H2TEC

HYDROGEN

ANLEG Advanced Technologie

MOVE2

ELECTROLYSIS as ENERGY STORAGE

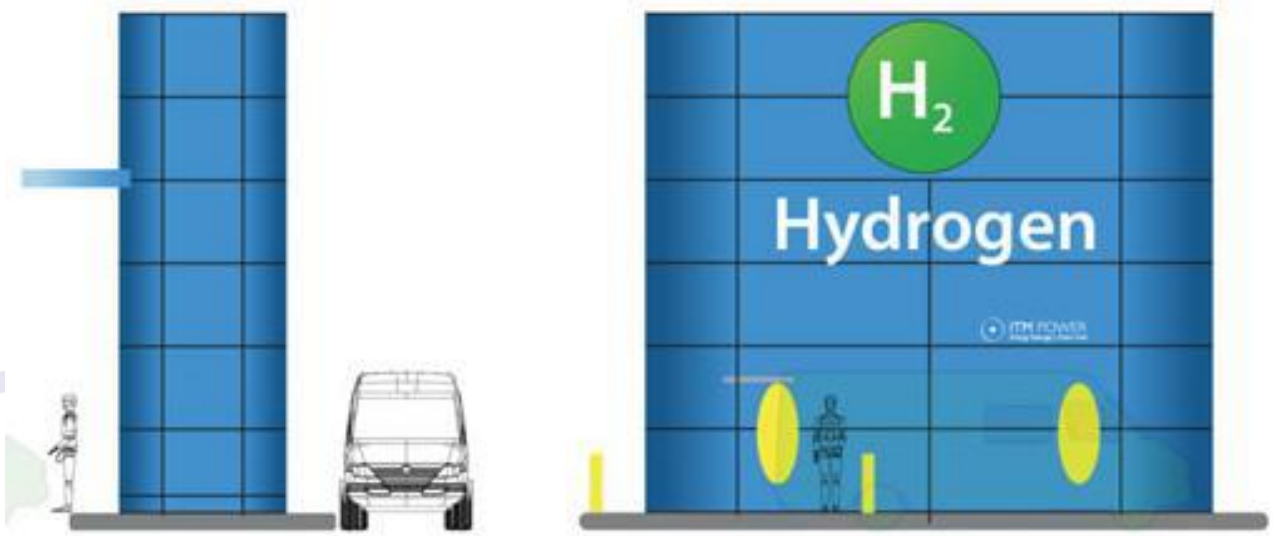
- renevable energy which has not be used in 2017: 5 TWh (Terra Watt/hour)
  → approx 125.000 tons of hydrogen
  → 25.000.000 cars‘refuelings (5kg/car)
  → 12.500.000.000 km (500 km/car)

- hydrogen can be produced on site
- hydrogen can be produced as energy storage
- hydrogen production to flat the electrical grid

- in the last 10 years 50 TWh electricity have been exported at 0,037 €/kWh
  This would be sufficiant to produce hydrogen for over 10 Million cars at a cost price between 3,50 € to 5,00 € per kg of H2

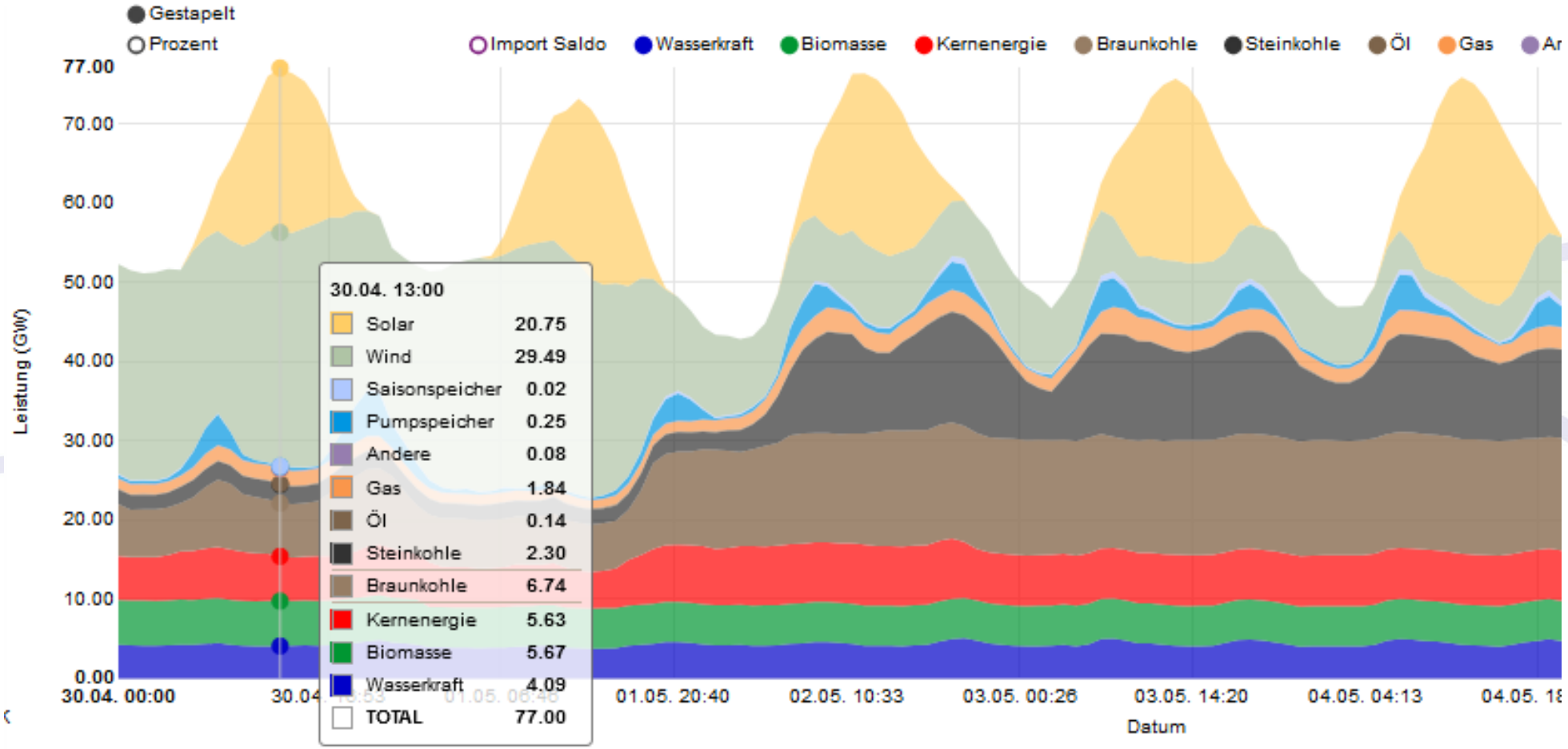
CO2 FREE MOBILITY

On-site H2 production
from renewable energy
→ « Triple Zero CO^2 » Free Energy



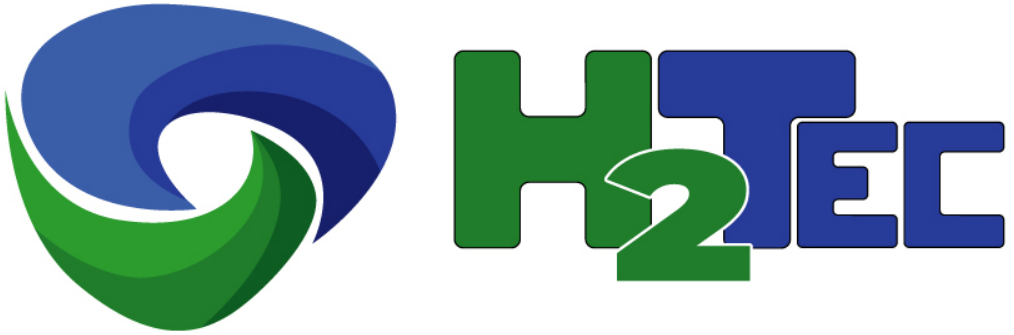
1st « Zero CO^2 »: production
2^{nd} « Zero CO^2 »: transport
3rd « Zero CO^2 »:consumption

2018 ELECTRICAL GRID in GERMANY

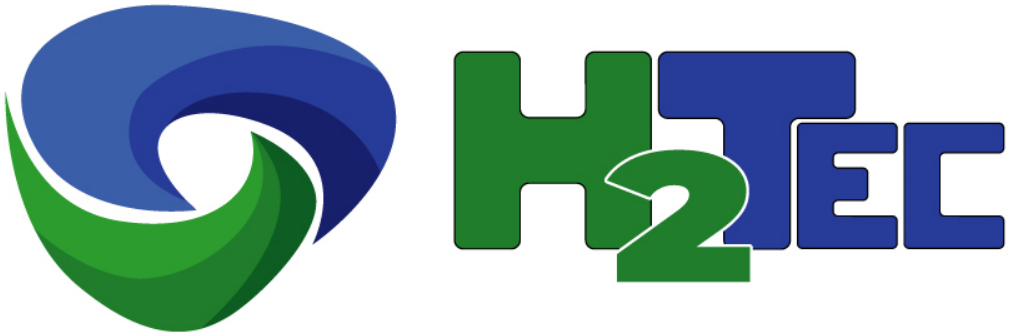


Nettoerzeugung von Kraftwerken zur öffentlichen Stromversorgung.
Datenquelle: 50 Hertz, Amprion, Tennet, TransnetBW, EEX
letztes Update: 09 May 2018 12:14

H2 FUEL CELL TECHNOLOGY



H2 RANGE EXTENDER



INTEGRATION of RANGE EXTENDER

How far can I drive with a battery car ?

45 km	70 km	90 km	250 – 500 km
Post-Service Verbraucher- Zyklus	Lieferungen Verbraucher-Zyklus	Ballungszentrum	Neuer europäischer Fahrzyklus

-5°C

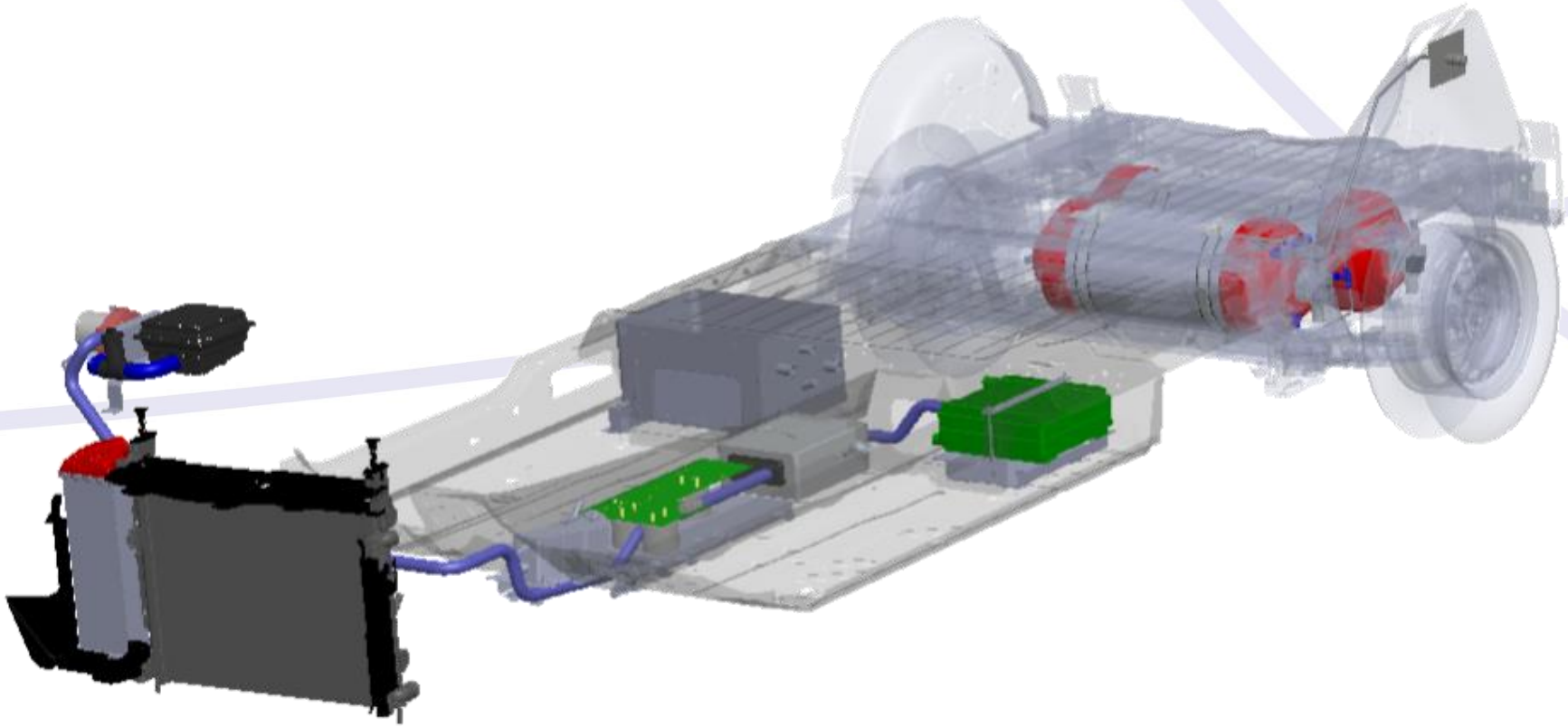
10 °C

18 °C

Car Vendor Datasheet

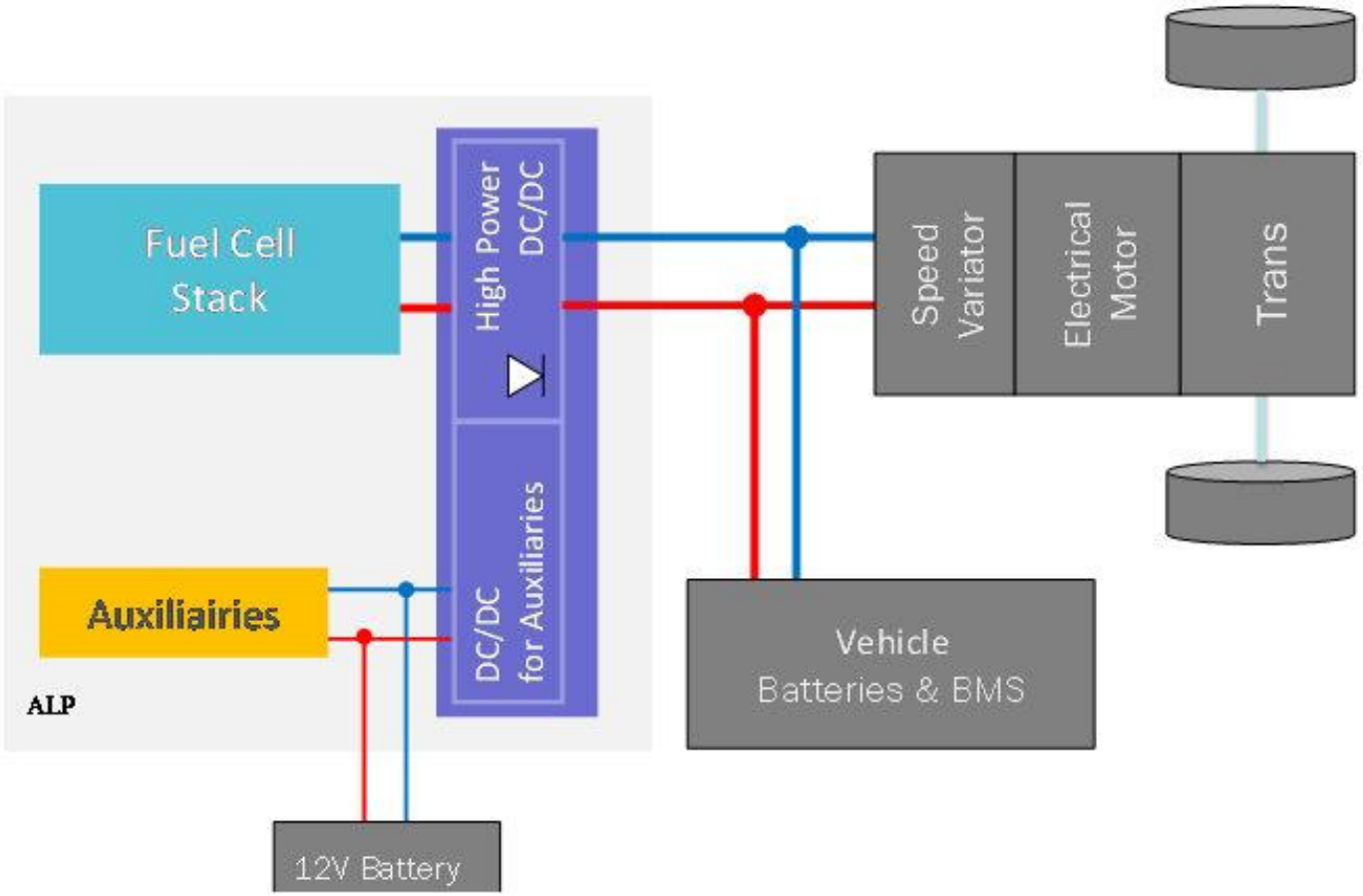
The distance will depend on weather, driving mode and driving cycle

RANGE EXTENDER SOLUTIONS



Non invasive, standard electric vehicle

RANGE EXTENDER SOLUTIONS



RANGE EXTENDER SOLUTIONS

Fuel cell 50 % efficency

- 294 kWh of usable energy on the wheel
- weight of tanks = approx 325 kg + fuel cell
- weight of Nicd battery: 5.000 kg
- Weight of Liion battery: 1.470 kg (200Wh/kg)

RANGE EXTENDER SOLUTIONS

Hydrogen Kevlar tank system weight :

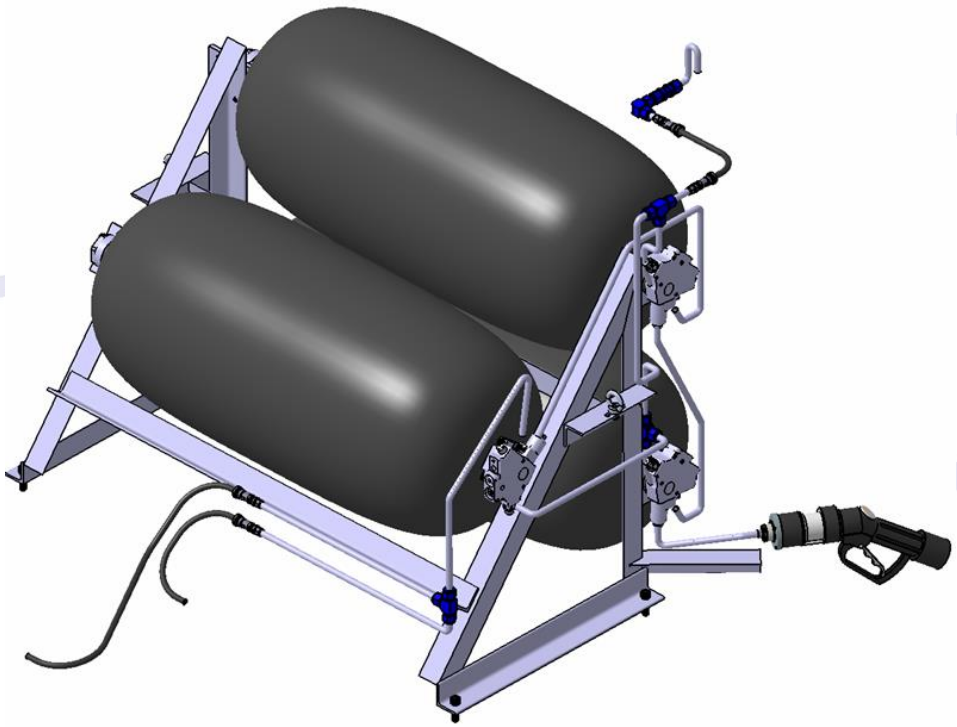
325 kg + fuel cell weight

Capacity: 3 x 104 L x 700 bars = 16 kg of H2

Electrical Power: 588 kWh

Electrical Power after Fuel Cell (50%):

294 kWh usable



RANGE EXTENDER ADVANTAGES

- basic standard battery vehicle
- fuel cell system → reduction of costs
- adaptable to utiliy mode (Size of the fuel cell and storage vessel coresponding to the usage of the vehicle)
- heat of fuel cell can be used to heat the interieur of the vehicle → no energy is needed to heat the inside of the vehicle

H2 RANGE EXTENDER
for
LIGHT VEHICLES

H2 Range Extender Kit for:

Electric bike

Electric scooter

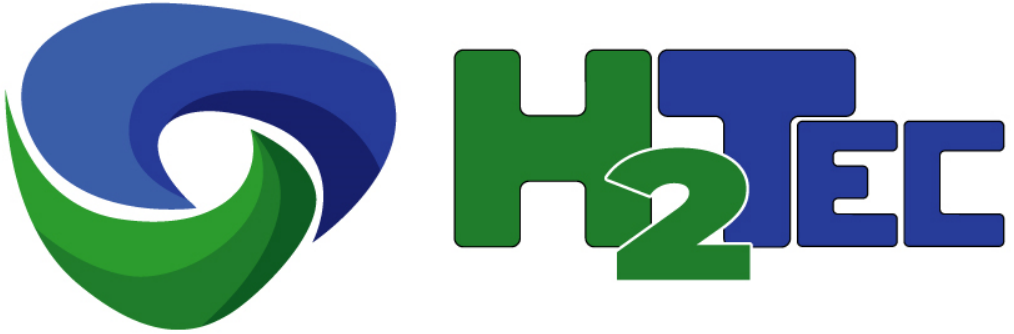
H2 Range Extender Kit for:

Electric tri-carrier

Electric tri-carrier

Electric bi-carrier

H2 RANGE EXTENDER
for
LAST MILE LOGISTIC VEHICLES



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H2 Range Extender Kit for:

Electric cargo bike

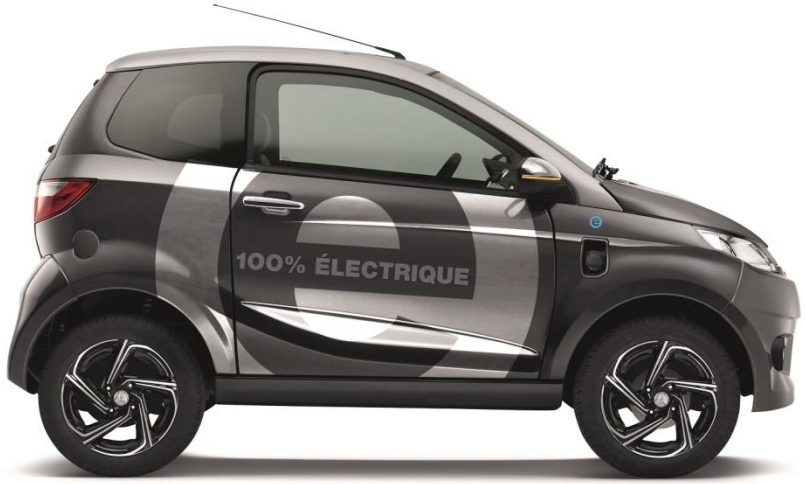
H2 Range Extender Kit for:

Electric golf kart

Electric transport bike

H2 Range Extender Kit for:

Electric mini van

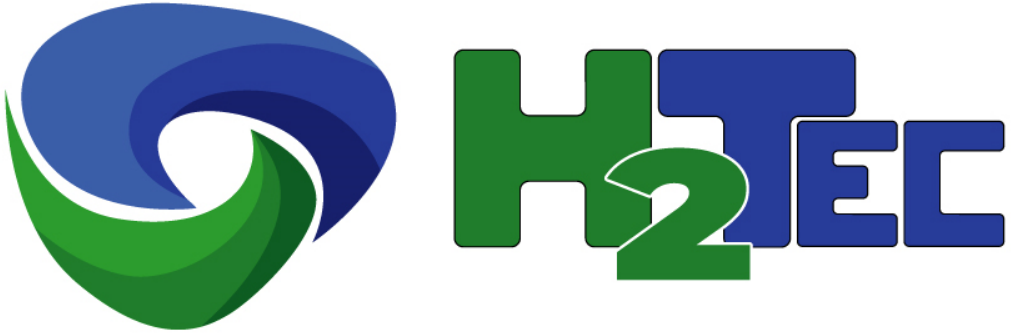


Electric micro car

H2 Range Extender Kit for:

SEABUBBLES®
Electric shuttle boat

H2 RANGE EXTENDER
for
PROFESSIONAL VEHICLES

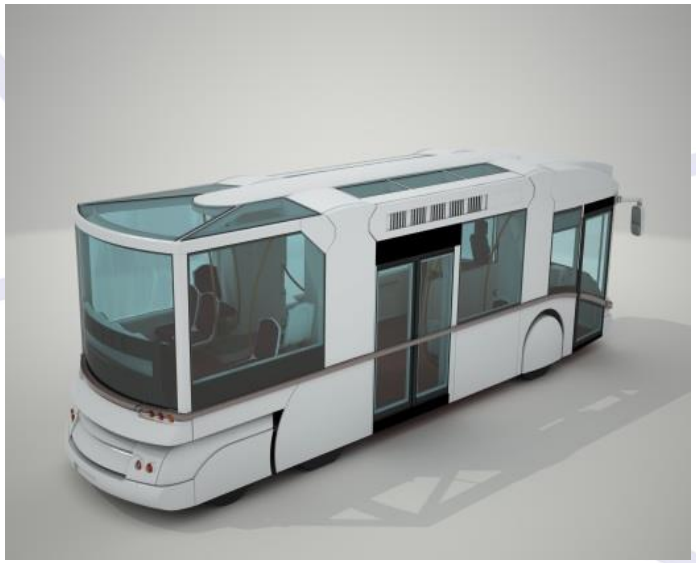


H2 Range Extender Kit for:

RENAULT Maxity truck
20 kW RE

RENAULT Kangoo ZE
5 kW RE

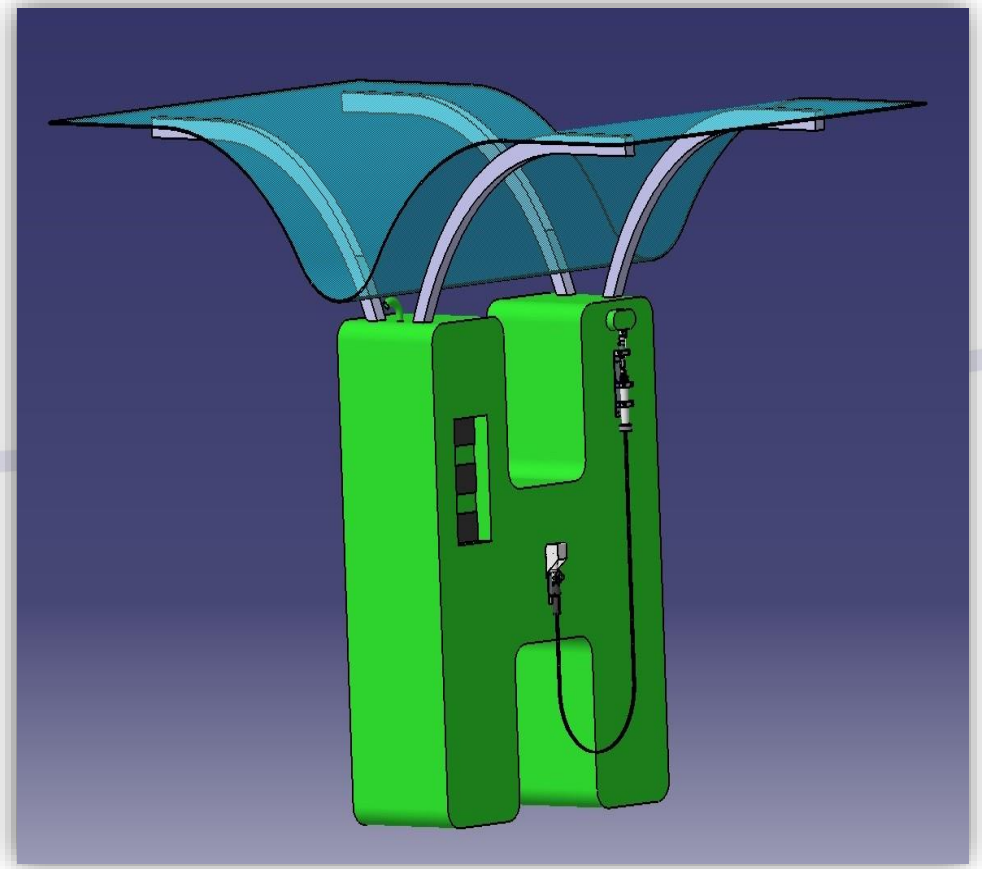
VOLVO EX2 Compact
20 kW RE



SAFRA Businova
40 kW RE

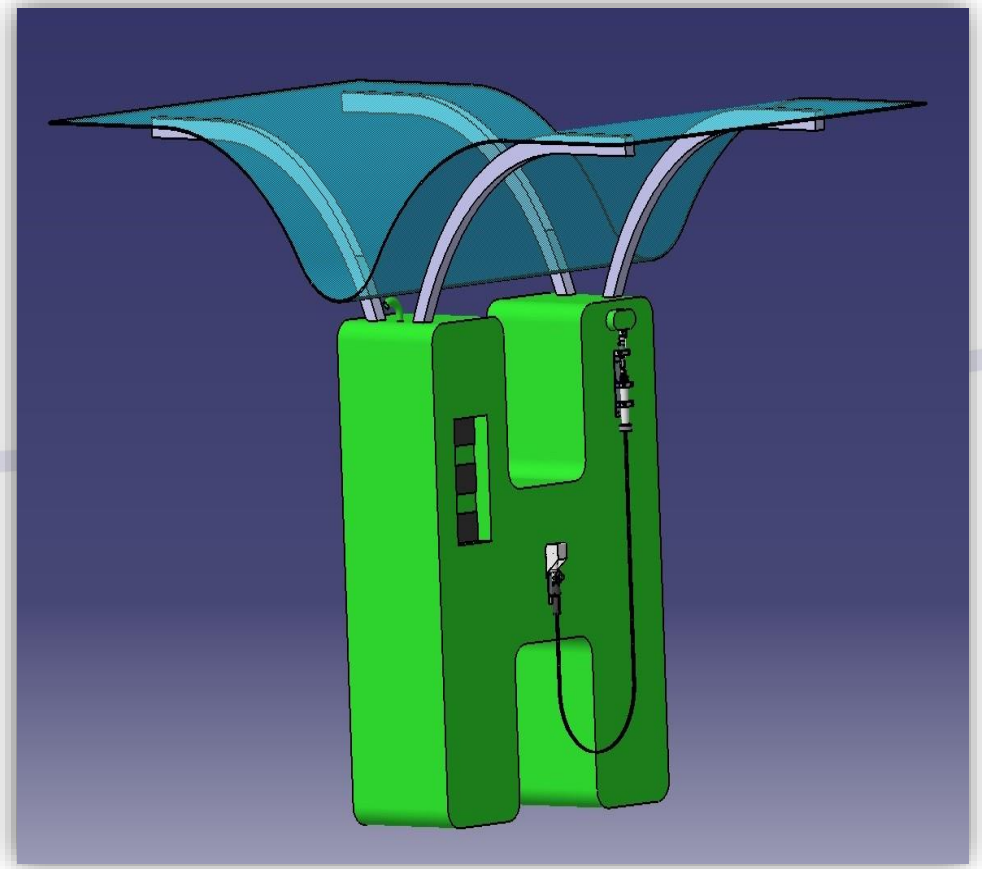
HYDROGEN REFUELING STATION

H2BIB®, H2 mini station: type I



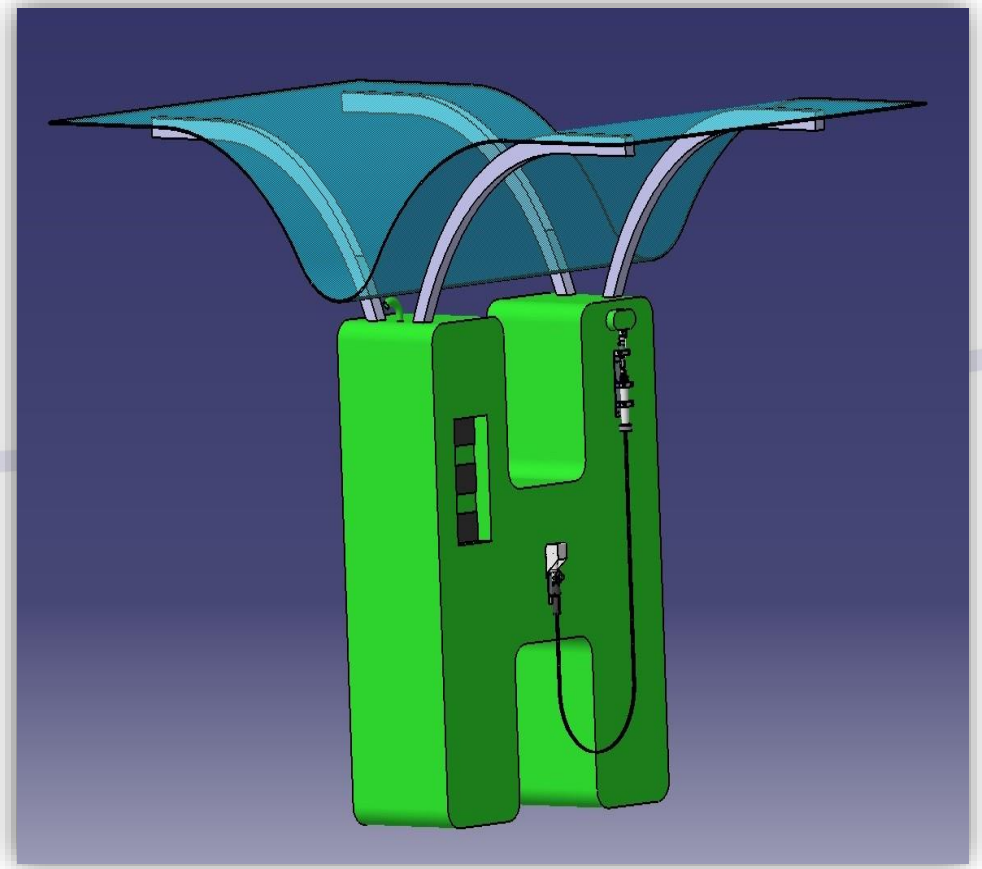
- tank : 1 à 2
- pressure : 350 à 700 bars
- H2 quantity : 2 à 4 kg
- bikes'tank: 300 grs
- H2 refueling : 60 à 120 bikes/day

H2BIB®, H2 mini station: type II



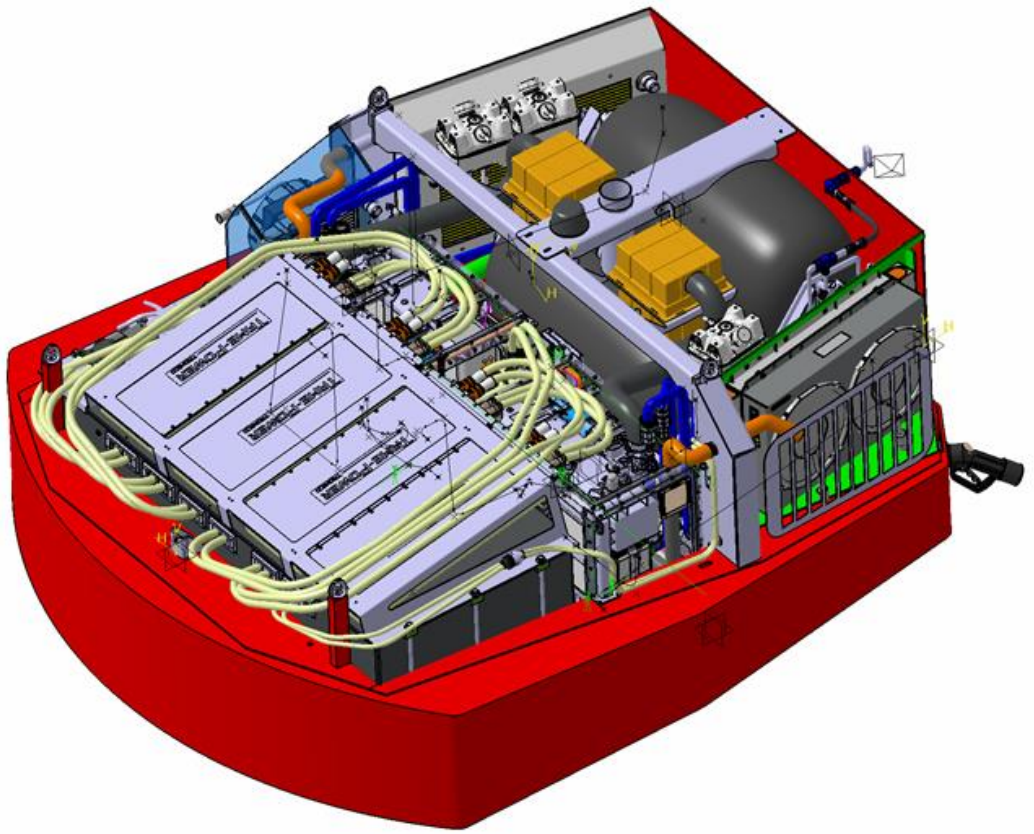
- compressor : 1
- tank : 1 à 2
- pressure : 350 à 700 bars
- H2 quantity : 2 to 15 kg
- bikes'tank : 300 grs
- H2 refueling : 60 to 240 bikes/day

H2BIB®, H2 mini station: type III



- electrolyser : 1
- compressor : 1
- tank : 2
- pressure : 500 bars
- H2 quantity : 10 kg
- bikes'tank: 300 grs
- H2 refueling : 350 bikes/day

MOBILE H2 REFUELING STATION for FORK LIFTS



- no battery logistic
- refueling time : 3 min
- simple refueling station
- pressure : 700 bars
- H2 quantity : 10 kg
- range of work: 8 hours

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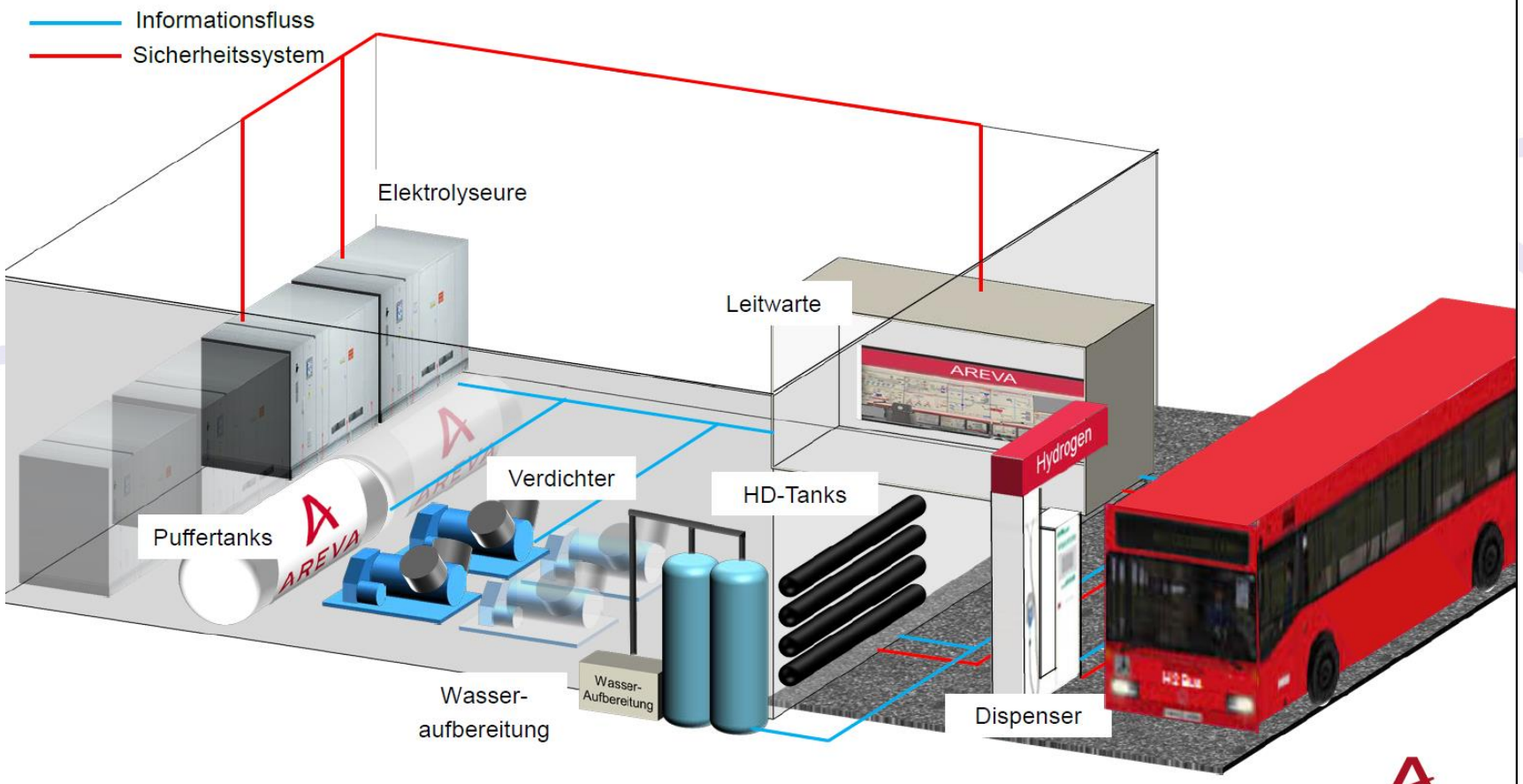
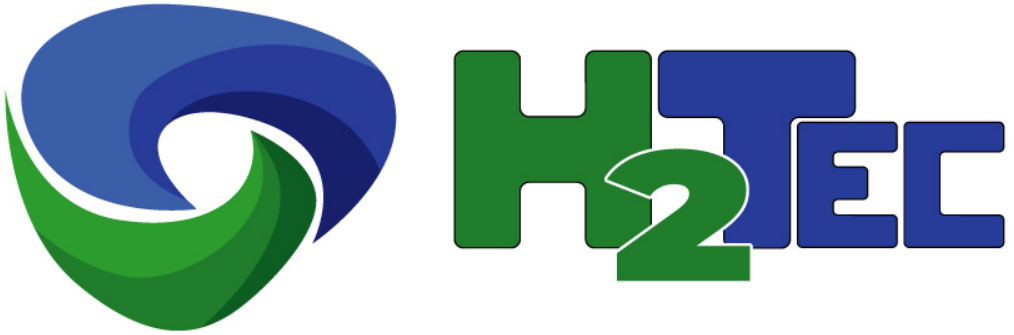
H2 REFUELING STATION for BUSSES

Model Wasserstofftankstelle

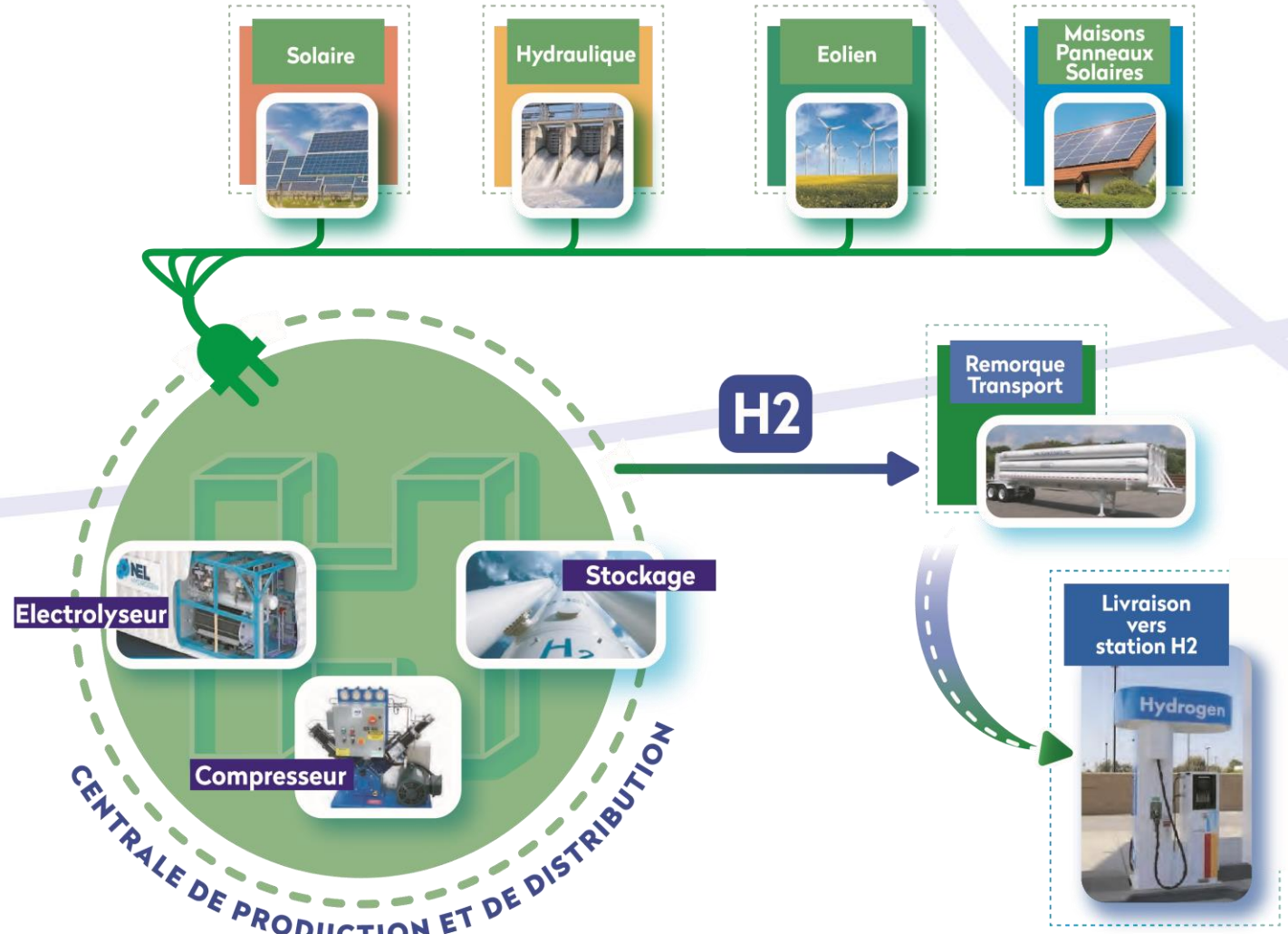


AREVA

ECOSYSTEME



H2 LOGISTIC CENTER



DISTRIBUTION H2

Stockage H2

Mini Station H2

H2BIB®

Livraison H2

H2FUELER®

Véhicules légers

Velo

Scootter

Cargobike

Golfkart

Microcar

Minivan

Bateau Taxi

HYDROGEN

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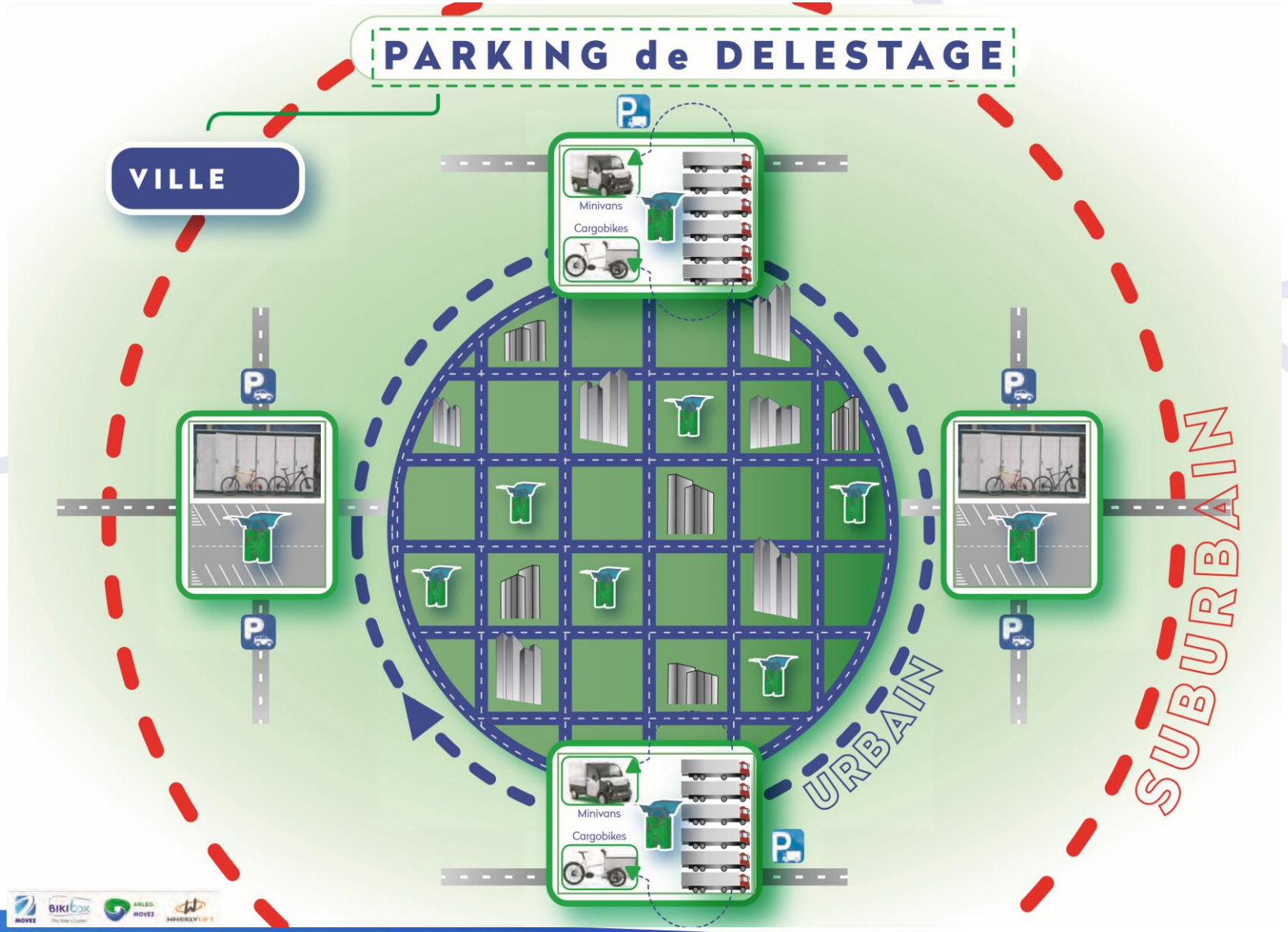
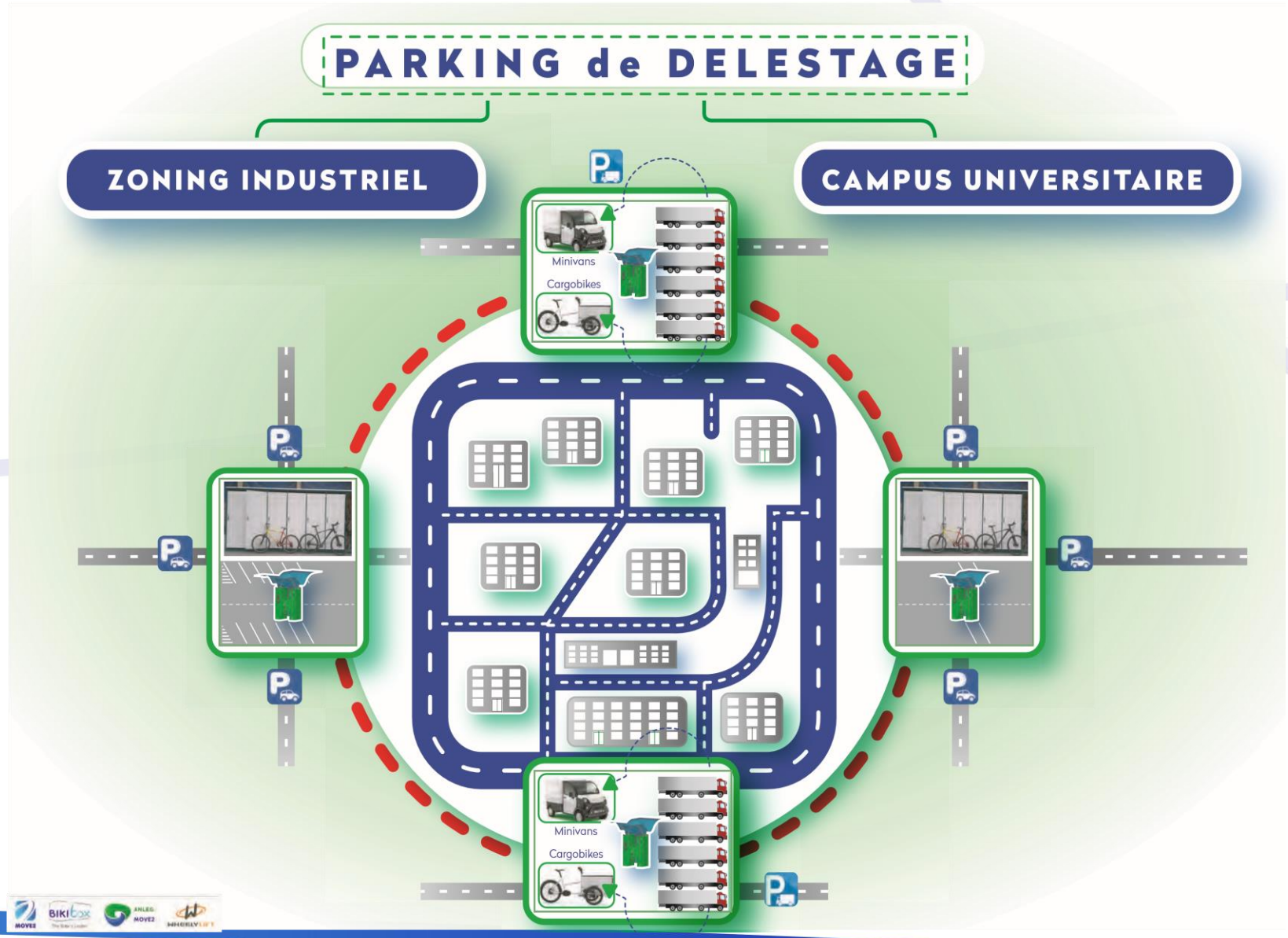

PARKING de DELESTAGE
VILLE
Minivans
Cargobikes
Minivans
Cargobikes
URBAIN
SUBURBAIN


PARKING de DELESTAGE
ZONING INDUSTRIEL
CAMPUS UNIVERSITAIRE
Minivans
Cargobikes
Minivans
Cargobikes

HYDROGEN, a REAL BUSINESS CASE

HYDROGEN INDUSTRY

- ✓ will generate new business and work places
- ✓ gives chance for new companies to enter new markets
- ✓ creates new jobs
- ✓ Korea, China and Japan are investing huge budgets, in order to become market leaders
  - China will become market leader in non combustion engines
  - Korea will create 420.000 new jobs
- ✓ H2 refueling stations are costless than batteries charging stations
- ✓ Logistics, trucks, trains busses are the main and short term markets for hydrogen

HYDROGEN, a REAL OPPORTUNITY

TO WORK AGAINST CLIMAT CHANGE

- ✓ Climat change costs 150 Milliards $ per year (Munch Re)
- ✓ Climat change kills worlwild 10,000 people per year (WHO)
- ✓ Climat change has created 24 Millions of refugees in 2017 (Weltbank)
- ✓ Climat change will create 140 Millions of refugees in 2050 (Weltbank)

"Look to the Future with a better tomorrow, it's time to MOVE2 hydrogen."

Jan ANDREAS
ANLEG

Jean-Luc HANNOSSET de MOXHE
MOVE2 Group