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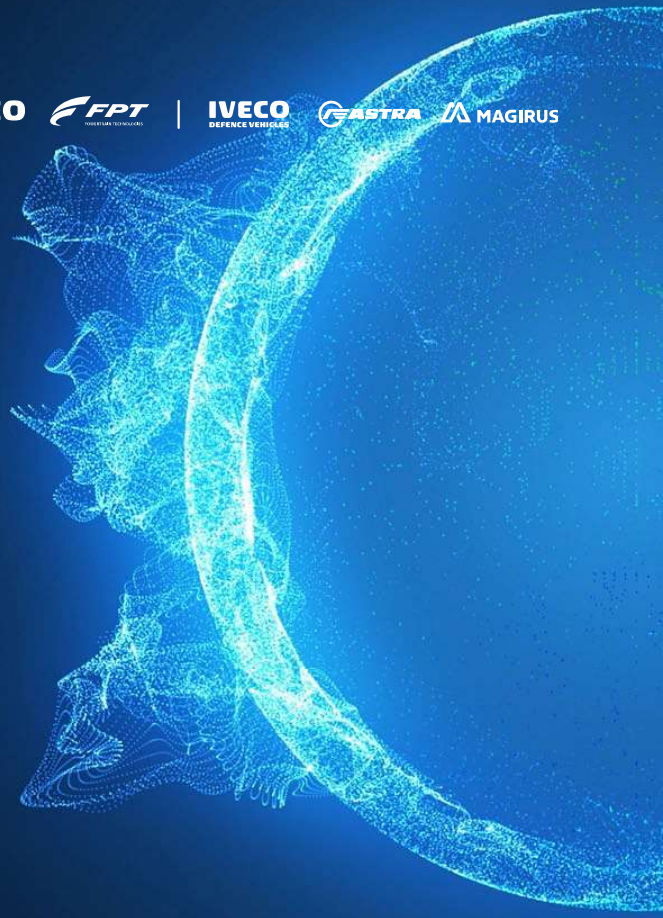
IDROGENO PER IL TRASPORTO PESANTE SU STRADA – PROGETTO H2HAUL

Federico Cartasegna

06/04/2022



ROADMAP DI IVECO PER LA DECARBONIZZAZIONE DEI TRASPORTI

GAS NATURALE

ELETTRICO

IDROGENO

IDROGENO
IL MOMENTO GIUSTO

FIT FOR 55

Frans Timmermans @TimmermansEU · 28 mag 2020

Clean **hydrogen** is one of the top priorities in our energy transition. Europe is, and can remain, a world leader if we get our investments right.

#GreenRecovery #EUGreenDeal

H2IT
Associazione Italiana Idrogeno e Celle a Combustibile

European Clean Hydrogen Alliance

Kick-starting the EU Hydrogen Industry to achieve the EU climate goals

Hydrogen Europe

FCH
Fuel Cells and Hydrogen Joint Undertaking

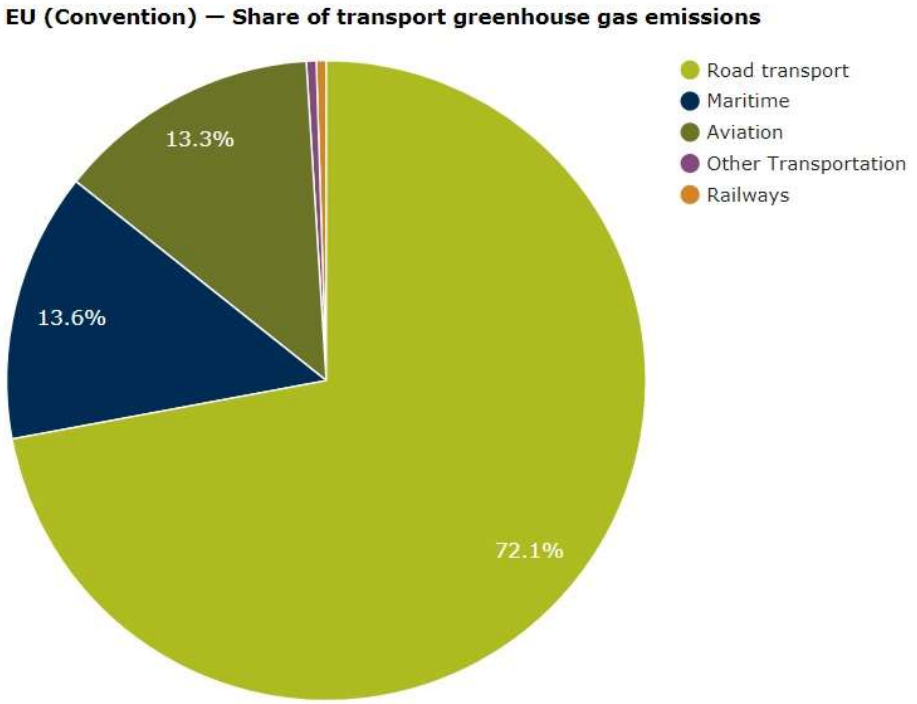
H2Accelerate

Authors: Sabrine Skiker, Amy Allsop Hydrogen Europe

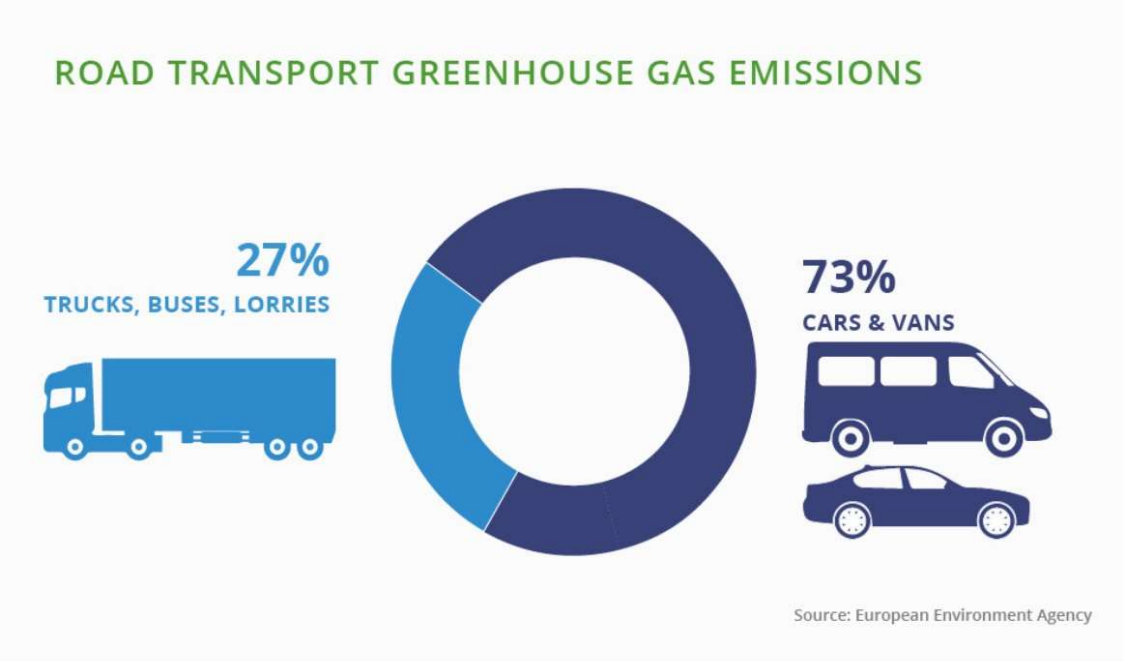
FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

Road transport sector's share of GHG emissions in Europe

- Road transport accounts for 2/3 of all transport GHG emissions
- The heavy duty sector represents nearly 1/3 of all road transport GHG emissions



Source: EEA (Nov 2018)



Council of the European Union
General Secretariat

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Source: European Council (Nov 2018)

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

Trucks in the EU – 2018-19 key figures

6.6 million

trucks were in circulation across the EU in 2018.

388,342

new trucks were sold in the EU in 2019, a 0,9% increase over the previous year.

Heavy trucks with alternative powertrains represent less than 1% of the current heavy lorry fleet.

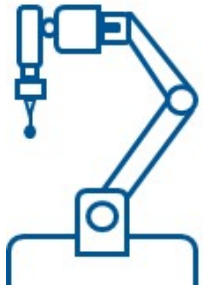
Source: ACEA, March 2020

537,186

trucks were manufactured in the EU in 2018.

59

There are 59 truck assembly plants in Europe.



98,3%

of the heavy truck fleet is powered by diesel, and 1% by petrol.

3,2 million

people were employed in the road freight transport sector

190,377

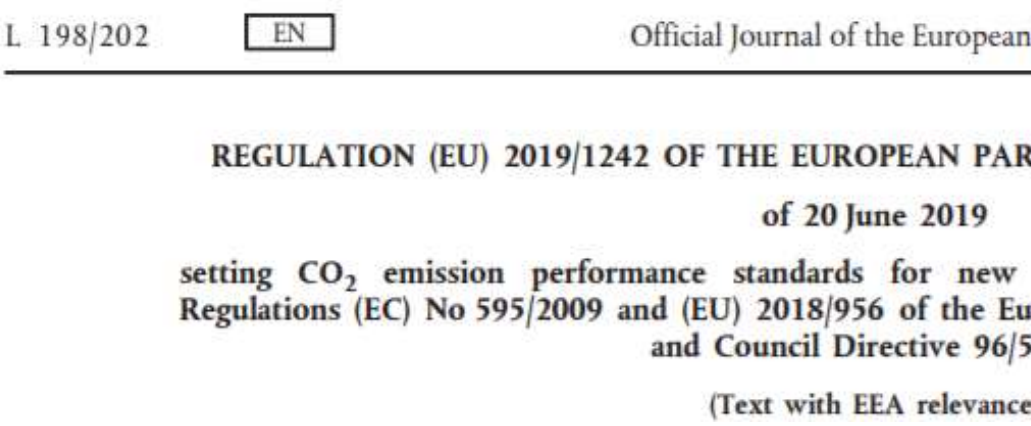
trucks over 5 tonnes were exported worldwide in 2019, worth €5.6 billion. They are responsible for a trade surplus of €5.2 billion.

12.4 years

is the average age of Europe's trucks

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

CO2 emission regulations will foster the uptake of zero emission solution



L 198/202 EN Official Journal of the European Union 25.7.2019

REGULATION (EU) 2019/1242 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 20 June 2019

setting CO_2 emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC

(Text with EEA relevance)

European Commission

European Parliament

Council of the European Union

- Targets for manufacturers: 15% CO2 reduction from 2025
  30% CO2 reduction from 2030*
- CO2 regulations for heavy-duty vehicles will require truck suppliers to develop innovative solutions.
- Substantial penalties are foreseen in case of non-compliance.

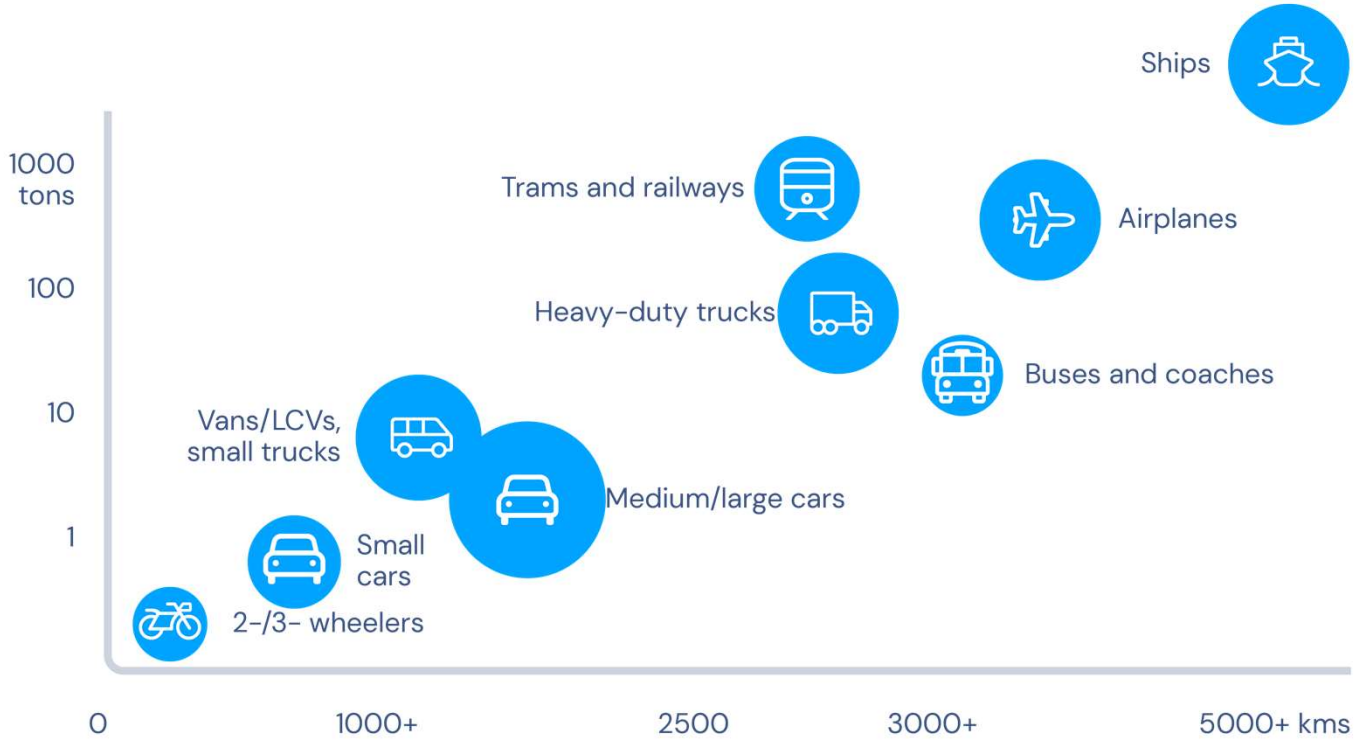
FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

*Review in 2022

Why go for fuel cell trucks?

FCEVs are the most efficient decarbonisation level for long-distances and heavy payloads

Comparison of range, payload, and preferred technology

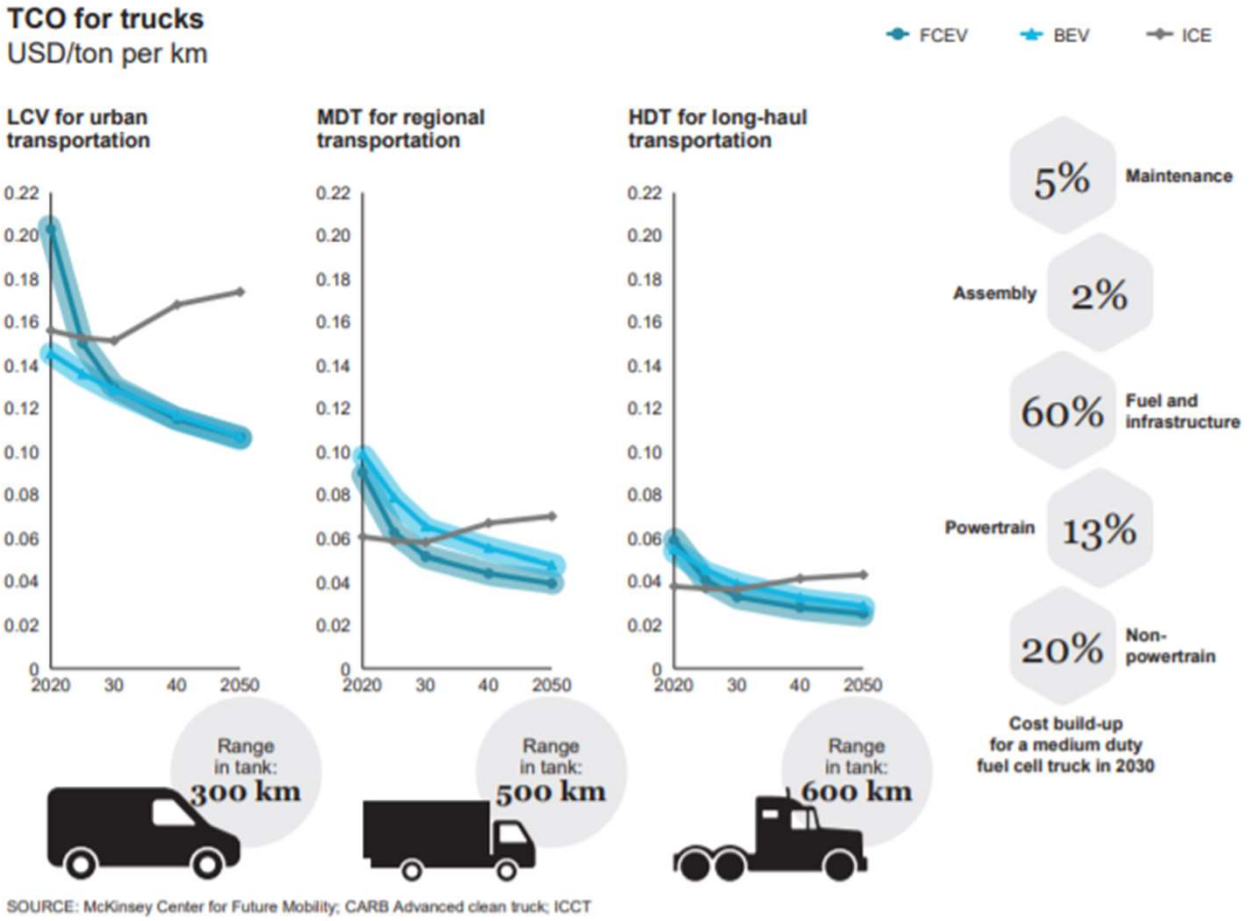


	Most attractive for BEV	Most attractive for FCEV
Airplanes/freight ships – synfuels based on H_2 as only feasible decarbonization option	n/a	
Passenger ships		✓
Medium and heavy truck segments, by attractiveness for FCEV vs. BEV		
Long-haul freight (coast to coast)		✓
Mining		✓
International road masters		✓
Regional distributor (high payload)		✓
Regional distributor (low payload)		✓
Local drop and drive		✓
Medium and large car segments, by attractiveness for FCEV vs. BEV		
Off-road, utility and military vehicles		✓
Taxis, limousine services		✓
Service fleets		✓
SUVs		✓
D segments for private use		✓
A-C segment for private use		✓

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

Source: Hydrogen Roadmap for Europe, 2019

Economics of fuel cell trucks: cost parity expected before 2030

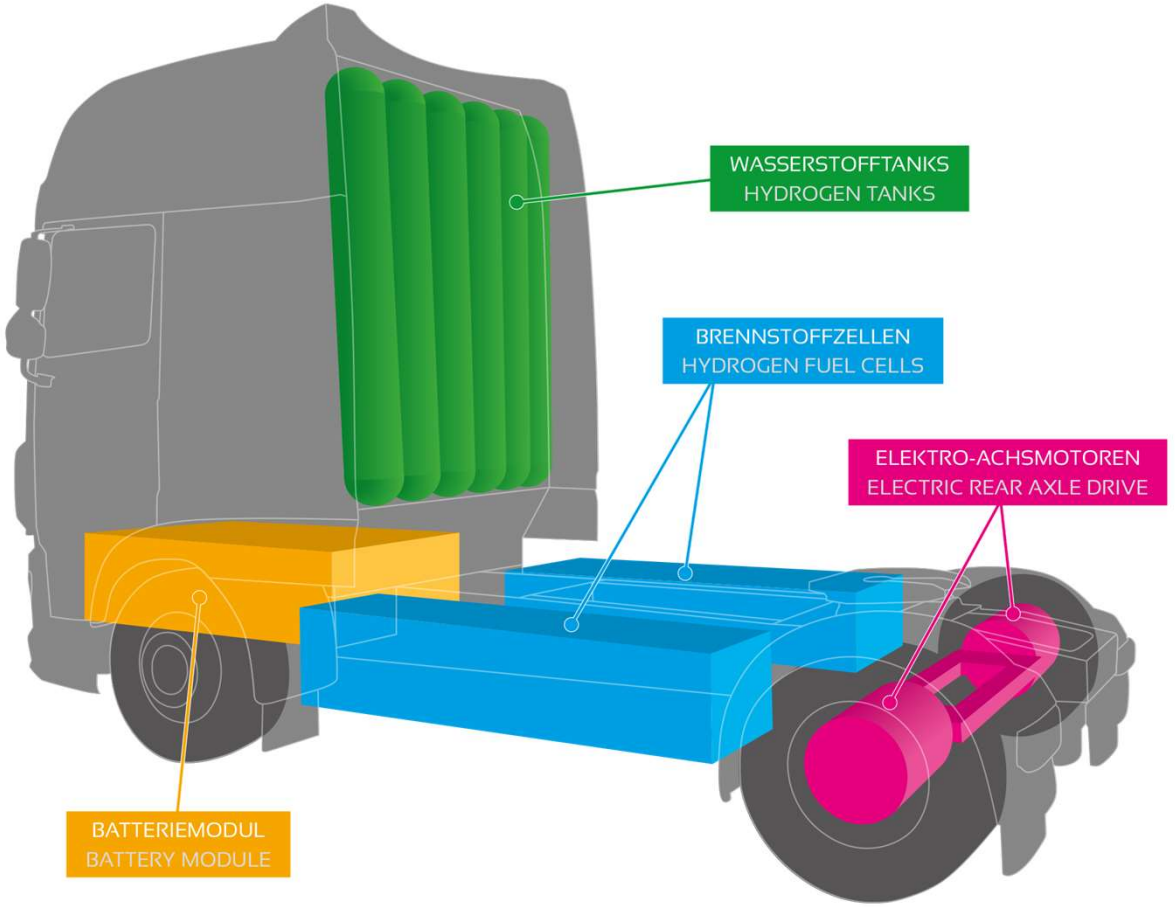


Source: [‘Path to hydrogen competitiveness A cost perspective’ study]

Joint venture between NIKOLA and IVECO/FPT to develop BE and FC trucks

- European joint venture announced on Dec 3d 2019 to develop and distribute FC and BE trucks for the European market.
- NIKOLA TRE fuel cell version available in 2024
- Truck based on the new IVECO S-WAY platform
- 800 km range

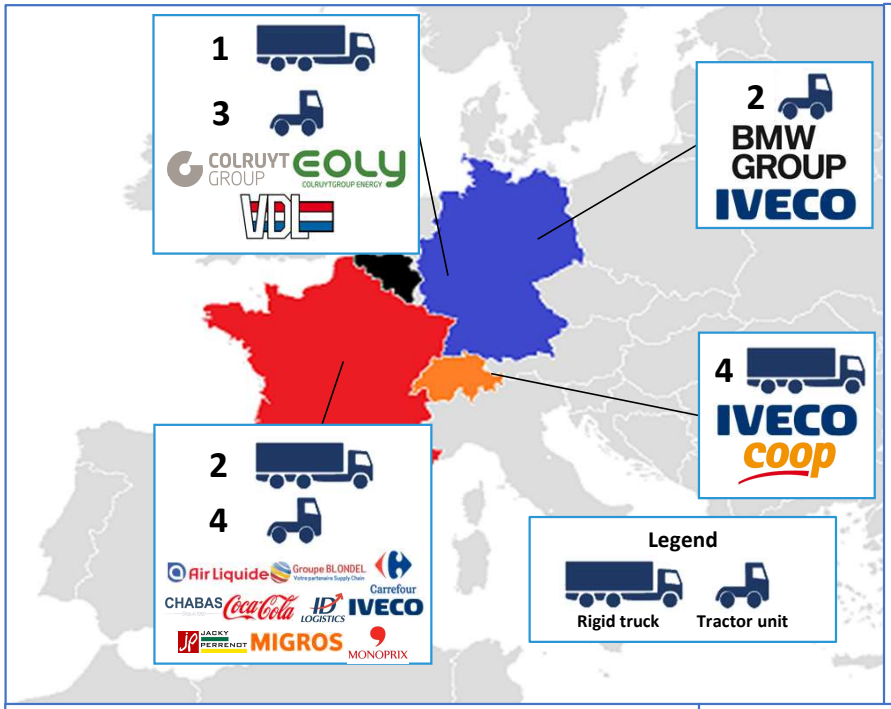
How does a fuel cell truck work?



Please note that this is one example of a fuel cell truck architecture

Source: Clean logistics

H2 Haul: deploying 16 heavy-duty trucks across four European countries



Objectives

- Develop **long-haul heavy-duty (26-44t) fuel cell trucks** that meet customers' requirements in a range of operating environments
- **Homologate fuel cell trucks**
- **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

Vehicle, component, and infrastructure suppliers

Air Liquide · BOSCH · elringklinger · FPT · H2energy · IVECO · POWERCELL · VDL

Coordination, dissemination & analysis

elementenergy · Hydrogen Europe · IRU PROJECTS · sphera

Observer Group

A.E.B.T.R.I. · Ahold Delhaize · antram · astic · BeMobility · BGL · Groupe BLONDEL · BMW GROUP · Carrefour · CETM · Coca-Cola · CHABAS · COLRUYT GROUP · coop · DELANCHY · DHL · FEBETRA · ID LOGISTICS · IRHA · JACKY PERRENOT · MALHERBE · MIGROS · MONOPRIX · ÖLGERÐIN · PETER APPEL Transport · AUTOMOTIVE INDUSTRY NL · STEF · SVERIGES ÅKERIFÖRETAG · TÜVRheinland · UNTRR · XPO Logistics

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

H2Haul partners

Coordination, dissemination, analysis

elementenergy an ERM Group company
Hydrogen Europe
IRU PROJECTS
sphera
WaterstofNet

Belgian deployment

COLRUYT GROUP
Shipper
VDL
Manufacturer
EOLY COLRUYTGROUP ENERGY
Hrs provider
elringklinger
Fc supplier

French deployment

Groupe BLONDEL Votre partenaire Supply Chain
CHABAS Depuis 1950
Carrefour
JP JACKY PERRENOT
Shipper/haulier
FPT POWERTRAIN TECHNOLOGIES
IVECO
Manufacturer
Air Liquide creative oxygen
Hrs provider
BOSCH
POWERCELL
Fc supplier

German deployment

BMW GROUP
Shipper
FPT POWERTRAIN TECHNOLOGIES
IVECO
Manufacturer
BOSCH
POWERCELL
Fc supplier

Swiss deployment

coop
Shipper
FPT POWERTRAIN TECHNOLOGIES
IVECO
Manufacturer
H2energy
Hrs provider
BOSCH
Fc supplier

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

Swiss project summary – local project coordinator: H2Energy

H2Haul will demonstrate:

- 4 x IVECO trucks completing 60,000 - 85,000 km/year per truck
- The trucks will be used to distribute goods to Coop stores
- An HRS at 350bar will be developed for back to back refuelling of 4 trucks in 1 hour, with 100% local renewable energy

French project summary – local project coordinator: Air Liquide

H2Haul will demonstrate:

- 5 IVECO trucks - up to 80.000 km/year per truck – operated by Blondel, Chabas, ID Logistics, Malherbe and Perrenot will distribute goods (including Coca-Cola's) to Carrefour shops and other end-users.

- 1 IVECO truck - up to 80.000 km/year per truck: Air Liquide will distribute hydrogen from production centres to HRS and other industrial customers.
- An HRS will be developed in Fos-sur-Mer supplied with low-carbon hydrogen at 350 and 700 bar from electrolysis

Air Liquide creative oxygen · Groupe BLONDEL Votre partenaire Supply Chain · BOSCH · Carrefour · FPT POWERTRAIN TECHNOLOGIES · IVECO

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING · JACKY PERRENOT · TC · POWERCELL

Belgian project summary – local project coordinator: Colruyt group

H2Haul will demonstrate:

- 3 VDL tractors + 1 VDL rigid truck – Min. 40,000 km/year per truck.
- The trucks will be operated by Colruyt group and based at one of the distribution centres in Belgium.
- The trucks will distribute goods between the distribution site and retail sites.
- A new hydrogen refuelling station for heavy duty vehicles, at 350 bar, will be built in Ollignies.

German project summary – local project coordinator: BMW

H2Haul will demonstrate:

- 2 IVECO truck - 40,000 km/year per truck.
- Operated by a German logistics provider on behalf of BMW, the trucks will transport parts between Bavaria (Nuremberg) and Leipzig (BMW-Plant), supported by two new HRS.

THE H2HAUL PROJECT HAS RECEIVED FUNDING FROM THE FUEL CELLS AND HYDROGEN 2 JOINT UNDERTAKING UNDER GRANT AGREEMENT NO 826236. THIS JOINT UNDERTAKING RECEIVES SUPPORT FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME, HYDROGEN EUROPE AND HYDROGEN EUROPE RESEARCH.

www.h2haul.eu

IVECO & NIKOLA

Stabilimento di ULM

- SUPERFICIE: 50.000 MQ (25.000 COPERTI).
- PRODUZIONE: 1000 UNITÀ ALL'ANNO.
- LO STABILIMENTO OPERERÀ SECONDO I PRINCIPI DEL WORLD CLASS MANUFACTURING (WCM).

NIKOLA Tre BEV

NIKOLA Tre FCEV

INFRASTRUTTURE CHIAVE DI VOLTA PER LO SVILUPPO DELLA FILIERA

PROGETTO CORRIDOIO SCANDINAVO - MEDITERRANEO

- QUINTO DEI DIECI ASSI PRIORITARI DEL SISTEMA DI RETI TRANSEUROPEE DEI TRASPORTI (TEN-T), CON UNA LUNGHEZZA DI 7.500 KM.
- **SCAN-MED** INFRASTRUTTURA FONDAMENTALE PER LE RELAZIONI COMMERCIALI TRA NORD AFRICA ED EUROPA E PER LO SVILUPPO INTEGRATO DELLA FILIERA DELL'IDROGENO.
- **4, 6** MT DI CO2 RISPARMIATE OGNI ANNO SE NEL **2030** METÀ DELLA FLOTTA DI VEICOLI PESANTI LUNGO IL CORRRIDOIO VENISSE ALIMENTATA AD IDROGENO.
- PER RAGGIUNGERE QUESTO OBIETTIVO SAREBBERO NECESSARIE **218** STAZIONI DI RIFORNIMENTO, **39.000** VEICOLI PESANTI E **328.000** TONNELLATE DI IDROGENO RINNOVABILE.

NUMERO DI STAZIONI DI RIFORNIMENTO PER IDROGENO LUNGO IL CORRIDOIO SCAN-MED NEL **2030**

PRIORITÀ PER LO SVILUPPO DELLA FILIERA

- Avviare subito la costruzione delle stazioni di rifornimento a 700 bar sui principali assi autostradali, un impegno correttamente assunto dal Governo italiano con il PNRR, e che necessita ora di una rapida implementazione.
- Definizione di standard tecnici univoci e omogenei in tutta Europa, proprio per la natura transnazionale del trasporto merci.
- Necessario assicurare che la disponibilità di idrogeno, prodotto o importato, sia tale da rendere competitivo il prezzo finale della materia prima per gli autotrasportatori.
- Stabili e pluriennali misure di supporto alla domanda per ridurre differenziale di prezzo tra veicoli FCEV e veicoli ad alimentazione tradizionale.
- Assicurare sostegno alla Ricerca & Sviluppo del settore (IPCEI – PNRR).