Shell Hydrogen

Global Experiences & Perspectives on China

Hydrogen Webinar Series, 10th June 2020

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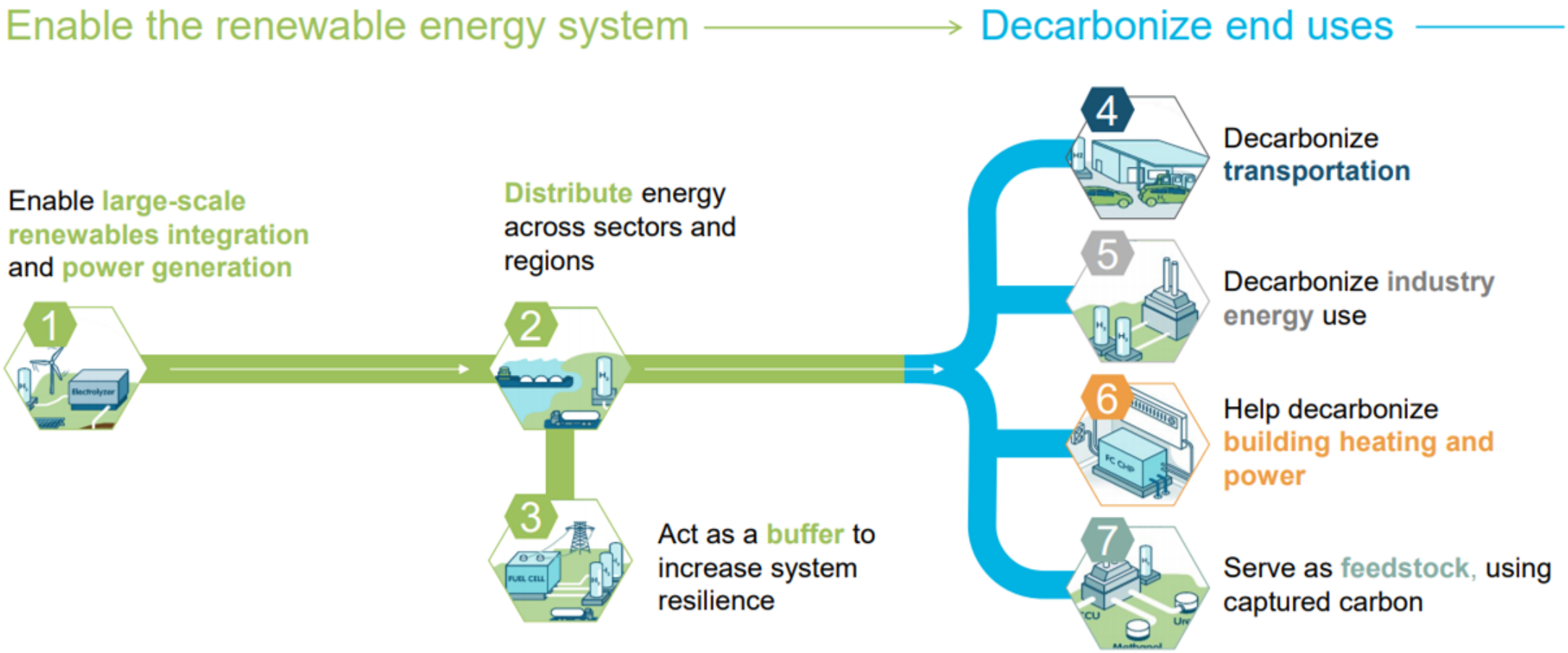
Hydrogen is the only molecular zero carbon vector and sits at the intersection of three systems: mobility, industrial and energy



Source: Hydrogen Council

COLLABORATION IS KEY FOR H_2 SUCCESS

The future success of hydrogen as a sustainable transport option will require actions by all players

Car manufacturers

to continue developing hydrogen fuel cell vehicles and reduce costs

Governments

to support the choice for hydrogen fuel cell vehicles

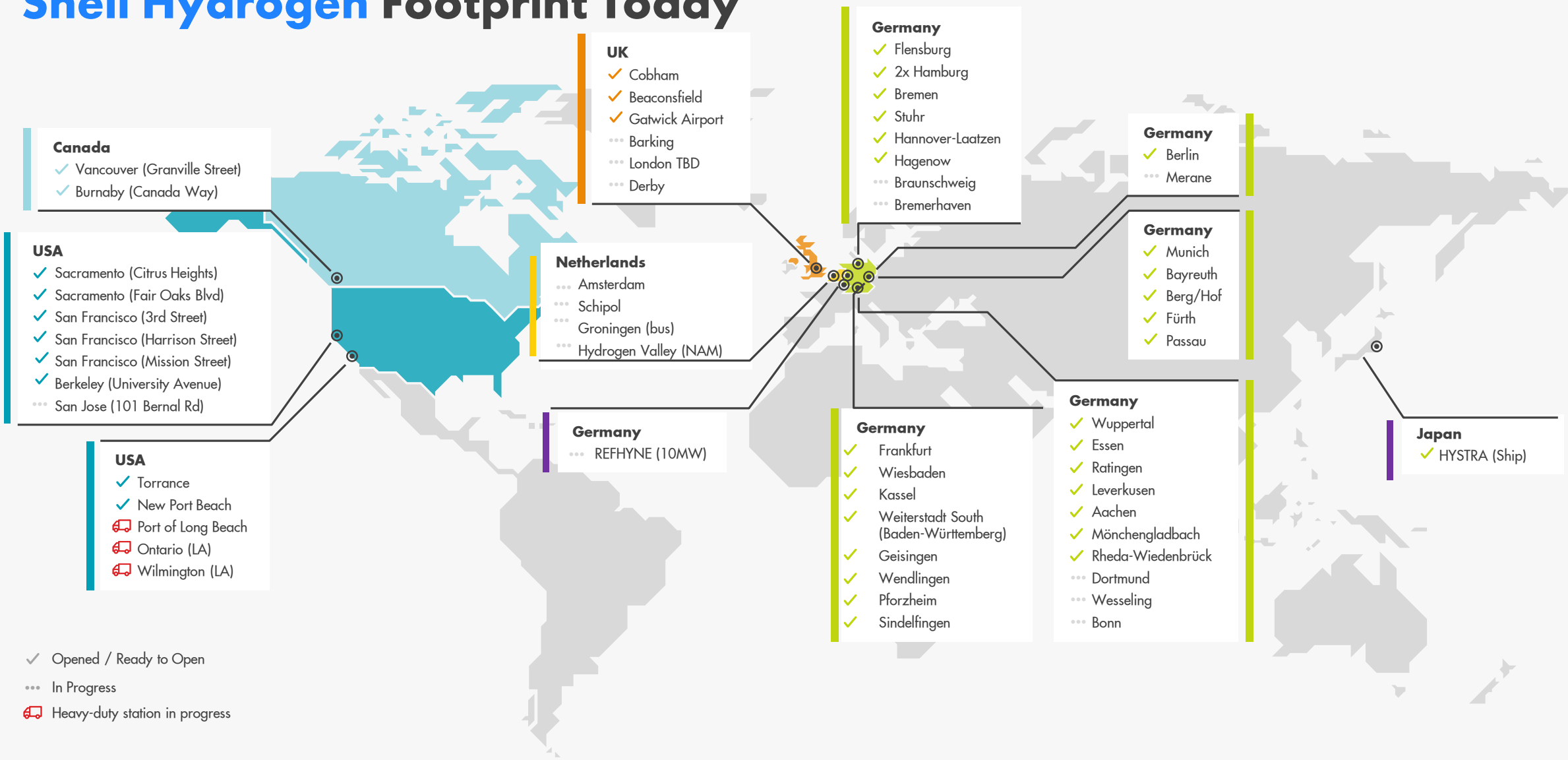
Customers

Greater hydrogen infrastructure and more hydrogen car models to choose

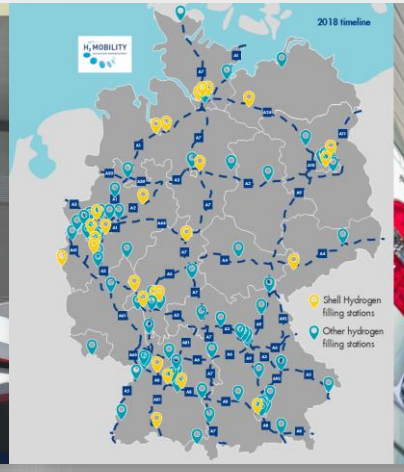
Energy industry

to invest in infrastructure and offer fuel at competitive price

Shell Hydrogen Footprint Today



Hydrogen Value Chain



Production

- Natural Gas → Steam Methane Reforming
- Renewable Electricity → Electrolysis

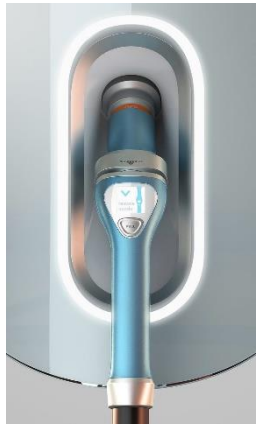
Storage & Transport

- Liquid H2
- Compressed H2
- Ammonia
- Synthetic Hydrocarbon

Conversion

- Re-gas
- Reforming

Utilisation



REFHYNE
BUILDING A 10MW PEM ELECTROLYSER

With ITM, Shell is installing a 10-megawatt PEM (polymer electrolyte membrane) electrolyser, the largest of its kind, to produce hydrogen at the Rhineland refinery in Germany.

REFHYNE
CLEAN REFINERY HYDROGEN FOR EUROPE

This project is supported by the European Union.

HYDROGEN IN HEAVY DUTY TRANSPORT
LOS ANGELES

- In California, Shell is part of a consortium to develop three new large-capacity refuelling stations for heavy-duty hydrogen fuel-cell trucks being developed by Toyota and Kenworth Truck Company.
- These stations will form the first hydrogen truck refuelling network in California, between the Port of Los Angeles and a major warehouse complex inland.

THE NEAR FUTURE FOR HYDROGEN AT SHELL

HYDROGEN RESEARCH & DEVELOPMENT

New hydrogen dispenser

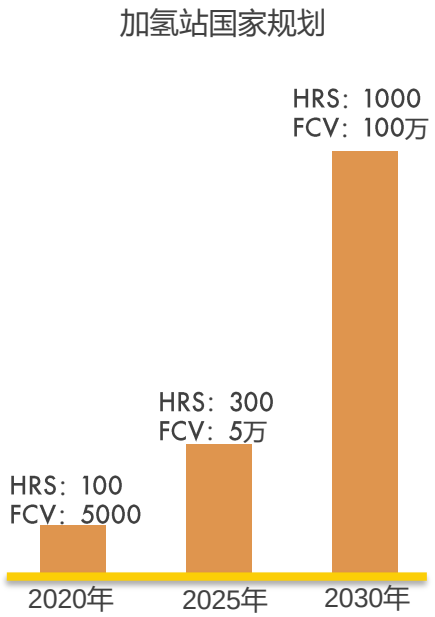
Improving customer's refuelling experience

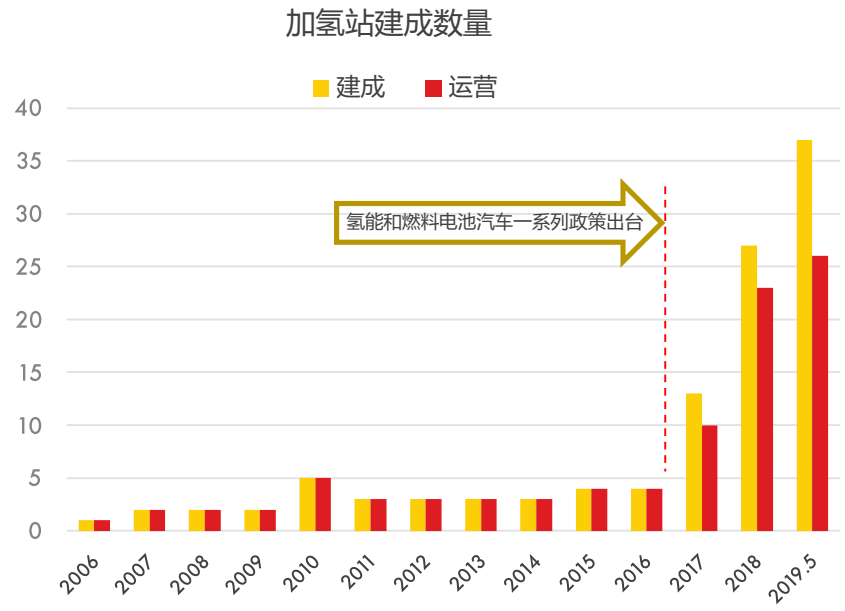
- Collaboration with BMW Designworks
- Release of prototype at the Dutch Petrol Retail Exhibition in the Netherlands in November 2018
- Final release in 3rd quarter 2019

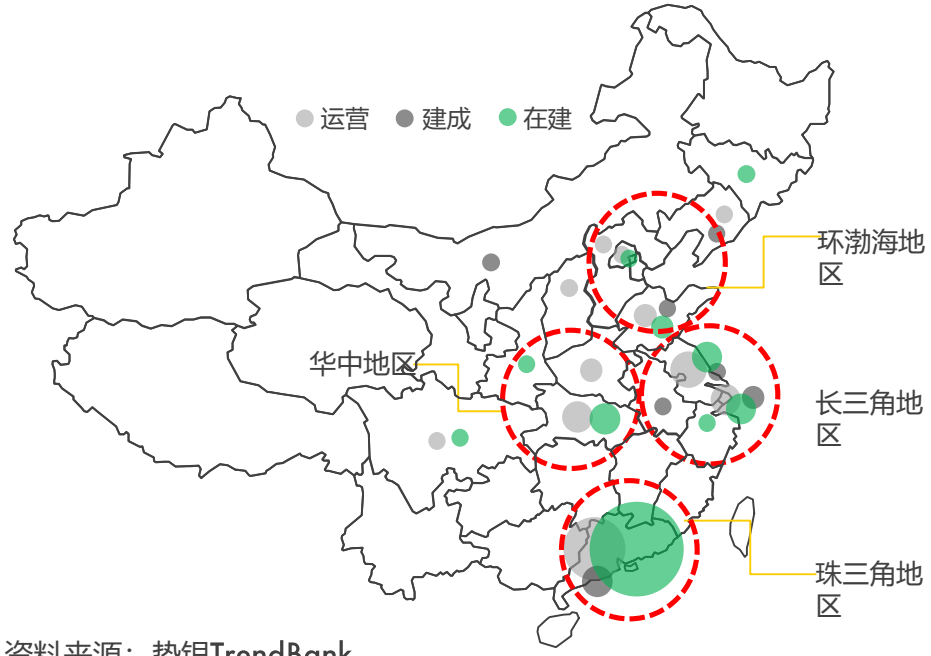
中国市场给壳牌氢能的启示

政策推动+市场响应：

从商用车起步，氢燃料电池车加速发展，加氢站建设快速跟上







资料来源：势银TrendBank

- 以商用车为起点，逐步扩大运营规模，推动产业链和基础设施的完善，与国外直接从乘用车发展的路线行成鲜明对比。
- 各地纷纷出台氢能和燃料电池车发展规划，逐渐形成区域化发展优势。
- 加氢站等基础设施相对滞后，尚存在建设成本高，审批过程复杂等问题。