

15th of March 2022

**Closing Conference H2-Share
Wystrach (Weeze, Germany)**

Welcome!

10.00 - 10.05h:

Rebecca Grossberg

Interreg NWE

Welcome & introduction

H2SHARE

Closing conference

Weeze, Germany
15 March 2022

Rebecca Grossberg
Joint Secretariat
Interreg North-West Europe



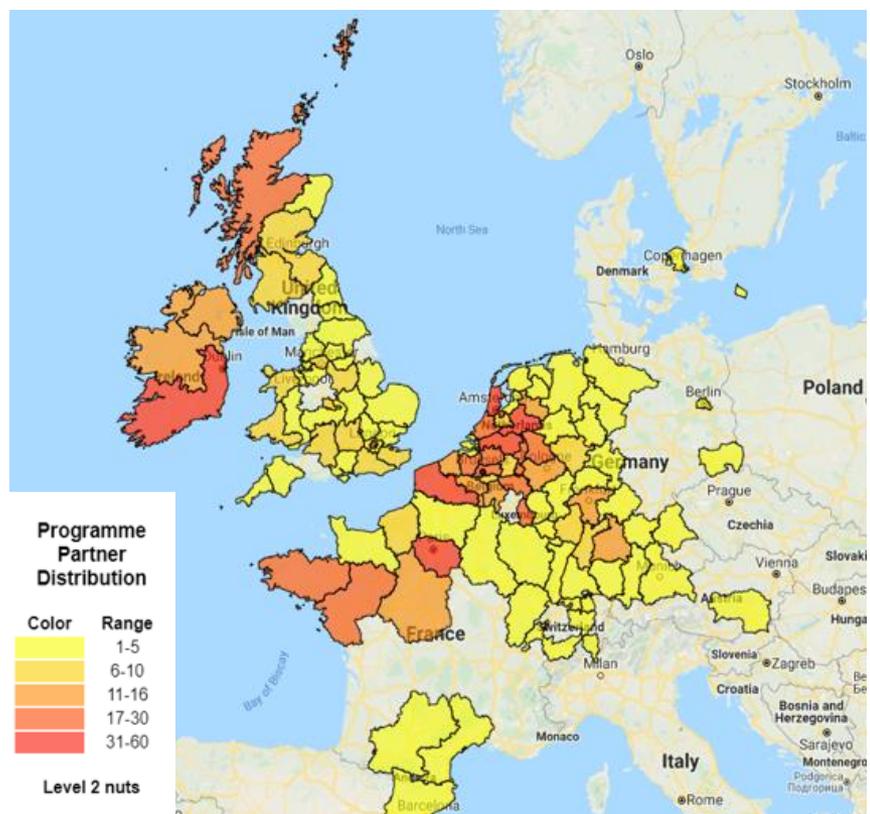
The NWE Programme

2014 - 2020

102 financed projects

1078 project partners

€376M ERDF allocated



Overview of NWE projects in the hydrogen field

4 projects implementing low carbon solutions in transportation

- **H2SHIPS** – hydrogen fuelled water transport
- **H2-SHARE**- hydrogen heavy-duty vehicles
- **FCCP** – fuel cell cargo pedelecs
- **HECTOR**- hydrogen waste collection vehicles

2 projects facilitating uptake of low carbon technologies

- **ITEG** - hydrogen storage from tidal energy
- **GenComm** - smart hydrogen-based energy matrixes

Results of cooperation



€49.3 Million:
Total ERDF committed to
hydrogen 2014-2020
(13% of programme budget)

Market influence through cooperation

“Joint call for the deployment of hydrogen fuel cell trucks” March 2020

- *To make large-scale deployments of fuel cell trucks a reality soon, with pre-commercial series ready by 2025 (5000-10 000 vehicles) and full commercialisation by 2030 (95 000 vehicles).*
- *To deliver low-carbon, renewable hydrogen at a competitive cost at the nozzle.*



NWE making an impact!

Expected results by 2023



3,936

Enterprises supported



133 253

TONS OF CO2

Estimated annual decrease of GHG emissions



959

Jobs created

Interreg North-West Europe 2021-2027

The new programme will focus on *“promoting a green, smart and just transition for all NWE territories with the aim to support a balanced development and make all regions more resilient”*.

The NWE Programme

2021-2027

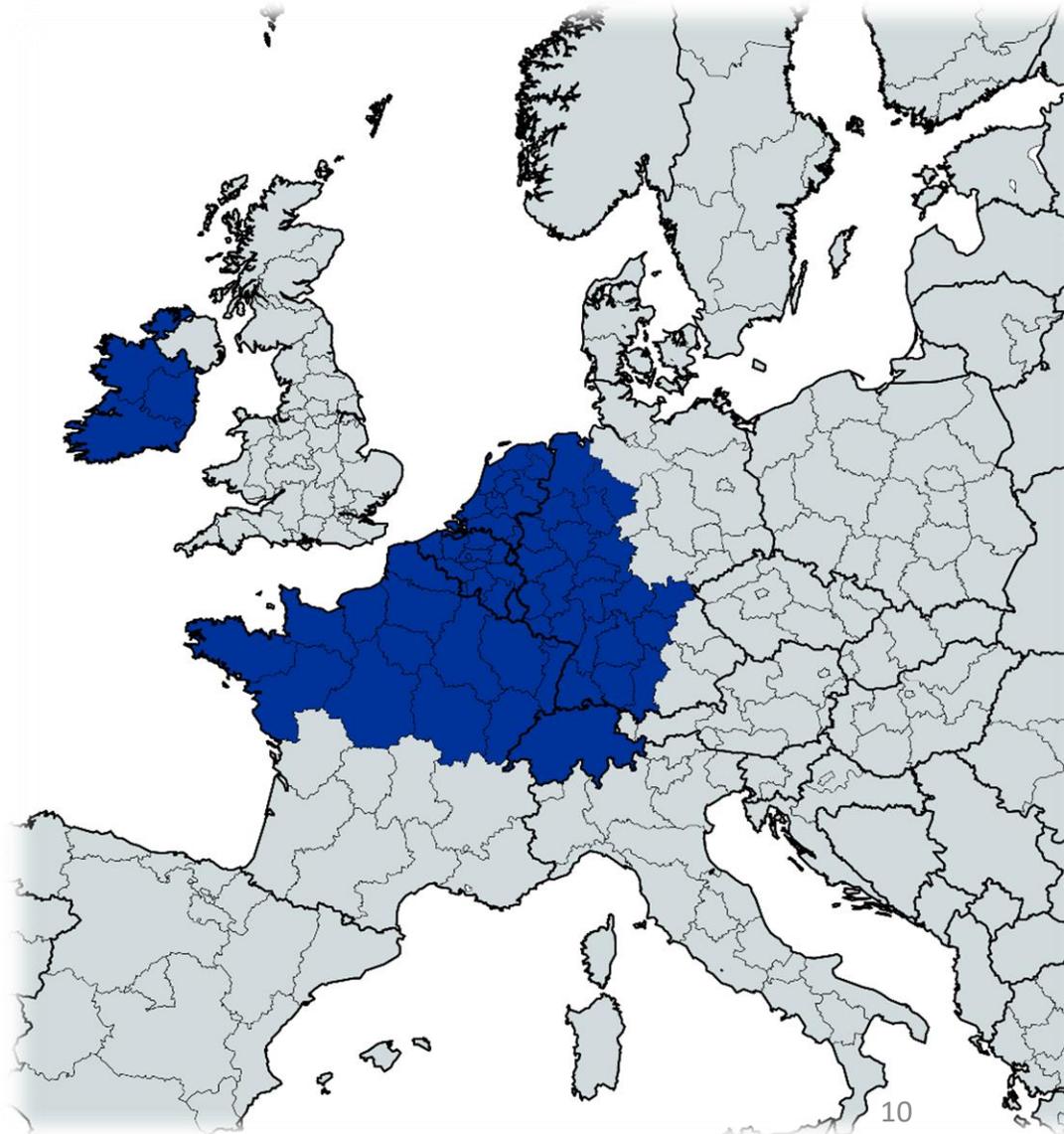
7 countries

Transnational cooperation:
Projects need at least 3
countries, of which 2 are from
the NWE area

Overall budget:
€703 million

EU contribution:
€400 million (60%)

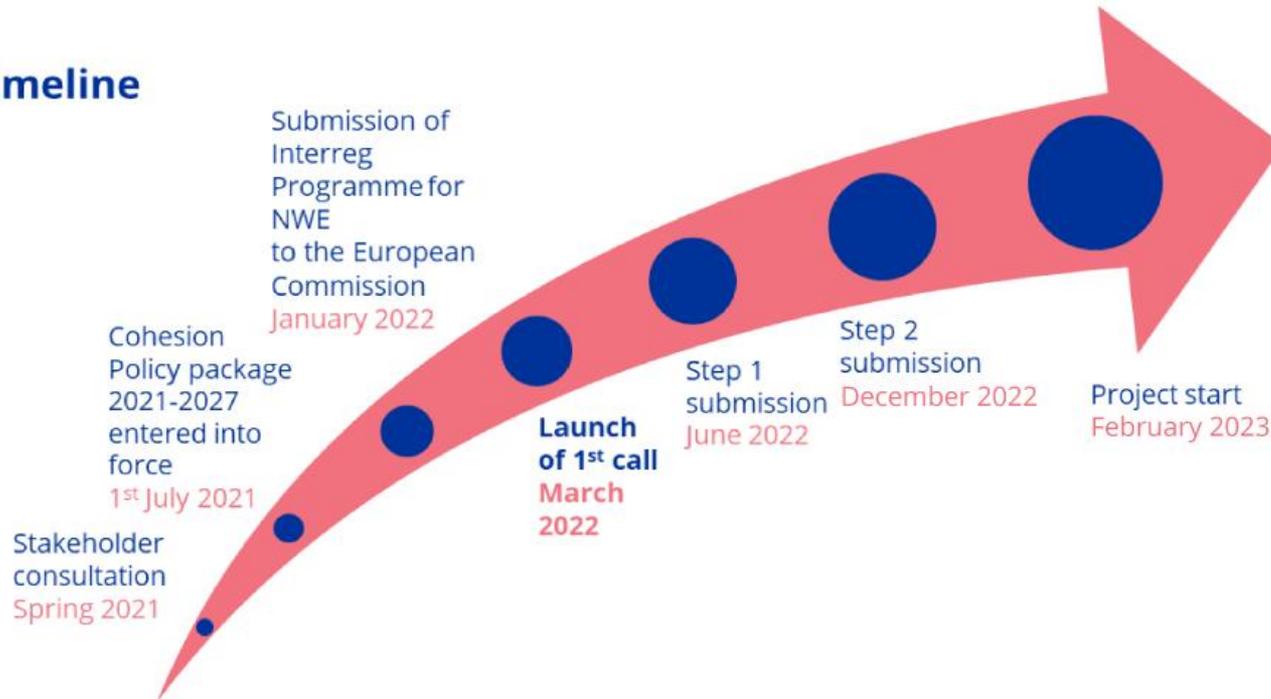
*(40% co-funding required at
project level.)*



The NWE Programme 2021-2027

Process & indicative timeline

Next steps



Thematic focus

2021-2027

Priority 1

Climate and Environment

SO 2.7

Enhancing nature protection, biodiversity and reducing all forms of pollution

SO 2.4

Promoting climate change adaptation and disaster risk prevention resilience

Priority 2

Energy Transition

SO 2.1

Promoting energy efficiency and reducing greenhouse gas emissions

SO 2.2

Promoting renewable energy

Priority 3

Circular Economy

SO 2.6

Promoting the transition to a circular and resource efficient economy

Thematic focus

2021-2027

Priority 4 Innovation and resilience

SO 1.1

Developing and enhancing research and innovation capacities and the uptake of advanced technologies

Priority 5 Inclusive society

SO 4.1

Enhancing the effectiveness and inclusiveness of labour markets and access to quality employment through developing social infrastructure and promoting social economy

SO 4.5

Ensuring equal access to healthcare through developing infrastructure, including primary care, and promoting the transition from institutional to family and community-based care

SO 4.6

Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation

Factsheets

Available here for every SO: <https://www.nweurope.eu/future-nwe-programme/call-1-support-documents/>

Example

Objectives

Within this Specific Objective, the Programme aims

- Develop green/blue infrastructure to ensure ecosystems and prevent the loss of biodiversity
- Embed in strategic ecosystem-based approach corridors, biodiversity, and natural capital.
- Show the benefits of sound green/blue infrastructure effects e.g., heat stress.
- Reduce the incidence of human activities on air

Target groups

- **Local/regional/national authorities, government organisations**, (including agencies or para-public relating to rivers, environment, natural protection, biodiversity protection and green/blue infrastructure more resilient regions.
- **Universities, public research centres, private education, training centres** are highly relevant

Activities

Projects should implement a combination of activities, such as:

- **Elaboration and implementation of joint strategies and/or action plans**, for example, nature management plans for measuring, maintaining, enhancing, and valorising green/blue infrastructure, ecosystem services, biodiversity (e.g., invasive species); or adaptation and mitigation measures at local or regional level with the aim to reduce heat stress and air pollution in the NWE area.
- **Pilot actions for testing tools and/or solutions**, for example demonstration and joint implementation of scalable and replicable solutions to embed green infrastructure and ecosystem-based approach in relevant strategies and measures; or of innovative measures to reduce heat stress by enhancing and installing green and blue infrastructure for adaptation.
- **Capacity building and awareness raising activities** in the field of innovation for resilience, for example, training schemes related to biodiversity, promoting its management, or planning and implementation of environmental protection and nature-based solutions, green / blue infrastructure, etc.

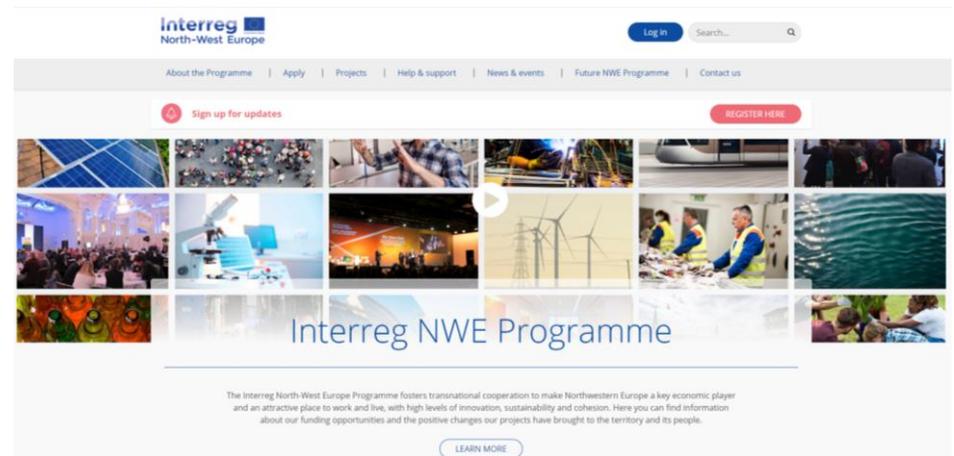
Results

The **combination of these activities** may lead to results such as:

- Key aspects of biodiversity preservation, green/blue infrastructure or heat stress and air pollution better embedded into territorial strategies and local initiatives.
- Increased knowledge and capacity of stakeholders about green/blue infrastructure and biodiversity-enhancing / nature-friendly practices.
- Innovative technologies, solutions, products, and services taken up aiming to prevent or reduce heat stress and air pollution, ensuring coherence between the proposed approaches and local/regional needs.

“Interreg NWE is funding frontrunner in heavy duty on hydrogen !!” – Adwin Martens, January 2019





Thank you!

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<https://www.nweurope.eu>
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@INTERREG_NWE



Interreg North-West Europe
(NWE)



INTERREGNWE

10.05 - 10.20h:
Mathieu Wuyts

WaterstofNet

H2-Share project

**Hydrogen
Solutions for
Heavy-duty transport
Aimed at
Reduction of
Emissions
in North-West Europe**

H2-Share



Mathieu Wuyts
Project manager H2-Share

Closing conference

Demonstration project



Total budget: € 3.52 M

EU funding: € 1.69 M (Interreg North West Europe)

Cofunding: Provinces of North-Brabant & Antwerp

Timeline: March 2017 – May 2022
(originally until March 2020)

Coordinator: WaterstofNet

Partners



Partners



Associated partners



Subpartners



(Co)funding



Objectives

Programme (Interreg NWE) objective

To facilitate the implementation of transnational low-carbon solutions in transport systems to reduce GHG emissions in NWE.

Project objective

The objective of H2-Share is to facilitate the development of a market for low-carbon heavy-duty vehicles on hydrogen for logistic applications and gain practical experience in different regions in NWE creating a transnational living lab and a basis for the development of a zero-emission heavy-duty vehicle industry in NWE area.

Sub objectives

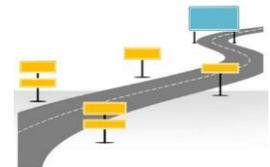
1. Realise *knowledge sharing* between frontrunner regions and 'following' regions, to stimulate technology and market development in North-West Europe.



2. Deliver *proof of readiness* of the H2 technology for heavy-duty applications in real life conditions.



3. Create a *roadmap and a long term cooperation* with other regions for the development of heavy-duty transport on hydrogen. Roadmap and regions development changes pending



Hydrogen-electric rigid truck



Interreg 
EUROPEAN UNION
North-West Europe
H2-Share
European Regional Development Fund

Mobile hydrogen refueling station



Demonstrations



Demonstrations



Demonstrations

PRESS RELEASE FIRST DEMONSTRATION EVENT H2-SHARE

H2-Share's first hydrogen-powered rigid truck hits the road in the Netherlands

On Wednesday, 1 April, a 27-tonne hydrogen fuel cell rigid truck built by VDL started its first demonstration with BREYTNER as part of the EU-funded H2-Share project in Schelluinen, the Netherlands. Wystrach GmbH built a low-energy mobile hydrogen refueller to accompany the truck on its demonstration sites.

This hydrogen truck is unique in the Benelux. It is the first time that a truck will be demonstrated in a setting like this, certainly in combination with a mobile refuelling station. The launch of this demonstration is a giant leap forward in the development of the zero-emission heavy-duty vehicle industry in Northwest Europe and to gain practical experience with fuel cell trucks.

BREYTNER, a zero-emission transport provider, will operate the truck for three months in retail logistics, such as replenishing stores and feeder lines for zero-emission last-mile solutions. By testing the truck in different types of logistical processes, BREYTNER hopes to contribute to the question of where a hydrogen truck is best deployed. After the demonstration at BREYTNER, the truck will go to one of the other project partners for its next demonstration.

'We are very excited to be one of the few companies worldwide that can demonstrate a hydrogen rigid in real-time operation. This gives our customers and us valuable knowledge on zero-emission transport solutions and will help us in taking the next steps towards more sustainable transport.' - Marie-José Baartmans, BREYTNER

The aim is to demonstrate the truck and the mobile refuelling station at 6 locations in Germany, the Netherlands, Belgium and France. To demonstrate the truck on all 6 locations, regardless of the availability of hydrogen refuelling stations, Wystrach is presenting a user-friendly and officially approved solution in the form of a mobile refuelling station with ample storage capacity, that allows flexible application possibilities. The truck can also refuel at the hydrogen stations in Rhoon/Rotterdam and Helmond during the demonstration in Schelluinen.

'We realise that there is an increasing demand for a holistic view of mobility concepts. Manufacturers of trucks, trains, buses, and even forklifts are interested in hydrogen-fuelled systems. The H2Share project, therefore, is an important showcase for trendsetting possibilities.' - Wolfgang Wolter, CEO of Wystrach GmbH.

Evidence from the logistics sector shows a strong, growing interest in zero-emission solutions to reduce emissions and environmental impact on air quality. In urban areas, zero-emission logistics can be operated by battery-electric trucks. They are, however, limited in their range. For large heavy-duty vehicles which travel longer distances, electric trucks with a hydrogen fuel cell range extender are a zero-emission solution. In the EU, such vehicles are not yet commercially available but have enormous potential. 'H2-Share' aims to unlock this potential.

The objective of H2-Share (Hydrogen Solutions for Heavy-duty transport Aimed at Reduction of Emissions in North-West Europe) is to facilitate the development of a market for low-carbon heavy-duty vehicles on hydrogen for logistics applications and to gain practical experience in different regions in North-West Europe.

'At this moment, there are some roadblocks for widely cost-effectively deploying hydrogen-electric heavy-duty vehicles in the market. To come to a good TCO (Total Cost of Ownership) model, these need

to be tackled; the cost of hydrogen needs to come down significantly, the number of hydrogen refuelling stations needs to go up, and the reliability of the hydrogen fuel cell system needs to come up. Within the H2-Share project, VDL aims to prove the market readiness of the hydrogen fuel cell system in a heavy-duty vehicle and demonstrate the reliability in daily use with real users in the North-Western Europe region as a pre-cursor to the mass-market deployment of the technology.' - Menno Kleingeld, managing director VDL ETS

The H2-Share project will deliver proof of readiness of hydrogen technology for heavy-duty applications in real-life conditions and will provide a basis for the development of zero-emission heavy-duty vehicle industry in the NWE area. The project receives 1.69-million-euro EU funding through Interreg NWE and is coordinated by WaterstofNet. WaterstofNet has been focusing on the development of hydrogen in Europe for over a decade and was responsible for the first projects with hydrogen refuse trucks and hydrogen heavy-duty trucks in Europe.

'At WaterstofNet, we foresee a major role for hydrogen in heavy-duty applications. Over four years ago, we started developing European projects with a focus on hydrogen as a heavy-duty solution with regional players, focussing on demonstrations with industrial partners and gaining practical experience. After successful demonstrations with hydrogen refuse trucks in other projects, we are very proud to be involved in the first demonstration of this rigid-truck in our region within the H2-Share project. We believe it is clear that this technology has strong prospects for the North-West-Europe region, and we are looking forward to taking the next steps.' - Adwin Martens, director of WaterstofNet

Concerning the current COVID-19 outbreak and hydrogen, Jorgo Chatzmarkakis, Secretary General of Hydrogen Europe, stated: "Currently Europe is facing an unprecedented crisis. Our economy will be greatly affected and hydrogen, as innovative technology, can plan a crucial role in supporting the post-COVID 19 recovery plan while complying with the EU Green Deal. With the deployment of the H2Share truck, we have tangible evidence that hydrogen fuel cell technology is ready today to play its part".

Partners

The H2-Share partners and associated partners are VDL, Wystrach GmbH, Rai Automotive NL, BREYTNER, Colruyt Group, Cure, DHL, e-mobil BW, Hydrogen Europe, Dutch Ministry of Infrastructure and Water Management, TNO, WaterstofNet. The city of Helmond and VIL are sub-partners in the project.



Pictures for free use can be found here (photo credit - Wystrach):

<https://cloud.wystrach.gmbh/s/ydk2mx3x4zcNQ3x>

Password: H2Share!

For more information:

Interreg NWE: <https://www.nweurope.eu/projects/project-search/h2share-hydrogen-solutions-for-heavy-duty-transport/>

WaterstofNet: <https://www.waterstofnet.eu/en/projects-roadmaps/h2-share>

VDL: <https://www.vdlgroep.com/en>

Wystrach: <https://www.wystrach.gmbh/en/produkt-wyrefueler.html>

Breytner: <https://breytner.com/>

Demonstrations



Demonstrations

Press release, February 16, 2021

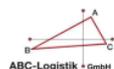
ABC Logistik demonstration a success in Düsseldorf H2-Share hydrogen fuel cell truck well received

Düsseldorf – The H2-Share truck performed well in demonstration at transport company ABC Logistik in Düsseldorf from the beginning of November until the end of December 2020. The company concluded in its final evaluation that hydrogen trucks are the future of zero-emission heavy-duty logistics.

Thanks to the efforts and collaboration of ABC Logistik, VDL, the EnergieAgentur.NRW and H2 MOBILITY Deutschland, the 27 tonne truck demo was organised on short notice. It was just the second of six demonstrations within the international H2-Share project, dedicated to the development of hydrogen heavy-duty transport and refuelling technology. It transported up to 8 tonnes of general cargo (e-commerce products), mainly on motorways and in industrial zones. The truck refuelled under supervision of Air Liquide at the hydrogen refuelling station (HRS) Düsseldorf-Holthausen operated by H2 MOBILITY Deutschland.

Of course the demonstration also brought a number of points for improvement into focus for the next stage of development. Hills formed challenges at times and a more powerful electromotor may be required. The truck is also quite noisy, too much so for night deliveries. This could be improved by lowering the high compressor air intake. In general, the configuration of the H2-Share truck consists of a number of compromises given the need for multiple demonstrations at different end-users. ABC Logistik concluded that most of these challenges can be overcome and are keen to continue the tests in a following phase. This will be supported by the commitment of North Rhine-Westphalia to stimulate the deployment of fuel cell vehicles with green hydrogen in the region.

Michael te Heesen, General Manager at ABC Logistik: "As a privately-owned logistics service provider with a strong interest in sustainable logistics concepts and technologies, we were very pleased to be invited to participate in the test phase. Although the vehicle is still a prototype, its use has left many positive impressions. We are convinced that hydrogen technology will soon be ready for daily operational use. Now the supply of hydrogen and the refuelling station network need to improve while refuelling costs need to drop."



Dr. Frank Koch, Senior Expert for Fuel Cell Vehicles at the Fuel Cell and Hydrogen Network, Electromobility at EnergieAgentur.NRW: "For NRW, the reduction of emissions in the transport sector is a key success factor in reaching our climate targets. Heavy-duty vehicles are main contributors of greenhouse gases. Thus, it is good to see that truck manufacturers are developing emission free vehicles. In cooperation with big transport associations, we are planning a larger roll-out of FC trucks. Therefore, we are eagerly looking for FC trucks and look forward to testing them with logistic companies in our Bundesland."

Rebecca Grossberg, project officer Interreg NWE: "This pilot has provided solid evidence on the potential of hydrogen for hydrogen trucks in Nord Rhein-Westfalia. H2-Share is testing the existing infrastructure which will help stimulate the development of hydrogen vehicles. The h2 applications such as the trucks are key enablers of hydrogen technologies and play a crucial role in Europe's energy transition."

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Pictures via [this WeTransfer link](#) The H2-Share truck refuelling at the HRS Düsseldorf-Holthausen operated by H2 MOBILITY Deutschland (demonstration at ABC Logistik in Düsseldorf)

More info and contact:

www.nweurope.eu/h2share

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Demonstrations



Demonstrations

The mobile hydrogen station, the WyRefueler from Wystrach GmbH, has been deployed at Geldhauser near Munich, one of the largest private bus companies of Bavaria.

The 'WyRefueler' mobile hydrogen refueling station ensures a reliable supply of hydrogen to the 350 bar test vehicles. CEO Wolfgang Wolter said: "We were able to set our system up on-site in Hofolding in under a day. All the customer needed was a 63 A power connection." Designed to supply 350 bar vehicles, the refueling station can also fill 700 bar vehicles up to a target pressure of 400 bar.

"As a bus company, we are keen to test the suitability of hydrogen technology under everyday conditions," says Martin Geldhauser, CEO of the Geldhauser Group and host of the HyBayern Hydrogen Days. Starting at the Geldhauser premises, the different bus models completed test drives on three different test routes. Geldhauser says: "It's important for us to compare fuel economy, handling, comfort, and day-to-day running before we decide which model to purchase."

"The refueling process was always fast and reliable, whatever the vehicle to be refueled. It's clear that emissions-free bus travel is not some vision of the future, but already a reality. The hydrogen technology used here is absolutely practical," Geldhauser reported.

Demonstrations



Demonstrations



Press release



DHL Express is piloting the first hydrogen truck throughout Deutsche Post DHL Group

- Apple is the first customer to test the new logistics solution
- The truck is part of a European testing program operating in the Benelux region
- The pilot is part of the de-carbonization strategy of Deutsche Post DHL Group

Bonn/Breda, November 23, 2021: DHL Express, the world's leading international express service provider, is the first within Deutsche Post DHL Group to test hydrogen-fueled trucks for the long haul. Together with its customer Apple, DHL pilots the vehicle in the Benelux region, as part of the Interreg NW Europe program H2-Share, coordinated by WaterstofNet. The program's goal is to facilitate the development of low-carbon heavy-duty vehicles on hydrogen for logistic applications and gain practical experience in different regions. It creates a transnational living lab and basis for the development of the zero-emission heavy-duty vehicle industry.

"In a globalized world, sustainable and clean fuels are essential for climate-neutral logistics. Not only for sea and air freight but also line-haul road freight, as these help reduce CO₂ emissions," says Alberto Nobis, CEO DHL Express Europe. "That's why we engage not only in the electrification of our fleet but also invest in the development of alternative drive systems for very long ranges. The project shows that we can achieve truly emission-free logistics in Europe if we join forces and build on experience."

While battery-electric trucks can operate efficiently within last-mile delivery, fuels from renewable energies such as hydrogen are essential for zero-emission line-haul. Due to their vast potential, DHL Express is now testing a heavy-duty vehicle, with a fuel cell range extender from VDL. The truck, operated by Dutch Nassau Sneltransport, covers a daily distance of around 200 km, running a cross-border route in the Benelux region. The truck refuels on a daily basis at a mobile fuel station from Wystrach as part of the project. It transports deliveries of DHL Express' customer Apple. During the piloting phase, up to 35 tons of CO₂ can be saved with the new technology.

Page 1 of 3

Press release



In line with its Sustainability Roadmap, Deutsche Post DHL Group is heavily investing in the use of alternative fuels. Hydrogen is opening up a new market and can contribute to green transport solutions. Insights from the project help evaluate the potential of this fuel alternative and support decision-making processes.

– End –

Note to editors:

Please find more information about the H2-Share project at [H2Share: Hydrogen Solutions for Heavy-duty transport | Interreg NWE \(nweurope.eu\)](https://H2Share.HydrogenSolutionsforHeavy-dutytransport|InterregNWE(nweurope.eu)).

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Demonstrations



Demonstrations

Hydrogen heavy-duty projects joining forces

September 17, 2021 1:27 PM

Interreg North-West Europe projects H2-Share and HECTOR recently joined forces with the FCH-JU project REVIVE. Last week the mobile hydrogen refuelling station of H2-Share (the 'WyRefueler') refuelled two zero-emission garbage trucks simultaneously in Breda. It is a first that three different heavy-duty, hydrogen projects join forces and reinforce each other.

The mobile HRS 'WyRefueler' (built by Wystrach) refuelled a Faun garbage truck of 'Wirtschaftsbetriebe Duisburg' and an E-Trucks Europe garbage truck. The Faun truck is currently operating in the HECTOR project collecting public waste in the Duisburg area. Faun and the Wirtschaftsbetriebe want to test the range of the vehicle and the refuelling experience at mobile refueler.

The E-trucks Europe garbage truck of the Municipality of Breda is operating under project REVIVE, funded by the FCH-JU. This vehicle is the first of two vehicles to operate in daily waste collection. The drivers operating the trucks, exchanged experiences and checked out each others vehicles. In daily operations they prefer the comfort and low noise, combined with no tailpipe emissions above a diesel truck.

The WyRefueler, capable of refuelling several heavy-duty applications on a daily basis, is part of the H2-Share project. In locations where no infrastructure is available (yet) the WyRefueler can provide the hydrogen needed. The 27 ton H2-Share truck (built by VDL) was also refuelled that same afternoon in Breda.

WaterstofNet facilitated the installation of the HRS and organised the permit for the mobile hydrogen refuelling station. Later this year TotalEnergies will open a hydrogen refuelling station in Breda, which is part of the [WaterstofRegio 2.0 project](#), also coordinated by WaterstofNet. The multi-fuel station is expected to open in November at the Minervum site.

More info about the other projects [REVIVE*](#) and [HECTOR](#) or the coordination of [WaterstofNet](#).

Demonstrations



Demonstrations



Colruyt Group tests 27 tonne hydrogen truck in Belgium and France

Halle, 9 November 2021 - In the past few months, Colruyt Group has been testing a 27-tonne "range extender" electric truck with hydrogen in Belgium, after it having tested a 44-tonne hydrogen truck earlier this year. The group will now also test this 27-tonne truck for a month in France. This truck was developed by the VDL Groep in Eindhoven, and the test is part of the European Interreg North-West Europe H2-Share demonstration project. While driving the truck, its batteries recharge with the electricity generated by the hydrogen fuel cell. In addition to being sustainable because of the use of green energy and hydrogen, this vehicle has the added benefit of being able to travel longer distances than other electric trucks - an important asset for freight transport. Colruyt Group believes that hydrogen can play an important role in making mobility and energy supplies more sustainable. That is why the group has been investing in this green energy carrier for years, and hopes that other companies will follow.

After Belgium also test with 27-tonne hydrogen truck in France

As a dedicated end user Colruyt Group is testing the hydrogen truck in its daily logistics operations in Belgium and France. Because of the diversity of the group, it is possible to test a variety of user cases. That way Colruyt Group fully lives up to its role as a pioneer in the concrete application of green energy. The truck is also quieter than others are, which also supports Colruyt Group's ambition to make more silent deliveries.

Colruyt Group and VDL Groep are active partners in the European demonstration project **H2-Share** (*H2-Share stands for "Hydrogen Solutions for Heavy-duty Transport Aimed at Reduction of Emissions in North-West Europe"*), which aims to build knowledge and experience with large-scale hydrogen applications in logistics. The truck is being tested by the various partners at 6 locations in Belgium, the Netherlands, Germany and France. By sharing the gained experience broadly, H2-Share wants to develop a roadmap for the application of hydrogen in heavy-duty transport. The project is partly made possible thanks to the financial support of the European Union within the framework of the **Interreg North-West Europe programme**.

Not a first: Colruyt Group leads the way in hydrogen

Since 2004, Colruyt has already invested 6 million euro in innovative projects with hydrogen. The group has been producing its own green hydrogen on the Dassenveld site for a few years now. In the distribution centre, a number of forklift trucks is hydrogen-powered. In addition, hydrogen is being used for 20 passenger cars, which are deployed within the group. In October 2018, the group opened the first

green public hydrogen filling station: the DATS 24 station in the Zinkstraat in Halle thus became the first fully integrated station in Belgium with a range of all possible fuels.

In 2020, Colruyt Group was the first in Europe to test a 44-tonne hydrogen truck. This is also a fully electric truck with hydrogen "range extender". This test was part of the European demonstration project Hydrogen Region 2.0, Interreg Flanders-Netherlands.



*This project is financed within the European cooperation programme Interreg North-West Europe.
More information: www.nweurope.eu*

About Colruyt Group

Colruyt Group operates in the food and non-food distribution sector in Belgium, France and Luxembourg, with more than 600 own stores and over 580 affiliated stores. In Belgium, this includes Colruyt, OKay, Bio-Planet, Cru, Dreamland, Dreambaby, Bike Republic and the affiliated Spar stores. In France, in addition to the Colruyt stores, there are also affiliated Coccinelle, Coccimarket and Panier Sympa stores. The group is majority shareholder of The Fashion Society, which includes the fashion retail chains ZEB, PointCarré, The Fashion Store and ZEB For Stars. JIMS runs fitness clubs in Belgium and Luxembourg. Solucious and Culinea deliver food service and retail products to professional customers in Belgium (hospitals, SMEs, hospitality sector, etc.). The other activities comprise the energy supply by DATS 24 in Belgium (fuels, natural gas and green energy), printing and document management solutions (Symeta Hybrid) and the production of green energy (Eoly). The group employs over 32.000 co-workers and recorded a EUR 9.9 billion revenue in 2020/21. Colruyt is listed on Euronext Brussels (COLR) under ISIN-no. BE0974256852

About WaterstofNet

WaterstofNet is a knowledge and cooperation platform that contributes to a carbon-neutral society by supporting and realising hydrogen projects in Flanders and the Netherlands. Along with the industry and the authorities, we provide concrete realisations in the field and lay the foundations for further cooperation. That way we can help Flanders and the Netherlands to develop as a leading hydrogen region. More info www.waterstofnet.eu

About VDL Groep

Strength through cooperation. That is the basis of VDL Groep, the international industrial family business with headquarters in Eindhoven. This company was founded in 1953 by Pieter van der Leege. At first VDL Groep was a specialist in metal working. When his son Wim van der Leege took over the company in 1966, it specialised in high-tech supplies for the semiconductor industry, among others, and expanded its portfolio to include plastics processing and the development, production and sale of buses. VDL Groep is active in subcontracting and semi-finished products, produces its own finished products such as suspension systems, automated car factory equipment, heat exchangers and container handling systems, and with VDL Nedcar in Born disposes of the only passenger car plant in the Netherlands in which serial assembly is carried out for third parties.

Learning experiences

Truck

- Different end-users > design not 100% fit for purpose
- Long certification proces
- Range extender testing behind bus was good decision
- Highway driving & FC capacity
- Service
- Start-up
- Sound of cooling
- Hills with fully loaded truck not easy

Learning experiences

Mobile refueler

- First month used station in Rhoon & Helmond
- Delayed due to Corona
- 2 weeks succesfull operations in full automatic mode
- Very quick permit proces in NL, special procedure
- Mobile solution is ideal to generate experiences and develop local/regional markets (trucks, buses, trains etc)

Learning experiences

Other

- Driver choice
- List with contact persons
- Type III & IV tanks refueling Germany

Interreg



EUROPEAN UNION

North-West Europe

H2-Share

European Regional Development Fund

Thank you

10.20 - 10.50h:
Hans Bekkers

VDL

H2-Share 27-ton truck



H2SHARE @ VDL

Dion Verhulst – VDL Enabling Transport Solutions by
Hans Bekkers – VDL Special Vehicles by
15-03-2022



STRENGTH THROUGH COOPERATION

H2SHARE @ VDL

TARGETS FOR VDL IN THE H2SHARE PROJECT

VDL targeted 4 major H2 topics within the H2Share project namely:

- Fuel Cell Costs
- Reliability of the Fuel Cell technology
- H2 Fuel Costs
- H2 Availability/Infrastructure

H2SHARE @ VDL

SPECIFICATIONS

- › GVW 27 ton
- › Power 210 kW
- › Torque 2.000 Nm
- › Battery 82 kWh
- › Fuel Cell 67 kW
- › Capacity 30 kg H₂
- › Range 300 km
- › TRL7 Readiness







H2SHARE @ VDL

LESSONS LEARNED

- Power balance tuning was initially too low. Long highway drives could drain the battery.
- Service maintenance
 - Fuel Cell maintenance carried out with VDL and Ballard.
 - Coolant contamination detected, insulation faults.
 - Data connection with Ballard, helpful in case of faults analysis.
- Cooling noise must be reduced.
- Big heat rejection
- The operator of the HRS needs to understand the minimum tank pressure set point in order to refuel.
- Proper driver training is a necessity, as is the availability of a technical helpdesk in case of issues.
- Start-up procedure of the system is too long (~15min), this must be reduced.
- Better communication regarding remaining range is necessary (combination battery/H2).
- Physical dimensioning of the Range extender is large and it therefore influences the driver's line of sight.

H2SHARE @ VDL

CARRY-OVER

- Vehicle will be rebuild, with new Fuel Cell Modules
- Base E-Truck Rigid FAN will be the same.
- Data logging will be adapted to H2Haul standards.
- Test for Infrared Communication on truck, will help optimal and fast filling, within set boundaries.





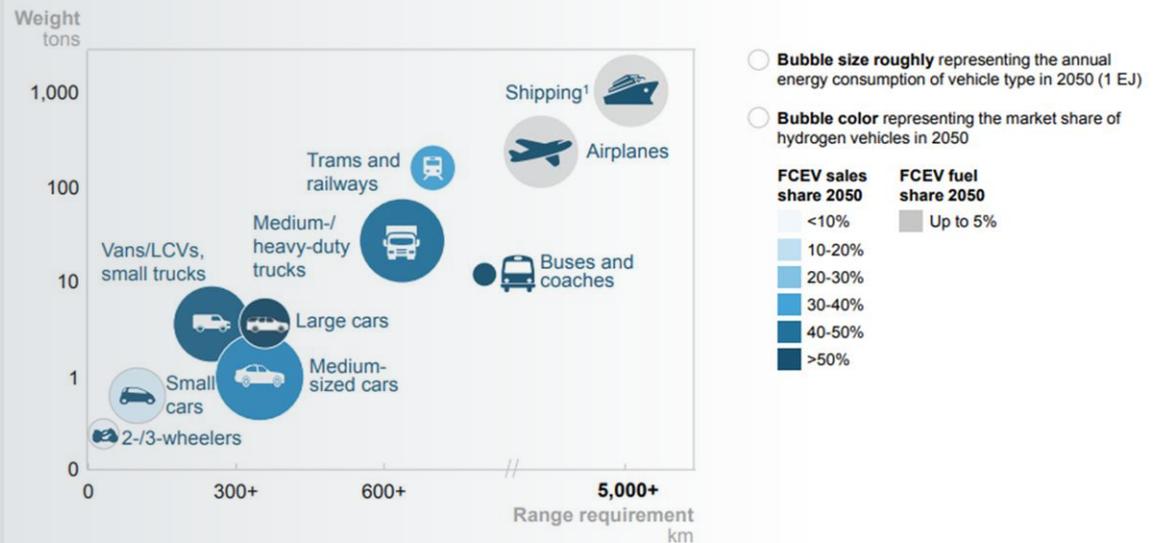
H2SHARE @ VDL

FUTURE PERSPECTIVE

- The Zero-Emission mix of the future will contain hydrogen as one of its solutions
- VDL works with a modular strategy of which one of the modules will be a hydrogen solution
- Focus on long-haul, heavy duty & off-road applications

Exhibit 8: FCEVs can help decarbonize segments with longer ranges and more weight

Transportation market segmentation



¹ Hydrogen-based fuels or fuel cells

SOURCE: IEA ETP; IHS; A Portfolio of Powertrains for Europe (2010); Thiel (2014); Hydrogen Council

THANK YOU VERY MUCH FOR YOUR
ATTENTION!

DION VERHULST – PROJECT MANAGER – VDL ENABLING TRANSPORT SOLUTIONS – D.VERHULS@VDLETS.NL
HANS BEKKERS – COMMERCIAL DIRECTOR – VDL SPECIAL VEHICLES – H.BEKKERS@VDSLPECIALVEHICLES.COM

10.50 - 11.20h:

Dirk Paessens

Wystrach

WyRefueller

Wystrach hydrogen systems

H2Share mobile refueller



Agenda

- Company profile
- WyBundle bundles for industrial gases
- WyStorage storage solutions
- WyCarrier transport solutions
- WyTankSystems tank systems
- WyRefueler hydrogen refueling stations
- WyService maintenance and service for hydrogen products



Company profile



- Located in Weeze, Germany (greater Düsseldorf area)
- Approximately 200 employees
- Over 30 years' experience with high-pressure systems
- EUR 38 million revenue in 2021
- Certified to DIN EN ISO 9001:2015
- Production largely on-site in Weeze
- In-house development department



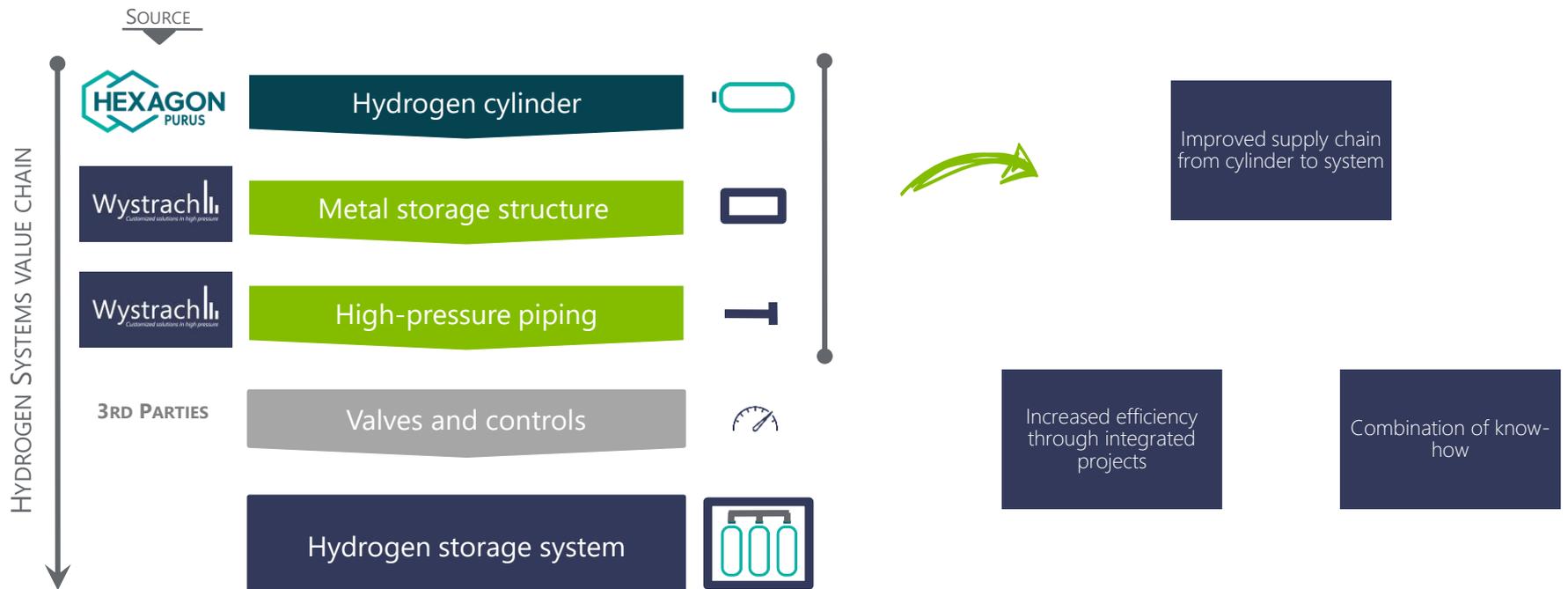
Wystrach – a part of Hexagon Purus



- Globally active, stock listed company based in Norway
- leader in key technologies for zero-emission mobility
- largest producer of Type IV high-pressure vessels



Extension of value chain



Corporate development



1990



2000



2010

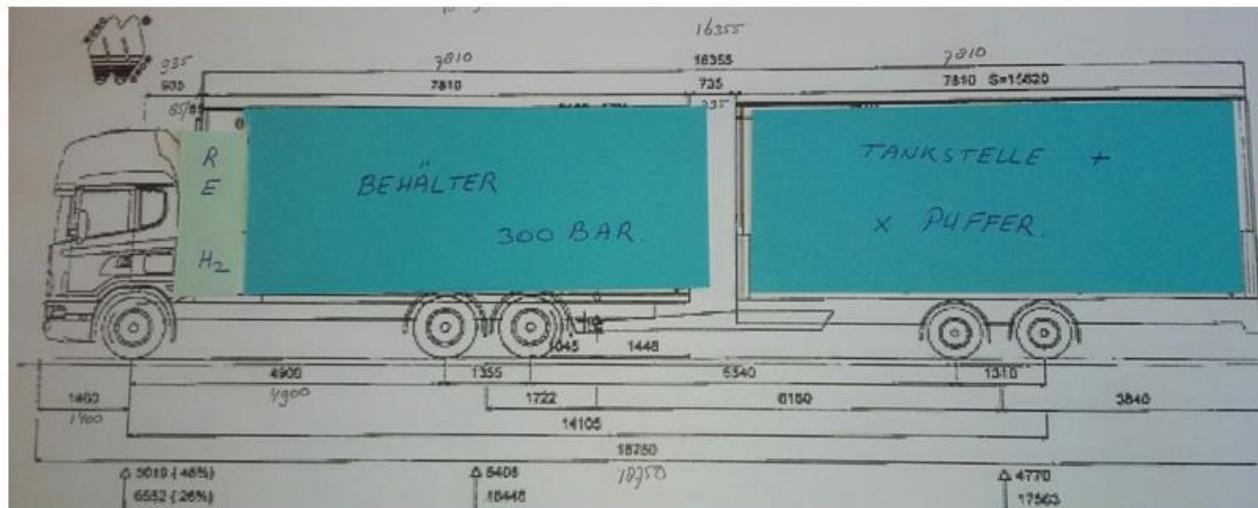


2020



First ideas in 2016

- Wystrachs Wolfgang Wolter had the idea to develop a mobile refuelling station for HD, 350bar
- November 2016, intensive discussions with Wasserstoffnets Wouter van Laak about H2Share
- May 2017 H2Share Interreg project start in Lille, France



3rd plenary meeting at Wystrach in April 2018

- The design and build of the tankcontainer was finished



Trial test in November 2019

- The complete design and build of the mobile refuelling station was finished
- Test trial and software programm extension
- In parallel the permitting progress for Breytner's demonstration in Schelluinen was pushed



First demonstration Breytner Schelluinen

- First set up of the mobile refueller at the facility of Vlot Logistics, March 2020



First demonstration Breytner Schelluinen

Corona-Impact

- Corona caused a huge delay for the start of the demonstration

First demonstration Breytner Schelluinen

- ...but finally...



Additional event Geldhauser Munich, Germany, October 2020

- Refuelling of Solaris and Caetano buses in the HyBayern project



Colruyt Brussels had to be canceled in March 2021

- Colruyt and Wystrach prepared the permit
- Everything was taken care of and the hotel was booked for the Wystrach staff
- Again a Corona shut down and travelling restriction caused a cancellation, short before the start

Many thanks to **Stephanie van Damme** and **Robin Lataire** from Colruyt, for there support and co-operation!

We are sorry that we ended up, not being at Colruyt Brussel for the demonstration!

DHL demonstration in Breda, July 2021

- Driver training event



Gemeente Breda Afvalservice used the mobile refueller

- The garbage truck was refuelled at the mobile refueller, for a longer time period
- The driver training event was supported by Waterstofnets Stefan Neis



Refuelling test FAUN garbage truck and others...

- The garbage truck was refuelled at the mobile refueller, for a longer time period
- The driver training event was supported by Waterstofnets Stefan Neis
- Three different trucks were refuelled, directly after each other.



Colruyt demonstration Dole, France, October 2021

- The mobile refueller was used for a final demonstration in Dole, France for one month in Oct./ Nov. 2021





WyRefueler

High-pressure hydrogen refueling

WyRefueler: Refueling systems

- Components and complete systems
- 350 bar and 700 bar
- stationary and mobile





Wystrach would like to thank Interreg, Waterstofnet and all project and industry partners for the good cooperation in the H2Share project!



Coffee break



Interreg
North-West Europe
H2-Share
European Regional Development Fund



11.20 - 11.35h: Coffee break

www.nweurope.eu/H2share

Demonstrations



11.35 - 11.50h:

René Van Gijlswijk

TNO

Data analysis

TNO innovation
for life

Interreg 
EUROPEAN UNION
North-West Europe
H2-Share
European Regional Development Fund



ASSESSMENT OF HEAVY-DUTY FCEV
RENÉ VAN GIJLSWIJK

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ASSESSMENT OF HEAVY-DUTY FCEV

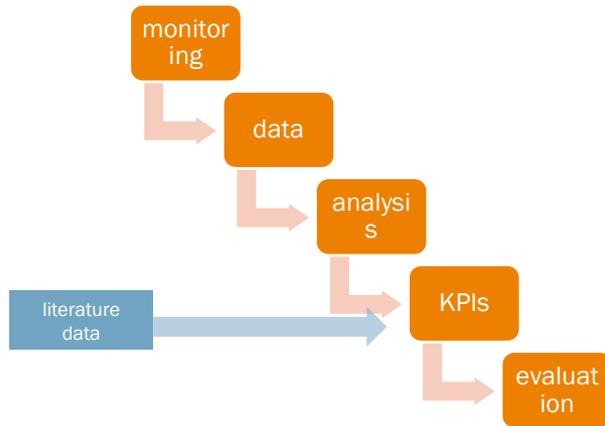
01. INTRODUCTION

02. THE KEY PERFORMANCE INDICATORS

03. RESULTS AND OBSERVATIONS

INTRODUCTION

- › Task 3 development of roadmap for NWE
- › Deliverable T3.4.1: assessment report



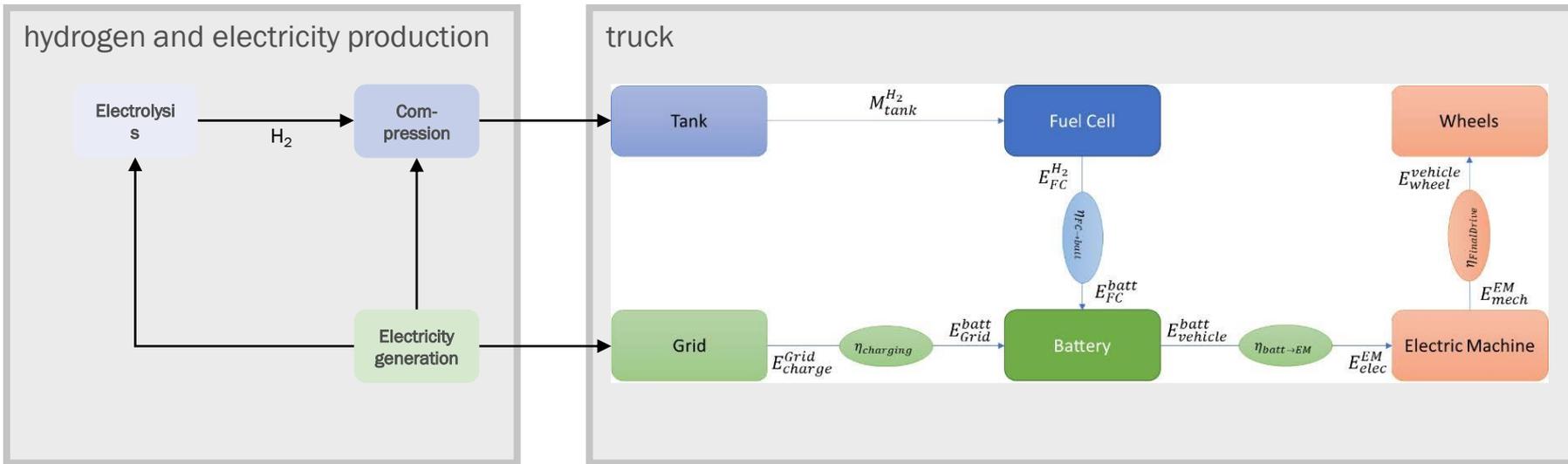
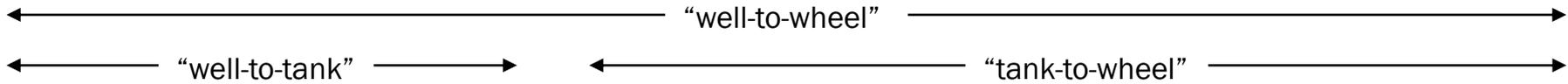
Subjects:

- Energy efficiency
- CO₂ emissions
- Operational use / applicability
- Costs

Data included in the analysis:

Site	Logistic operator	Period (up to and inclusive)
Rotterdam (NL)	Breytner	April 2020 – June 2020
Düsseldorf (DE)	ABC Logistik	November 2020 – December 2020
Brussels (B)	Colruyt	June 2021 + October 18-29
Breda (NL)	DHL	21 July to end of September 2021
Dole (F)	Colruyt	10 November to 26 November 2021

INTRODUCTION



THE KEY PERFORMANCE INDICATORS

AS DEFINED IN T3.3.4

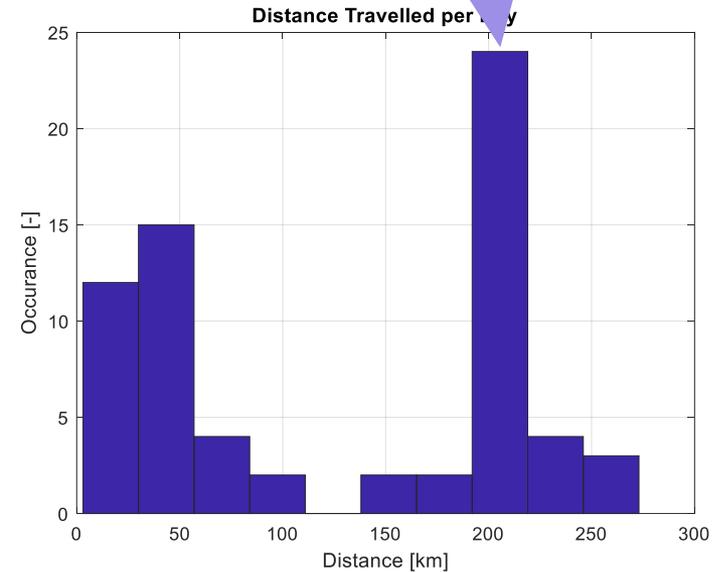
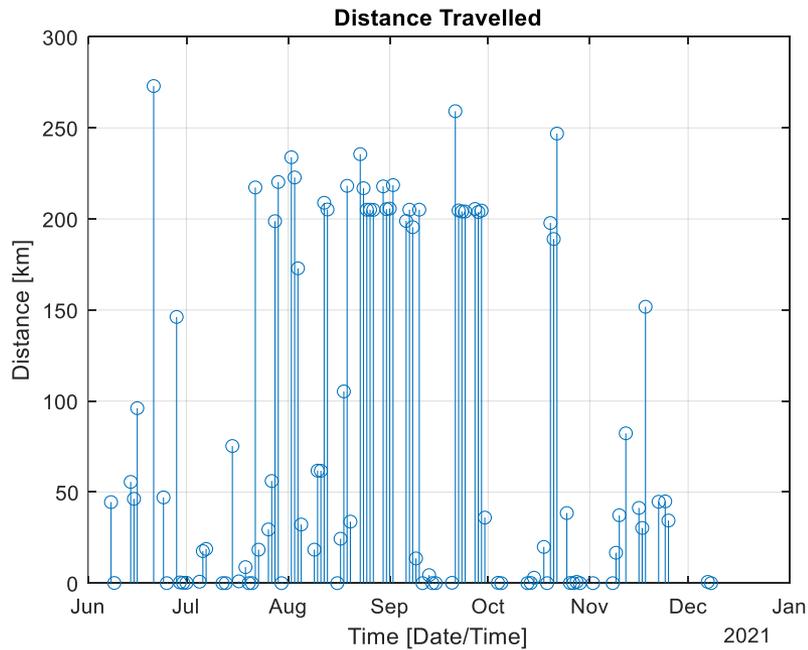
Reference	KPI	Unit	
KPI1	WTW GHG/km	g/km	C
KPI2	WTW energy efficiency	%	
KPI3	TTW energy efficiency	kWh/km	
KPI4	TTW transport efficiency	kWh/tkm	
KPI5	% relative battery to fuel cell WTW GHG	%	
KPI6	WTT efficiency	%	
KPI7	Range	km	B
KPI8	Operational time difference	h	E
KPI9	Operational cost	euro/km	D
KPI10	Break-even TCO distance	km	
KPI11	Distance driven per day	km/d	A

RESULTS

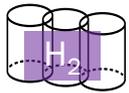
A. DISTANCE DRIVEN

Total: 8613 km

Daily average: 127 km (for days actually in operation)



B. RANGE



30 kg

x

10.0 km/kg H₂

300 km



82 kWh

x

0.9 km/kWh el.

74 km

374 km (theoretically)

› C. ENERGY EFFICIENCY

› Assumptions for the well-to-tank part:

- › Local electrolysis on retail site; no additional distribution assumed
- › Electricity is Dutch grid mix; two scenarios:
 1. Grey/green mix (baseline)
 2. Green mix (100% renewable electricity)

› General starting points:

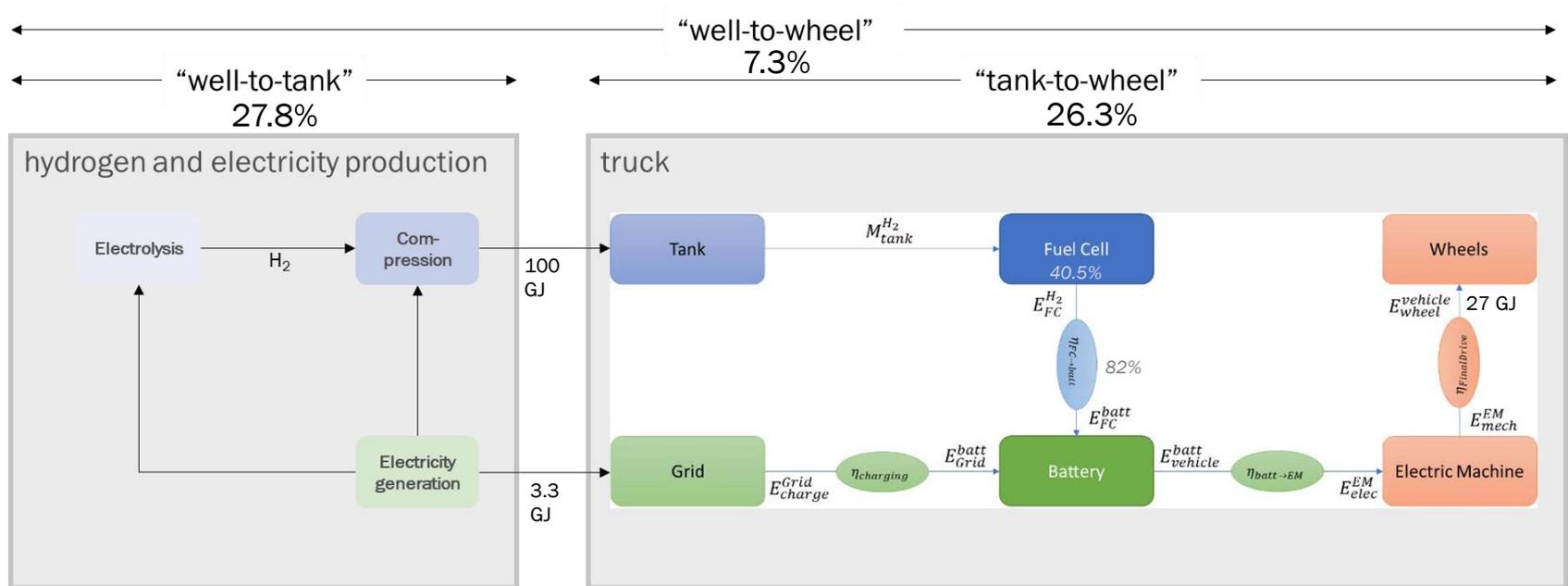
- › GHG emissions = CO₂-equivalents. In this report: CO₂ + CH₄ + N₂O.

C. ENERGY EFFICIENCY

Of every megajoule that enters the vehicle, 0.26 MJ reaches the wheel.

Of every megajoule in primary energy sources, 0.07 MJ reaches the wheel.

If only renewable electricity is used to produce hydrogen (and electricity for charging), this number approximately doubles (~0.14 MJ).



C. ENERGY EFFICIENCY

GREENHOUSE GAS EMISSIONS

		CO ₂ emission per kg of hydrogen	CO ₂ emission per km driven
Electrolysis	Average electricity	26.0 kg CO ₂	2651 g CO ₂ /km
Electrolysis	Renewable electricity	0.3 kg CO ₂	33 g CO ₂ /km
Steam reforming of natural gas	-	15.9 kg CO ₂	1532 g CO ₂ /km
Battery electric	Average electricity		530 g CO ₂ /km
Diesel			1213 g CO ₂ /km

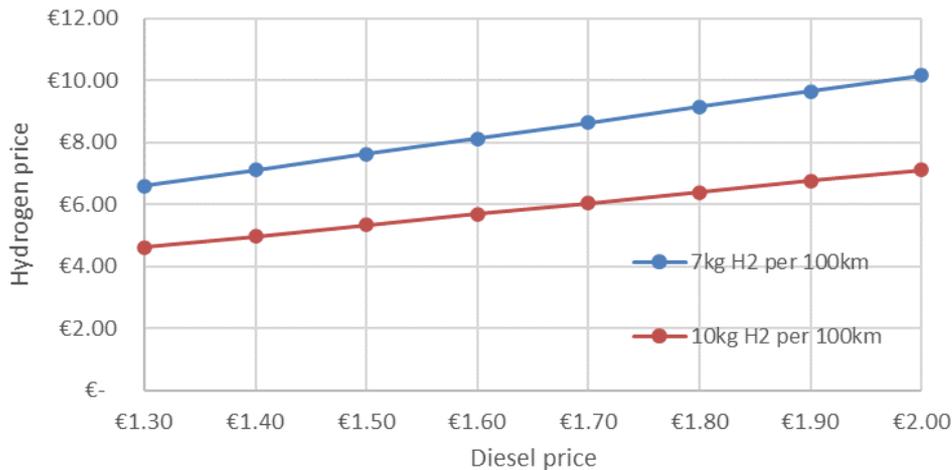
Diesel truck fuel consumption taken from monitoring data of five 27t trucks, reweighted urban/rural/motorway ratio

D. COSTS

Using the inputs shown in the table, the running costs of the HRE truck in its current form are estimated at € 1.06. The electricity price may be outdated by now...

Symbol	Short Description	Unit	Source	Value
$Cost^{elec}$	Price of electrical energy	$\frac{€}{kWh}$	[13]	0.127
E_{charge}^{Grid}	Charged electrical energy from the grid	$[kWh]$	Measurement	350.3
$Cost^{H_2}$	Price of hydrogen	$\frac{€}{kg}$	Internet	10
d	Driven distance during the whole test period	$[km]$	Measurement	8612.6
$M_{tank}^{H_2}$	Fuelled hydrogen during the whole test period	$[kg]$	Measurement	829.6
$Cost_{Maintenance}^{HRE}$	Maintenance costs	$\frac{€}{km}$	Literature [14]	0.089

Break-even fuel costs per kilometer



- The break-even TCO distance equals infinity, because the operational costs of the HRE are higher than those of a comparable diesel truck.
- Graph: lines are break-even operational costs $H_2 \leftrightarrow$ diesel.

› E. OPERATIONAL TIME DIFFERENCE

COMPARED TO DIESEL

› Assumptions:

- › Usable range HRE: $30 \text{ kg} * 10 = 300 \text{ km}$
 - › Usable range CF diesel (tank at 20% level): $954 * 0.8 = 763 \text{ km}$
 - › Hydrogen: $3.6 \text{ kg/min} \gg 10 \text{ min}$ incl. handling, payment
 - › Diesel: $100 \text{ l/min} \gg 5 \text{ min}$ incl. handling, payment
 - › No detours assumed for either
 - › Annual mileage of 80,000 km for both
-
- › Under these assumptions, tanking hydrogen requires an additional 46 hours per year.
 - › For the current configuration, 50,000 km/year would be more realistic (225 km/day, 5 days, 45 weeks). Assuming tanking hydrogen every night or morning, it would be 35 hours per year.

CONCLUSIONS

7

- › KPIs computed using field measurements of the HRE truck, literature and experts knowledge.
- › CO₂ reductions can be achieved only when H₂ is produced from renewable sources.
- › With electrolysis using grid average electricity the CO₂ emissions are almost twice as high as for of a diesel truck.
- › The well-to-wheel efficiency is playing a large role in this.
- › The truck drives almost exclusively on hydrogen. Charging via an external charger reduces the operational cost.
- › The theoretical range is 374 km. The practical range is smaller, given the maximum daily mileage during the demo (~275 km) and the comments from the drivers.
- › The extra refuelling time would be roughly 46 hours per year. Note that this is calculated with the current hydrogen tank capacity of 30 kg and an annual mileage of 80,000 km.
- › With current hydrogen prices, no break-even TCO distance could be calculated.



› **THANK YOU FOR
YOUR TIME**

TNO innovation
for life

11.50 - 12.20h:

BREYTNER Zero-emission Transport
ABC-Logistik
Colruyt Group
DHL

Panel discussion with end-users about experiences, recommendations and next steps,...

12.20 - 12.35h:

Freek de Bruijn

Rai Vereniging

White spot & performance analysis
of NWE and European roadmaps

Team ANL



Gerard Koning
Manager Sustainable Mobility



Freek de Bruijn
Program Consultant

Contents

- Market Potential Study
- White Spot & Performance Analysis of NWE & EU28 Roadmaps
- KPI analysis

Market Potential Study



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50 pagina's
30 Ref Documenten

Note: 2 x geup-date door projectverlenging

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White Spot & Performance Analysis of NWE & EU28 Roadmaps



Gemeente Helmond



3 Schrijvers

45 pagina's

100 Ref Documenten

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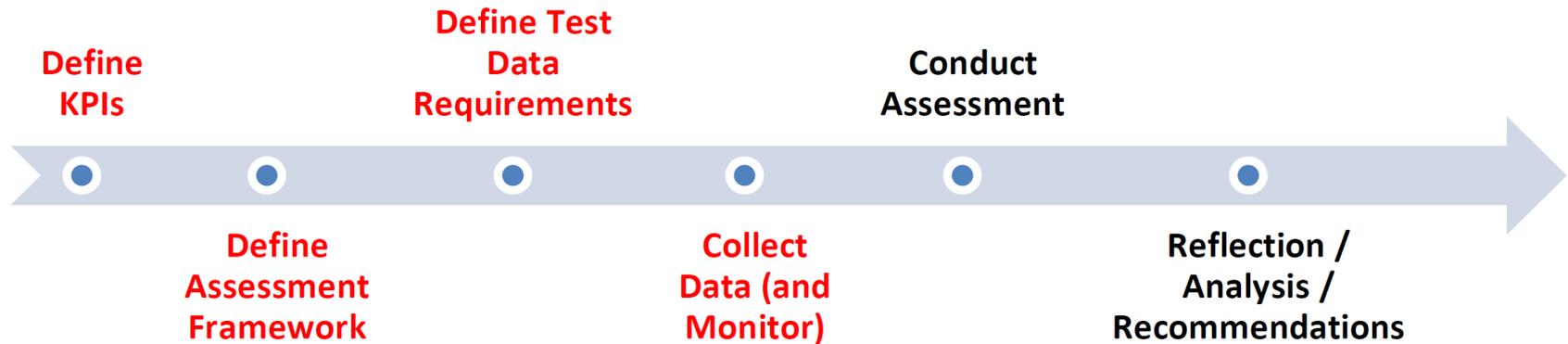
[9 Abbreviations](#)

[10 List of References](#)

T3.4.1 KPI analysis

- 1. KPI definition**
- 2. KPI definition internal revision**
- 3. Partners input**
- 4. Measurements analysis**
- 5. Literature resources gathering**
- 6. Report draft (internal)**
- 7. Report draft internal revision finished**
- 8. Report finalized**

Approach



KPI's defined in D3.1

Reference	KPI	Units
KPI1	WTW GHG/km	[g/km]
KPI2	WTW energy efficiency	[%]
KPI3	TTW energy efficiency	[kWh/km]
KPI4	TTW transport efficiency	[kWh/t-km]
KPI5	% Relative battery to fuel cell WTW GHG	[%]
KPI6	WTT efficiency	[%]
KPI7	Range	[km]
KPI8	Operational time difference	[h]
KPI9	Operational cost	[euro/km]
KPI10	Break-even TCO distance	[km]
KPI11	Distance driven per day	[km/d]

Conclusions

A significant reduction of CO₂ emissions in the HRE truck (Well to Wheel) is only achievable if the H₂ is produced from renewable sources. That means, using the average mixture of electricity of the Dutch network to produce hydrogen via electrolysis, results in CO₂ emissions nearly twice as large as those of a diesel truck. However, if the hydrogen is produced via electrolysis from renewable sources, the resulting CO₂ emissions of the HRE truck are only 2.8% (97.2% reduction) of the CO₂ emissions from an equivalent diesel truck.

- One of the reasons why the CO₂ emissions of the HRE truck are high in the average electricity mix case, is the well-to-wheel energy efficiency. It is approximately 7.3%, which means that 92.7% is lost in the combination of the hydrogen generation, transportation and fuel cell. From this loss's percentage, the generation and transportation losses adds up to 73% (well to tank efficiency is 27%).
- Most of the wheel energy used by the HRE truck is produced by the fuel cell rather than from an external battery charger, i.e., only 2.9% of driving energy came from charging.
- The theoretical vehicle range is estimated to be 374km.
- The extra refueling time when using a HRE truck compared to a diesel truck is roughly 46 hours per year.
- Hydrogen prices need to drop from 10€/kg to at least 7€/kg (when diesel price is 2€/L) for a breakeven distance to exist.

Interreg



EUROPEAN UNION

North-West Europe

H2-Share

European Regional Development Fund

Thank you

12.35 - 12.55h:

Matteo Azzimonti

Hydrogen Europe

European hydrogen strategy
for heavy-duty

EU strategy on HDVs

H2Share Closing Conference

15.03.2022



Contact details

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- Junior Officer, Mobility Policy – Hydrogen Europe
- m.azzimonti@hydrogeneurope.eu / v.borecky@hydrogeneurope.eu



Matteo Azzimonti

Junior Officer, Mobility Policy



Viktor Borecký

Manager, Mobility Policy



Relevant legislation



- Alternative Fuels Infrastructure Regulation
- Weights&Dimensions
- CO2 Standards for HDVs
- REDII / ETD / EU ETS

Transport Council 9/12



- **Most of the Ministers agree that the right solution to decarbonise the HDV sector is using H2 technologies rather than electrification.** Nonetheless, some countries, as Greece, Poland, Lithuania, and Romania insist on the use of LNG and CNG as transitional fuels.
- Many countries, among which Latvia, Estonia, Hungary, Bulgaria, Romania, Spain and Finland called for **more flexibility regarding the refuelling and recharging stations targets, particularly geographic flexibility.**
- **Other countries (including Portugal, Greece, Poland, Romania) mentioned the need for a financial package to meet the new goals.**
- Other topics of discussion:
 - Public and private infrastructure for recharging and refuelling for HDVs.
 - Specific incentives or measure to facilitate faster integration of alternatively powered HDVs.

TRAN draft report on AFIR



- Increased support of electricity and H2 targets, LNG excluded
- **Minimum number of public HRS to be available by 31/12/27 (instead of 2030).**
- **Max distance between HRS reduced to 100km. (400km for LH2 HRS).**
- At least one HRS for each urban node

Issues on H2 HDVs



- Growing narrative on the fact that BEV HDVs will play a major role in long haul transport
- Reluctance from policymakers to understand the benefits of having two infrastructures (e.g. MEP Bloss, ITRE Rapporteur for Opinion)
- Resistance from some Member States on the proposed HRS targets

The optimal choice is not black-and-white

Stereotypical user personas

Powertrain purchase criteria	Middle-aged in suburbs	Parents in city home	Environmentally conscious young adult	Family on holidays	Couple in a city apartment	Driver with busy schedule	Taxis, LCV, autonomous	Buses and MDT/ HDT
Cost (CAPEX and OPEX)								
Range								
Charging access and convenience								
Infrastructure requirements								
Durability (Reliability, Maintenance)								

● BEV ● FCEV

Source: Hydrogen Council: [Roadmap towards Zero Emissions: The Complementary Role of BEVs and FCEVs](#)

Next steps



- TRAN exchange on the draft report: 14 March
- ENVI adoption of opinion: 31 March
- ITRE adoption of opinion: 20 April (tbc)
- TRAN Exchange of views on amendments: 20 April (tbc)
- TRAN Adoption of report: 16 May
- Plenary vote: July 2022

Will be crucial to **protect higher targets** to ensure a dense HRS network in the future

Weights&Dimensions; current rules

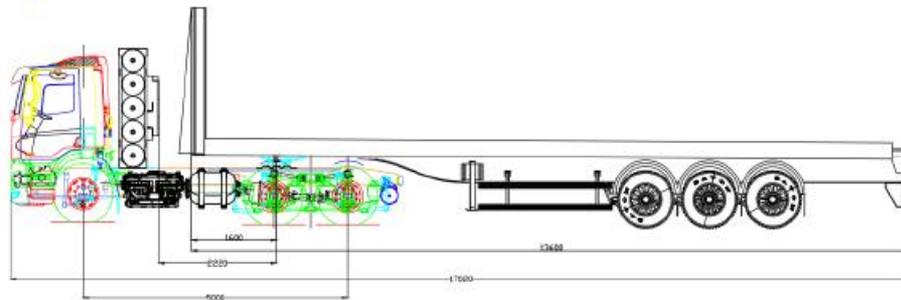


- **Weight limits:**
 - **Articulated vehicle: 40 ton**
 - two-axle motor vehicle: 18 ton, semi-trailer: 22 ton)
 - three-axle motor vehicle: 25 ton, semi-trailer: 15 ton for the semi-trailer
 - **Motor vehicle:**
 - driving axle: 11.5 ton
 - tandem axle: between 11.5 and 18 ton, depending on the inter-axle distance
 - **Semi-trailer:**
 - tandem axle: between 11 and 20 ton, depending on the inter-axle distance
 - tri-axle: between 21 and 24 ton, depending on the inter-axle distance
- **Length limits: 16,5m (articulated vehicle); 18,75m (road train, articulated bus)**
- **2019 review: 1 extra ton of weight for vehicles running on alternative fuel powertrains. Length derogation only for aerodynamic devices improving energy efficiency**

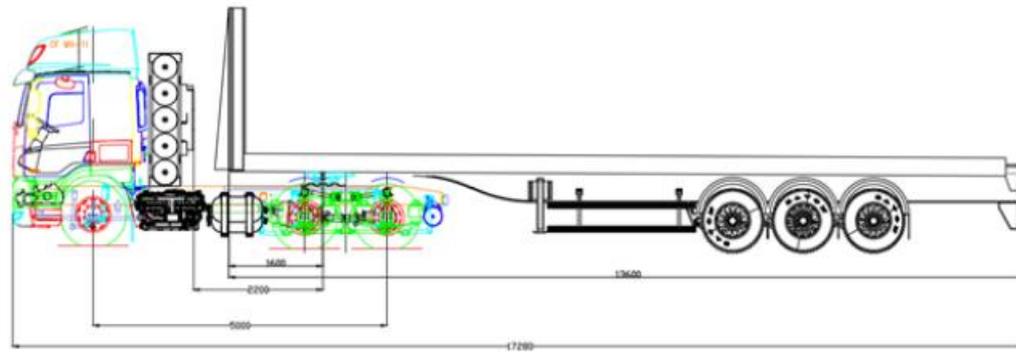
Example



Day-cab required length 17,02



Night-cab required length 17,28



Next steps

- Next steps:
 - Q1 2022: public consultation
 - Q4 2022: Commission adoption



CO2 Standards for HDVs



- Consultation stage.
- Most contentious issues:
 - Targets / phase out dates of ICEs
 - Design of incentive system
 - Introduction of carbon correction factor and/or fuel crediting system
- Commission adoption: Q4 2022



Other files 1/2



- Inclusion of road transport under the **EU ETS**: very divisive topic. Discussions focused on: need of a separate system, timeline, consequences on consumers.
- **REDII**: Rapporteur Pieper proposes to raise the target of renewable fuels and electricity in the transport sector to at least **20% by 2030** (instead of 13%) and to raise the share of RFNBOs to at least **2,6% in 2028 and 5% in 2030** (instead of 2,6% in 2030). Report adoption July 2022.
- **ETD**: Rapporteur opposes the determination of the environmental performance of energy products by the Parliament (not good), recognizes H2 as an energy carrier equal to electricity (good), and deletes EC taxation rates, stating that it is up to the Member States to decide. Report adoption date tbc.

Other files 2/2



- **Urban Mobility Framework:** action plan to further promote zero emission mobility within cities. On freight transport, need for refuelling infra in multimodal terminals. EC recommendations on SUMP to be published by end of 2022.



- **Eurovignette:** Final act signed, text to enter into force after 20 days since publication.



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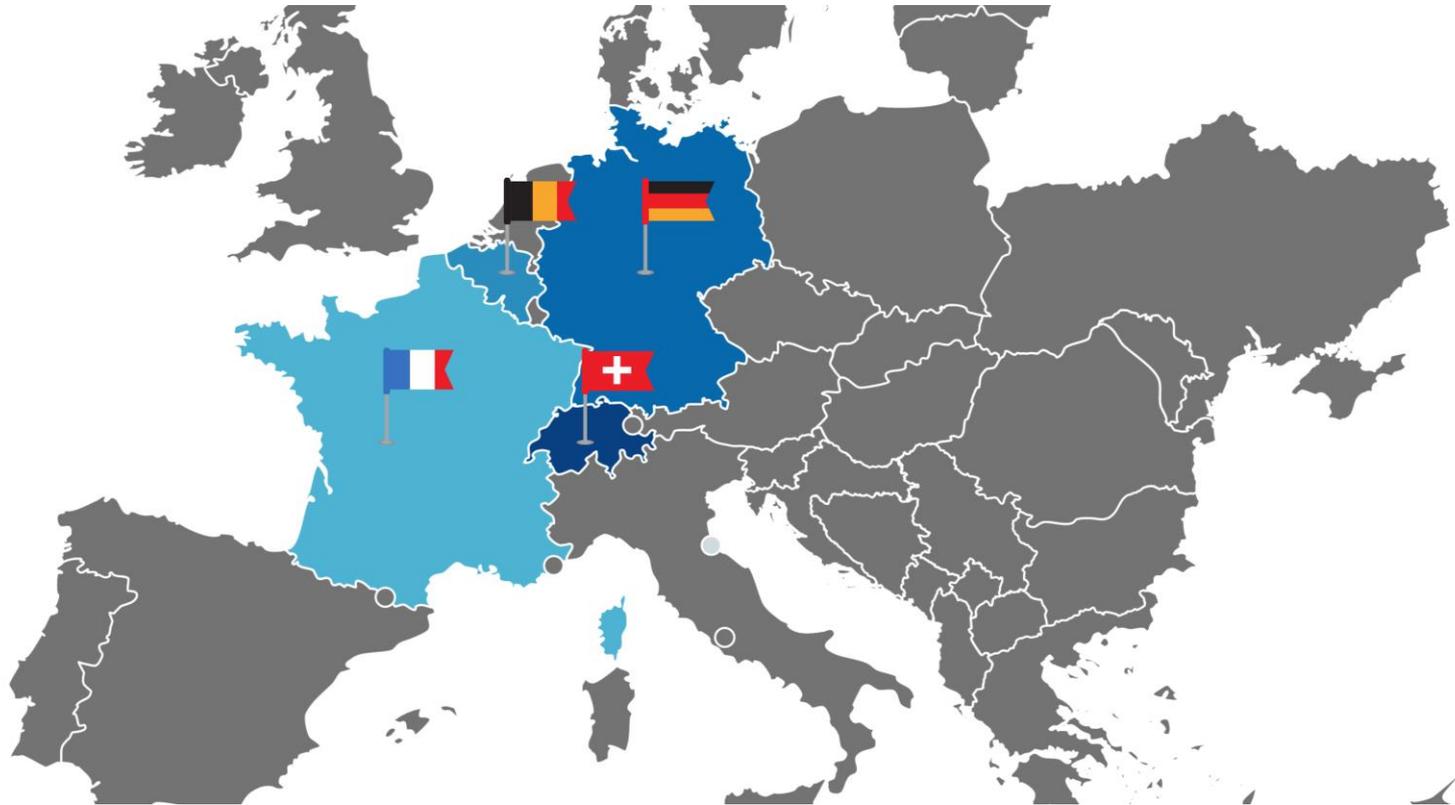


Objectives

- Develop **long-haul heavy-duty (26-44t) fuel cell trucks** that meet customers' requirements in a range of operating environments
- **Homologate three fuel cell truck types**
- **Install hydrogen refuelling infrastructure** at each site and provide high reliability hydrogen supplies that maximise environmental benefits
- **Achieve >2 million kilometres** of day-to-day driving, proving the viability of the technology
- **Monitor the performance of the vehicles and infrastructure** to provide evidence on the availability, efficiency, and environmental benefits
- Develop the business case to **prepare the European market for further roll-out** of fuel cell trucks



H2Haul deployment map





Thank you for your support!



Hydrogen
Europe

*Propelling global carbon neutrality by accelerating the
European hydrogen industry.*

12.55 - 13.00h:

Rebecca Grossberg

Interreg NWE

Closing speech

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road for a
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Thank you for your interest!

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