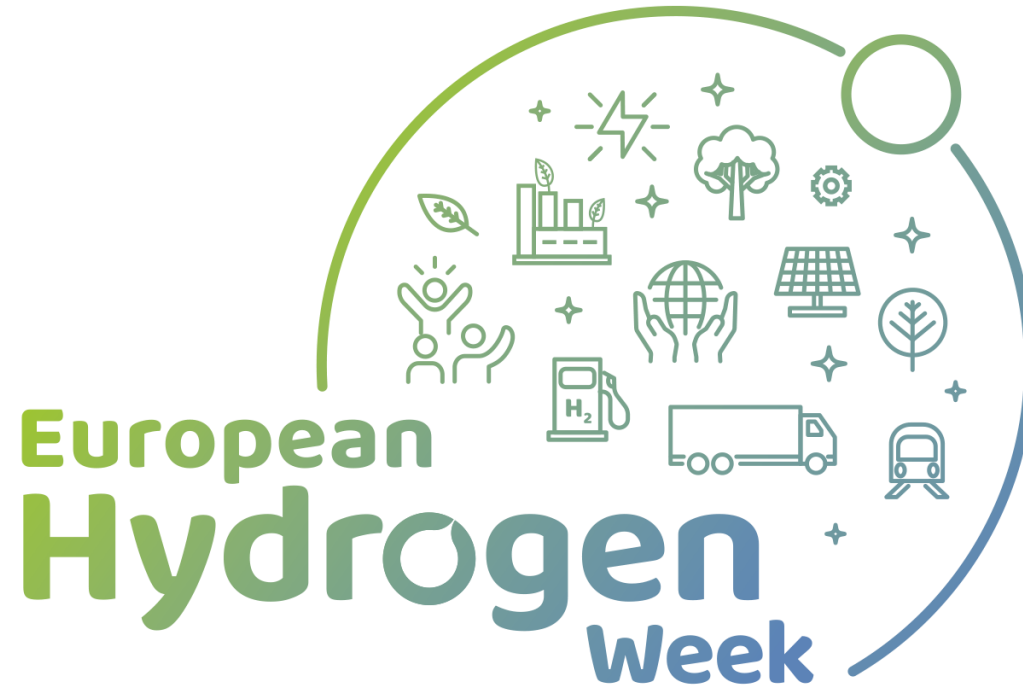




Hydrogen Fuel Cell
Trucks for Heavy
Duty Zero
Emissions Logistics



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Project Overview - H2Haul

- Call year: 2018
- Call topic: FCH-01-1-2018 - Large Scale Demonstration of H2 fueled HD Trucks with High Capacity Hydrogen Refueling Stations (HRS)
- Project dates: February 2019 - January 2024
- Total project budget: € 28,137,377
- FCH JU max. contribution: € 12,000,000

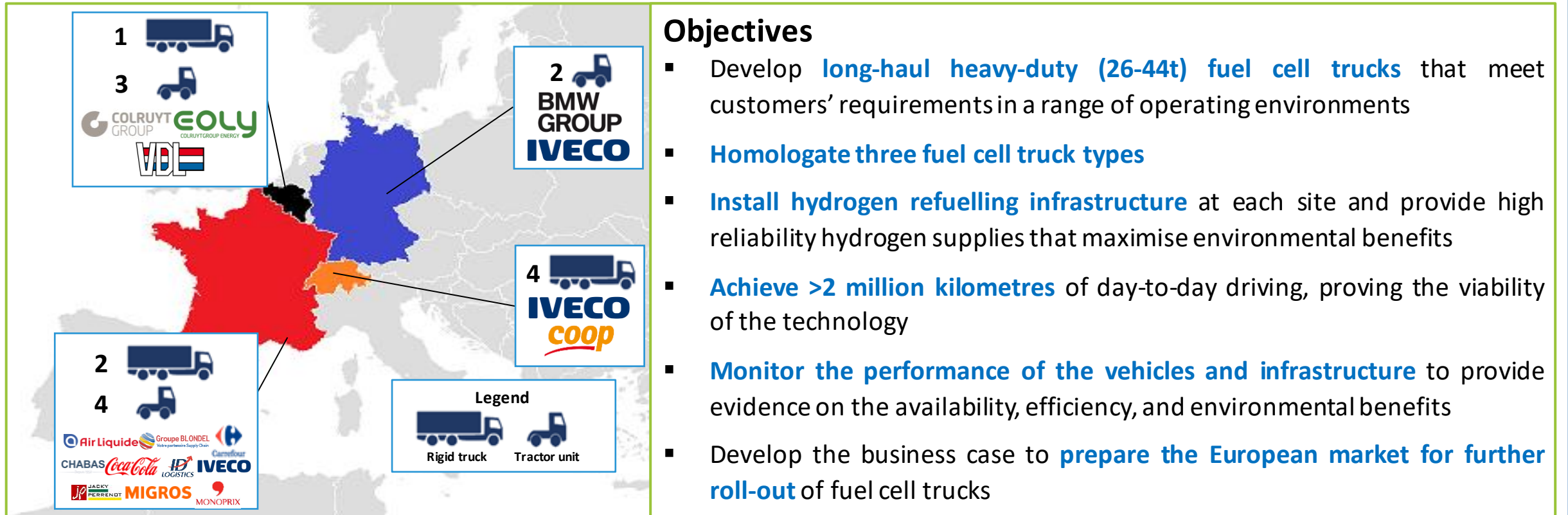
Partners:



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H2Haul Objectives



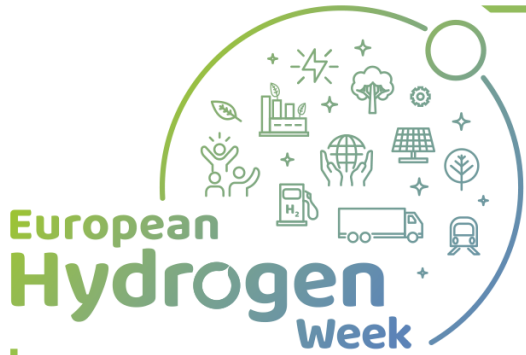
The map shows four regions with callouts:

- Region 1 (Black):** 1 Rigid truck, 3 Tractor units. Partners: COLRUYT GROUP, EOLY, VDE.
- Region 2 (Blue):** 2 Tractor units. Partners: BMW GROUP, IVECO.
- Region 3 (Red):** 2 Rigid trucks, 4 Tractor units. Partners: Air Liquide, Groupe BLONDEL, CHABAS, Coca-Cola LOGISTICS, IVECO, JACKY FERRENDI, MIGROS, MONOPRIX.
- Region 4 (Orange):** 4 Rigid trucks. Partners: IVECO, coop.

Legend: Rigid truck (blue truck icon), Tractor unit (orange tractor icon).

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 Delivery Phases



Specification of **truck requirements** and customisation or **build of vehicles**.



Assessment of proposed HRS sites. **Preparation** or expansion of **HRS**.



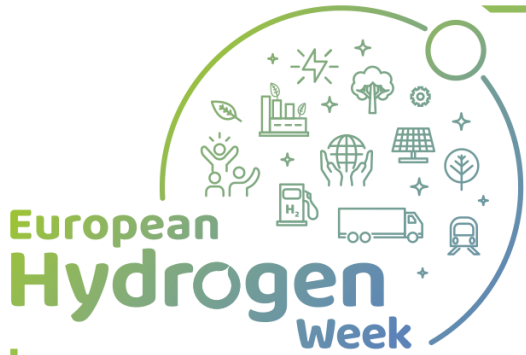
Launch of hydrogen fuel cell vehicles. Commence **real world operations** and maintenance. Scale-up of tests to **challenge performance** capabilities.



Continuous **collection, monitoring** and **analysis** of operational data, controlled in line with the **data management** principles.



Evaluation of performance and results. **Sharing of information** to consortium partners and selected end users throughout the project to leverage **learnings and best practices** to influence future developments.

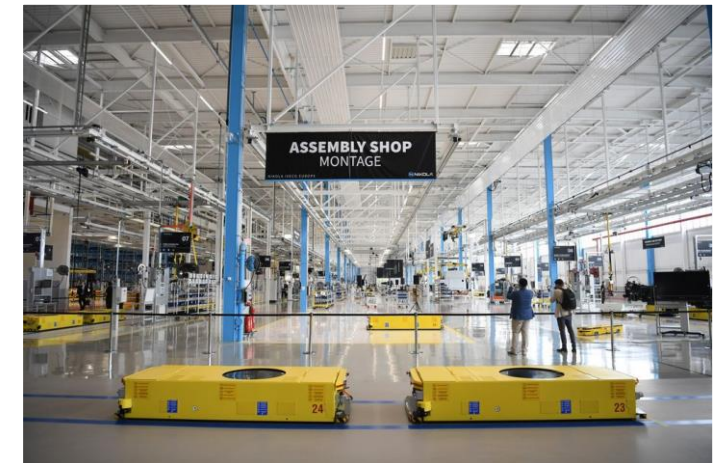
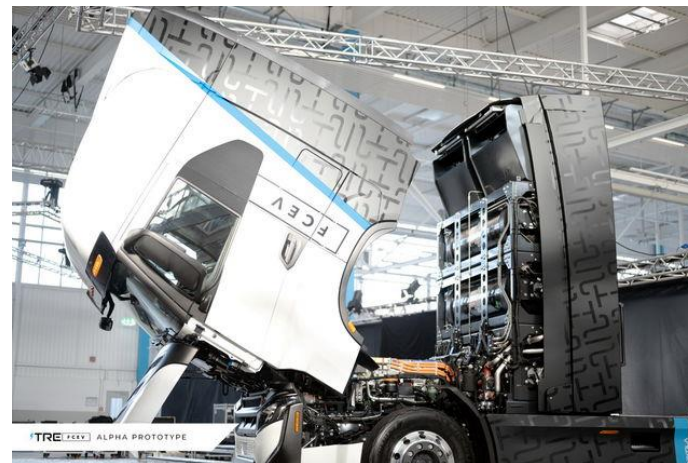
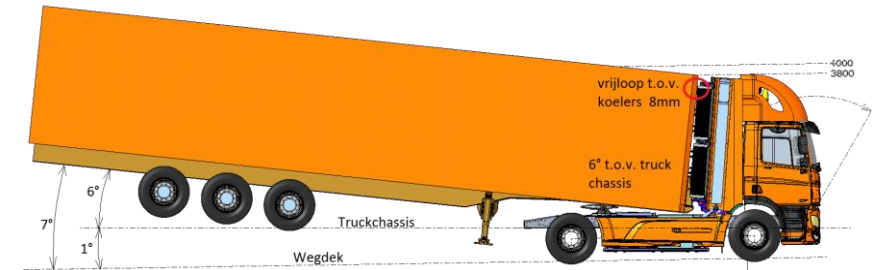
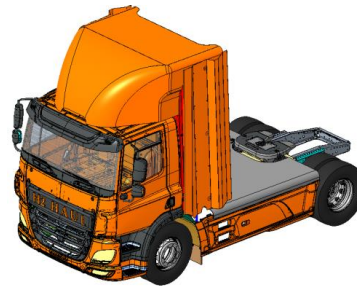


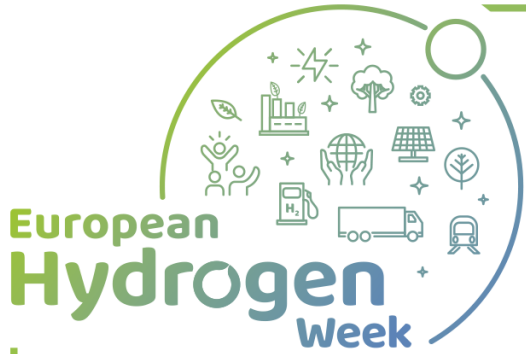
H2Haul progress to date - FC truck development

Development of fuel cell truck specifications and designs for several truck types (articulated & rigid)

Work on the first functional prototype fuel cell systems and testing of the first alpha trucks

Official opening of the IVECO/NIKOLA Ulm manufacturing site and tests of the alpha truck





H2Haul progress to date - HRS site development

Definition of specific requirements at each site, as per the HRS designs and the truck mission profiles



The two HRS in Hunzenschwil and Rothenburg, Switzerland, are fully operational and able to refuel trucks at 350 bar. Work ongoing to align data collection requirements.

All other HRS are in development, civil works and construction activities are ongoing. All HRS will be operational in 2022 in advance of the H2Haul trucks



Fos-sur-Mer, France

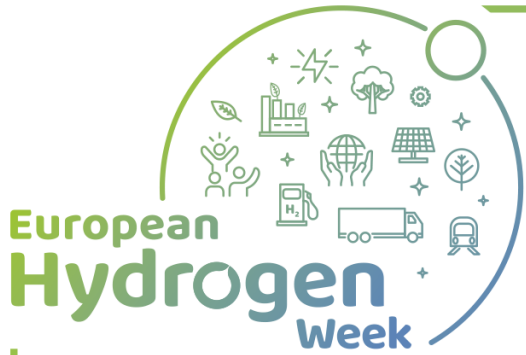


Ollignies, Belgium



Leipzig and Nuremburg, Germany





Location of Swiss HRS



2 x Dec 2022

1 x Aug; 1 x Sep 2023

4 rigid trucks from Iveco/FPT to be deployed

HRS Müntschemier and Frenkendorf opening Q1_2022



Coop distribution centre

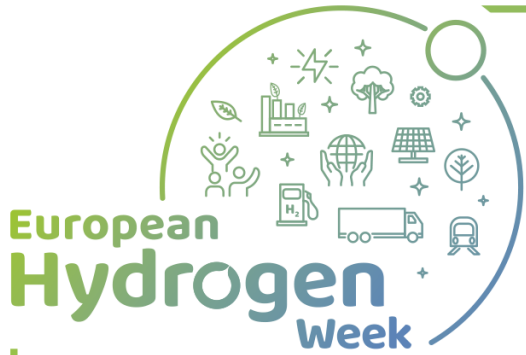


Near Swiss service partner of Iveco



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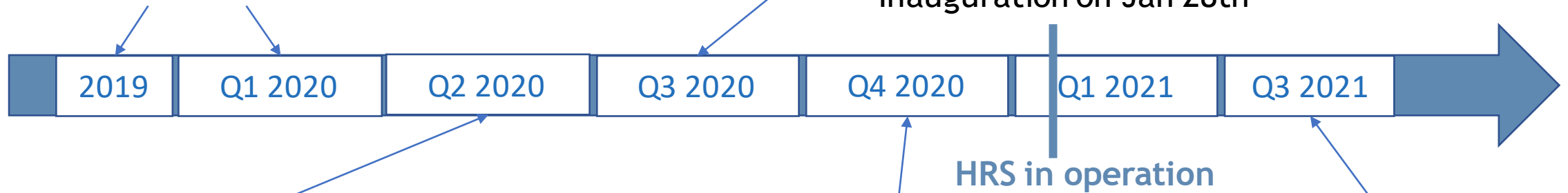


Activities to deploy HRS Rothenburg

- Selection of HRS location
- Establish collaboration with operator
- Clarifying HRS specifications
- Rough planning of HRS (e.g. layout)
- Pre-informing authorities

- Tender & award civil works contract
- Received permit

- Commissioning of HRS
- Inauguration on Jan 28th



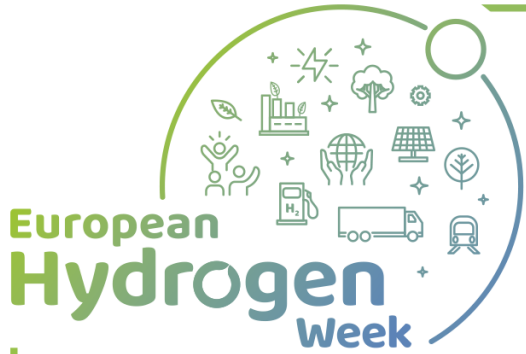
- Preparing detailed project documents
- Risk & safety assessment
- Equipment supplier selection
- Submitting request for building permit

- Civil works
- Installation of HRS equipment

- Final documentation
- TÜV certificate released

HRS Rothenburg overview





Swiss H2 trucks development

45 Customers already engaged in Switzerland

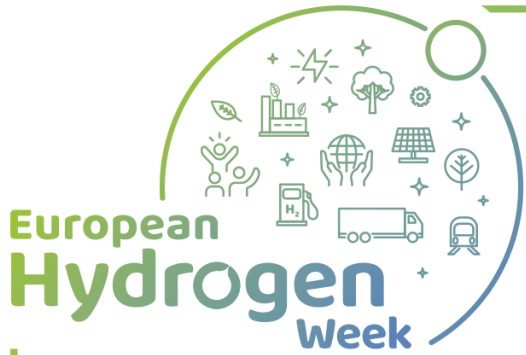
Excellent Customer feedback → > 2 Mio km in 2021 → > 700 containers exchanged → > 1'500 t CO2 Emission saving

Longest driven distance in one day : 687 km



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Key operation data - HRS Rothenburg



Operation and data recording since 28th of January 2021

Data collection on IVECO trucks will start Dec 2022.

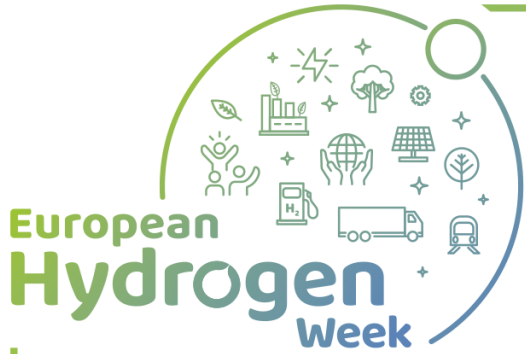
Other info to date:

H2 amount dispensed: ~ 20'000 Kg @ 350 barg

Number of swap container supplied per week: 2 - 3

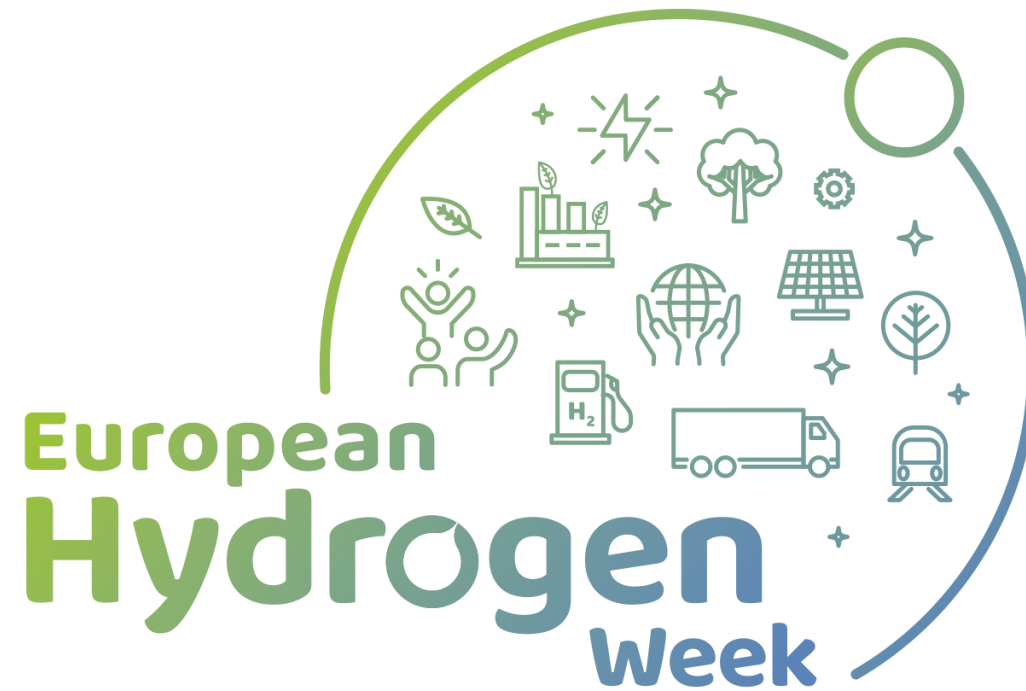
Reliability: > 95% → 2 main events reported in early phase

Refuelling of trucks	Feb - Sept
H2 refilling/ truck (kg)	16-19
refilling time (min)	7.5 - 10
vehicles/ working day (#)	4-5



Next steps

- Accompany and support operation of HRS Rothenburg
- Implement infrared-communication for truck nozzle, before IVECO trucks delivery
- Align with IVECO and define possible info exchange with infrared
- Establish efficient recording of the data stated in the performance assessment handbook



Thank you

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