Industrial Sector-Coupling using a Connected eH2-Cycle

BOSCH

The world is changing.

1. Increasing population

In 2050 there will be 10 billion people living on earth.

2. Urbanization
Around 60% of the world population is living in cities.

3. Climate Change
The top 20 of the warmest years since recording can be found in the periode since 1990.

Impact

CO_2 neutral

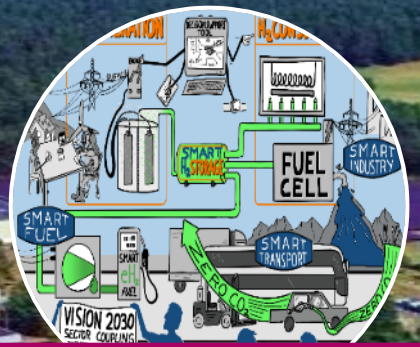
Sustainability Initiative

From the start 2020 Bosch is CO2-neutral - worldwide

Bosch embraces the value "Responsibility and Sustainability“ more strongly .

BOSCH

regenerative power generation



Connected eH2 cylce

Energy Platform

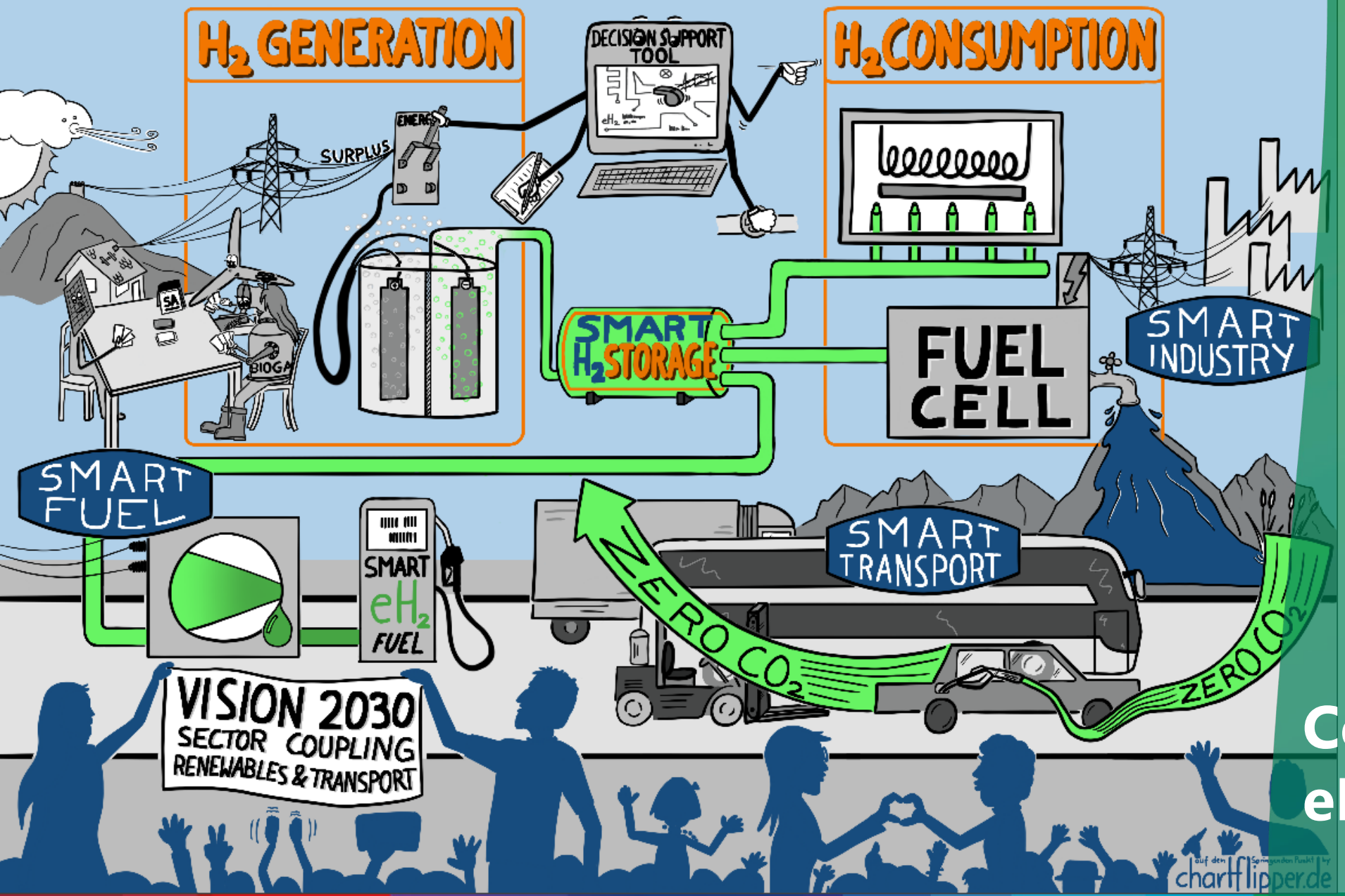
Reduction of consumption by increasing efficiency and flexibility

What Homburg stands for?

CO_2 neutral

- Efficient and flexible consumption
- optimized power generation for own consumption
- **Linking-up** all components by the Energy Platform
- **storage** and sector-coupling i.e. by the connected eH2 cycle

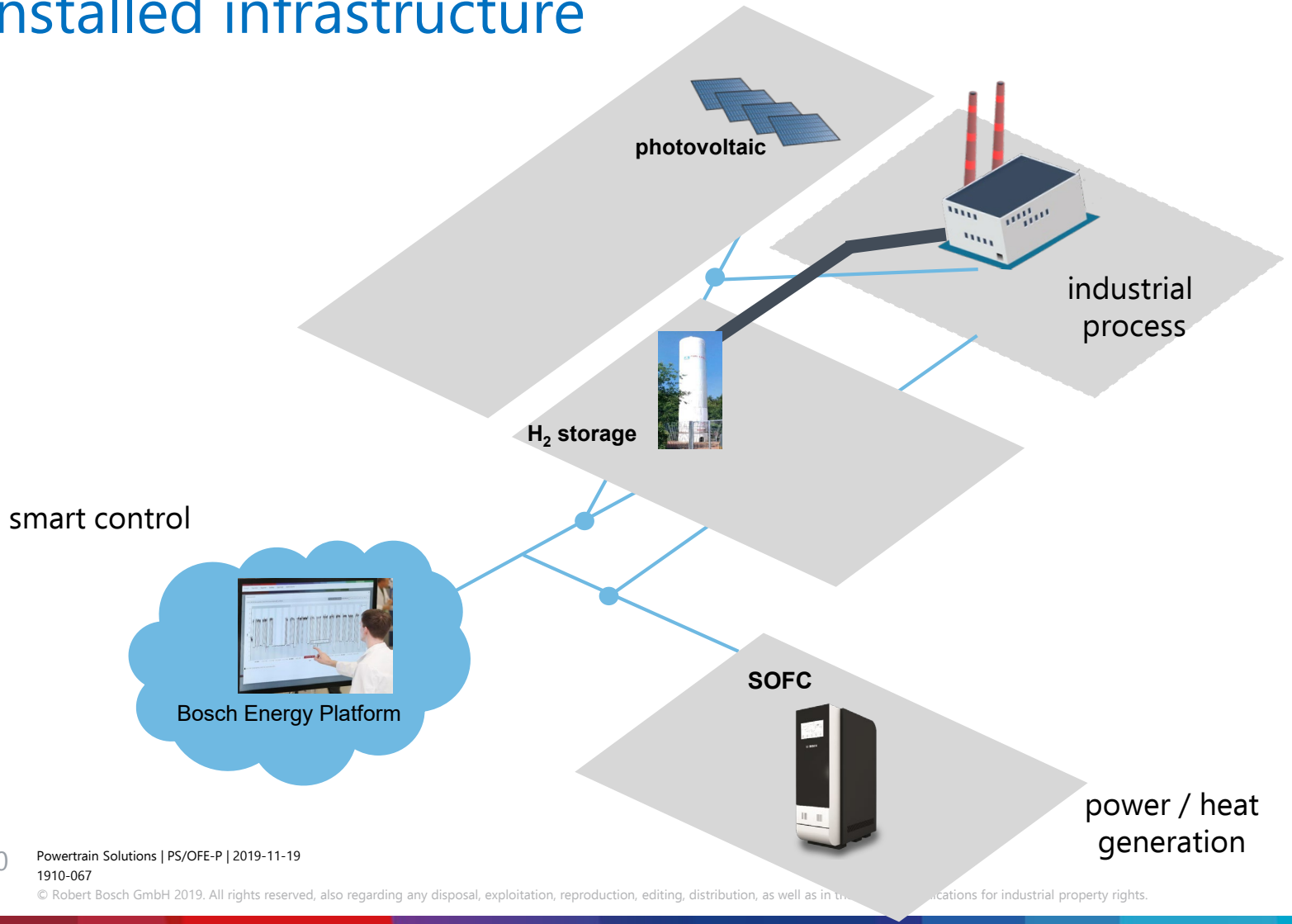
BOSCH



Connected eH_2-Cycle

Connected eH_2-Cycle
installed infrastructure

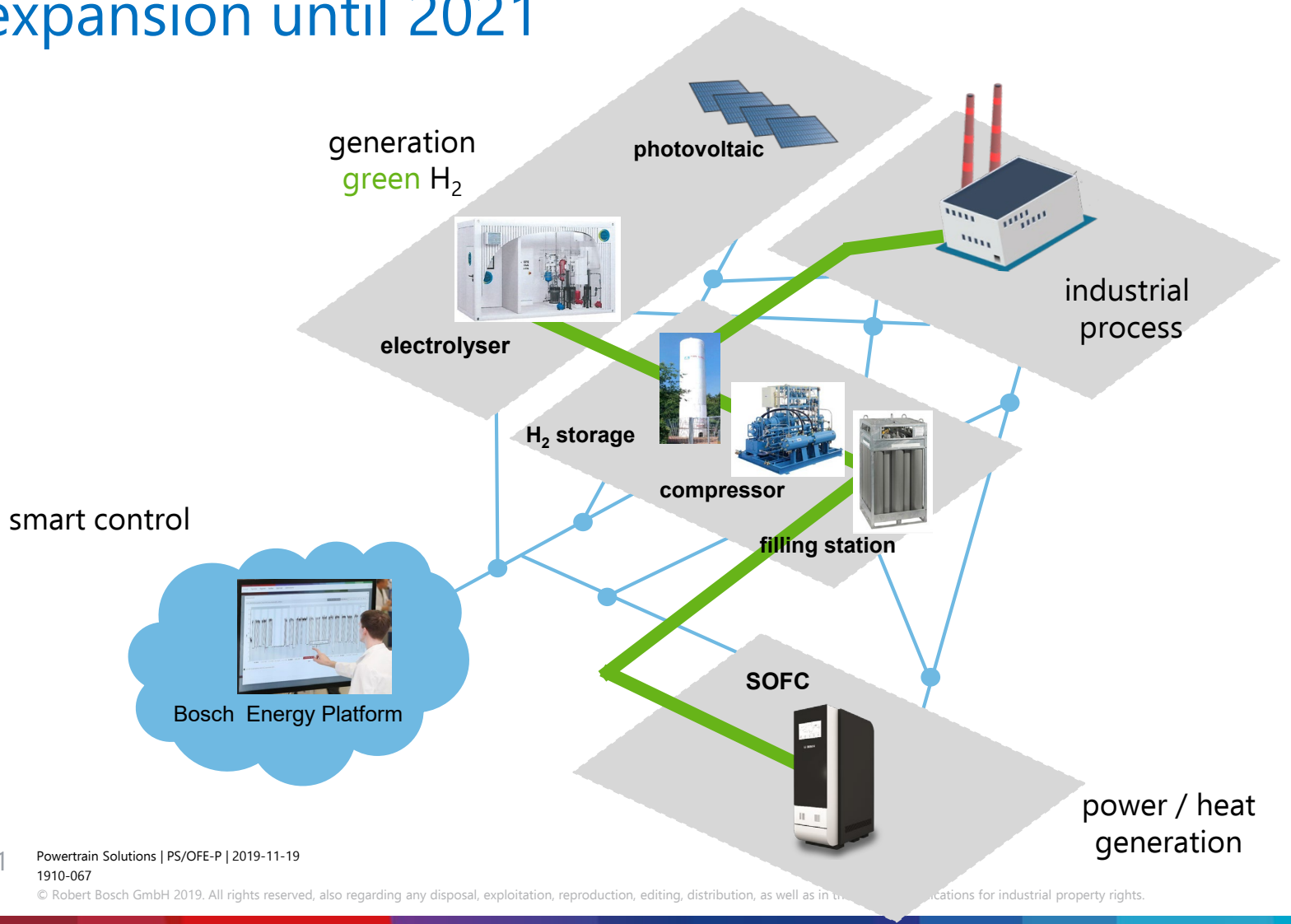
Wir bewegen die Zukunft
BOSCH HOMBURG



BOSCH

Connected eH_2-Cycle
expansion until 2021

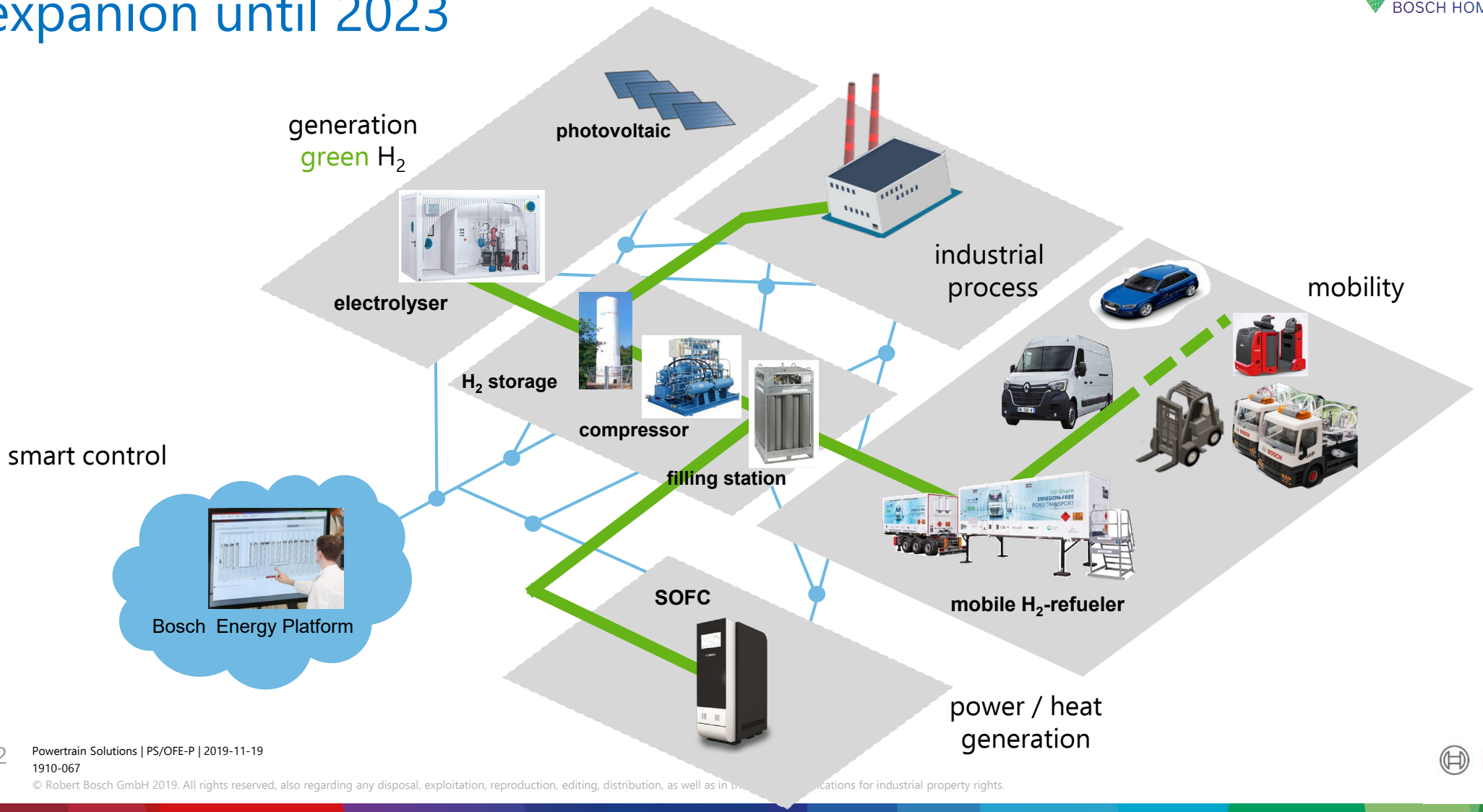
Wir bewegen die Zukunft
BOSCH HOMBURG



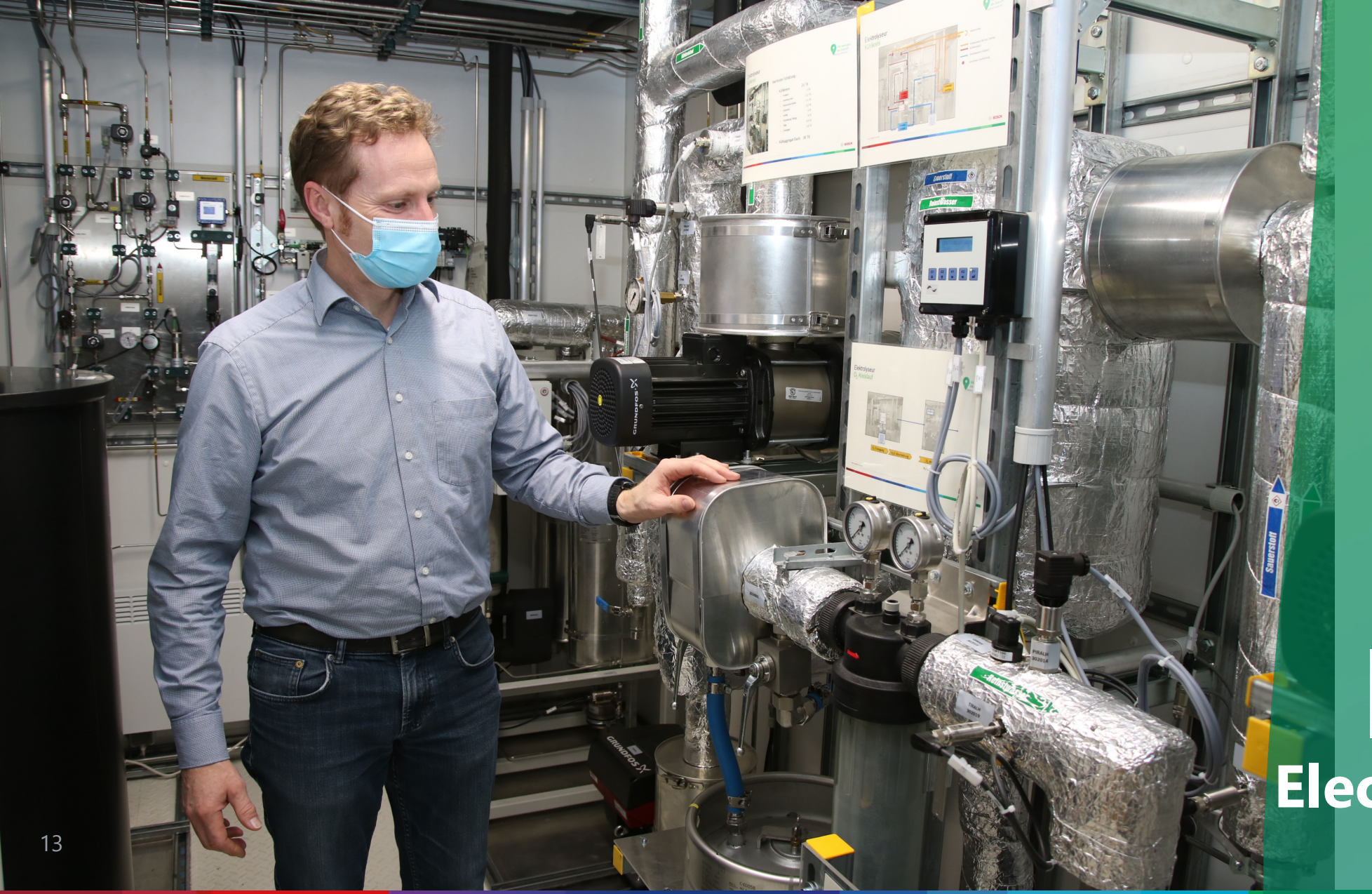
BOSCH

Connected eH$_2$-Cycle
expanion until 2023

Wir bewegen die Zukunft
BOSCH HOMBURG



BOSCH



Electrolyser

Solid Oxide **Fuel Cell**

Target Values

>60%

Electrical efficiency (AC)

>85%

Overall efficiency

CO2 reduction

Capable to run on:
Hydrogen (H2)
Biogas/Ecogas
Natural Gas
& all combinations of above

Almost **emission-free:**
No nitrogen oxides
No particles

Very low noise
No vibrations

10 kW_{el}

AC power nominal load

> 3 kW_{th}

Thermal output

Extended & rapid
Power modulation

Efficiency

Scalability up to several MW_{el}

Resilience

Profitability

Solide Oxid Fuel Cell
Bosch starts Mass-Production in 2024

SOFC

WyRefueler - the mobile hydrogen refueling station

Wystrach
Customized solutions in high pressure

- standalone tank system for 350 bar refueling
- discharging capacity: 360 kg/day
- available 24/7
- with smart control
- mobile as BDF swap body (ADR)
- ADR and PED approved

Wystrach GmbH | Industriestraße 60 | 47652 Weeze | Germany | +49 (0) 28 37 / 91 35-0 | info@wystrach-gmbh.de

www.wystrach-gmbh.de

The fuel cell is on its way

BOSCH

Why Fuel Cell?
Fuel Cell Electric Vehicles - Motivation

Commercial Vehicles

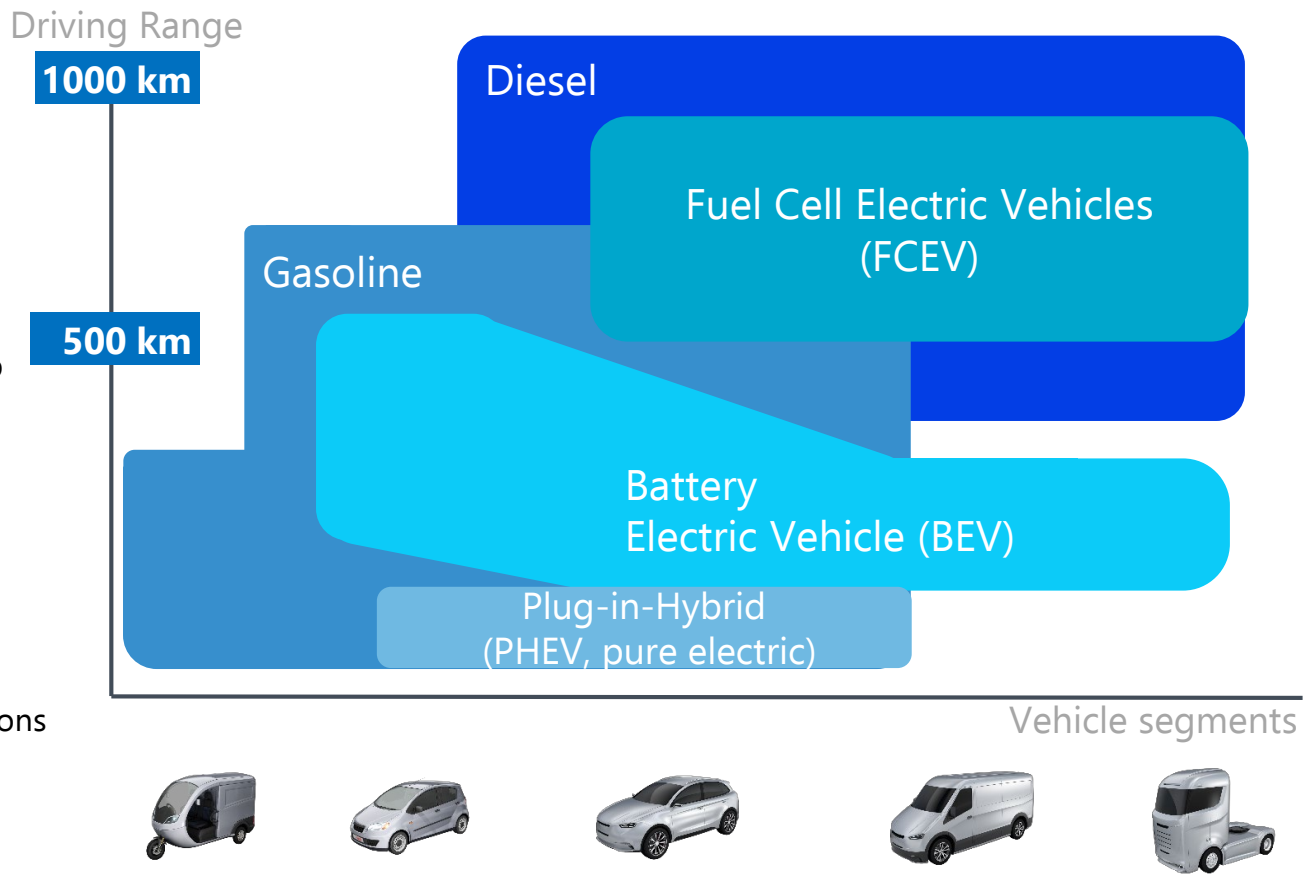
Weight- and space optimized e-mobility with potential for attractive TCO-case

- ❑ FCEV might be the only viable option for HD long-haul e-mobility
- ❑ In many use-cases and based on attractive Hydrogen costs FCEV will be able to offer attractive Total-Cost-of-Ownership

Passenger Cars

Attractive UX-factors in long-distance use cases

- ❑ FCEV can provide an ultimate solution for zero tail-pipe emissions in all applications for long distance uses cases
- ❑ FCEV can remove range anxiety barrier in e-mobility applications
  - refueling time in 3 min
  - driving range above 500 km



Sector-Coupling in industrial environment
components for mobile fuel cell systems

Anode recirculation blower (ARB)

The recirculation blower returns the surplus hydrogen back into the system cycle

Sector-Coupling in industrial environment
components for mobile fuel cell systems

Hydrogen gas injector (HGI)

The gas injector provides
the correct amount of hydrogen.

Sector-Coupling in industrial environment
components for mobile fuel cell systems

Electric air compressor (EAC)

The air compressor is required to supply the fuel cell with oxygen.

Our target 2020