

HYDROGEN 2024 UTRECHT



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OUTLOOK TOWARDS 2050

2025
First city bans implemented

2030
Widely city bans active



2050
RENEWABLE
CIRCULAR
SUSTAINABLE

2028
EURO VII

2040
ACEA: NO FOSSIL FUELS



~2025
PUBLIC CHARGING ?



~2028
H2-ICE



~2030
GREEN H2



~203+
FCEV



AUTONOMOUS L4



CO2 reduction 2030

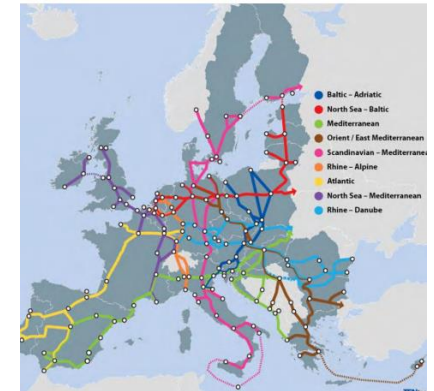


TODAY
BEV REGIONAL /
DISTRIBUTION

~2025
ADAS L2

2025
350kW Chargers
Every 60km

2030
H2 stations Every
150km



ICE
Diesel
Bio-Fuels
E-Fuels
Hybrid



BEV



H₂ICE



FCEV

PARIS 2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP1

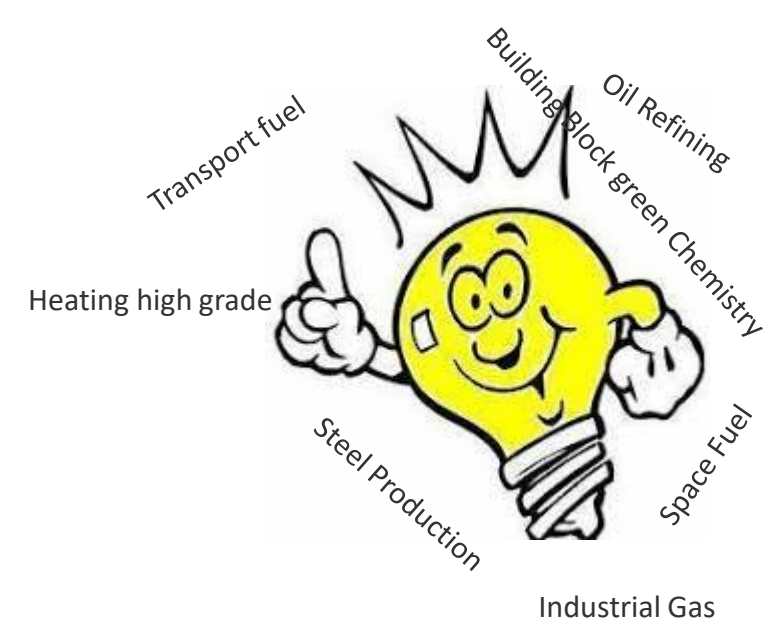
POWERING YOUR SUCCESS



Hydrogen 2020 – 2024

2020 Hydrogen solution for almost everything.

- ✓ Hydrogen big public support.
- ✓ Blue (and other colors) Hydrogen can help to kick start Hydrogen economy.
- Hydrogen infrastructure developments are delayed.
- Green Hydrogen costs have been underestimated.
- Policy drivers are needed to ignite the Hydrogen economy.
- Import Green Hydrogen and Local storage is needed to get Lower cost H2 for Northwest EU markets.



HYDROGEN SOLUTIONS

Fuel Cell Electric Vehicle (FCEV)

ADVANTAGES

- Best fuel economy potential
 - $\eta > 55\%$ theoretical
 - Brake energy recuperation



FCEV



Hydrogen Engine (H2-HPU)

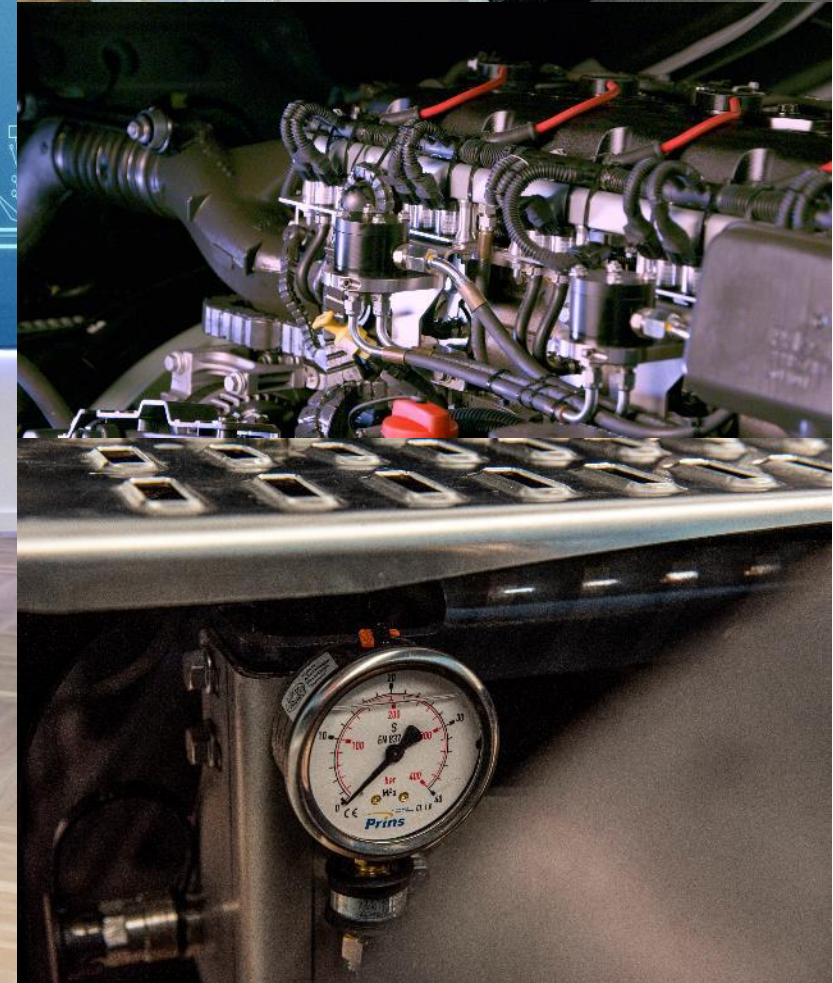
ADVANTAGES

- By far the best cost proposition and easiest vehicle integration (less complex)
 - No additional battery pack
 - Same cooling impact as a Diesel truck
 - Simple air intake filter and less complex H₂O exhaust system (less condensed water to emit)
- Highest Payload carry ability
 - Legal restriction of RA load < 11,5 T
- At high loads the fuel efficiency tends to get better → “Brennerpas workhorse”
- Based on robust and known ICE technology
 - > 100 year of application experience → time to market
 - Less sensitive to hydrogen impurity → lower fuel cost price?
 - No dependency on rare earth materials → Asia

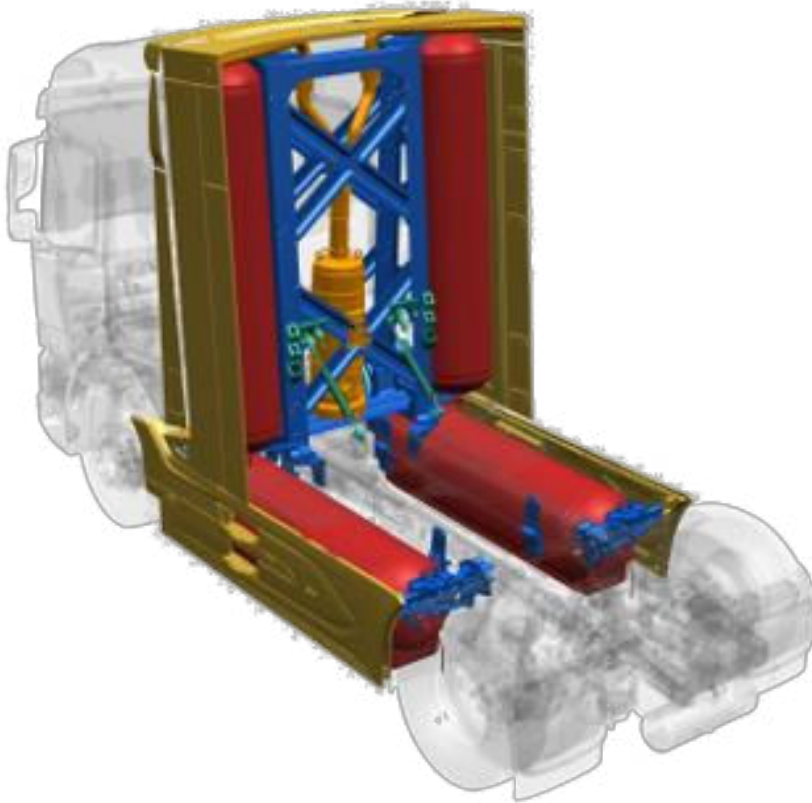


H2-ICE

NEW GENERATION DAF H₂



DAF Hydrogen Storage System



- Hydrogen ICE engine
- Storage system H2 identical for H2-ICE and future FCEV
- One day fueling concept (800km range = 80kg H2)
- Fueling time target 10-15 min.
- Able to tow standard ISO trailers without steerable axles
- Aftertreatment H2-ICE Euro 7. Zero emission compliant.
- SOP (Start of production) End of the decade.

Kenworth FCEV

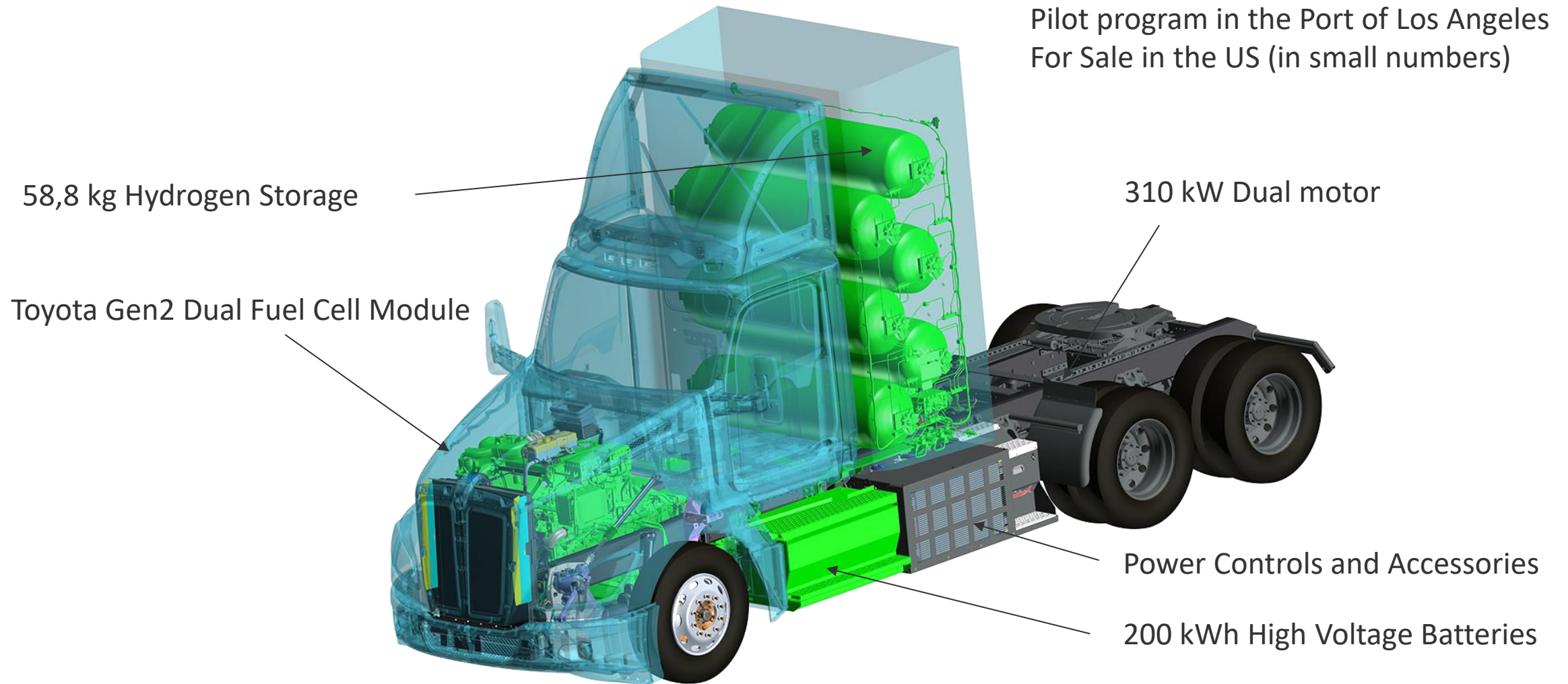


FCEV activities Paccar

- Kenworth T680 FCEV



Kenworth T680FCEV





Thanks for your attention