

# HYDROGEN



## industrial activities in Hydrogen - vision and reality

IPHE Education and Outreach Event  
Hamburg, April 25<sup>th</sup> 2017

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# Definitions & cautionary note

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this release “Shell”, “Shell group” and “Royal Dutch Shell” are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words “we”, “us” and “our” are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this release refer to companies over which Royal Dutch Shell plc either directly or indirectly has control. Entities and unincorporated arrangements over which Shell has joint control are generally referred to as “joint ventures” and “joint operations” respectively. Entities over which Shell has significant influence but neither control nor joint control are referred to as “associates”. The term “Shell interest” is used for convenience to indicate the direct and/or indirect ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This release contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Royal Dutch Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “anticipate”, “believe”, “could”, “estimate”, “expect”, “goals”, “intend”, “may”, “objectives”, “outlook”, “plan”, “probably”, “project”, “risks”, “schedule”, “seek”, “should”, “target”, “will” and similar terms and phrases. There are a number of factors that could affect the future operations of Royal Dutch Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this release, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. There can be no assurance that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this release are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Royal Dutch Shell’s 20-F for the year ended December 31, 2015 (available at [www.shell.com/investor](http://www.shell.com/investor) and [www.sec.gov](http://www.sec.gov)). These risk factors also expressly qualify all forward looking statements contained in this release and should be considered by the reader. Each forward-looking statement speaks only as of the date of this release, 25<sup>th</sup> April 2017. Neither Royal Dutch Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this release.

With respect to operating costs synergies indicated, such savings and efficiencies in procurement spend include economies of scale, specification standardisation and operating efficiencies across operating, capital and raw material cost areas.

We may have used certain terms, such as resources, in this release that United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. U.S. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC website [www.sec.gov](http://www.sec.gov).

# Hydrogen as a transport fuel

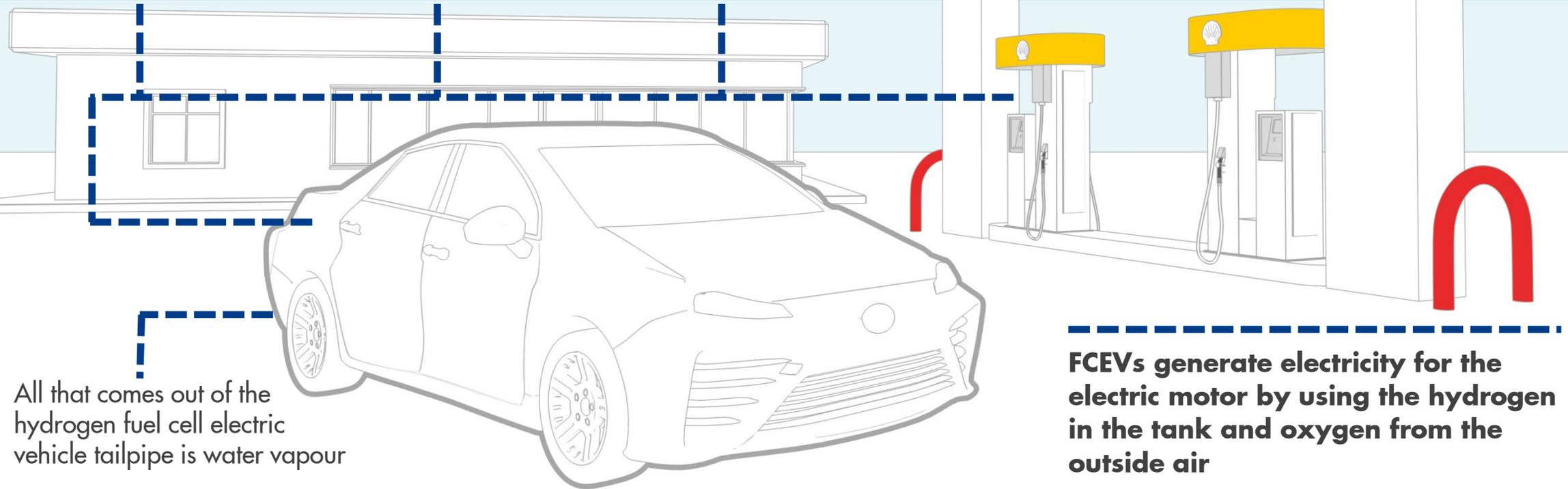
Clean and convenient

Energy easily stored, in the form of compressed hydrogen fuel

High range – can drive up to 700 km per refill

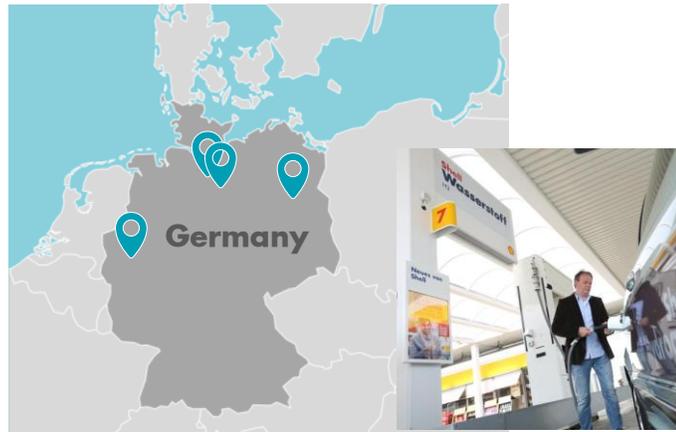
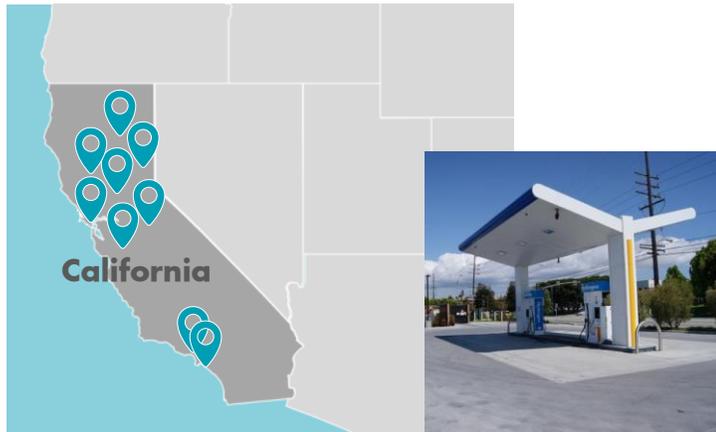
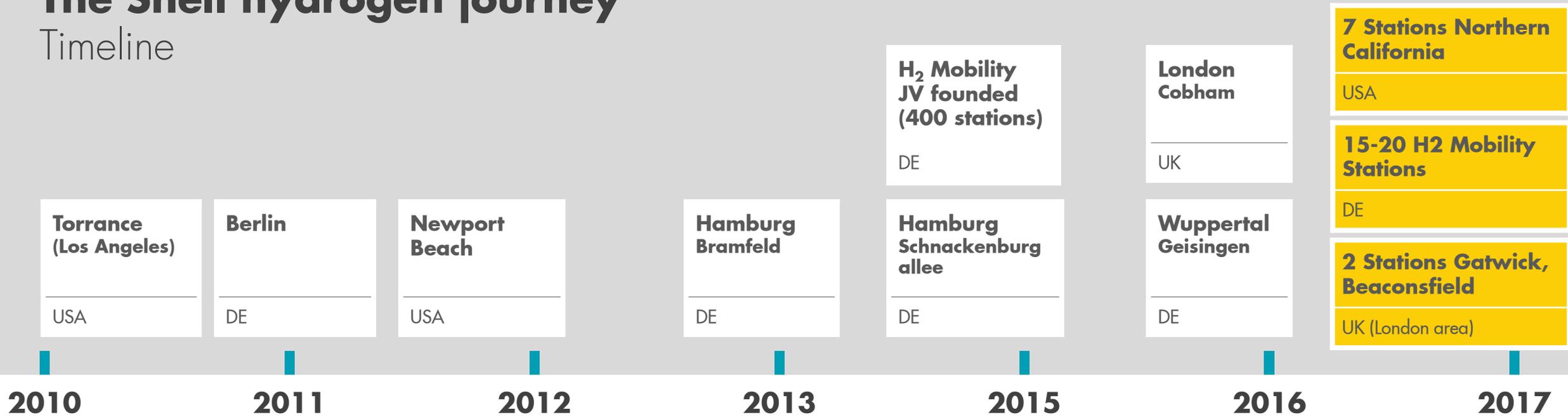
Takes only a couple of minutes to refuel

**Fuel cell electric vehicles (FCEVs) offer the performance, acceleration and range of conventional automobiles and the quiet driving experience of battery electric vehicles**



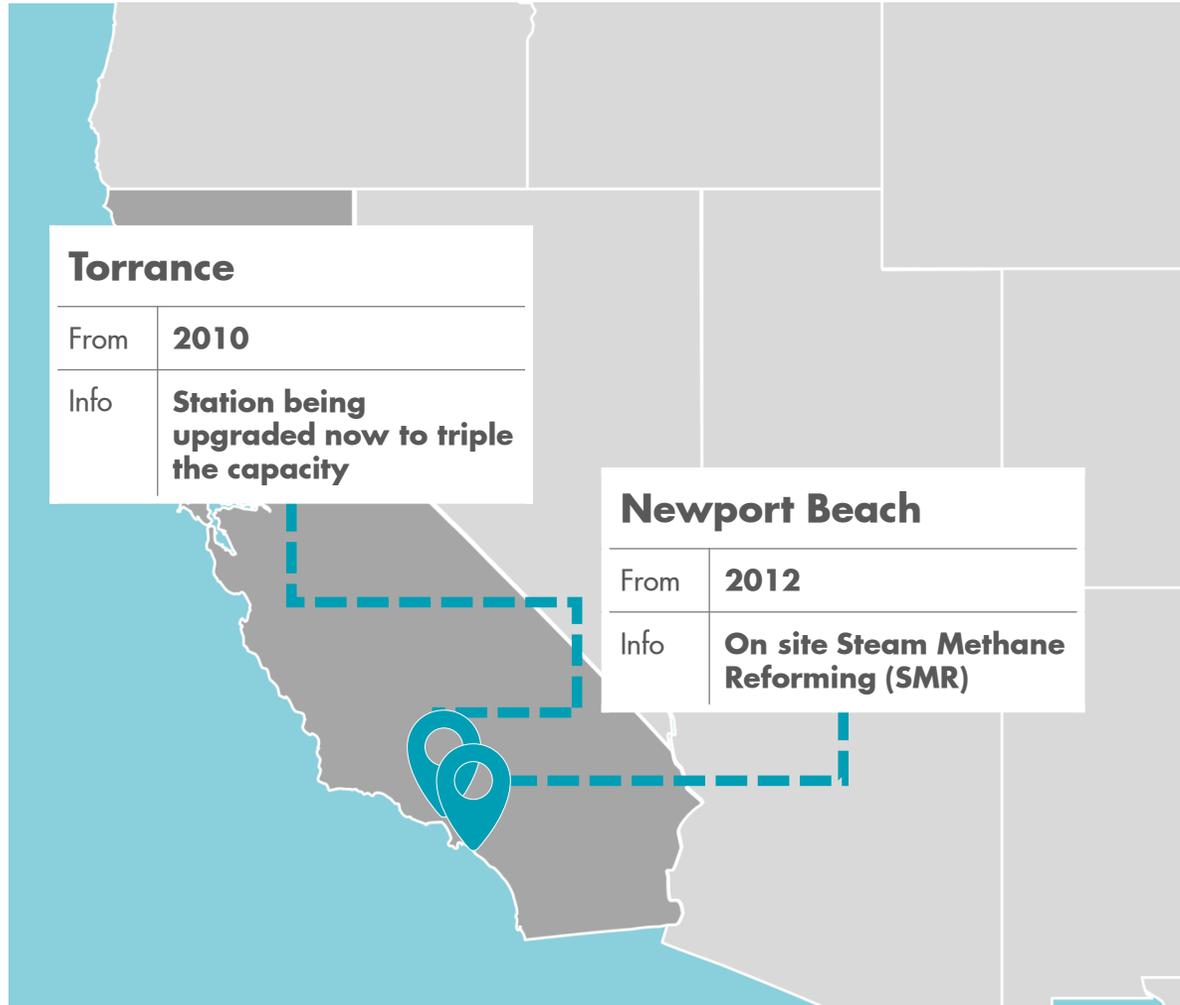
# The Shell hydrogen journey

## Timeline



# The Shell hydrogen journey

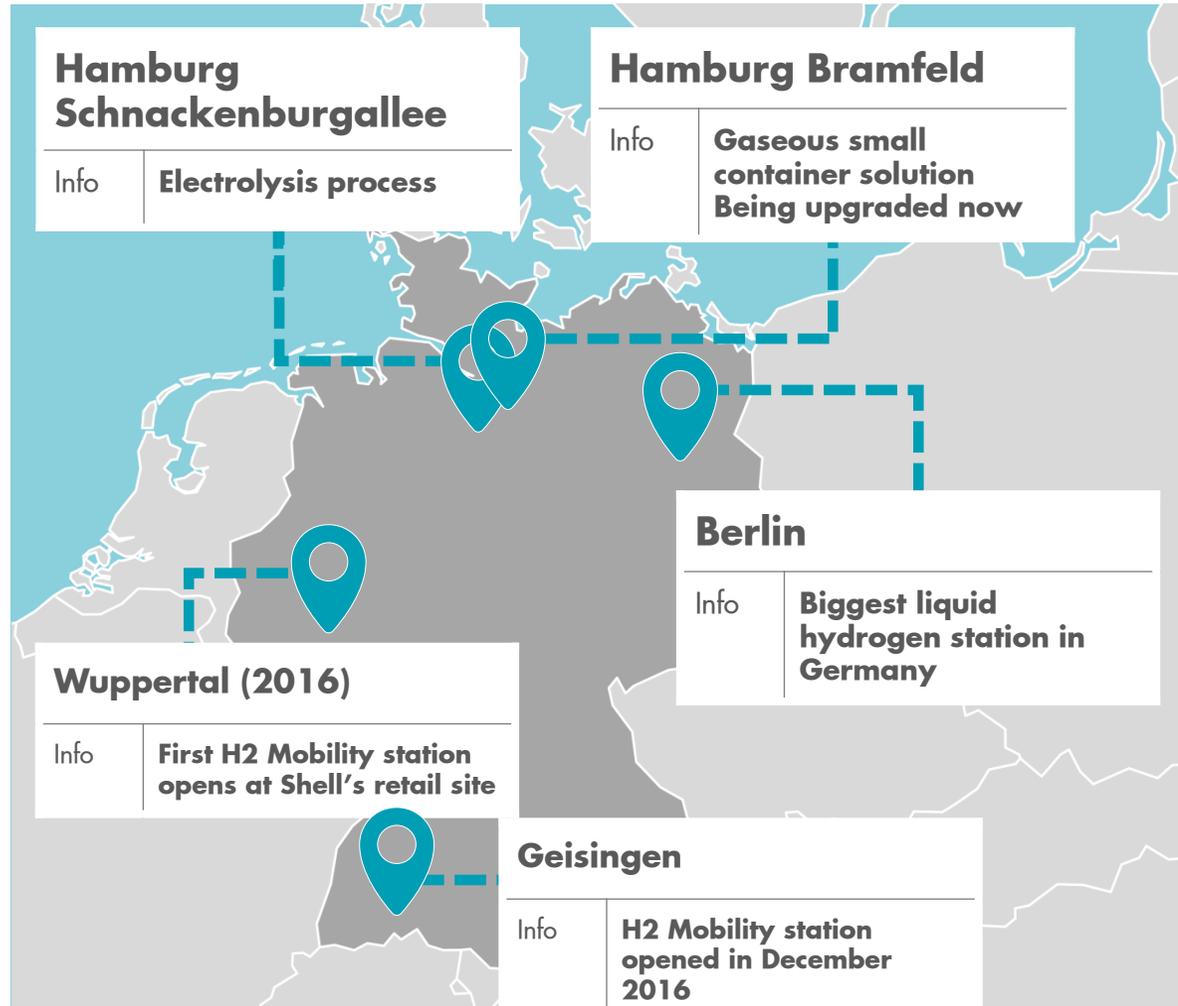
Locations – California USA



Torrance (Los Angeles)

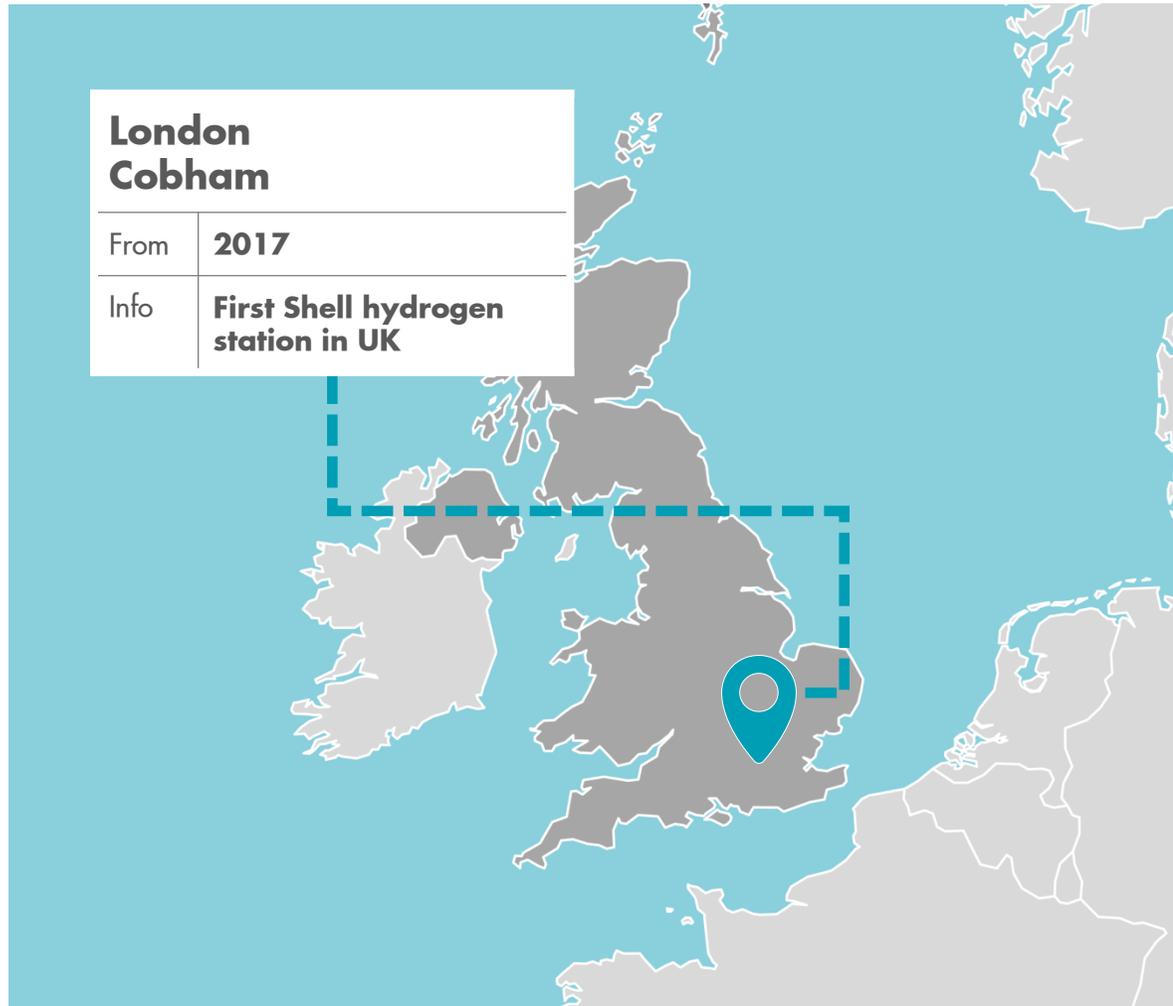
# The Shell hydrogen journey

## Locations – Germany



# The Shell hydrogen journey

Locations – UK



# The Shell hydrogen journey

## Research & development



■ New Iconic Dispenser



■ Improved refuelling nozzle



■ Efficient H<sub>2</sub> production using solid oxide fuel cells (partly FCH JU funded)



■ Purity test lab and quality sensor development



# Collaboration is key for H<sub>2</sub> success

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

## Car manufacturers

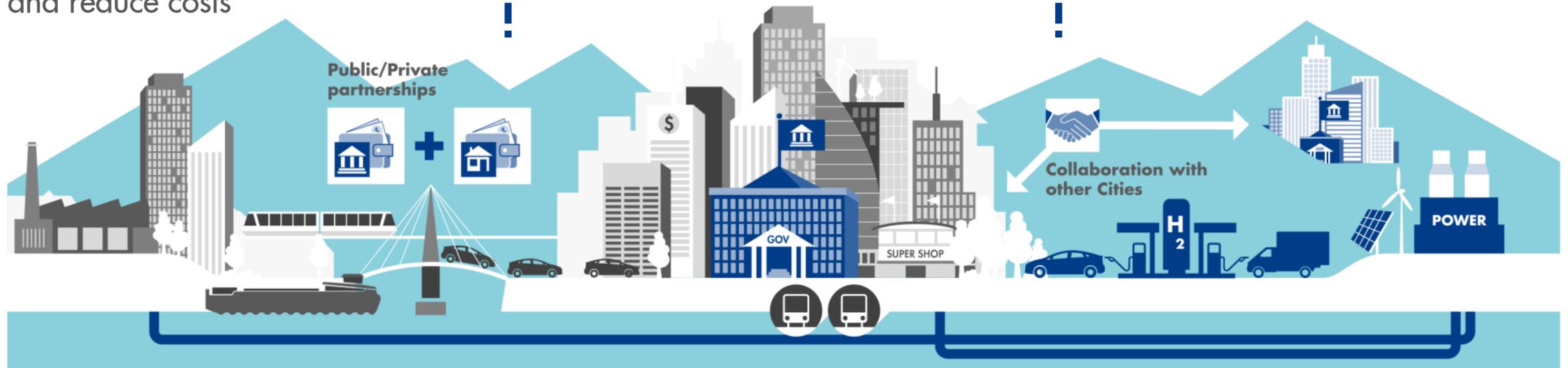
to continue developing hydrogen fuel cell vehicles and reduce costs

## Governments

to support the choice for hydrogen fuel cell vehicles

## Energy industry

to invest in infrastructure and offer fuel at competitive price



# Collaboration is key for H<sub>2</sub> success

## Hydrogen Council

- 13 CEO's committed to lead the vision on the essential role of hydrogen technologies in the energy transition
  - Give visibility to the solutions available and progress made
  - Advocate for the instrumental role of hydrogen technologies in terms of climate action, energy security and competitiveness

"The Hydrogen Council will exhibit responsible leadership in showcasing hydrogen technology and its benefits to the world. It will seek collaboration, cooperation and understanding from governments, industry and most importantly, the public....we know that in addition to transportation, hydrogen has the potential to support our transition to a low carbon society across multiple industries and the entire value chain. The Hydrogen Council aims to actively encourage this transition." Takeshi Uchiyamada, Chairman, Toyota.

Launch at World Economic Forum in Davos, Switzerland, January 2017



ALSTOM



DAIMLER



HONDA



THE LINDE GROUP



TOYOTA

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