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Electric Mobility with Batteries and Fuel Cells - Daimler's perspective on alternative propulsion systems and the new Mercedes GLC F-CELL

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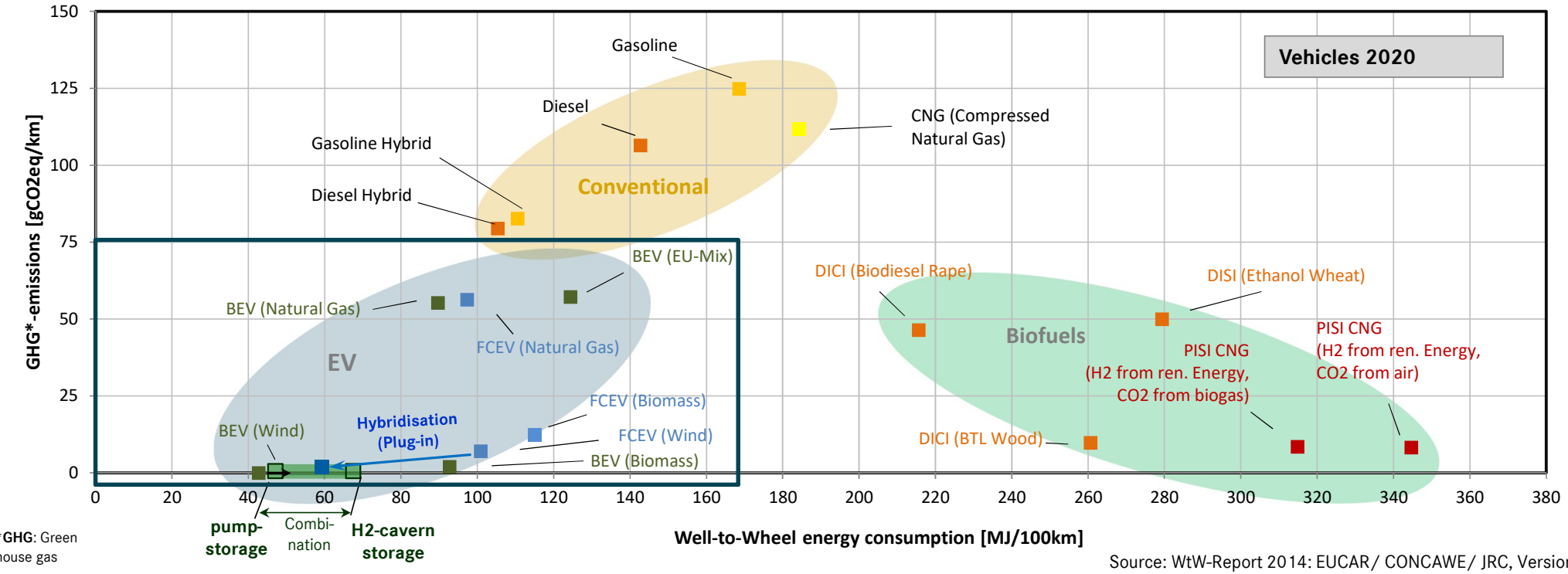
On the road to emission free mobility – Electrification of powertrain portfolio

Well-to-Wheel Comparison of Greenhouse Gas Emissions and Energy Consumption

Fuel Cell: High range , short refuelling time (3 min), usable for different types of vehicles

Battery: Ideal in compact cars and city traffic, Charging overnight

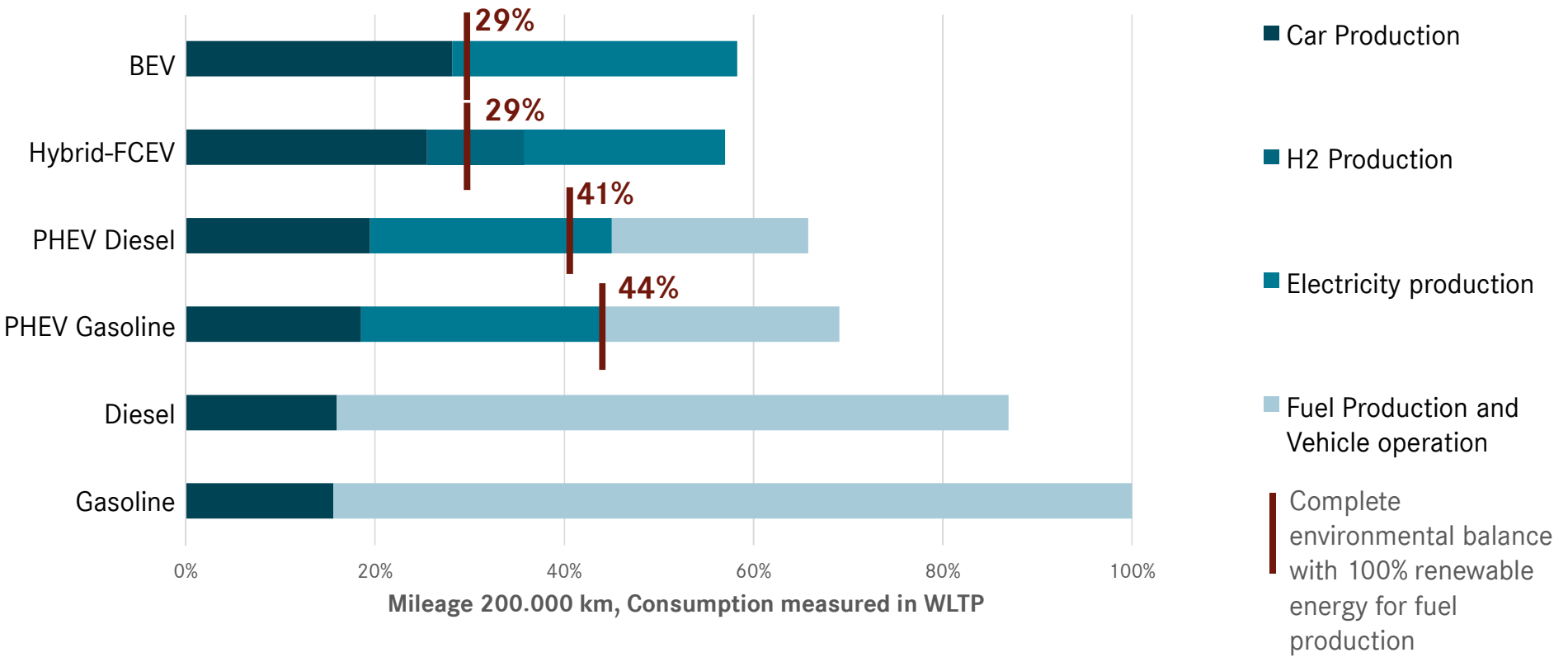


*GHG: Green house gas

Source: WtW-Report 2014: EUCAR/ CONCAWE/ JRC, Version 4a

Environmental Balance of Alternative Powertrains CO2-Emissions

BEV & FCEV show similar low total GHG emissions in the total life cycle



Clear Commitment to E-Mobility

10 bn Euro invest in electric vehicle fleet

Various electrified alternatives in every segment - from the compact car to the major SUV

New brand EQ for electric vehicles

> 10 Electric vehicles on the market by 2022

World premiere EQC – First Mercedes-Benz vehicle to be launched under the EQ brand

0g CO_2/100km
CO_2 emissions combined

rd. 40 min. charging time
with DC charging with 110 kW
(80% SOC)

> 450 km
driving range (NEDC)

80 kWh
battery capacity

5,1s 0-100km/h
acceleration

20,8 – 19,7 kWh/100 km
combined
electricityconsumption
(NEDC)

EQ 400 4-Matic: preliminary values

smart fully electric in Europe by 2020

smart EQ fortwo coupé (power consumption combined 16,5 – 14,0 kWh/100km, CO2-emission combined: 0 g/km), smart EQ fortwo cabrio (power consumption combined 16,8 – 14,2 kWh/100km, CO2-emission combined: 0 g/km) und smart EQ forfour (power consumption combined 17,3 – 14,6 kWh/100km, CO2-emission combined: 0 g/km)

eVito: Electrically powered, mid-sized van has been available to order since the end of 2017

- Ecosystem to electrify commercial fleets
- Range of up to 150 km
- Designed for inner-city delivery, commercial and passenger transport

Electric, locally emission-free and silent:
Our battery-powered commercial vehicles for urban areas

Thomas Built Buses
Jouley

2017: World premiere
2018: Innovation fleet
2019: Small series

Mercedes-Benz
eActros

2016: World premiere
2018: Innovation fleet
~2021: Market introduction

FUSO
eCanter

Freightliner
eCascadia & eM2

2018: World premiere
2019: Innovation fleet
2021: Market introduction

The all-electric Citaro: Emission-free through the city

- Modular design of battery packs allows range to be tailored
- Innovative thermal management
- eMobility system:
  - eConsulting before procurement
  - eMobility service of brand OMNIplus
- World premiere IAA Commercial Vehicle Sept. 2018
- New generation FC bus with FC range extender

Daimler has the broadest experience with fuel cell Technology: Highlights from fleet operation

B-Class F-CELL

- > 10 million km in Europe and USA
- > 300.000 km driven in one single vehicle
- < 3 minutes average refueling time on the basis of 36,000 refuelings

Customer - Feedback

Consistent positive feedback

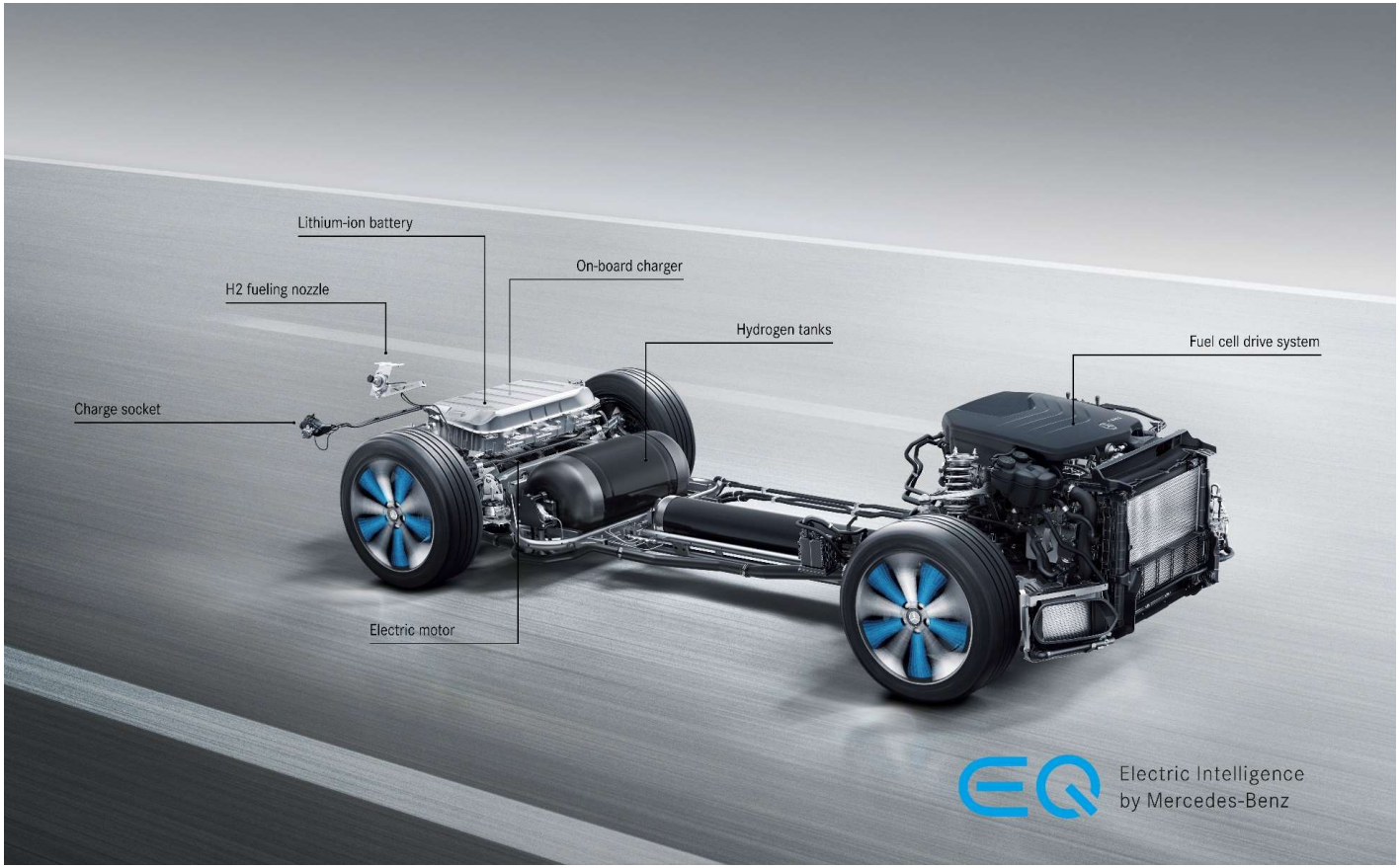
- „After driving the F-CELL, you don‘t want to get back to your old car!“
- „My next car will be a Fuel Cell car again!“

Citaro FuelCELL-Hybrid

- > 5 million km in Europe
- Press release of an operator
  > 1 million km in regular operation
  1,200 tons of CO_2 avoided

Mercedes-Benz GLC F-CELL: Fuel Cell Electric Vehicle with Plug-in-Technology

Next generation fuel cell powertrain

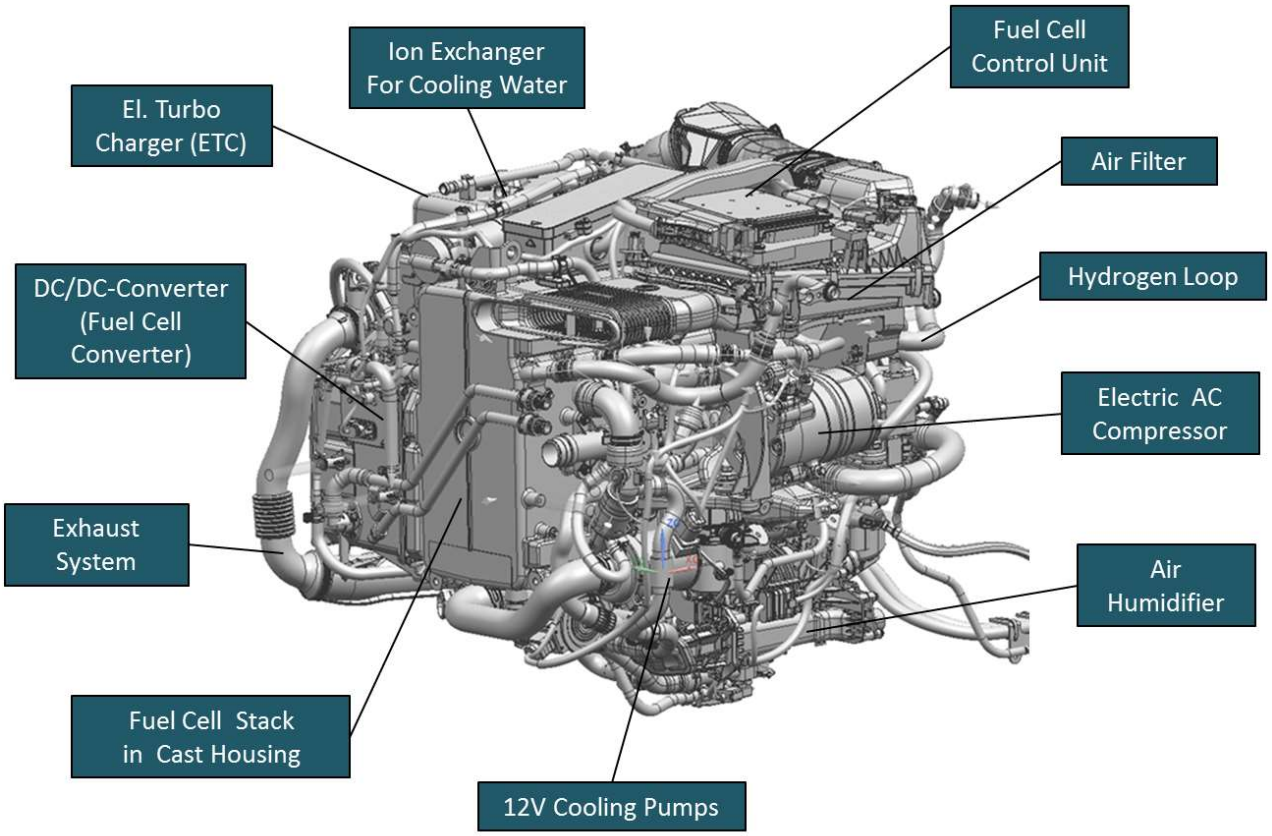


Combined electrical consumption (kWh/100 km)		18
H_2-Range in hybrid mode (NEDC) (km)		427
Battery electric range in battery mode (NEDC) (km)		51
Engine Rated output (kW/PS) Peak torque (Nm)	Electric motor **160** (218)	 375
Battery	Lithium-Ion	
Energy content (gross/net) (kWh)	13,5 /9,3	
Fuel cell	PEM	
Hydrogen tank capacity (kg) (usable for SAE J2601, 2014 or more recent)		4,4
top speed (km/h)	160 (governed)	

Next Generation Fuel Cell Vehicle:
„The Fuel Cell gets a Plug!“

- Increase in range to 427 km from hydrogen and 51 km from HV-battery
- Driving power: 160 kW
- Volume of fuel cell engine: - 30 %
- Reduction of platinum in fuel cell stack: - 90 %
- Switch to plug-in-battery, in order to satisfy the gradual build-up of hydrogen infrastructure
- Cost-efficient carry-over of various high-voltage components from the Mercedes-Benz modular system

Daimler‘s Next Generation Fuel Cell Engine

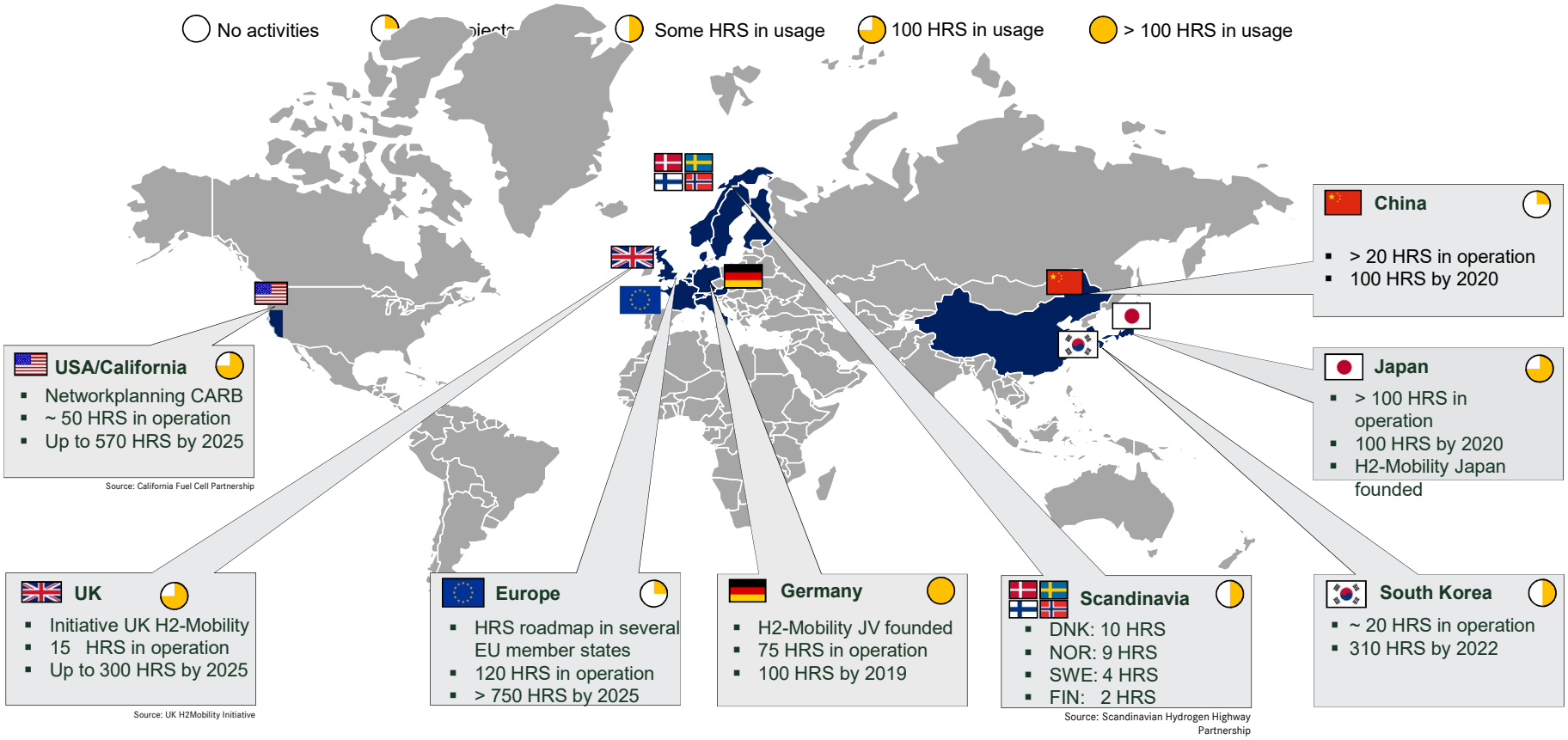


- High level of component integration
- Increase in fuel cell stack power density by ~ 100 % compared to B-Class F-CELL
- Introduction of electric turbo-compressor for air supply
- Absolute platinum content in fuel cell stack reduced by 90% compared to B-Class F-CELL
- Increased amount of series-produced carry-over parts (e. g. air filter, coolant pump)

Fuel Cell Power Train for Vans

Mercedes Concept Sprinter F-CELL presented in Hamburg July 2, 2018

H_2-Infrastructure – Activities Worldwide Overview



➢ H_2-Infrastructure development based on availability of the vehicle

HRS: Hydrogen Refueling Station (700 bar PKW) | JV: Joint Venture
ZEV States: Arizona, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Washington

* annual assessment 2017, LBST and TÜV SÜD Database

Thank you very much for your attention!