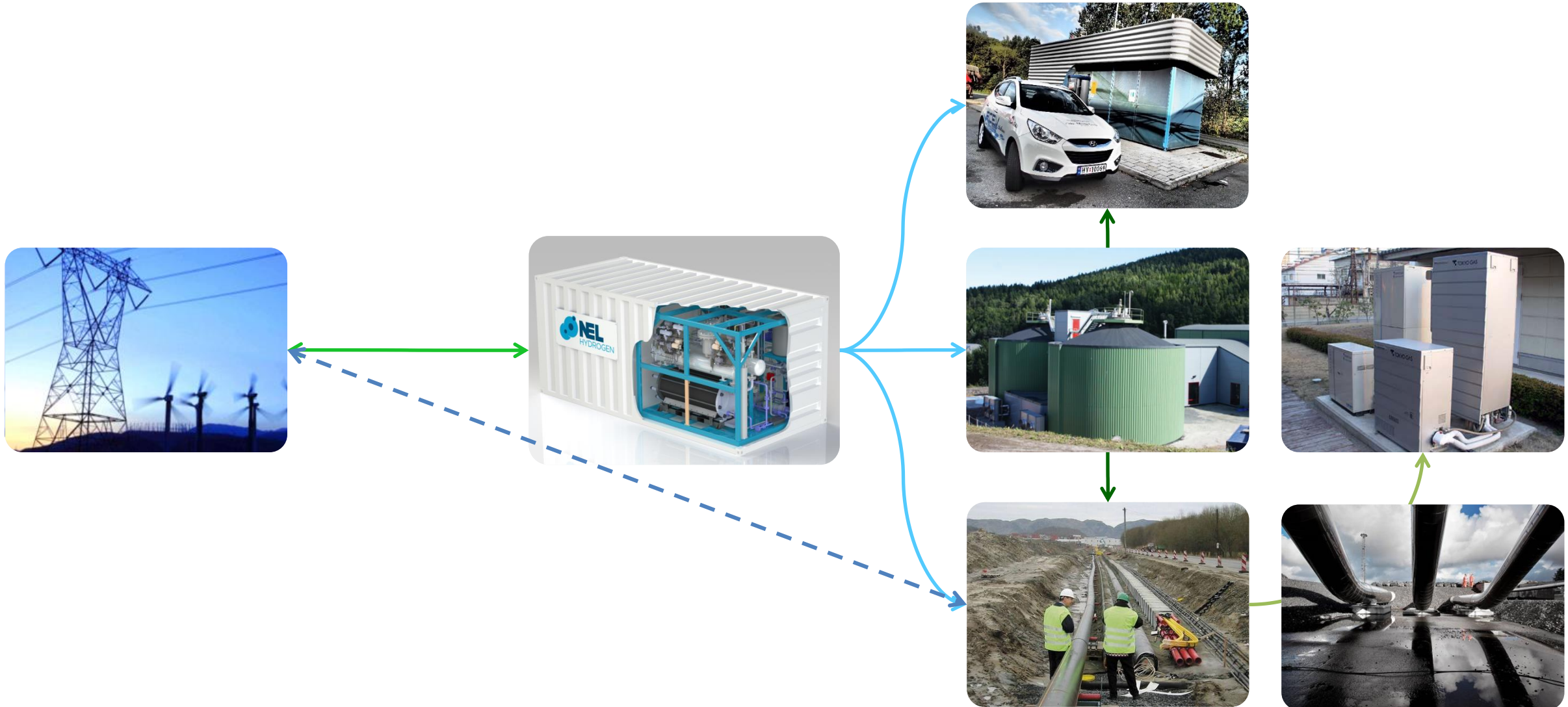


61,000,000 Nissan Leaf

ENERGY STORAGE OPTIONS



POWER... TO GAS



POWER-TO-GAS, MAIN CONSIDERATIONS:

- ELECTRICITY PRICE
- GRID BALANCING SERVICES
- HYDROGEN
 - FOR FUEL
 - INJECTED INTO GAS GRID
- RE-ELECTRIFICATION
- METHANATION
 - TO VEHICLES
 - INJECTED INTO GAS GRID
- HEAT FOR CENTRAL HEATING GRID



Source: <http://www.powertogas.info/power-to-gas/interaktive-projektkarte.html>

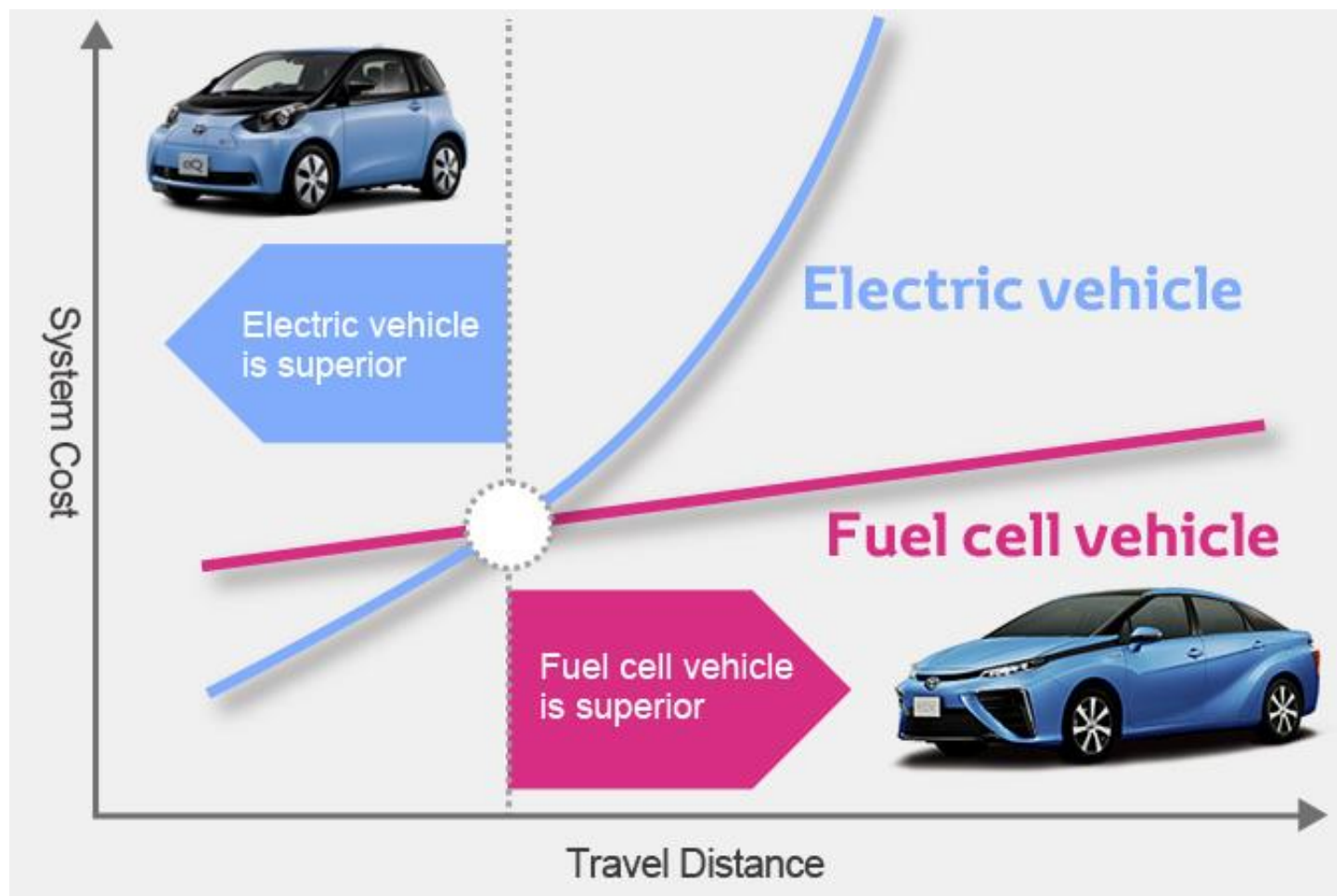
THE FUEL OF THE FUTURE, AVAILABLE TODAY



DO WE NEED HYDROGEN VEHICLES?

50% OF
VEHICLES

25% OF
EMISSIONS



50% OF
VEHICLES

75% OF
EMISSIONS

Source: Toyota Motor Corporation & Report: A portfolio of Powertrains for Europe











... "THEY ARE JUST LIKE THE CARS OF TODAY"

- FCEV: Fuel Cell **Electric Vehicle**
- Range: 600+ km
 $1 \text{ kg } H_2 = 100 \text{ km}$
- Energy content: 3 x gasoline (weight)
- Conversion efficiency: 60 vs 20% for internal combustion engine
- Refueling time: 3 – 4 minutes
- No limitations on vehicle size
- Low impact on range from cold climate operation
- Noise & emission free (pure water)



"*It's the most important car since the car was invented"*
- James May, Top Gear

FCEV ARE BEING INTRODUCED NOW

	2015	2017	2020+
 HYUNDAI	Pre-production	Introduction	
HONDA	Demonstration	Introduction	
TOYOTA 	Demonstration TOYOTA	Introduction TOYOTA	Introduction 
DAIMLER NISSAN  	Demonstration DAIMLER NISSAN 	Introduction DAIMLER NISSAN 	Potential introduction 
	Demonstration	Potential introduction	
 BALLARD	Demonstration		Potential introduction

TOYOTA OFFICIAL LAUNCH: APRIL 2015

“The need for an alternative to fossil fuel is real. And in time, **hydrogen will be our most sustainable option**. Not only because hydrogen can be produced from renewables like solar and wind but also because the only emission from the tailpipe is water vapor. **So what was once seen as a pipe dream now has more potential than ever.**”

- Toyota Motors, 2014 

WHY HYDROGEN?



IT LEAVES NOTHING BUT WATER
VAPOR FROM THE TAILPIPE.

Source: Toyota



IT CAN BE PRODUCED FROM
RENEWABLE SOURCES LIKE SOLAR
AND WIND.



IT'S SAFE, EFFICIENT AND PRICE
FRIENDLY.

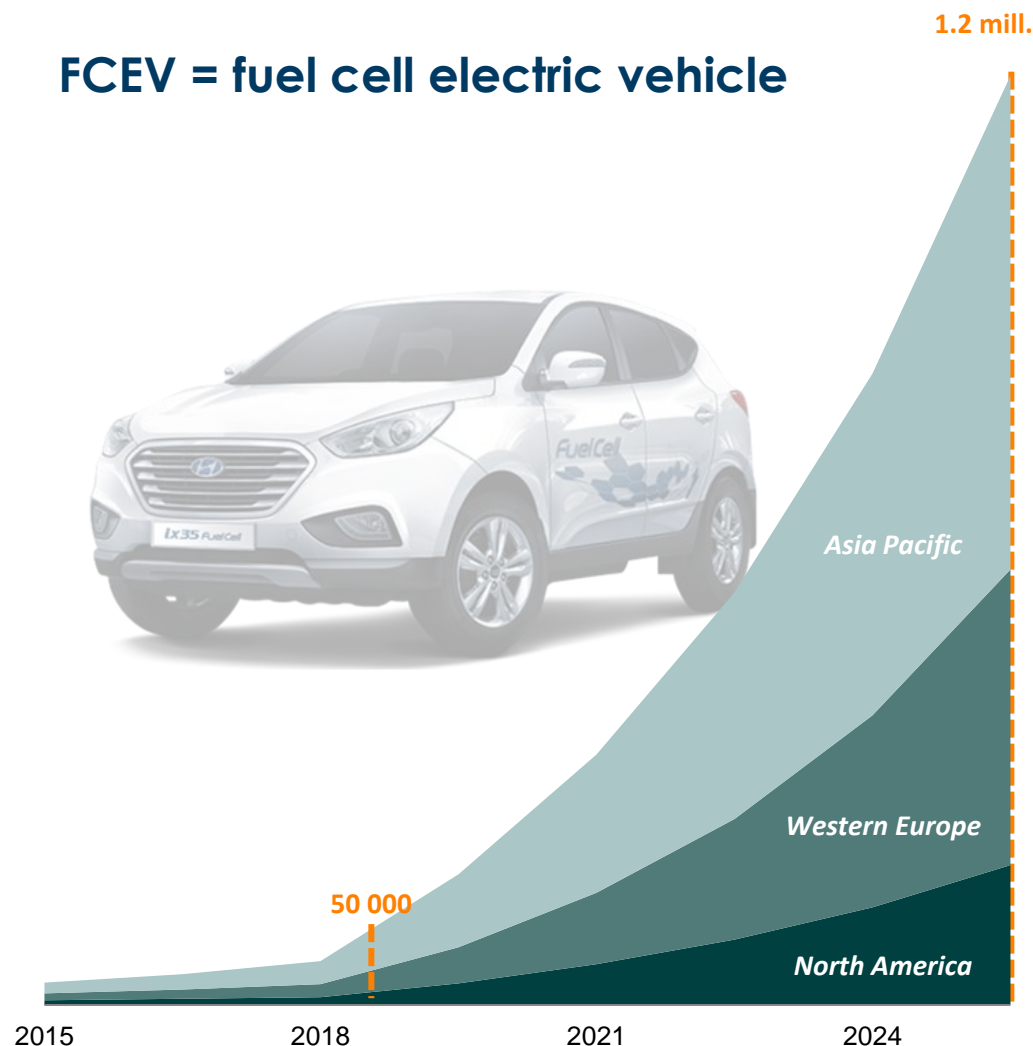


HYDROGEN REFUELING STATIONS

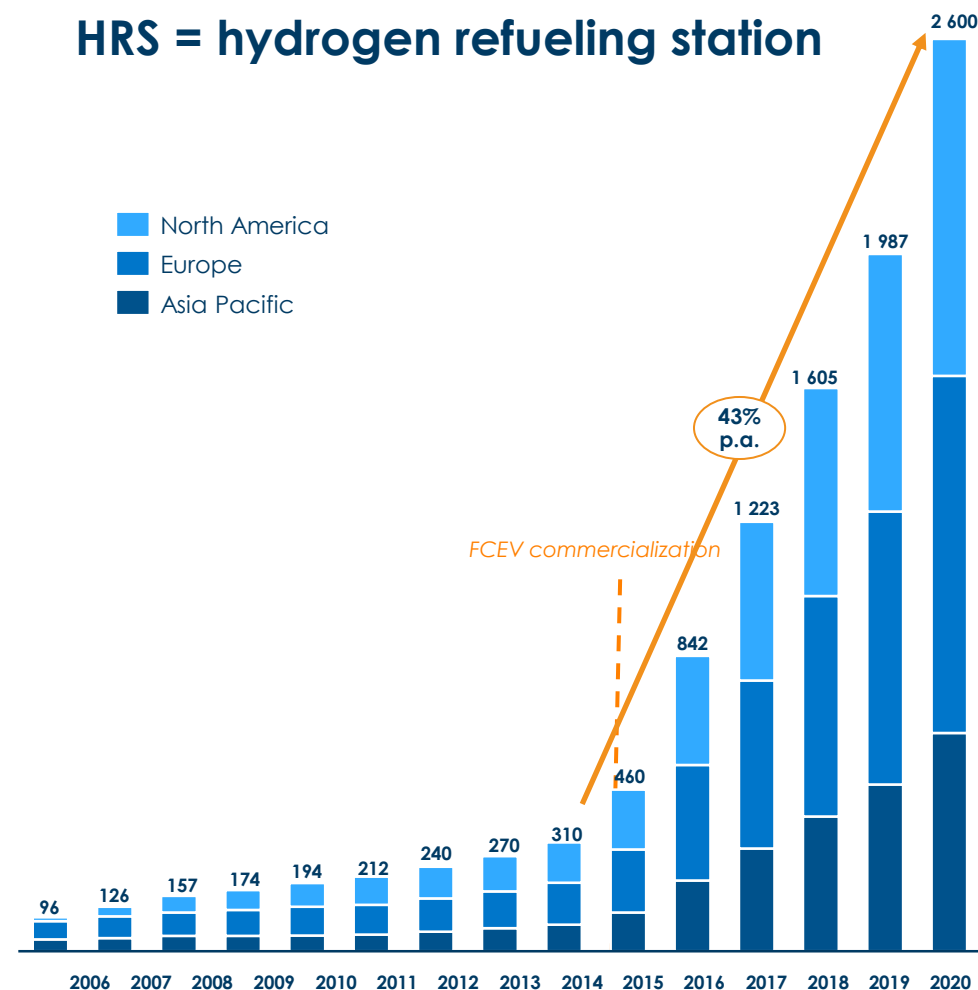


FORECAST OF GROWTH IN FCEVs AND HRS

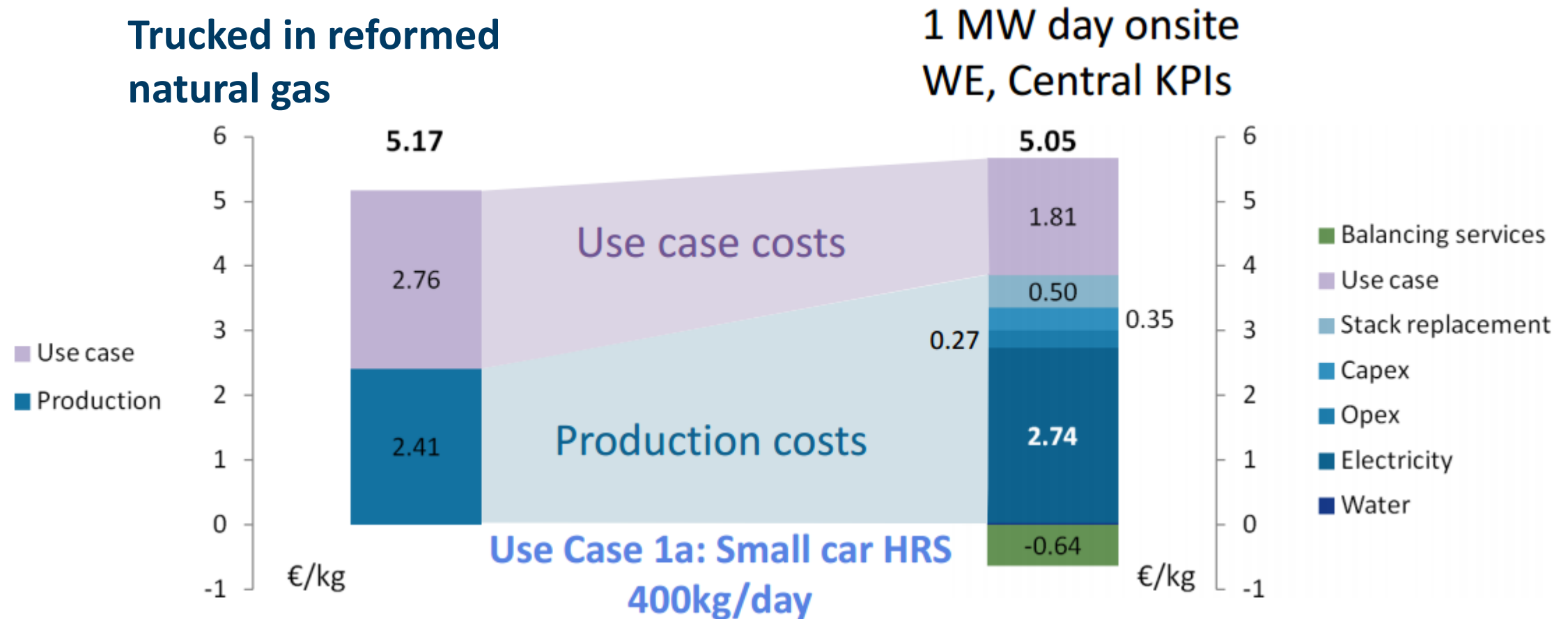
FCEV = fuel cell electric vehicle



HRS = hydrogen refueling station



BUSINESS CASE OF RUNNING A HRS:



- Use case costs include refuelling station costs, compression, storage, and distribution as appropriate – electricity price: ~50 €/MWh

Source: EU-report, 2014: Development of Water Electrolysis in the European Union

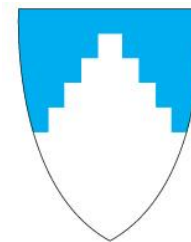
OSLO & AKERSHUS HYDROGEN STRATEGY

Ensuring commercial introduction of hydrogen in the Oslo-region.

- 2014 – 2018: 400 MNOK (high public funding: Oslo/Akershus/Transnova/EU)
- 2019 – 2025: 1000 MNOK (gradually lower public funding)
- EU's hydrogen program: 1.4 B€ until 2020
- Infrastructure going forward: commercial grade HRS:
 - Higher capacity & availability/redundancy
 - Lower CAPEX & OPEX



Oslo kommune



AKERSHUS
fylkeskommune

HRS-EXPERIENCE IN NEL:

NEL HRS DELIVERIES:

- Reykjavík, Iceland
- Hamburg & Berlin, Germany



STATOIL & HYDRO:

- Porsgrunn, Kjellstad & Økern, Norway



HRS-technology from Statoil & Hydro now owned by NEL.

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OUR VALUE PROPOSITION

Unique electrolyser technology



- Non-patented active coating

Superior energy efficiency



- 3 - 15% more efficient than competitors*

Design and scalability



- Flexible design & competitive systems from 500 kW – multi-MW

Quality and reliability



- High regularity & long lifetime

Green technology



- Enables fully zero-emission hydrogen production

Profitable business



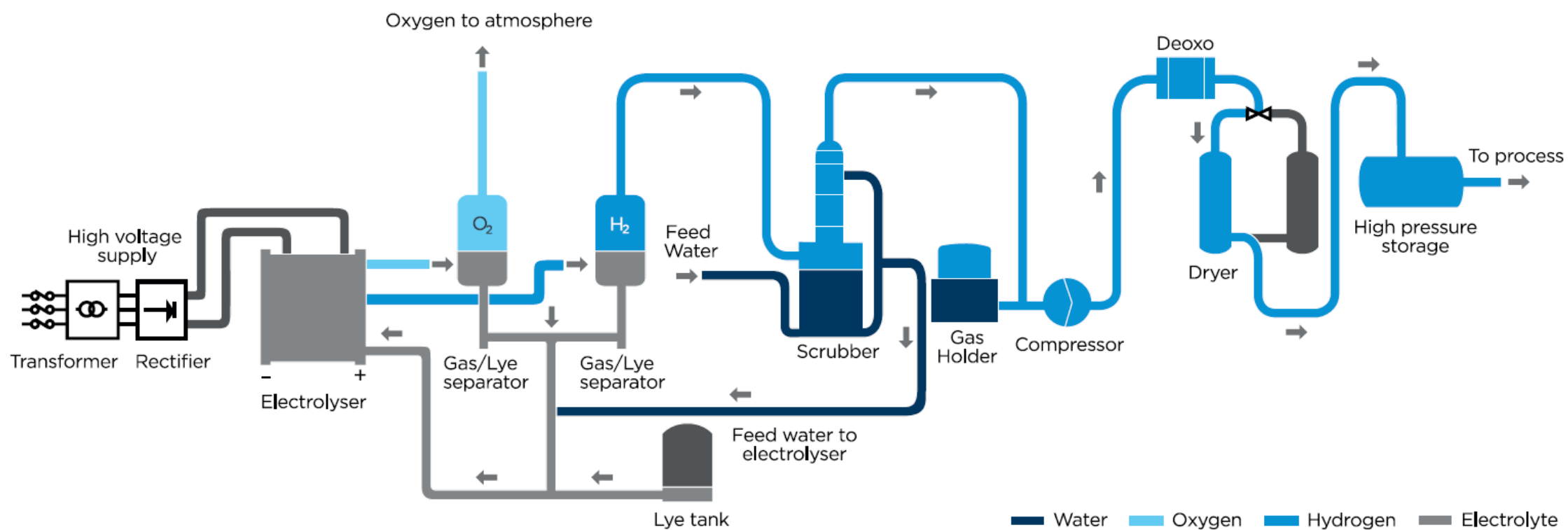
- Positive cash flow from current business

*EU-report, 2014: Development of Water Electrolysis in the European Union

Appendix

WHAT IS “ELECTROLYSIS”?

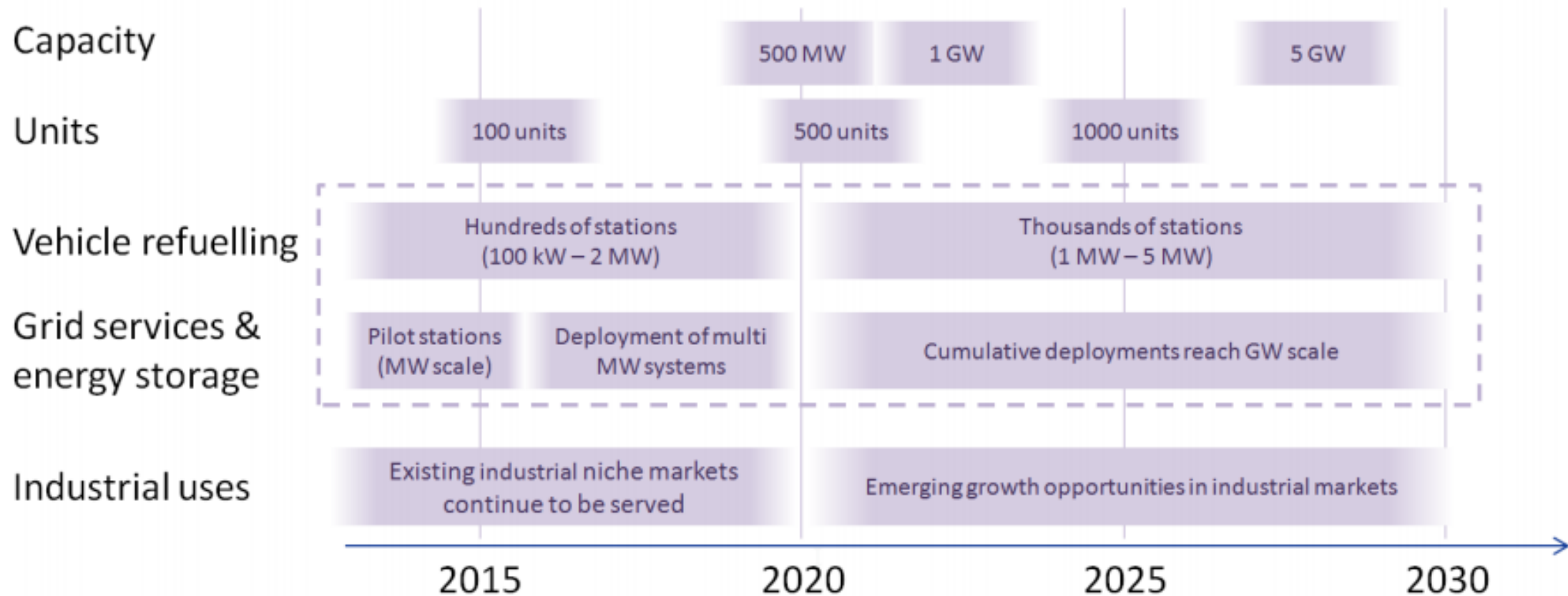
Electrolysis is the process of splitting water into hydrogen and oxygen using an electrical current. The inputs to this process are simply feed water and electrical power. Below a schematic of a typical hydrogen generation plant is seen:



OUR CUSTOMER REFERENCE LIST



MARKET OUTLOOK: WATER ELECTROLYSIS



Source: EU-report, 2014: Development of Water Electrolysis in the European Union

MANAGEMENT & CONTACT DETAILS

Management



Lars Markus Solheim
CEO

- With NEL Hydrogen since 2005
- Long experience from employment in NEL, with previous positions as Lead Automation Engineer and Director Operations
- BSc in System Engineering from Buskerud University College



Erik Evju
Director, Finance

- With NEL Hydrogen since 1994
- Education: Bank, insurance and business administration from Norwegian School of Management (BI)
- Norwegian School of Export



Bjørn Simonsen
Director Market development and public relations

- With NEL Hydrogen from September 2014
- Experience with hydrogen since 2008: Researcher (IFE), followed by key positions in the HyNor-project, The Norwegian Hydrogen Council and Norwegian Hydrogen Forum.
- Education: M.Sc. in Energy and Environmental Engineering (NTNU)



Ole Arnt Lindgren
Director, Production

- With NEL Hydrogen since 2009
- Previous experience include ABB (assembly and logistics mgr) and GPV (production and logistics mgr)
- Education: Spec. In Logistics, Norwegian School of Management (BI)

Contact details

NEL Hydrogen AS

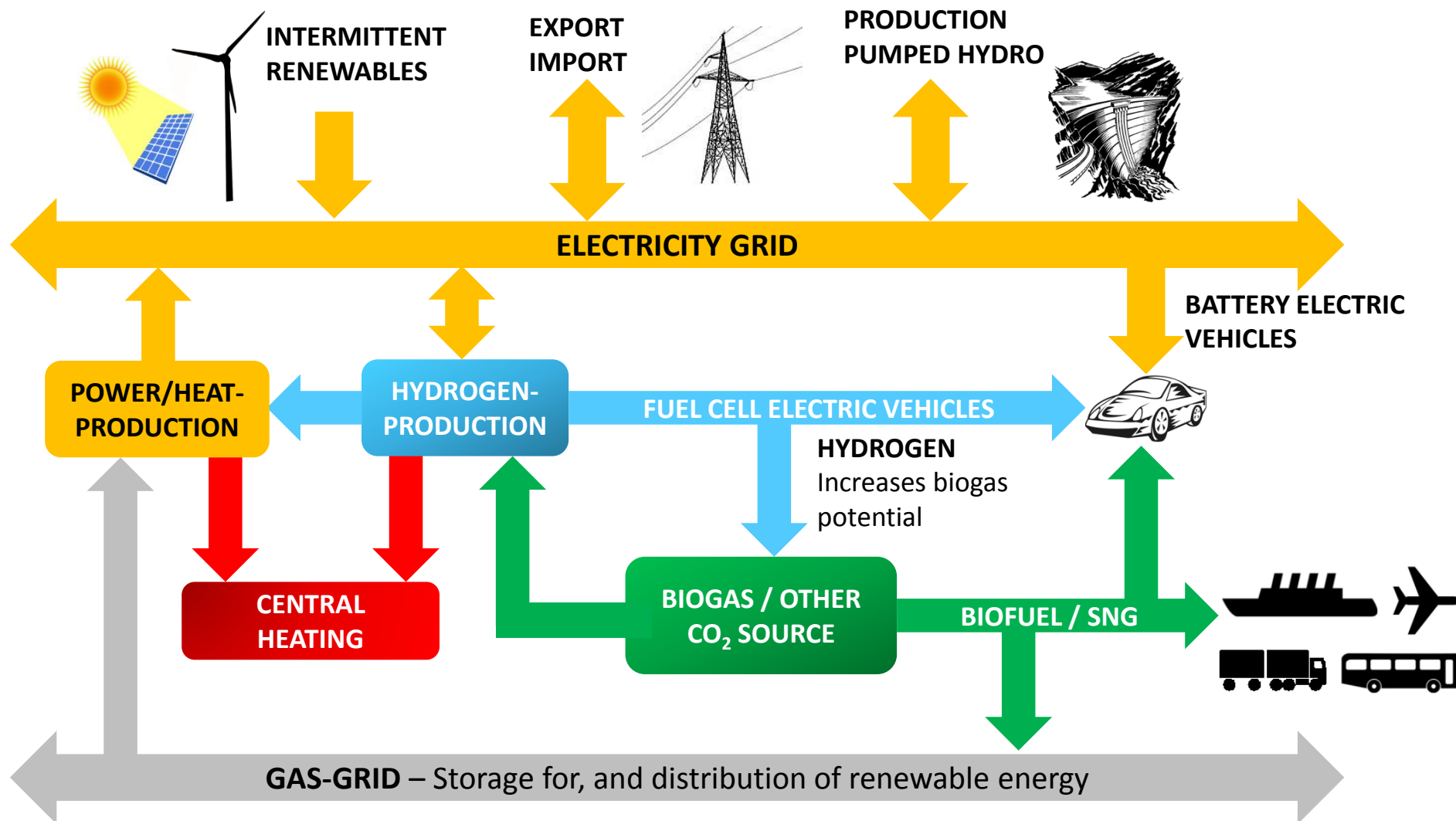
Tel: +47 35 09 38 38

E-mail: info@nel-hydrogen.com

Web: www.nel-hydrogen.com

Address: P.O. Box 24, NO-3671
Notodden, Norway

POWER-TO-GAS (more in-depth)



P2G: EFFICIENT ALTERNATIVE TO BATTERIES

- For large scale energy storage, power-to-gas (P2G) is the most attractive pathway
- P2G in brief: conversion of electricity to gas
- Electrolysers are the key component of P2G-systems
- NEL Hydrogen is well positioned to be part of this growth
 - Superior large-scale supplier ($> 120 \text{ Nm}^3/\text{h}$)
 - Experienced and reliable supplier



NEL A - TECHNICAL SPECIFICATIONS

NEL A-150
NEL A-300
NEL A-485

Capacity / Nominal Flow Rate

Capacity range (Nm ³ H ₂ /hr) per unit	50 - 150	151 - 300	301 - 485
Production capacity dynamic range	20 - 100% of nominal flow rate		

Energy (electrolyser cell stack)

Typical power consumption (kWh/Nm ³ H ₂)	3.8 - 4.4
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Purity (measured on dry basis)

H ₂ purity (%)	99.9 ± 0.1
O ₂ purity (%)	99.5 ± 0.2
After purification⁽¹⁾	
O ₂ -content	< 2 ppm v
H ₂ O-content	< 2 ppm v

Pressure

H ₂ outlet pressure after electrolyser	200 - 400 mm WG
H ₂ outlet pressure after compressor ⁽²⁾	Max 250 bar g

Operation

Operating temperature	80°C
Electrolyte	25% KOH aqueous solution
Feed water consumption	0.9 litre / Nm ³ H ₂

CASE STUDY(1): ILLOVO SUGAR SA Ltd

COMPANY	Illovo Sugar SA Ltd
COUNTRY	South Africa
PRODUCT	NEL A•485
CAPACITY	360 Nm ³ /hour
APPLICATION	Refined Sugar
INSTALLED	1983



"The original electrolyser is still in operation today and is extremely reliable. It runs at full capacity 24 hours a day. No significant maintenance is required"

Alastair Warman
Engineering Manager
Illovo Sugar Ltd



CASE STUDY (2)

GUARDIAN – EGYPTIAN GLASS CO.

COMPANY	Guardian – Egyptian Glass Company
COUNTRY	Egypt
PRODUCT	NEL A•150
CAPACITY	120 Nm ³ /hour
APPLICATION	Float Glass
INSTALLED	1998



“Since the start-up of the plant in May 1998, we have enjoyed a stable production with high gas purity, without any problems whatsoever”

Ihab Ishak
Utility Manager
Egyptian Glass Co.



CASE STUDY (3)

INDUSTRIAS DE ACEITE FINO S.A.

COMPANY	Industria de Aceite FINO S.A.
COUNTRY	Bolivia
PRODUCT	NEL A•300
CAPACITY	300 Nm ³ /hour
APPLICATION	Edible Oils & Fats
INSTALLED	2012



"The refurbished electrolyser works perfect for us. It is very easy and safe in operation. In addition we have made significant savings in our energy costs with this electrolyser."

Cesar Campoverde
Production Manager
Industrias de Aceite Fino

The logo for FINO, featuring the word "FINO" in a bold, green, serif font. Below the text is a green swoosh that starts under the 'F' and curves under the 'O'.

CASE STUDY (4)

HYDROGEN FOR POLYSILICON INDUSTRY

CUSTOMER	Tokuyama Corporation
COUNTRY	Malaysia
PRODUCT	11 x NEL A•485
CAPACITY	5500 Nm ³ /hour
APPLICATION	Polysilicon (20,000 tonnes/yr)
INSTALLED	2013 - 2014
ORDER VALUE	160 MNOK

Even though large resources of natural gas is available nearby the plant, electrolysis based hydrogen was chosen due to its superior purity, alongside with good access to local, renewable electricity.



TOKUYAMA 

The Tokuyama logo, consisting of the word "TOKUYAMA" in bold black capital letters, followed by a stylized blue and red circular icon.