

VDMA Fuel Cells Survey 2019

Economic Situation and Outlook of the Fuel Cell Industry in Germany

Revenues, Employment and Systems in Stationary Applications and Stack components

**Dr. Manfred Stefener, Chairman
Gerd Krieger, Managing Director**

VDMA Fuel Cells



VDMA Fuel Cells Members



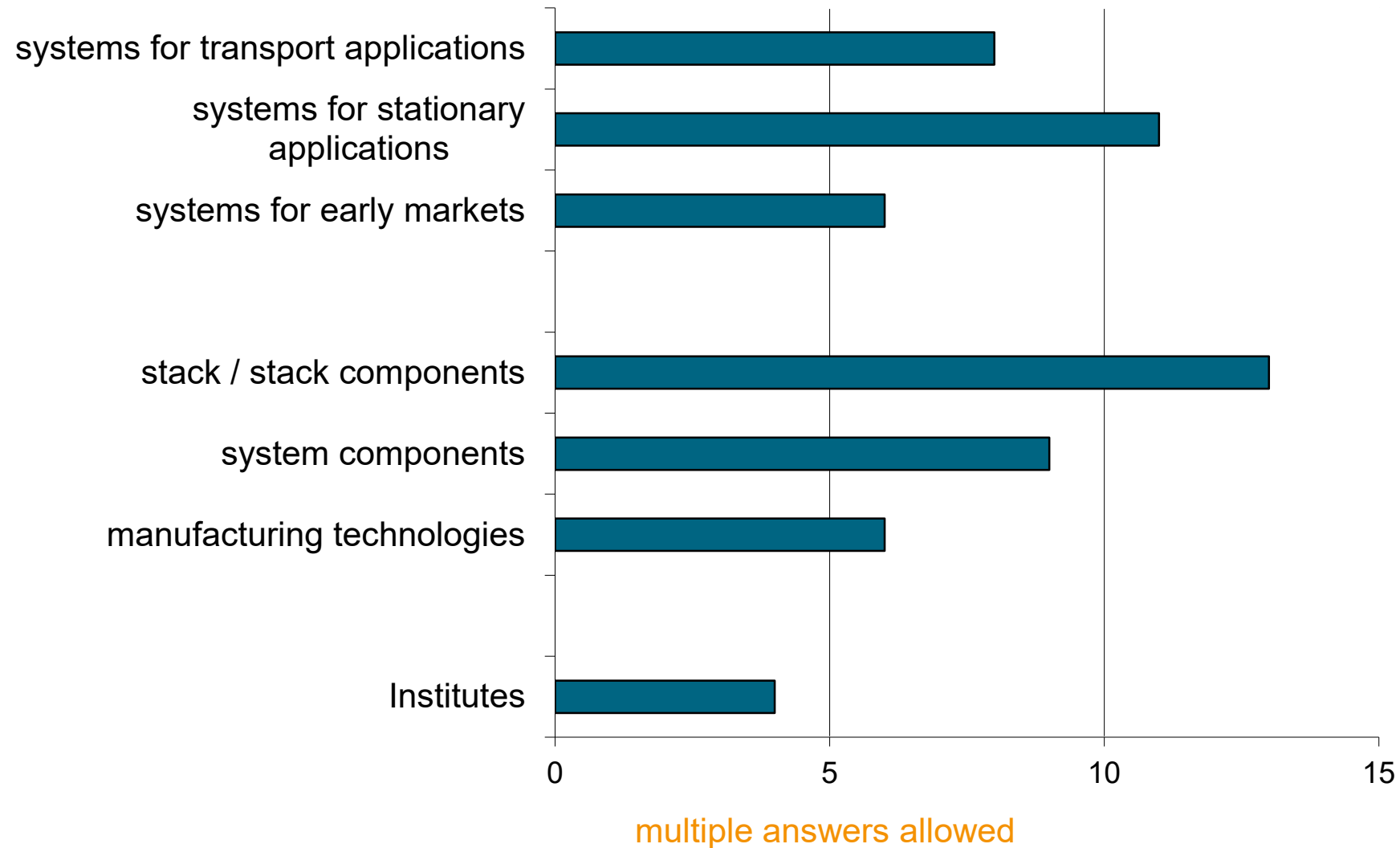
Preliminary note



- » Survey carried out every 2 years since 2009
- » Nearly 50% of the members also participated in 2019, a total of 30 answers, with a focus on stationary systems and stack components (see chart).
- » Market ramp-up in the mobility and electrolysis sectors begins, but is not (yet) reflected in sales and unit numbers. Focus is to firm-up supply chain.
- » German importance as location for world-leading scientific institutes is also insufficiently reflected in figures
- » Development depends strongly on regulatory conditions in Germany/EU as well as North America and Asia. This complicates statements for 2024! Companies continue to expect high growth rates.
- » Longer-term forecasts from 2030 onwards, gives a clearer picture. For deep decarbonisation the importance of H2 and fuel cells will grow strongly.

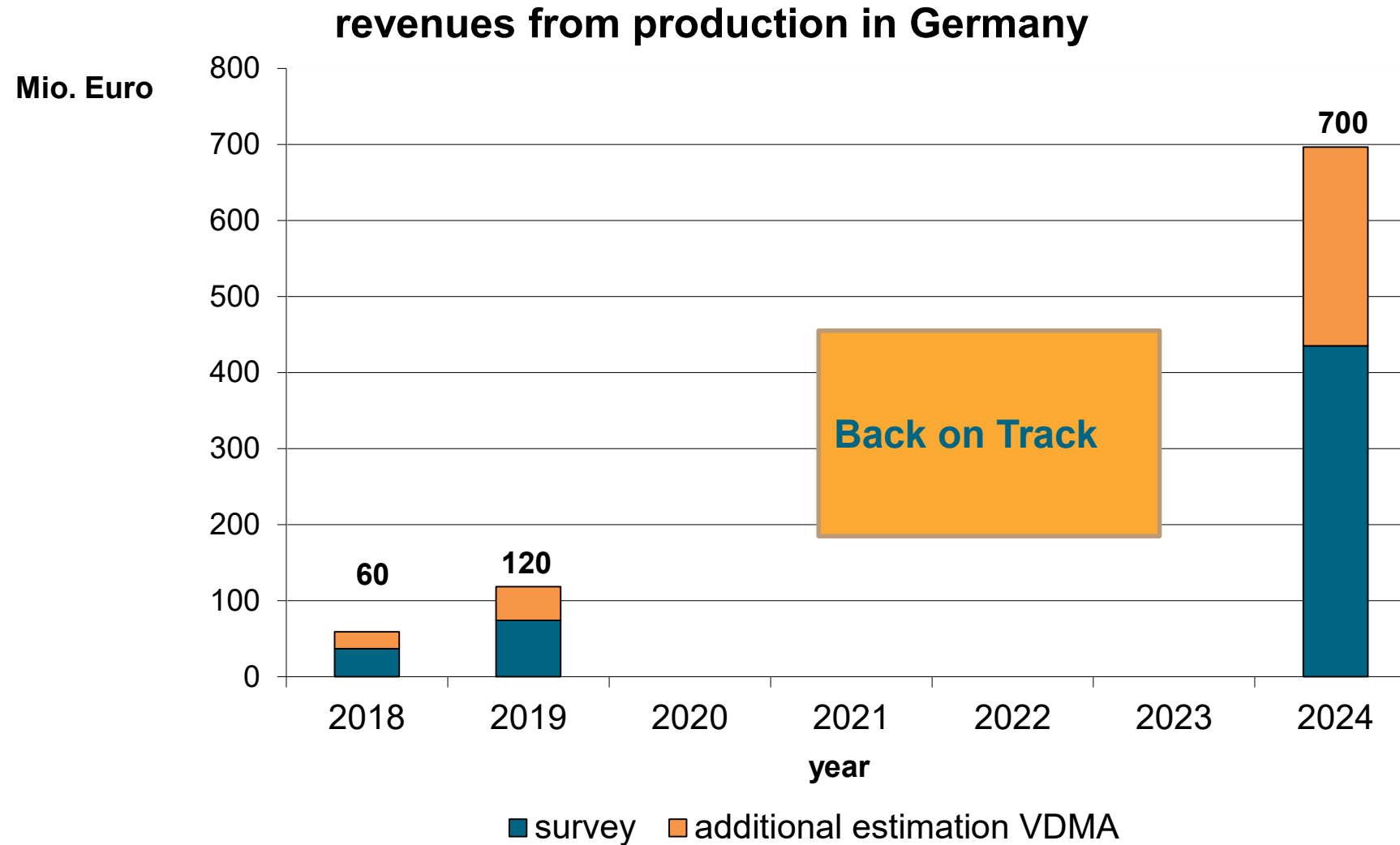
VDMA Fuel Cells – Survey 2018/2019

Participants



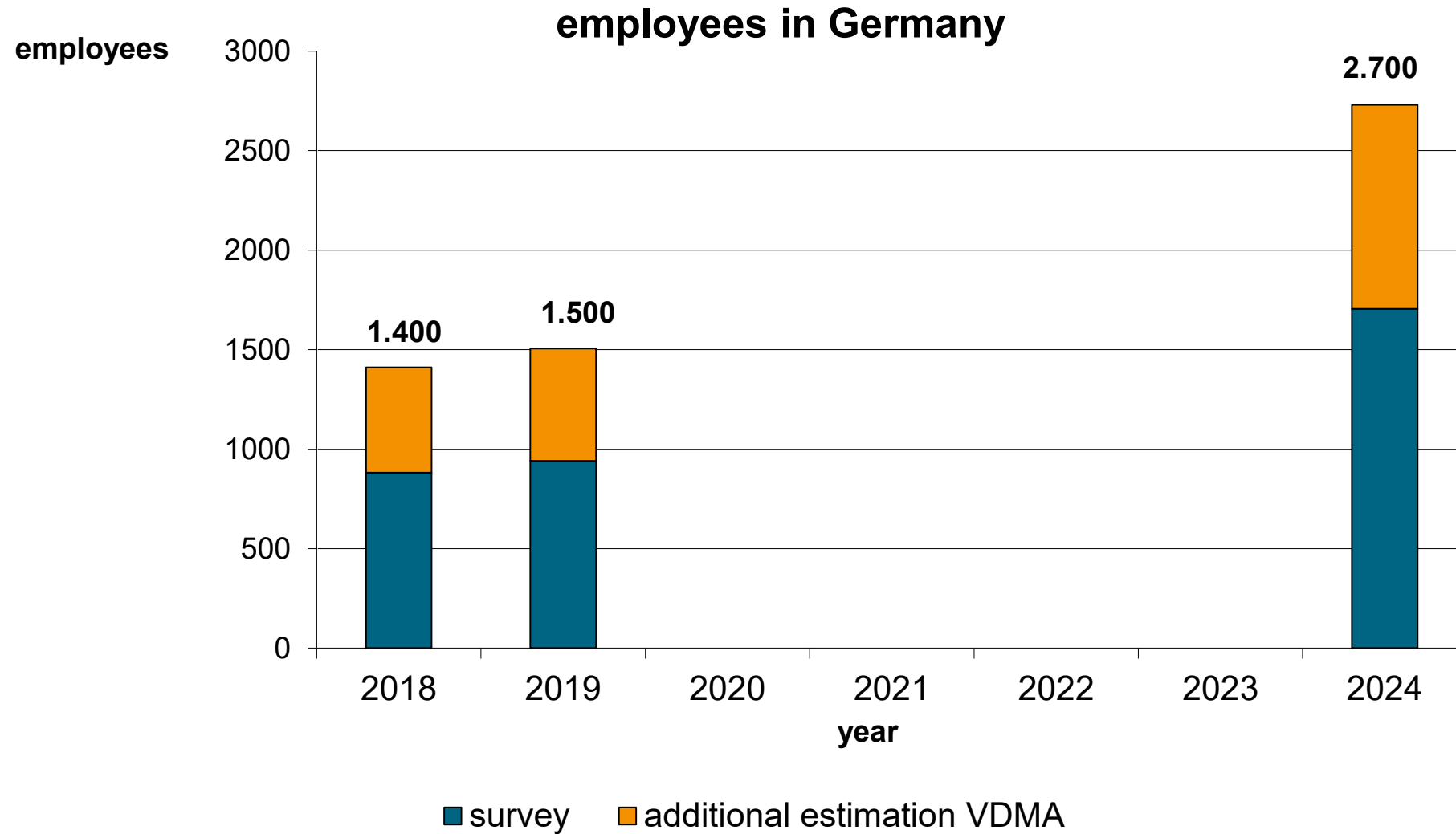
VDMA Fuel Cells – Survey 2018/2019

Revenues – Stationary and Early Markets in Germany in Million Euro



VDMA Fuel Cells – Survey 2018/2019

Employees – Stationary and Early Markets in Germany

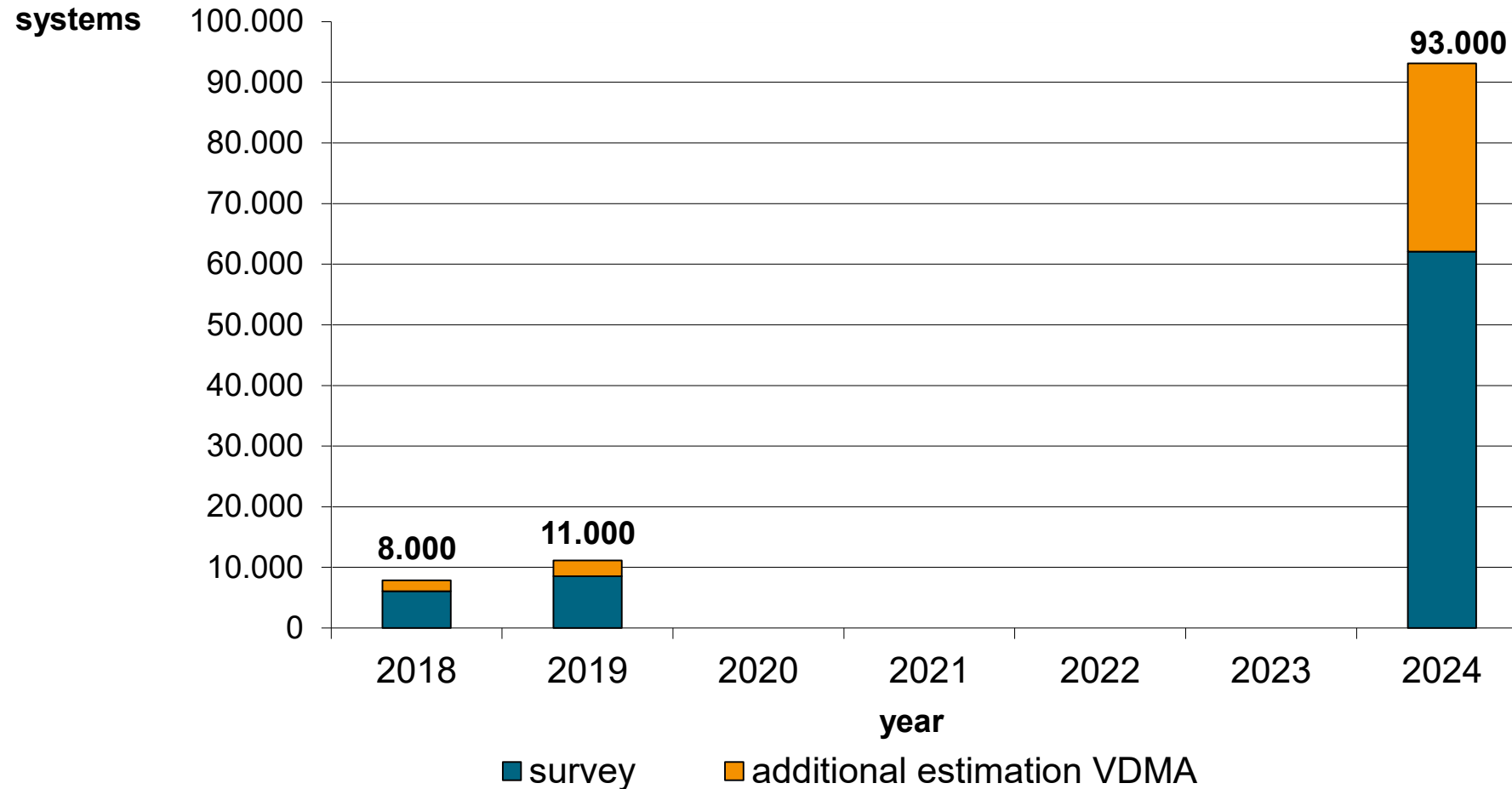


VDMA Fuel Cells – Survey 2018/2019

Fuel cell systems annually produced in Germany



fuel cell systems produced in Germany



The industry expects high growth rates the next years

Fuel Cell Industry Review 2018

Franz Lehner

Hannover, 3 April 2019



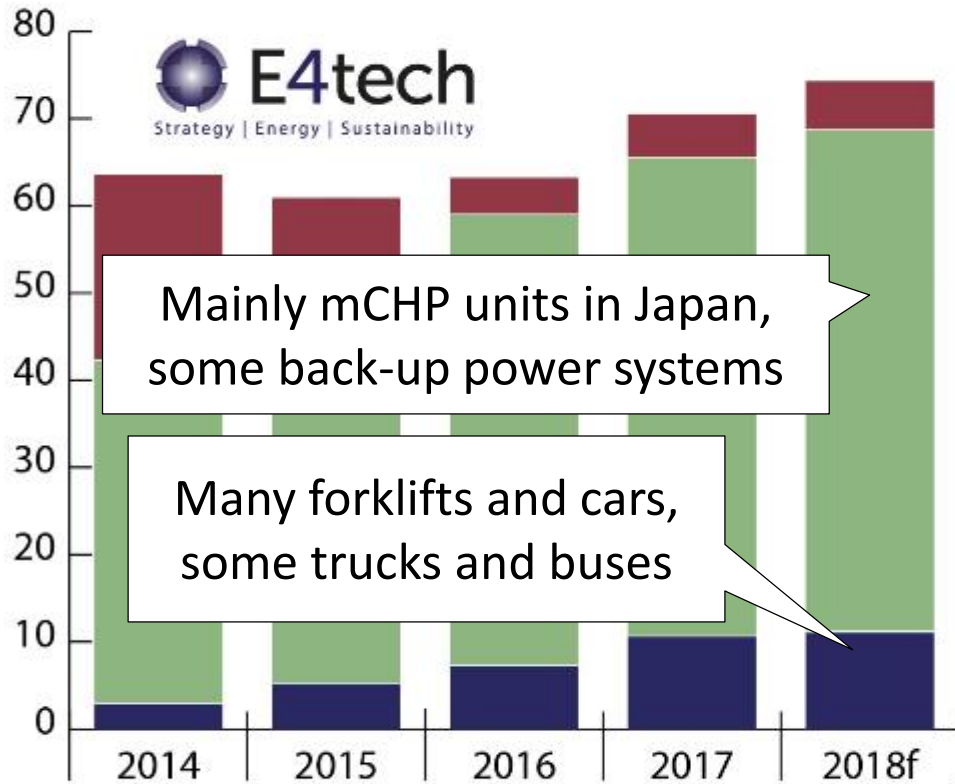
E4tech's annual Fuel Cell Industry Review
www.FuelCellIndustryReview.com

Key messages from the Fuel Cell Industry Review 2018

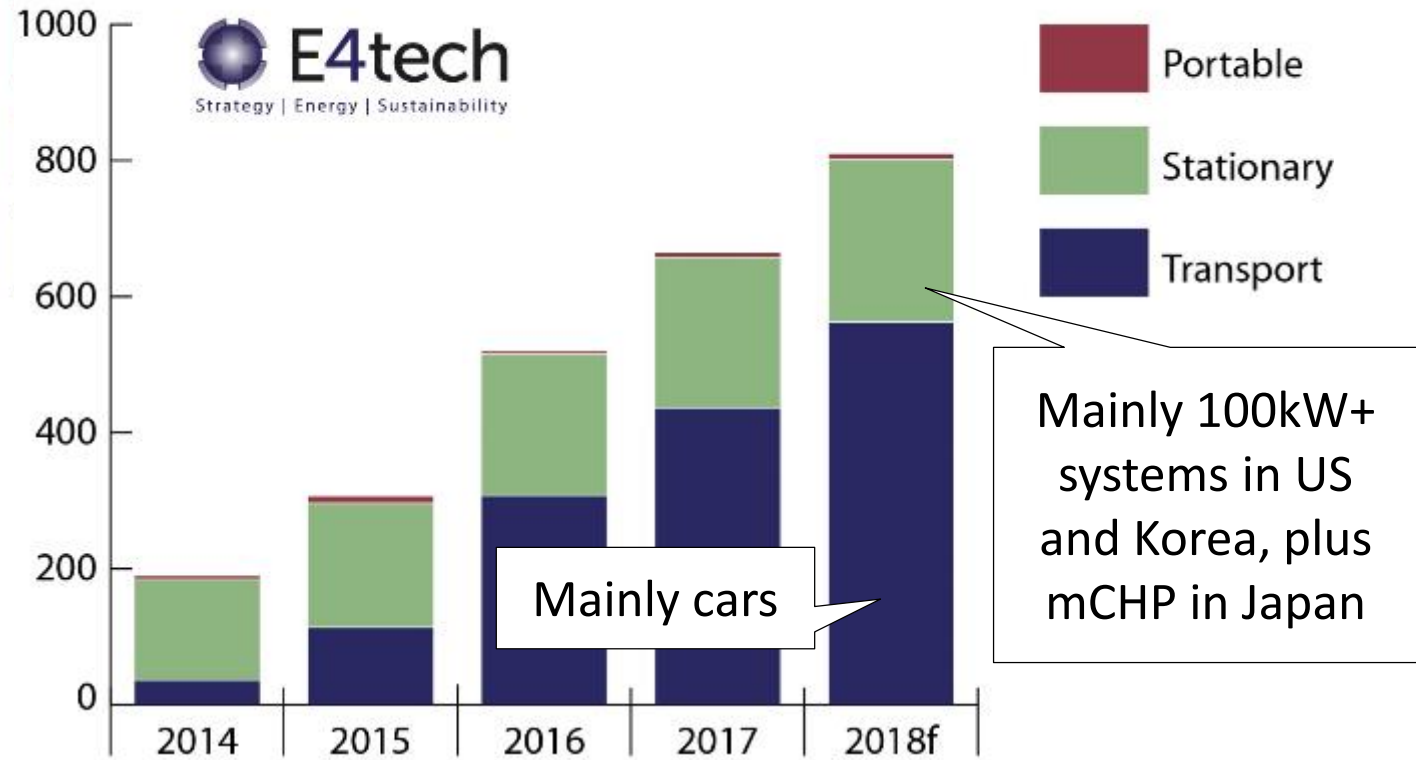
- 2018 was a good for fuel cells and hydrogen: Shipment numbers grew further, lots of groundwork was laid, serious players entered and invested in the sector
- Buses and other heavy-duty applications are starting to get real traction
- Costs are coming down, and the supply chain is starting to firm up
- Announcements are frequent and sometimes big:
 - Toyota 30,000 units/yr 2020
 - Hyundai 40,000 units/yr by 2022
- China is important: Strong policy and desire, good opportunity but rapid/chaotic evolution
- Europe has seen a number of larger power-to-X/hydrogen projects being announced
- Subsidy ‘carrots’ and regulatory ‘sticks’ still play an important role for the current fuel cell market
- Fuel cell industry remains in flux, and the next two years will be very important

Data from the Fuel Cell Industry Review show how vehicle unit shipments have increased, and their major impact on MW shipped

Shipments by application 2014 - 2018 (1,000 units)



Megawatts by application 2014 - 2018

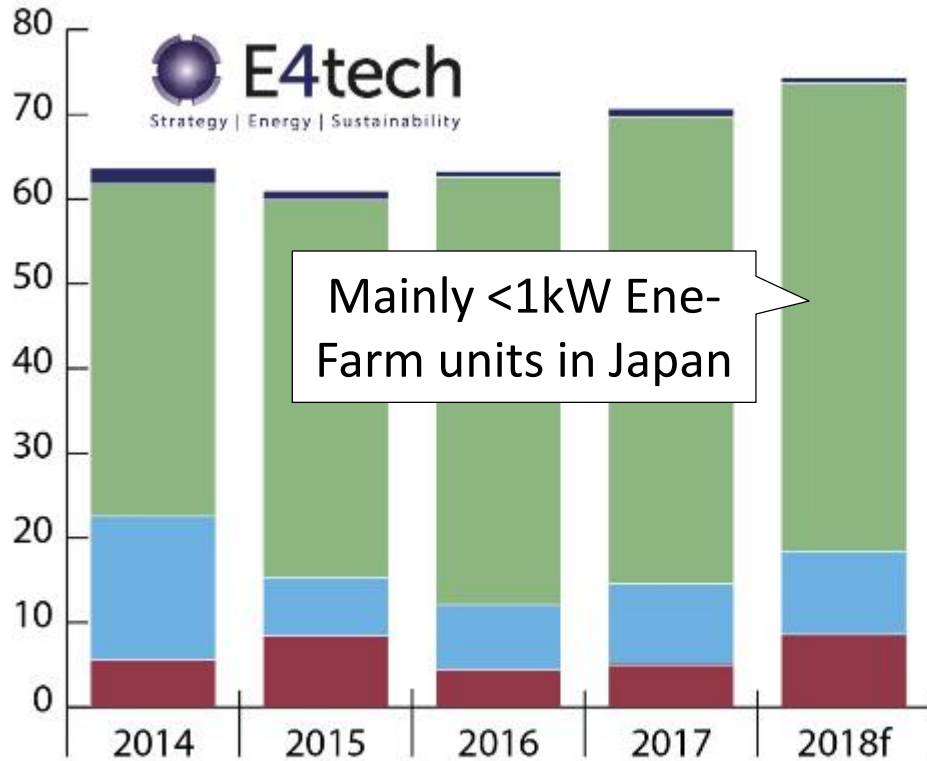


Full annual report available for download (free):

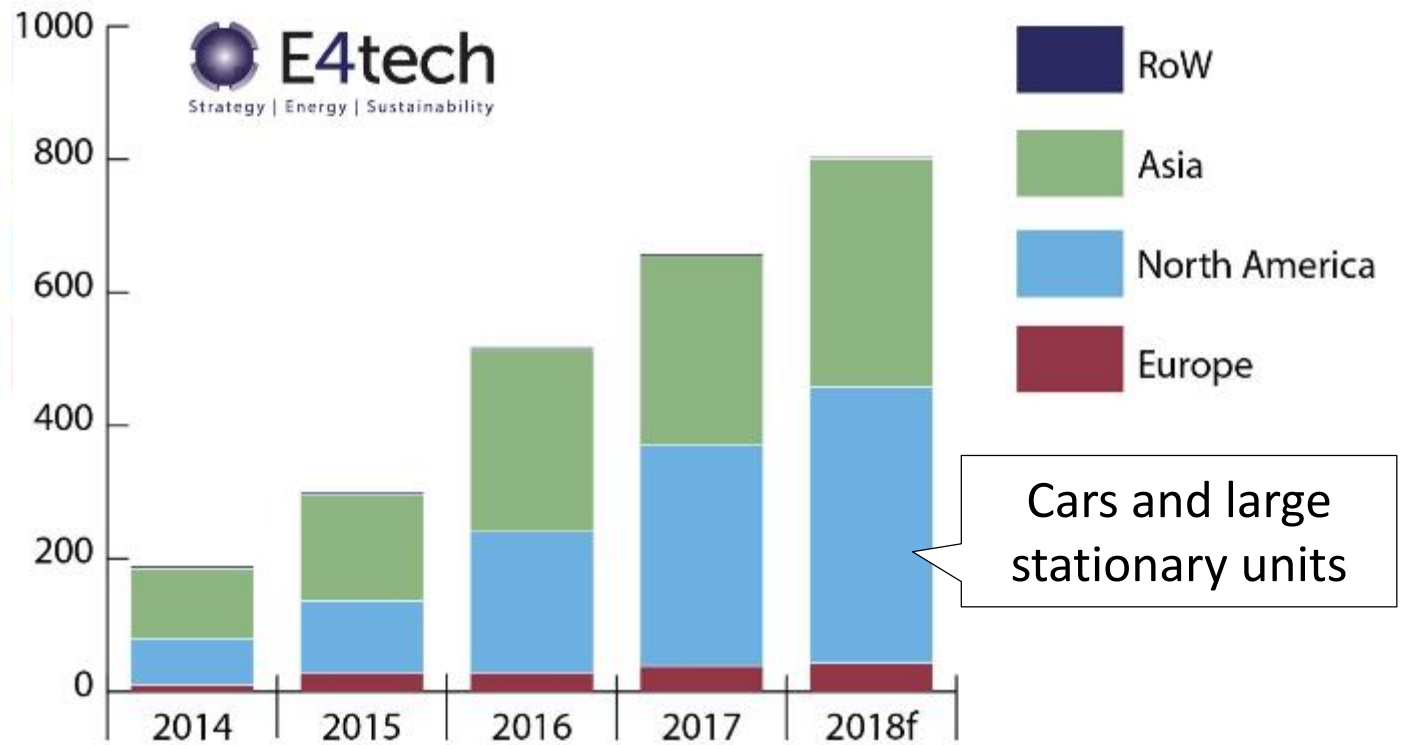
www.fuelcellindustryreview.com

Asia and North America dominate the deployment, with Asia leading by far in manufacturing. Europe is small but growing.

Shipments by region of adoption 2014 - 2018 (1,000 units)



Megawatts by region of adoption 2014 - 2018



Full annual report available for download (free):

www.fuelcellindustryreview.com

Conclusion



- » Unit numbers, turnover and employment increase. Export ratio growing, especially in the components sector and in the direction of China and South Korea.
- » The main pillar for German Fuel cell manufacturers is currently further development in the building sector and in special markets (UPS). Existing programmes (Technologieentwicklung-Program KfW 433, NOW/NIP II) must be continued here.
- » The next two years will decide whether it will be possible to create a stable market perspective on the basis of the technical knowledge built up over the last decade and the experience gained from demonstration projects. In the mobility sector the focus will not be on the passenger car, but rather on light- and heavy-duty applications.
- » If this does not succeed in Germany/EU, the industrial policy opportunity of a German fuel cell industry will be squandered!



Manfred.Stefener@fst.com

**Chairman
VDMA Fuel Cells**

**Vice President
Freudenberg Lead Center Fuel Cell Systems**



Gerd.Krieger@vdma.org

**Managing Director
VDMA Fuel Cells**