

V O L V O

HYDROGEN IN TRANSPORT

Volvo Group

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- Volvo Group
- Drivers for renewable fuels
- The way towards net zero emissions 2050
- Different types of hydrogen and their well to wheel emissions
- Green hydrogen initiatives and Volvo's engagements



Volvo Group

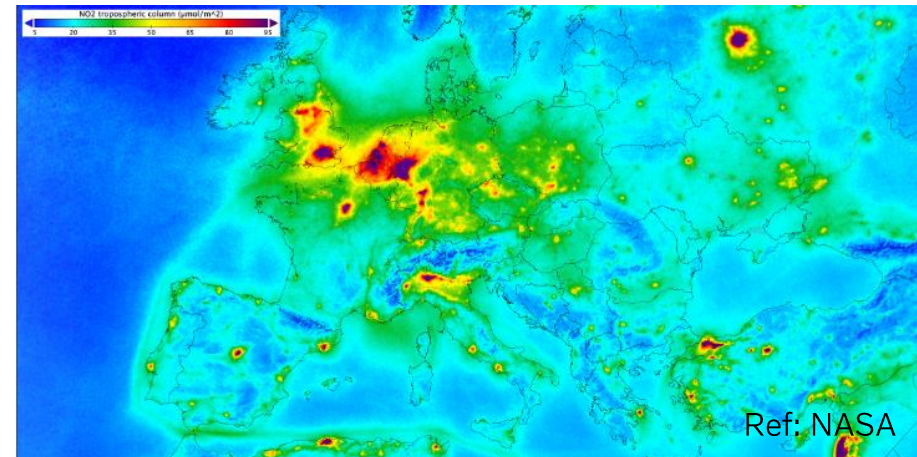
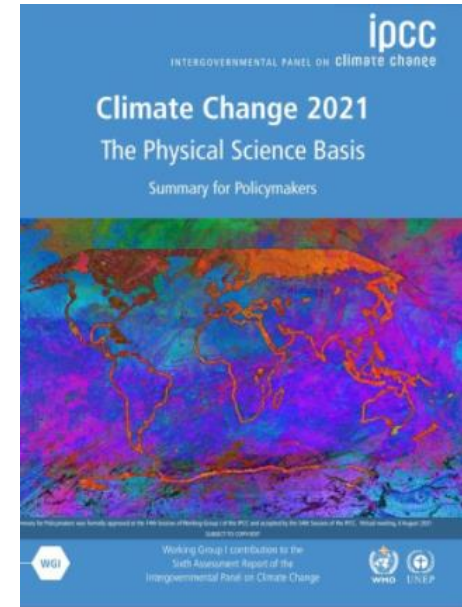
Volvo Group offers trucks, buses, construction equipment, power solutions for marine and industrial applications, financing and services that increase our customers' uptime and productivity.

We contribute to the development of electrified and autonomous solutions for the benefit of customers, society and for the environment.



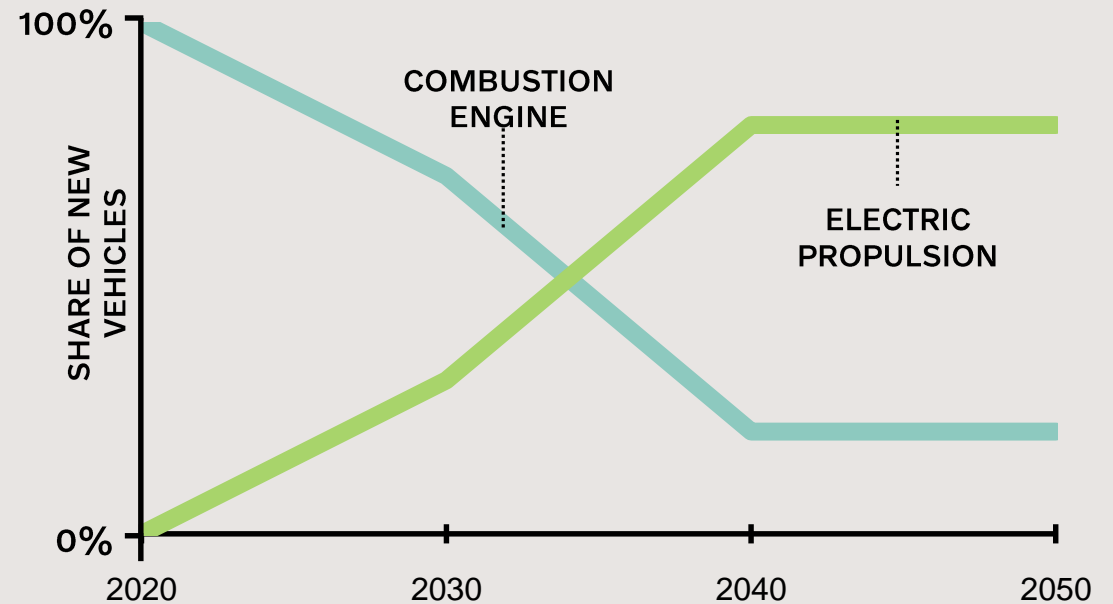
Drivers for Renewable Fuels

- Climate change
- Availability of energy resources and projected increasing demand
- Security of supply
- Emissions, regulated and unregulated
- Urbanisation and noise
- Customer and transport buyers

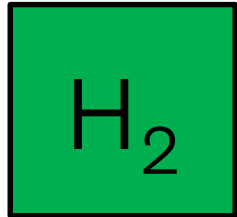


Accelerating the sustainable transformation 100% fossil-free fuel

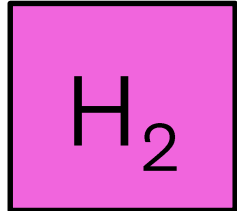
- In order to deliver on our commitment to the Paris Agreement, the entire running fleet, provided by Volvo Group, needs to run on **100% fossil-free fuel by 2050**.
- To contribute to an emissions-free future, there will be a **steady shift into electric propulsion**, and combustion engines will run on biofuel.
- Our ambition is for **100% of our products to be driven by fossil-free fuels by 2040**, as our products have an average life-span of 10 years.



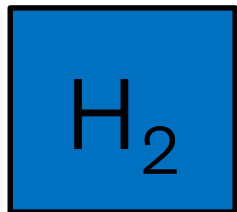
Green/Pink/Blue/Grey H₂



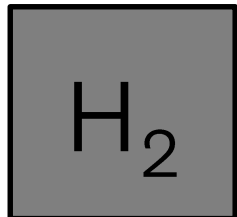
- Electrolysis (PEM or Alkaline)
- From water and power
- Renewable energy
- 100% CO₂ emissions reduction



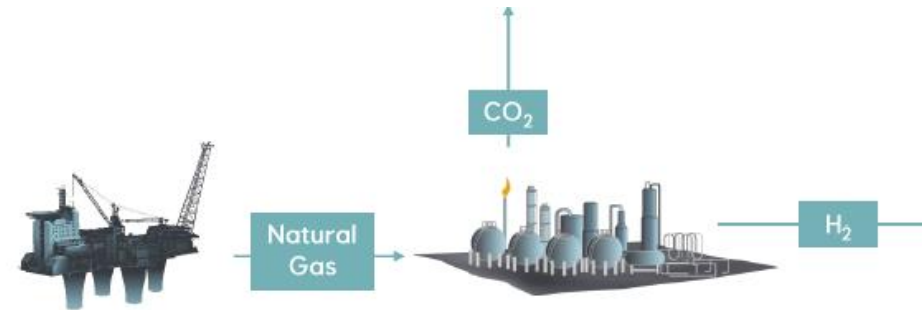
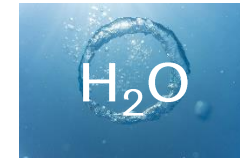
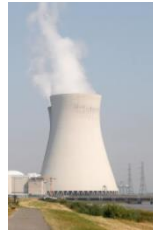
- Electrolysis (PEM or Alkaline)
- From water and power
- Nuclear energy
- 100% CO₂ emissions reduction



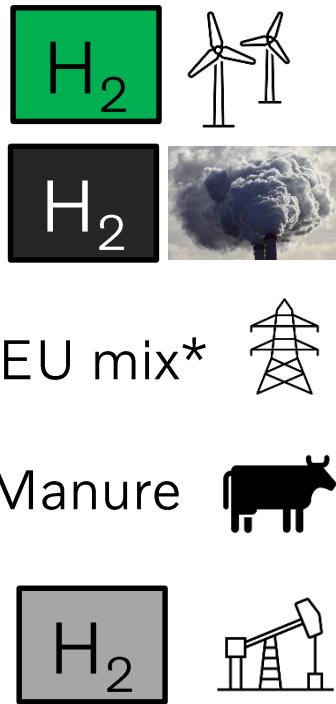
- Steam methane reforming
- From natural gas
- With CCS/CCU
- 70% CO₂ emissions reduction*



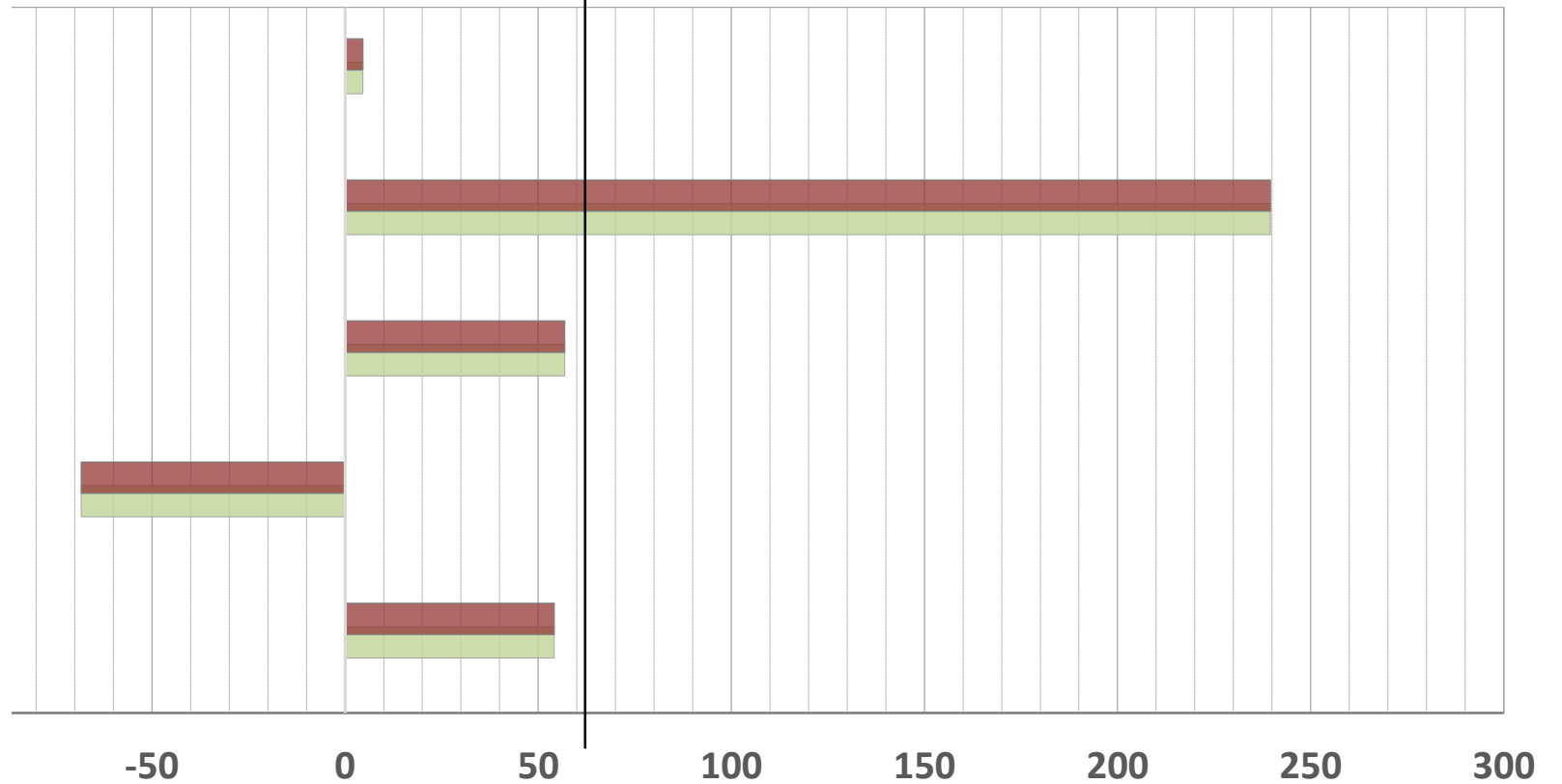
- Steam methane reforming
- From natural gas
- Without CCS/CCU
- 1 ton H₂ => 8 ton CO₂ emissions



Well to wheel CO2 eq for H2 in FC from different sources



B7 WTW



gCO2e/tkm

■ WTW ■ WTT ■ TTW

Ref: JEC WTW 2020

* EU mix 2030



First Movers
Coalition



VOLVO
United Nations
Climate Change



**UN CLIMATE CHANGE
CONFERENCE UK 2021**
16-18 November 2021, Glasgow

First Movers
Coalition

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VOLVO CONTRIBUTES!

Paris Agreement

- Net-zero greenhouse gas emissions by 2040
- Lower the CO₂ emissions with 40% per vehicle km by 2030 for our trucks and buses
- Lower the CO₂ absolute emissions with 30% by 2030 for Volvo CE
- Lower the CO₂ absolute emissions with 37.5% by 2034 for Volvo Penta



cellcentric

A Daimler Truck & Volvo Group Company

- Intend to create a joint venture for development and large-scale production of fuel cells
- Building on existing assets to shorten time to market
- Joint investment demonstrates commitment to fuel cells as an attractive option for heavy loads and long haul



Volvo Energy

Volvo Group's business area dedicated to accelerating electrification and sustainability.

- Charging solutions for battery electric vehicles.
- Repurposed (second-life) and recycled batteries.
- Hydrogen infrastructure solutions for fuel-cell electric vehicles.



Charging infrastructure

- Install and operate public charging network for long haul trucks and coaches
- Initiate fast development of charging infrastructure



Volvo Group and SSAB to collaborate on the world's first vehicles of fossil-free steel

Volvo Group and SSAB have signed a collaboration agreement on research, development, serial production and commercialization of the world's first vehicles to be made of fossil-free steel

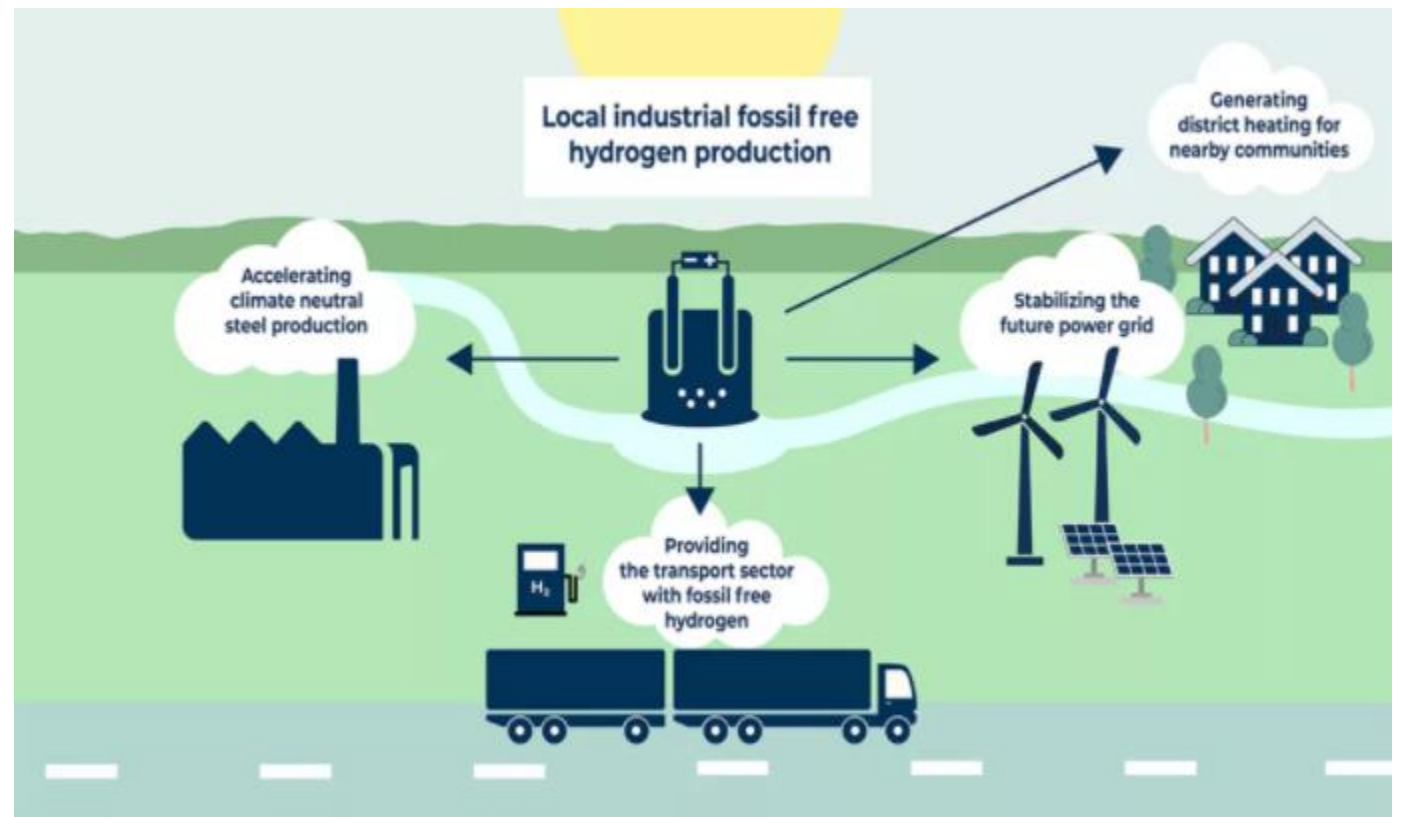
Volvo plans already this year to start the production of concept vehicles and components from steel made by SSAB using hydrogen



OVAKO and Volvo collaborates

[Ovako](#) builds Sweden's largest fossil-free hydrogen facility

- Reduce CO2 emissions
- Develop local industrial hydrogen production
- Future hydrogen infrastructure for the transport sector
- Enable large-scale and cost-effective production of hydrogen for applications



Summary

Volvo Group is a global company and contributes to sustainable transports through

- Developing sustainable vehicles
- Transforming from fossil to renewable fuels
- Creating partnerships

