# Hydrogen Dispensing as a Driver of Customer Demand

## Designing an icon as the face of hydrogen

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Shell Hydrogen

# 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 and 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, 31.05.2017. 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.

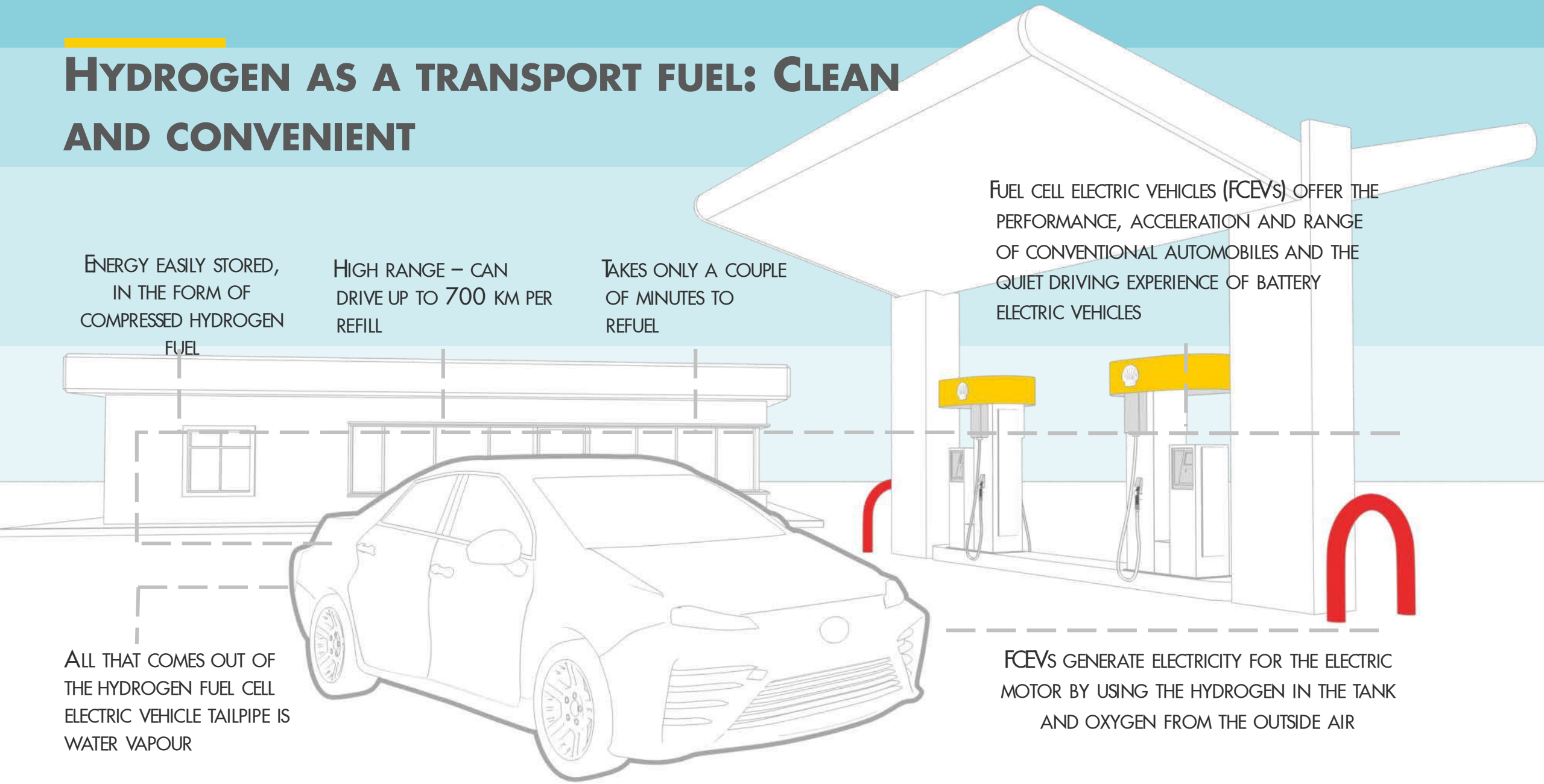
# Future of Transport

A range of factors are changing the transport sector …

Shell

- Increasing demand for energy and transport
- Climate change and air pollution
- New technologies available
- New transport policies

# 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

All that comes out of the hydrogen fuel cell electric vehicle tailpipe is water vapour

FCEVs generate electricity for the electric motor by using the hydrogen in the tank and oxygen from the outside air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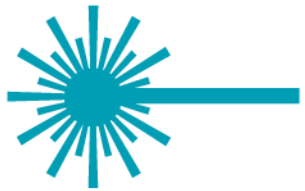
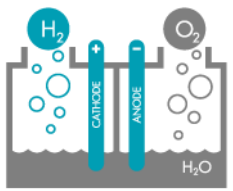
# THE NEAR FUTURE FOR HYDROGEN AT SHELL

## Hydrogen research & development

**Flow metering**

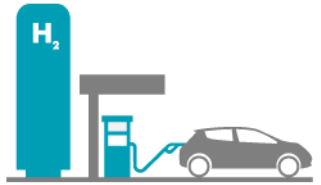


**Quality control**




**Electrolysis**

**$H_2$ shipping**




**$H_2$ dispensing**

**Developing other aspects of value chain, e.g. wind to hydrogen** + **Leader in establishing standards for safe dispensing**

# DISPENSER NEEDS IMPROVEMENT

Current dispensers:

- Industrial look and feel
- Liquid fuel dispenser require extensive modification to incorporate H2 components
- Customer research shows:
  - 50% of customers have difficulty attaching the nozzle
  - 30% of customers have difficulties to release the nozzle from vehicle
  - Process to refuel vehicle is described as cumbersome
- Heavy weight and design of nozzle is causing drops and damages
- And many many more…

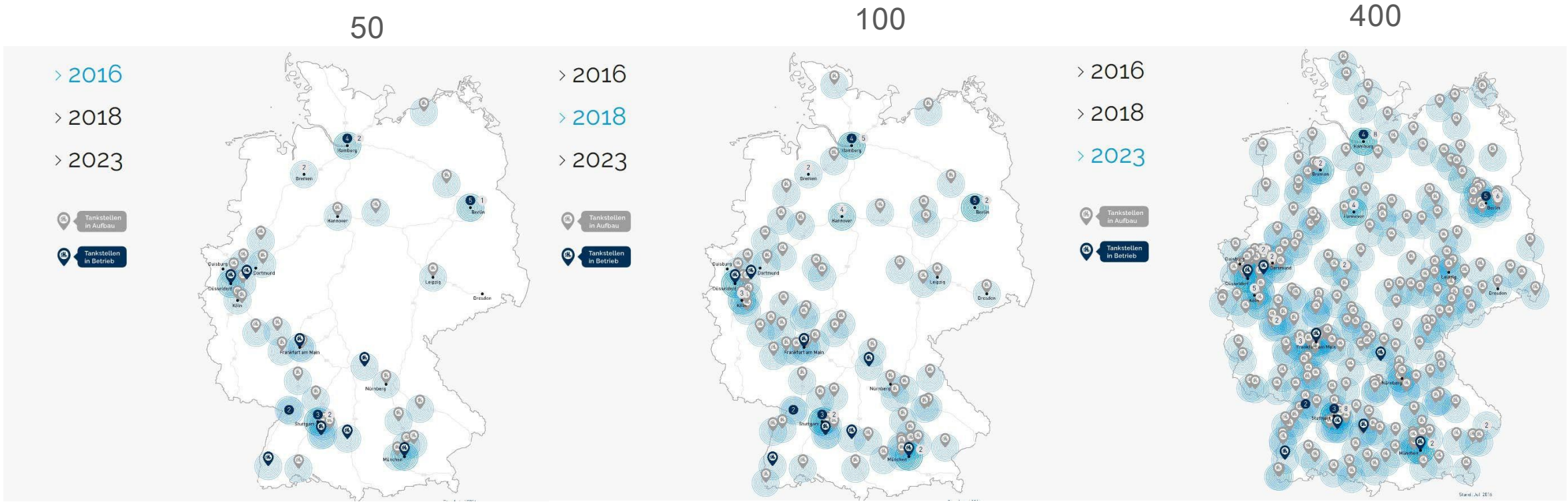
Consumer experience will be a key differentiator!

# SCOPE OF THE PROJECT

Develop a new innovative hydrogen dispenser design that is both technically and commercially feasible, whilst providing improved functionality and superior consumer experience.

# Why now?

- Roll Out of 400 Stations Has Begun in Germany
- Increasing Numbers of Stations in California, UK …



# DESIGN PARTNER: Designworks
A BMW Group Company

"With a deep-seated brand understanding, we create consistent experiences across digital and physical platforms for brands with the most diverse challenges".

# CONCEPT EXPLORATION

## 01 DROP


COMPONENT FIT

## 02 WATERFALL


TODAY'S USER FIT

## 03 OASIS


FUTURE USER FIT

# CONCEPT EXPLORATION

## 01 DROP

ICONICITY: 1

SCALABILITY: 2

INNOVATION: 1

COST EFFICIENT: 3

USER FRIENDLY: 1

**"COST EFFICIENT BUT NOT ICONIC ENOUGH"**

COMPONENT FIT

## 02 WATERFALL

ICONICITY: 2

SCALABILITY: 1.8

INNOVATION: 2

COST EFFICIENT: 1

USER FRIENDLY: 2

**"MEDIOCRE COMPROMISE"**

TODAY'S USER FIT

## 03 OASIS

ICONICITY: 2.7

SCALABILITY: 2.3

INNOVATION: 2.5

COST EFFICIENT: 2

USER FRIENDLY: 2.5

**"THE MOST ICONIC AND USER ORIENTED SOLUTION"**

FUTURE USER FIT

# A NEW EXPERIENCE IN HYDROGEN REFUELLING

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ELECT

# Unique Design

As simple as 1-2-3
Space saving footprint
Guiding light / guiding screens
Vertical flow
Guiding forecourt graphics
Beacon of light
Ergonomic height
User oriented
Start button on nozzle
Simplified Maintenance

# VERSATILITY

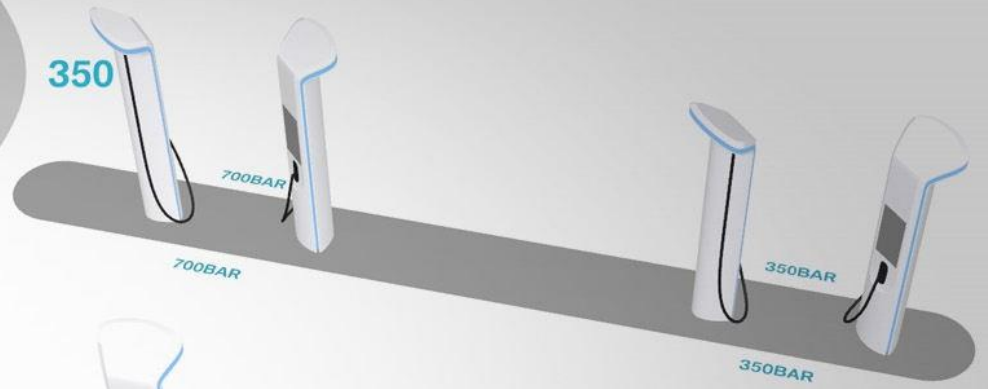
FLEXIBLE FOR FORECOURT CUSTOMISATION

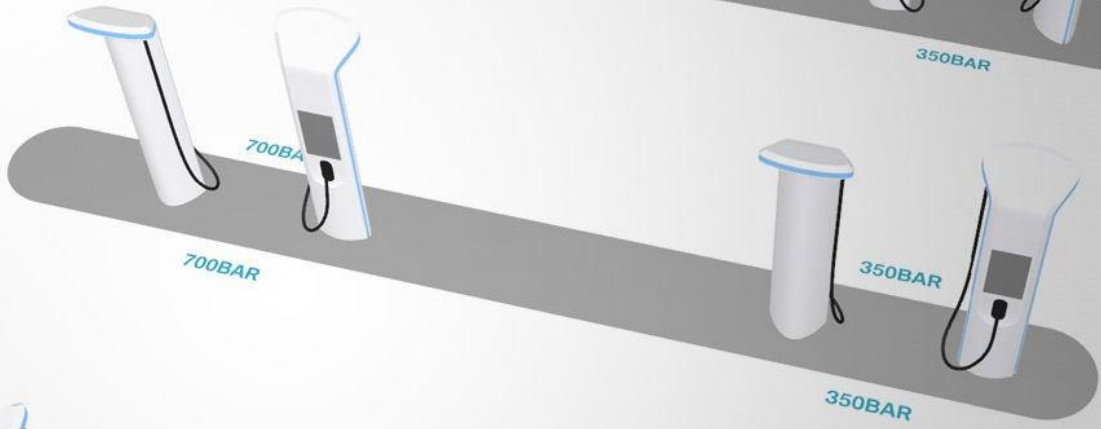
350 & 700 BAR OPTIONS

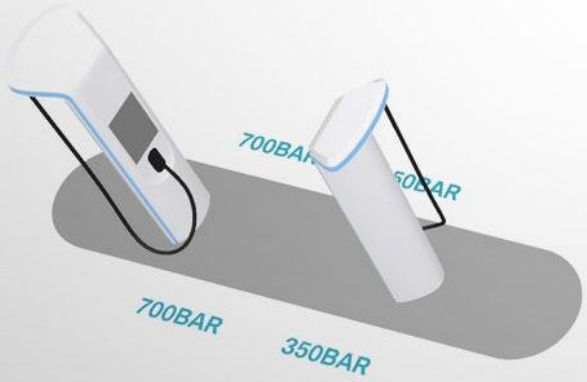
MODULAR UNITS FOR SPECIFIC FORECOURT NEEDS

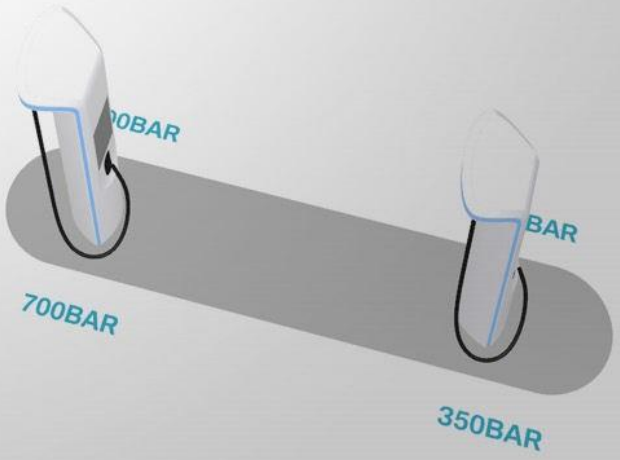
ROTATED UNITS 0, 45, 90 DEG



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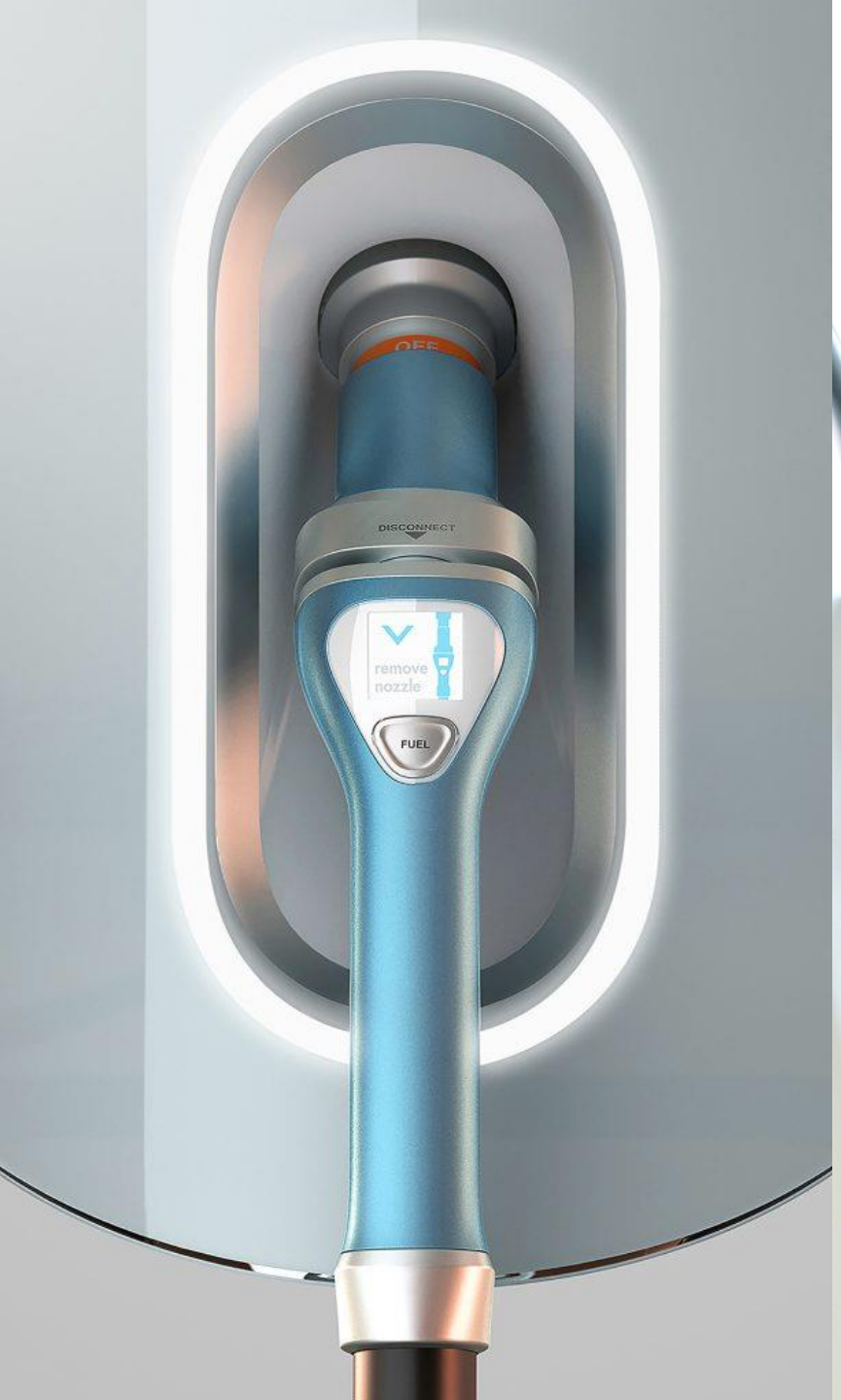
# Intuitive and Ergonomic Nozzle

- Ambidextrous Operation
- Slim grip / grip zones
- Digital feedback
- Start / Stop button
- Standard connection for H2 Refuelling
- Improved nozzle Holster

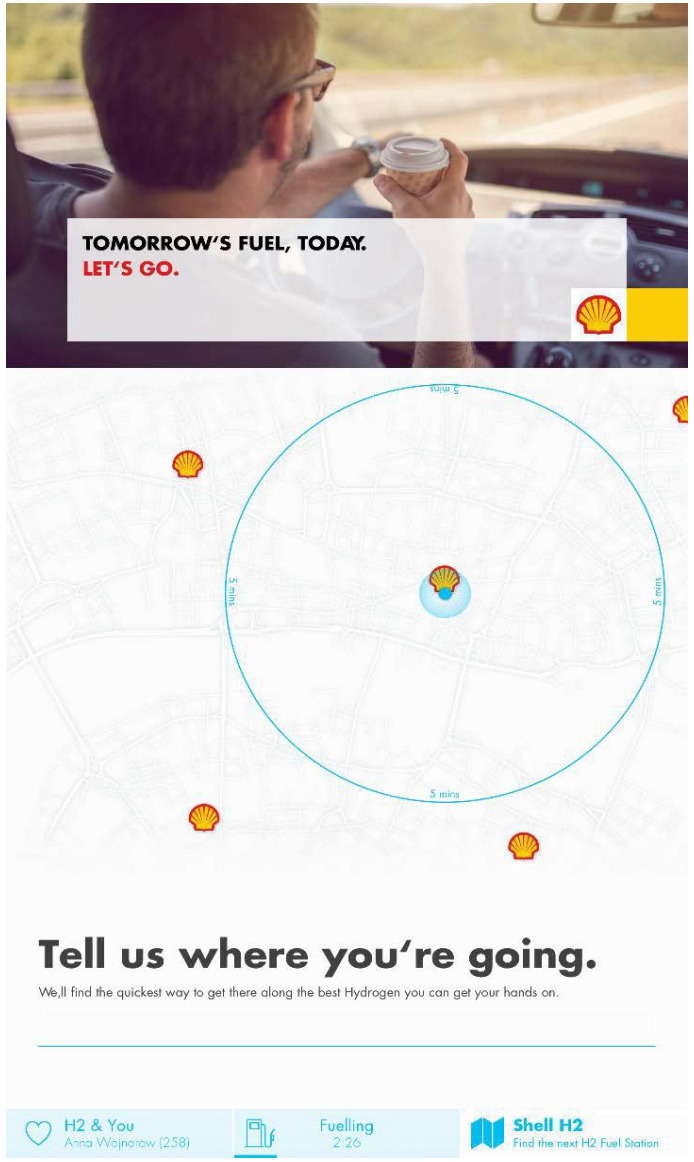

OFF
DISCONNECT
remove nozzle
FUEL


H2 GAS

# CUSTOMER CONNECTIVITY

H2 & YOU

SHELL H2 SERVICES

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# QUESTIONS?

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