



# Connected eH<sub>2</sub> Cycle: Industrial Sector Coupling

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# Bosch Invented for Life



## Mobility Solutions



## Industrial Technology



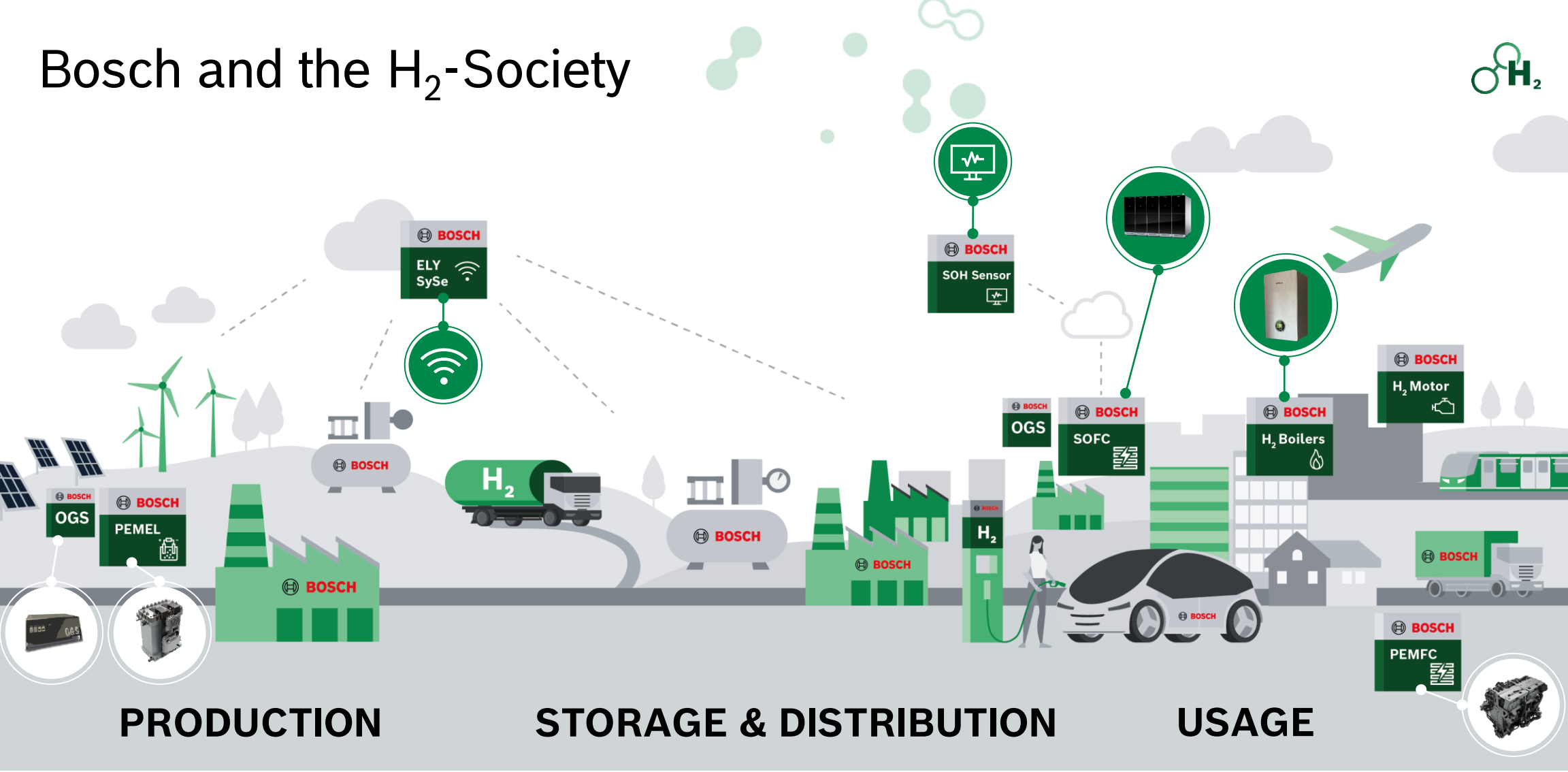
## Energy and Building Technology



## Consumer Goods



# Bosch and the H<sub>2</sub>-Society



**PRODUCTION**

**STORAGE & DISTRIBUTION**

**USAGE**

PEMEL: Polymer electrolyte membrane electrolysis; OGS: Optical Gas Spectrometer; ELY SySe: Electrolysis Systems & Services; SOFC: Solid oxide fuel cell; SOH Sensor: Virtual Sensor for SOFC Stack State of Health; PEMFC: Polymer electrolyte membrane fuel cell

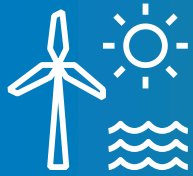


Climate protection becomes specific:



Increase energy efficiency

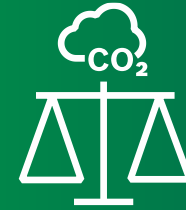
The four levers of CO2 neutrality



Supply with renewable energies



Green electricity purchase



Offset CO2 emissions



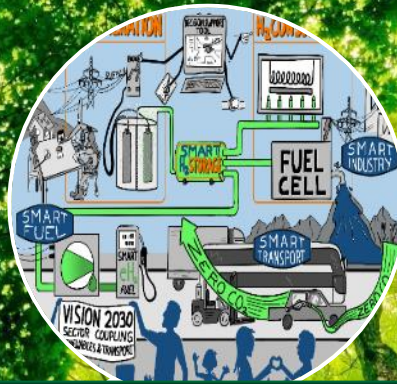


# Challenges

- Rising costs
- New mobility concepts
- High volatility

# Strategy

- Efficient and flexible use
- Connection through the Energy Platform
- Optimized generation in regard to consumption
- Storage and sector coupling, e.g. through H2-Cycle



Connected eH<sub>2</sub>-Cycle

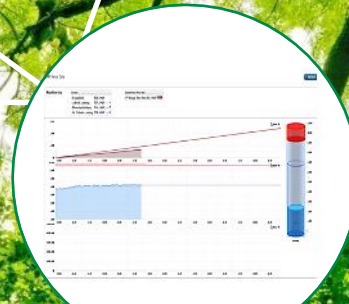
**Storage & sector coupling**



Energy Platform

**Cross-linking:**

Datapoints: **15.000 Stk.**



Cost reduction through flexibility

Actual : **2MW**



Reduced consumption through efficiency

Savings: - **40% kWh/pcs.**



Self-generated energy

PV, Solar thermal, heat pump, SOFC

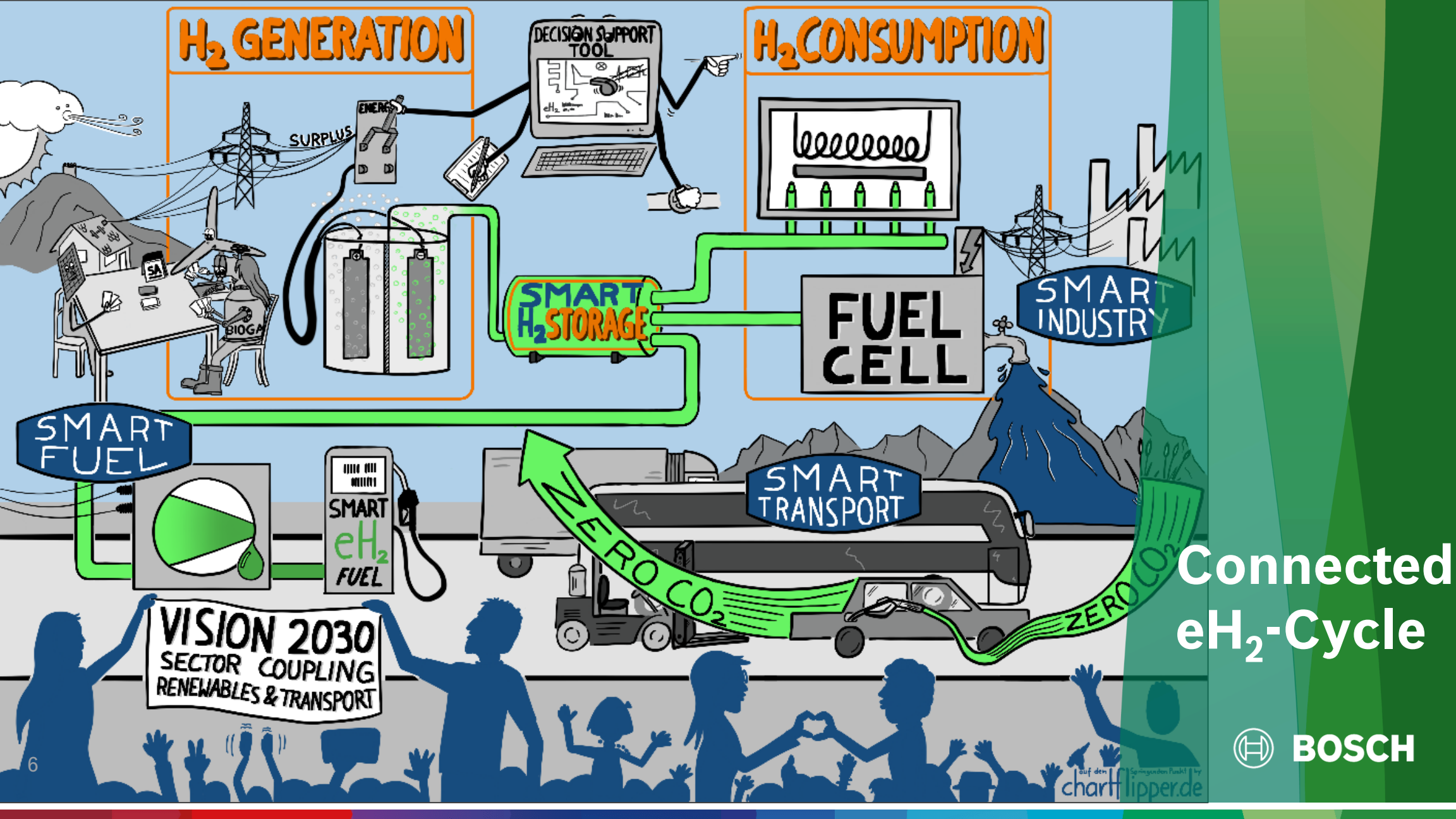
Actual: **3,8MW<sub>Peak</sub>**

Plan: **8,3MW<sub>Peak</sub>**



# H<sub>2</sub> GENERATION

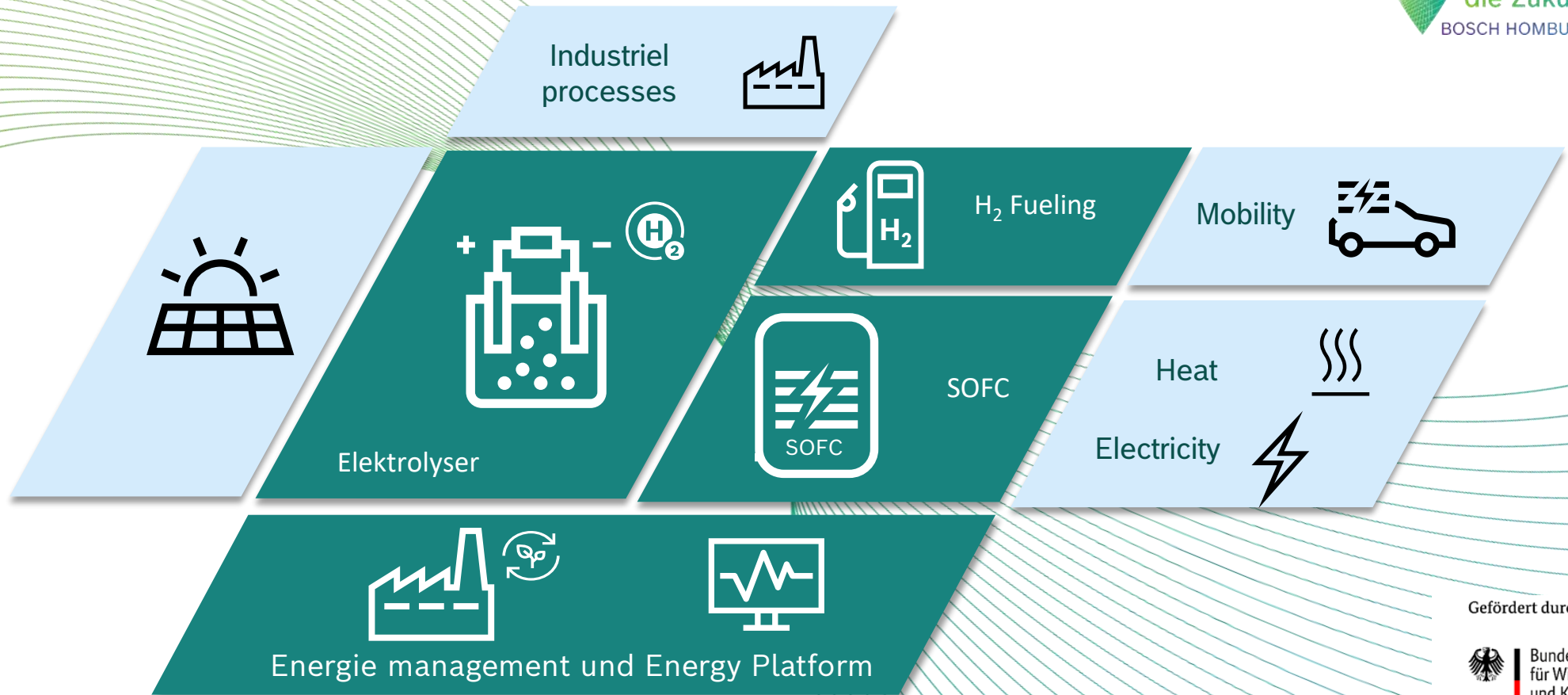
# H<sub>2</sub> CONSUMPTION



Connected  
eH<sub>2</sub>-Cycle







Gefördert durch:



aufgrund eines Beschlusses  
des Deutschen Bundestages



# Connected eH<sub>2</sub> Cycle







**PV**  
**3.8 MW<sub>p</sub>**  
(2023: >8 MW<sub>p</sub>)





green  
Electrolyzer

# Electrolyser





# Electrolyser





# Electrolyser





**H<sub>2</sub> Storage  
> 300 kg**

 **BOSCH**





Industry

 **BOSCH**







SOFC



# Performance and application of SOFC

## Performance

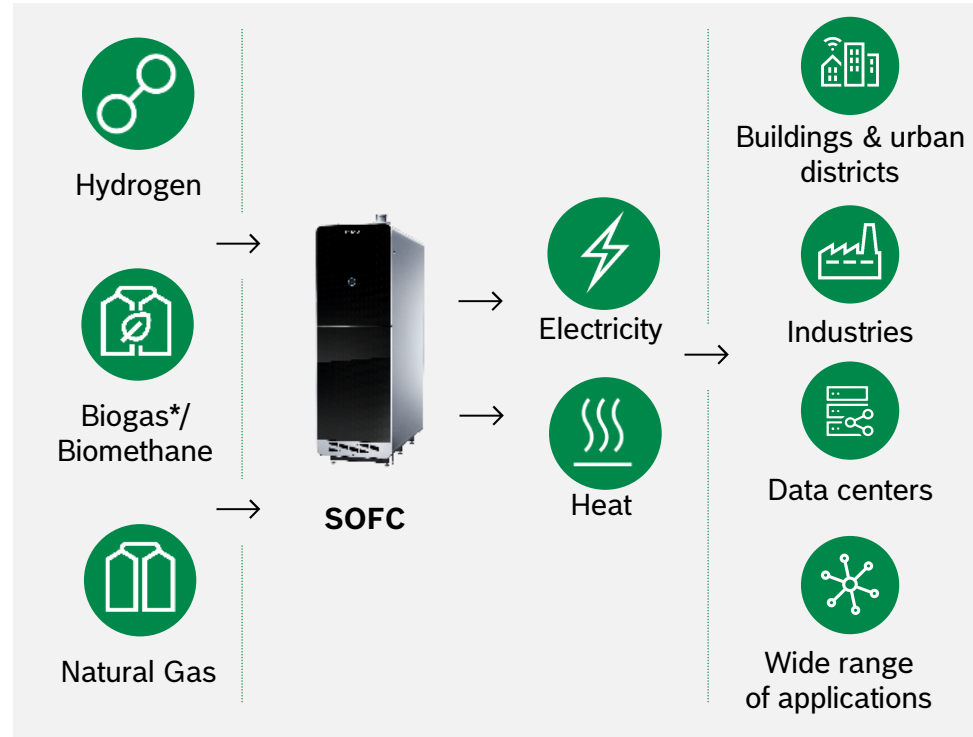
 **> 60 %**  
Electrical efficiency (AC)\*

 **> 85 %**  
Overall efficiency\*

 **10 kW<sub>el</sub>**  
Nominal power (AC)\*

 **> 3 kW<sub>th</sub>**  
Thermal output\*

## Multi-fuel system & flexible application



1 A stack of several hundred cells

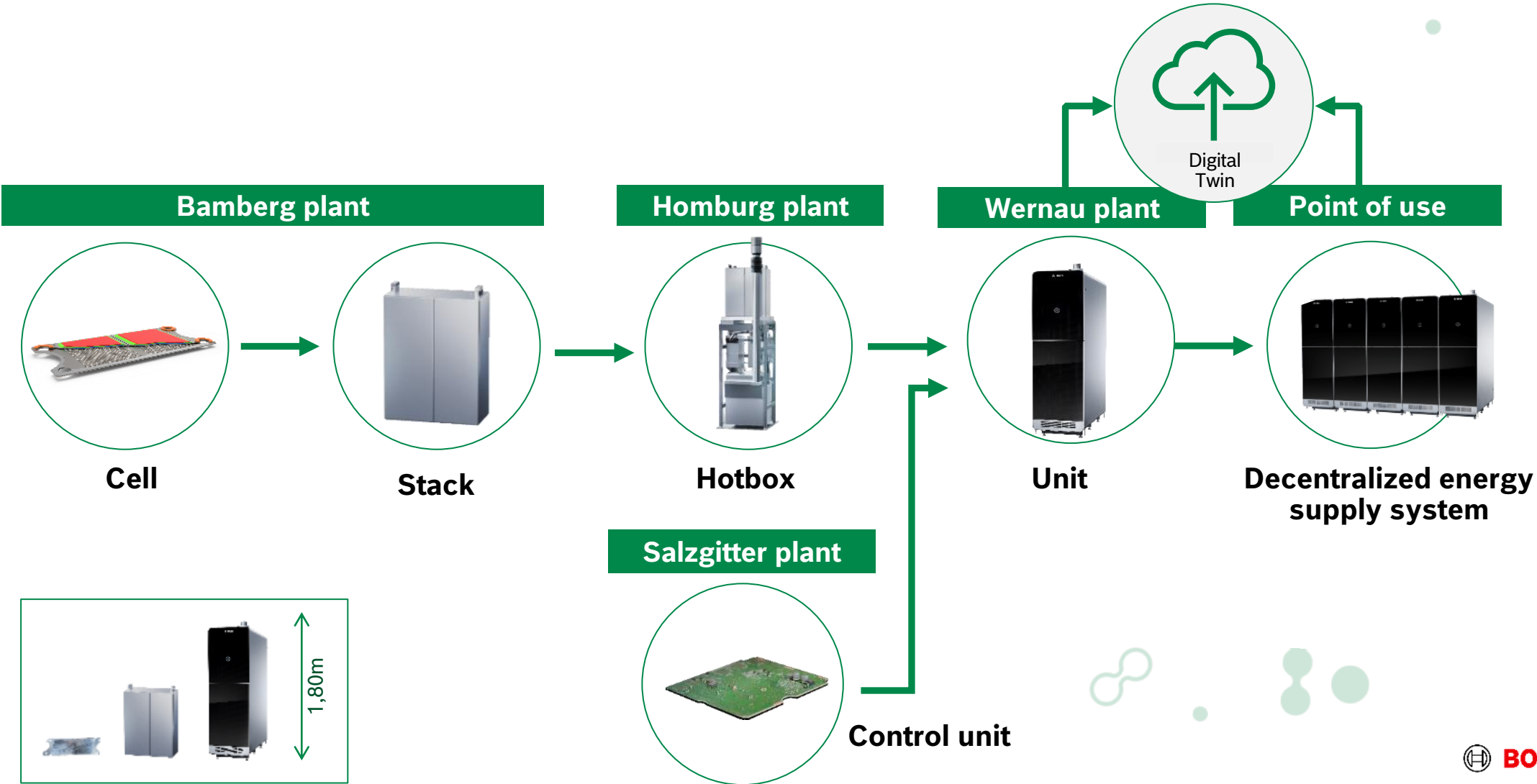
\* Currently in the pilot phase, the Bosch SOFC system is to be mass-manufactured by 2024. All technical specifications given in this informational document are development objectives.

\* Biogas processed according to DVGW G260

\* Beginning of life



# SOFC: Complete value stream covered at Bosch





# Compressor







Compressors  
from Maximator  
Hydrogen w/  
Bosch Rexroth  
technology





**Mobility**







# H<sub>2</sub> Fueling Station







# H<sub>2</sub> Fueling Station







eler  
refueling

Wasserstoff-Tankstelle

innovativ

nachhaltig

technologieoffen

BOSCH

Kevelaer

BOSCH

H<sub>2</sub> Forklifts

 BOSCH





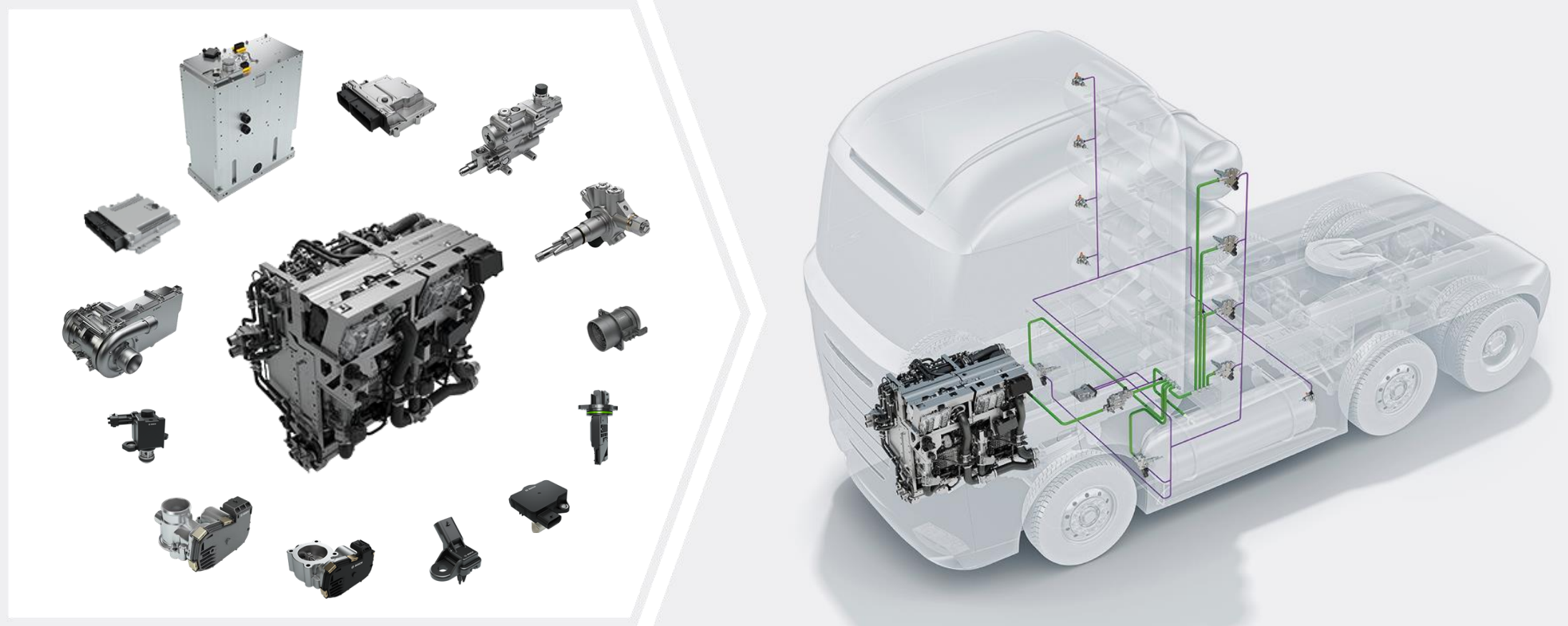
# H<sub>2</sub> Van





# The industrialization of the Bosch fuel cell system

## The fuel cell system



# Bosch Homburg: Transformation of the Powertrain




## PRESENT CORE DIESEL SYSTEMS



Lead Plant for injectors and rails (PC/CV), as well as inline pumps (Aftermarket)

## FUTURE CORE: H<sub>2</sub> TECHNOLOGY


### Components for Fuel Cell Electrical Vehicles

Electronic Air Compressor		SOP 1.Q 2023	Anode Recirculation Blower		SOP 2022	Hydrogen Gas Valve	
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### Components for Hydrogen Tank Systems

H2 Tank Plug		H2 Tank Valve		SOP 2.Q 2023	H2 Distributor	
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### Components for Solid Oxide Fuel Cell (SOFC) Systems

	SOP 2025	Solid-Oxide-Fuel-Cell (SOFC): Hotbox
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- 6 H<sub>2</sub>-Components w/ SOP 2022/2023
- 300 Associates in H<sub>2</sub> products





**Bosch Homburg**

1.310 Follower:innen

1 Monat • 🔒



Bosch Homburg unterstützt Aufbau der Wasserstoffwirtschaft im Saarland ... mehr





# More to come...





# More to come...

**MISSION H<sub>2</sub>**

Industrieprozesse

Wasserstoff-Tankstelle

Mobilität

Elektrolyse und Wasserstoffspeicher

Dezentrale Brennstoffzelle

Wärme

Strom

**H<sub>2</sub> KREIS**

Energiemanagement und Energy Platform

**BOSCH**

**izes**





# More to come...





# More to come...



## H<sub>2</sub> Bus



# More to come...



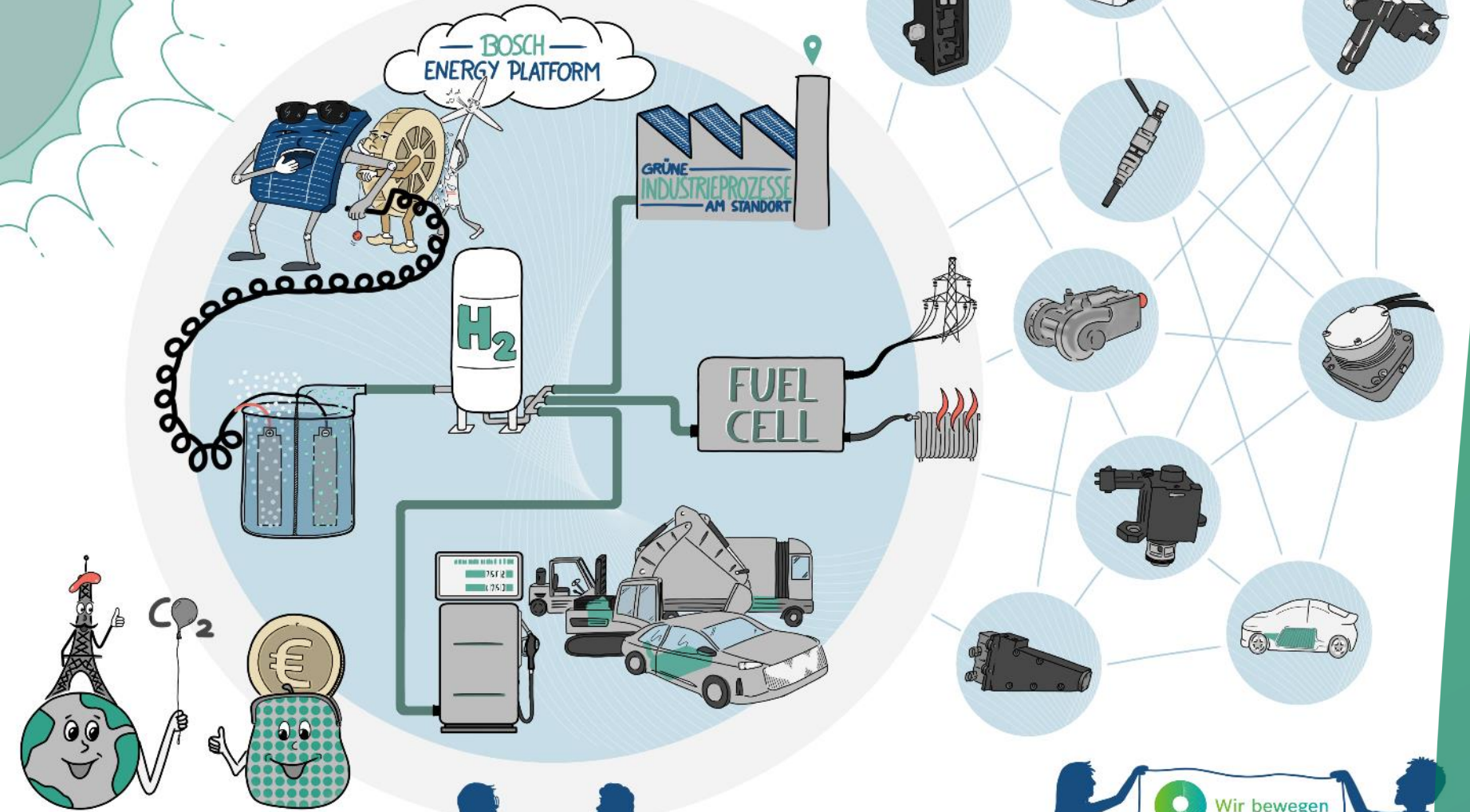
**iX5** Hydrogen





# H<sub>2</sub> STRATEGIE

## BOSCH HOMBURG



Wir bewegen  
die Zukunft  
BOSCH HOMBURG

 **BOSCH**

Wir bewegen  
die Zukunft  
BOSCH HOMBURG