NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

Hydrogen cars and hydrogen refuelling stations in Norway – up and downhills the last 20 years

Oddvar Røyset, Leader, HYBIL

HYBIL FOUNDED 2018- Purpose

Promote interests of **Norwegian hydrogen car owners, hydrogen benefits** and the **hydrogen-based mobility transport segment**

- **Discussio**n, Information, Knowledge
- **Information** to and influencing **authorities and decision makers**
- **Hydrogen infrastructure in the order:** Production plants => Refuelling stations => Transport => Marine => Heavy duty => Construction => Vans and Cars
- **Infrastructure support and Incentives; Taxes, road tolls, parking, other benefits**
- **International business and cooperation**
- An uniue organization worldwide for hydrogen car owners

NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

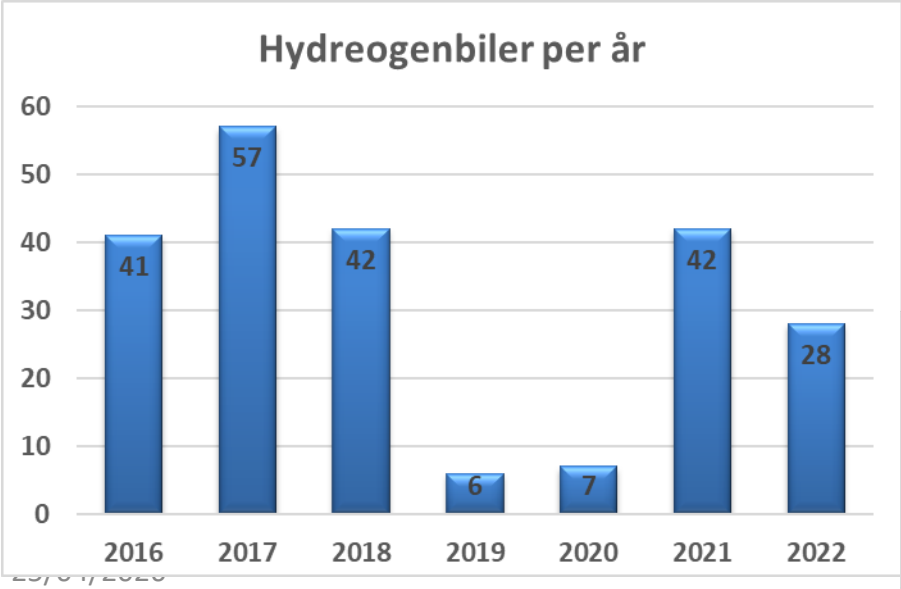
Hydrogen car since 2000

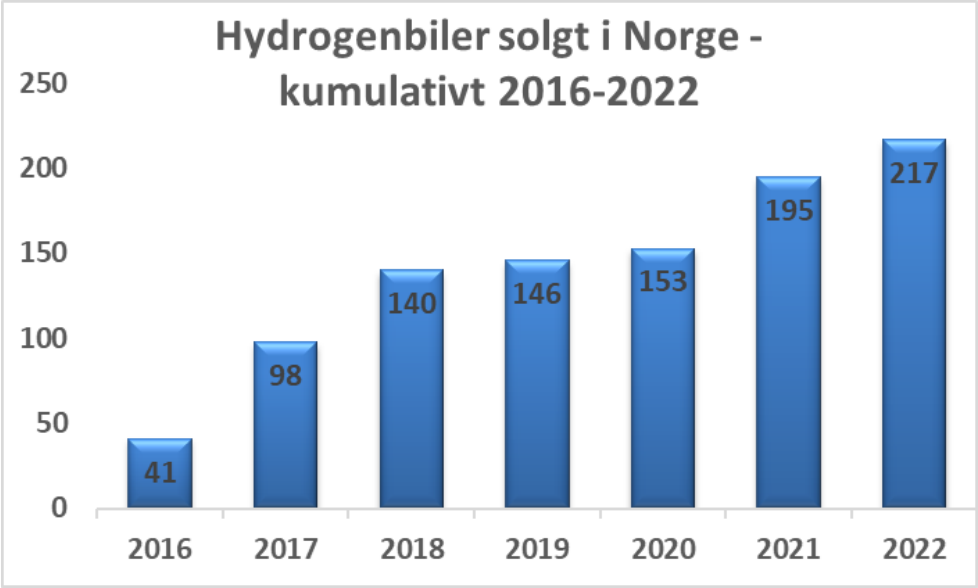
- Cars (~70 000 vehicles)
  - Toyota Mirai Sedan - MI 2015-19, MII 2020
  - Hyundai SUVS's IX35 2012-2017, NEXO from 2018 , 2026?
  - Honda Clarity from 2018 – only USA
  - Think BEV - FCEV !! 2010-12 First FCEV car Made in Norway!
  - BMW IX35 (750 km) from 2028
- Car Prototypes from 2000 –
  - Mazda, Mercedes, Stellantis, Renault, Ford, Vans, pickups -20++ brands
- Busses, Trucks, and Trains (5000 ++ units)
  - Long distance, continious operation - 20 ++ brands
- Marine vessels and long haul trucks – most promising?
  - 3 Norwegian ferry projects,
  - Lightweight carrier boats ?
  - Several marine long distance vessels?

Made in Norway!

NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

- Up to 300 Hydrogen cars sold in Norway + 10 - 20 busses & trucks
  Car market in Norway at hold from 2024 - 2026
- Due to limited HRS (hydrogen refuelling stations) especially in the Oslo Area



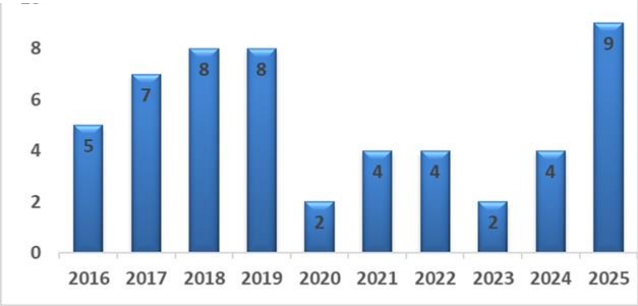


NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

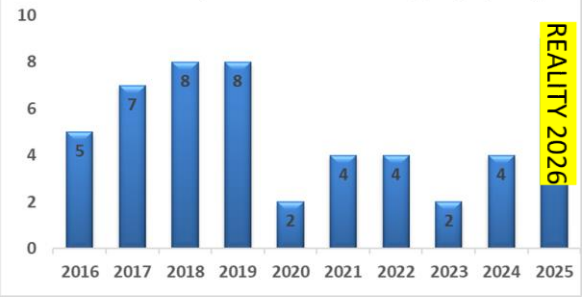
HYDROGEN REFUELLING STATION (HRS) HISTORY 2006- 2026 – Norway- Frontrunner in HRS deployment from 2006-2016
14 HRS have been installed - but did the dreams come true?

2006 - 2011	STATOIL	Stavanger - HYNOR project Hydrogen and CNG
2007 - 2019	Norsk Hydro	Porsgrunn
2011 - 2018	HYOP AS	4 stations - Gardemoen, Kjeller, Blinden, Porsgrunn
2019 - 2026	HYNION AS	Høvik 2019-2025 , Tests Porsgrunn
2012 - 2021	Oslo/RUTER	Rosenholm, Holmlia, 4 Bus, 4 cars
2016 - 2019	UNO-X	Sandvika, Bergen, Skedsmo (Hvam)
2021 - 2023	Everfuel	Bergen, Hvam, Oslo (Alnabru) (UNO-X stations 2021-23)
2017 +	ASKO	Trondheim (Tiller) – 2 - 4 Trucks, Taxies, cars, 30++ cars
2024 +	VIREON AS Berlevåg	Hellesylt, 2024 , hydrogen mostly for export ! Berlevåg 2026 - Local Energy company – 5 cars
2024 - 2025	ENOVA Truck companies	Support 4-6 TRUCK HRS to VIREON AS: Hamar, Dombås, Vinje, Alvdal, Skedsmo, Stavanger Cancelled by 2025 - limited finance & future guaranties
2006-2026		3 stations in operation by 2026 14 stations have been in operation and for test purposes

Expectation of 9 HRS by 2025-26



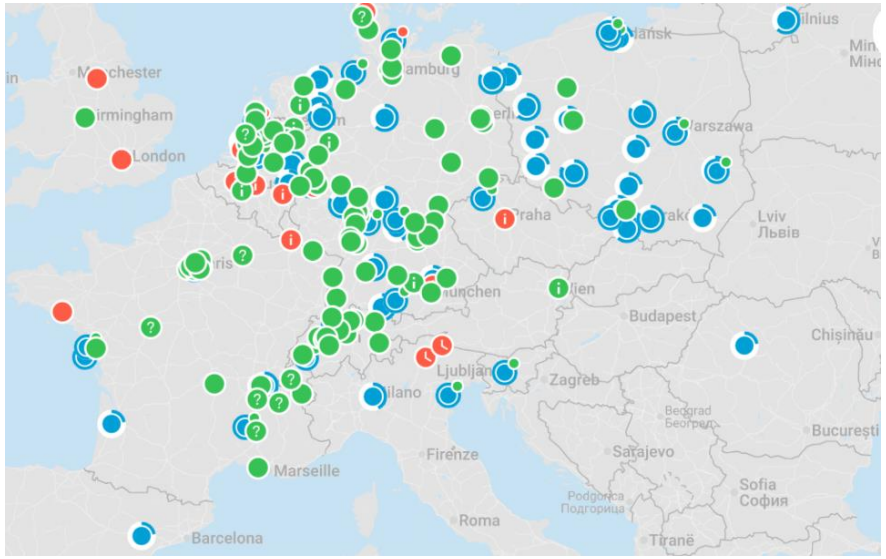
Reality 3 HRS in operation 2026



NORSK HYDROGENBILFORENING

Hydrogen Refuelling Stations (HRS)

- WORLD WIDE 1200 - 1400 by 2026 – rapidly growing in ASIA
  - Europe ~350
  - US ~100 (60 California)
  - Asia (CN, JP, KR) ~800 ++ fast growing in CN (500+)
    300 ++ (KR)
- Scandinavia 20 - 40
  - NO up to 14 by 2023 ~ 3 by 2026
  - DK up to 10 by 2023 ~ 2 by 2026
  - SE ca 10 by 2025, ~20 by 2026
  - IC 2 not in operation
  - FI 1 (4 by 2028 - 30)



NORSK HYDROGENBILFORENING

Norwegian ENOVA HRS support cancelled 2025

- ENOVA support 2024 of up to 6 HRS i South Norway cancelled

ENOVA plans stopped by 2025

- **Sweden takes action since 2023**
  - Support grants up to 30 - 50 HRS stations
  - Private companies build
  - ~20 HRS stations built and ready by 2026
  - Customers ? Truck rollout expected from 2028 -2032?

10 installed by 2026 by HYDRI Sveden
~10 HRS by other energy companies

WWW.HYBIL.NO ©

NORSK HYDROGENBILFORENING

Hydrogen-trucks necessary to sustain a commercial HRS - market ?

- **Several brand are marked ready ?**
- **EU:** Volvo, Scania, Daimler, BMW, Iveco
- **USA:** Nikola (Iveco), Toyota/Kenworth m.fl
- **ASIA:** Hyundai, Toyota, Kina – several brannds
- When will the trucks become mature for the market
- EU expectations first by 2030?

Takes 200-300 car to sustain one HRS station investment use 150 -200 kg/year per car

Takes 50 trucks to sustain one HRS station investment?

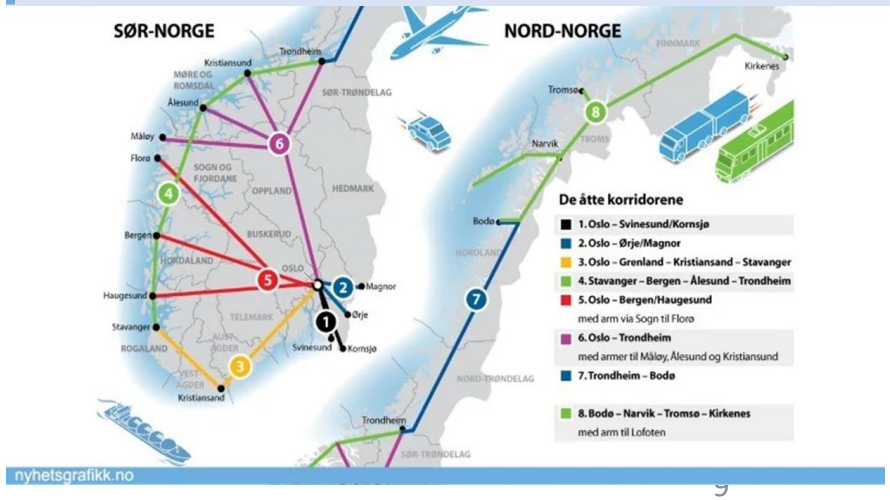
Trucks consumes up to 100 times more hydrogen per day - 60 - 100 kg by 800 to 1200 km

NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

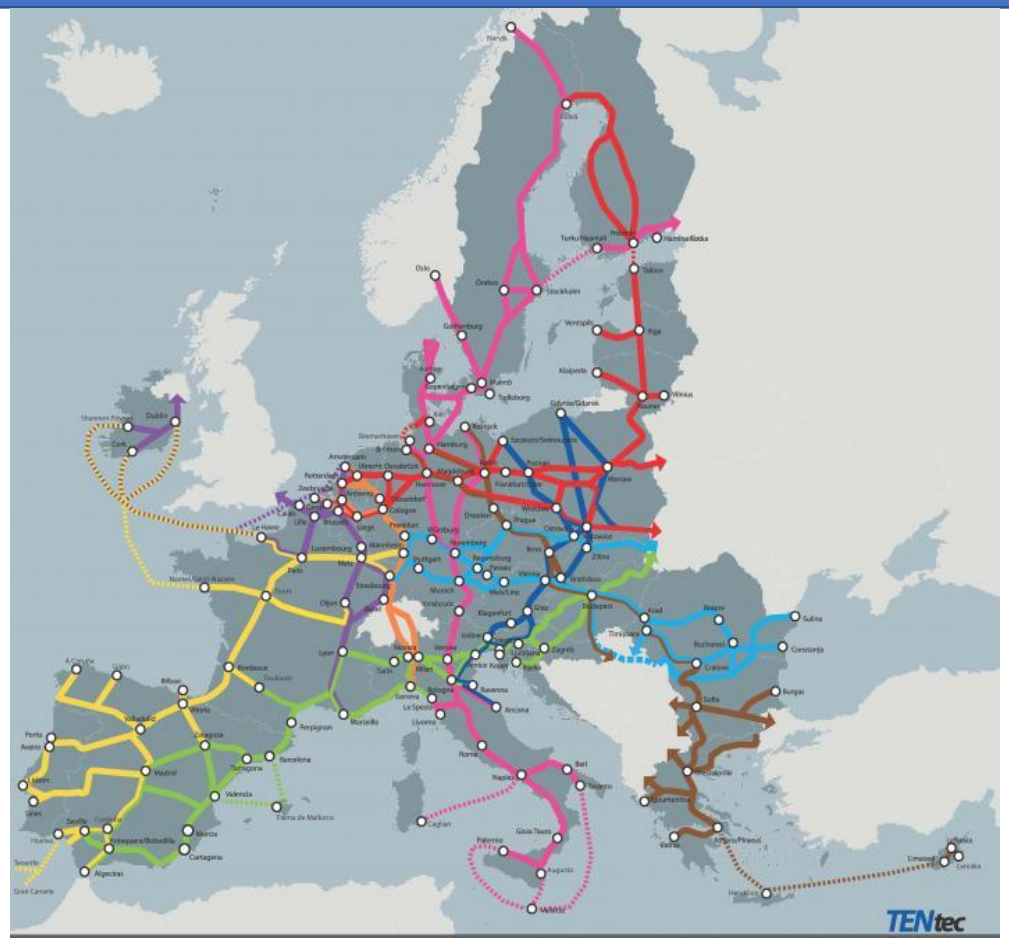
The Norwegain Scale is promising by 2026 - 2000 MILL NOK in NO/EU grant for 20 Hydrogen production Hubs by 2030?

- NO/EU infrastructure support with focus on Marine transport and industry
- Ca 10 hubs installed and ready for operation by 2026
  - Ca new 5 South Norway
  - Ca new 5 i North Norway
- 20 production hubs ideally located by 2030 for sea and truck transport
- Hydrogen Customers
  - Industry, Marine transport, Road transport, Construction, Agriculture, Offgrid sites

Production hubs Match with main transport corridors – NTP 2020



NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association



The European Scale - Trans-European Transport Network (TEN-T) and AFIR

The TEN-T Regulation is an EU legal framework which governs the development of a Europe-wide network of ***railways, roads, inland waterways, maritime shipping routes, ports, airports, and railroad terminals***

AFIR- regulation

- max 200 km between HRS stations within EU by 2030

- *Norway's position: not EU member – wait and see*
- *AFIR – possibly a few hubs – EU-EØS by 2030?*
- *ENOVA – wait and see - truck support ?*

FUTURE PERSPECTIVES – MORE RESEARCH IS NEEDED!

- Huge innovation potential in hydrogen technology and mobility!
- Hydrogen and battery hybrids – the best og 2 techologies
  - Battery for basic power– hydrogen for long distances – 1000 -2000 km per refuel
- Bring Hydreogen Refuelling infrastructure (HRS) costs down!
  - Battery swapping is already in the marked both for cars and trucks
  - Tank swapping («jerry cans» for hydrogen) at each energy station?
  - Energy carrier swapping network for all future green energy sources, H2, CNG, CBG; Battery, etc,
  - New standards for the next genereation cars and trucks
- H2-ICE motors- retrofit and re-vitalize conventional diesel trucks ?

WWW.HYBIL.NO ©

NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

Breaking News today: Mileage cost of hydrogen lower than for diesel!?

Hydrogen prices at HRS stations world-wide vary from 50 to 350 NOK/kg

Diesel prices are increasing due to a unstable energy world pushing energy prices upwards

ChatGPT tells us per 13. April 2026 that hydrogen cost as car fuel start to get lower than for diesel per km (mileage cost)

In 10 out of 15 hydrogen countries, hydrogen is lower or on parity with diesel

		RETAIL PUMP		MILEAGE pr 10 km		Break	H2 Cheaper
		Diesel	H2	Diesel	H2	Even H_2	Compared
	Country	NOK/L	NOK/kg	NOK/10 km	NOK/10 km	NOK/kg)	Per Mileag
NO	Norway	25–27	100–120	18	11	180	☑ H_2 cheaper
SE	Sweden	23–25	110–200	15	15	175	⚖ Near parity
NL	Netherlands	28.7	105–128	20	12	201	☑ H_2 clearly cheaper
BE	Belgium	25.7	110	18	11.0	180	☑ H_2 cheaper
FR	France	24.8	128–147	17	13	174	⚖ Near parity
DE	Germany	27.1	200	19	20	190	✕ H_2 more expensive
DK	Denmark	28.5	112	20	11	200	☑ H_2 clearly cheaper
FI	Finland	25.1	100–111	17	11	176	☑ H_2 cheaper
IT	Italy	23.3	167	16	17	163	✕ H_2 more expensive
PT	Portugal	23.7	167	16	17	166	⚖ Parity
CZ	Czech Rep	22.0	228	15	23	154	✕ H_2 much more expensive
US	Callifornia	13.4	247–285	9	27	94	✕ H_2 extremely expensive
KR	South Korea	12.1	65–96	8	7	85	⚖ / ☑
CN	China	11.5	49–70	8	6	81	☑ H_2 cheapest
JP	Japan	9.3	95–131	7	12	65	✕ H_2 more expensive

NORSK HYDROGENBILFORENING - HYBIL
Norwegian Hydrogen Car Association

- Cars and HRS - many up and downhills in Norway until 2026 - but we hang on!
- Huge need for innovation and R&D– we call for young scientist with new energy!
- Welcome to the future R&D of hydrogen production and mobility!
- Your knowledge and energy is needed!

- More info about HYBIL : www.hybil, Facebook , Linkedin

Thank you for your attention!