GAS PATHWAYS TO 2050 AND THE INTERPLAY WITH RENEWABLE ENERGY

September 2019

Harleen Kaur Sindhu
(Renewable Energy Lead - Shell Kazakhstan B.V.)
Definitions & cautionary note

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate legal entities. In this presentation “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 presentation 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 “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 presentation 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 presentation, 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. No assurance is provided that forward dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this presentation are expressly qualified in their entirety by the cautionary statements contained herein 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, 2016 (available at www.shell.com/investor and www.sec.gov). These risk factors also expressly qualify all forward-looking statements contained in this presentation and should be considered by the reader. Each forward-looking statement speaks only as of the date of this presentation, [26th September 2019]. 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 presentation. This presentation may contain references to Shell’s website. These references are for the readers’ convenience only. Shell is not incorporating by reference any information posted on www.shell.com. We may have used certain terms, such as resources, in this presentation 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.
OUR APPROACH

- The world needs to produce more energy with fewer greenhouse gas emissions if global society is to meet its development and environmental goals.

- Achieving these goals will require significant shifts in the way the world produces and uses energy over the course of this century.

- Shell’s long-term success relies on our ability to provide much-needed energy and related products in a way that is commercially competitive as well as socially and environmentally responsible.
In order to meet the climate goals set out by the Paris Agreement, we recognize the strong role renewables will need to play.

However, given the current challenges with renewables, they alone may not help us achieve these targets in time.

A significant contribution towards decarbonization can also come from natural gas, bio gas and Hydrogen.

In all 3 of Shell’s energy scenarios: Oceans, Mountains and Sky, a balanced mix of energy generation concepts will be key for achieving the climate goals whilst cost effectively meeting the energy demand of the future.

OUR AREAS OF FOCUS INCLUDE OUR INTEGRATED THINKING ON ENERGY TRANSITION

• Within the Fence Projects:
  • Target: Reduce GHG footprint of assets; optimize usage of hydrocarbons for own consumption
  • Examples: Solar PV project in Oman, Currently studying application of solar PV for off-shore assets and downstream facilities

• Outside the Fence Projects:
  • Target: Commercial scale energy projects and investments
  • Key Business Divisions:
    • Shell New Energies: Offshore Wind; Renewable Power (Onshore Wind & Solar); New Fuels; Digital Business; Nature Based Solutions; Behind the Meter
    • Connecter Energy Solutions and Shell Venture
    • Shell Energy: Power Trading and Marketing
ROLE FOR GAS TO POWER & POWER TO GAS IN THE ENERGY MIX

- Whilst the cost of renewables have come down significantly, in some geographies they are still more expensive than conventional fuel.
- In addition there are other limiting factors such as energy intensity and intermittency that influence the uptake of renewables.
- Bridging role for natural gas:
  - This creates an opportunity space for a role for natural gas, which can be used for conventional end uses (such as district heating and power gen) and enhanced end uses such as flexible generation, load balancing, mass transportation etc.
  - In addition grey Hydrogen (produced using natural gas) still offers a cost competitive solution vs. green and blue Hydrogen.
  - Shell is also working on biogas based hybrid energy projects, which offer a credible solution for non-grid connected areas esp. in semi-rural and rural districts.
CRITICAL ENABLERS

- Adoption of legislative structures supporting monetization of de-carbonized gases and supporting incentives are critical enablers

- Development of supporting infrastructure such as storage and transportation are required to incentivize the market to adopt de-carbonized gases such as blue/green Hydrogen

- Demonstration projects esp. for newer concepts such as power to gas and hybrid power gen can act as proof points for the technology and associated commercial model

- Cost effective technical solutions are required to increase the pace of adoption

LEGISLATION & REGULATORY FRAMEWORK

TECHNOLOGY

SUPPORTING INFRASTRUCTURE

PILOTS AS PROOF POINTS
# NEW ENERGIES

## Investments, Acquisitions and Ventures

### 2016
- **Blauwwind, Netherlands**
- **Sense Home Monitor, USA**
- **Kite Power Systems, UK**

### 2017
- **NewMotion, NL (HQ)**
- **Hydrogen Stations, UK & California**
- **SBI BioEnergy, Canada**
- **IH2, India**
- **First Utility, UK (HQ)**
- **SolarNow*, Uganda (base)**
- **SteamaCo*, UK (base)**
- **Sunseap, Singapore (HQ)**
- **Innowatts, USA**
- **Greentown Labs, USA**
- **Fare Pilot**, UK (HQ)
- **Connected Freight**, Philippines

### 2018
- **Silicon Ranch*, USA**
- **Cleantech Solar*, Singapore**
- **Moerdijk, Netherlands**
- **Atlantic Shores**
- **Offshore Wind*, USA**
- **Mayflower Wind Energy*, USA**
- **TetraSpa*, Norway**
- **Light and heavy duty hydrogen stations, USA (California)**
- **Junction City biogas plant, USA (Oregon)**
- **GI Energy, USA**
- **Rheinland Hydrogen Electrolyser, Germany**
- **Shell Energy Inside**, USA
- **Husk Power*, India (base)**
- **Sunfunder*, Kenya (base)**
- **HyET, NL**
- **Axiom Exergy, USA**
- **Ample, USA**
- **WonderBill**, UK

### 2019
- **Greenlots, USA**
- **W2C, Netherlands**
- **Makani, Norway**
- **TetraSpa*, Norway**
- **sonnen, Germany**
- **Limejump, UK**
- **EcoSmart Solutions, USA**
- **Convergent Energy storage at Shell facilities, Canada**
- **Aurora, USA**
- **AutoGrid, USA**
- **Nordsol, Netherlands**
- **Sense Photonics, USA**
- **LO3 Energy, USA**
- **Maniv Mobility, Israel**
- **Corvus Energy, Norway**
- **Asperitas, Netherlands**
- **Ravin.ai**, UK and Israel

**KEY**
- 🌞 Energy Solutions
- 🏢 Digital Businesses
- 🌆 Energy Access
- 💡 Wind
- 🌞 Solar
- 🌟 New Fuels
- 🌟 Shell Ventures
- 🌟 Nature-based Solutions
  - * Minority investment, JV or consortium
  - ** Product launch date
THE SHELL HYDROGEN JOURNEY
Hydrogen stations opening

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Torrance (LA)</td>
<td>USA</td>
</tr>
<tr>
<td>2011</td>
<td>Berlin</td>
<td>DE</td>
</tr>
<tr>
<td>2012</td>
<td>Newport Beach</td>
<td>USA</td>
</tr>
<tr>
<td>2013</td>
<td>Hamburg Bramfeld</td>
<td>DE</td>
</tr>
<tr>
<td>2015</td>
<td>Hamburg Schnacken-burgallee</td>
<td>DE</td>
</tr>
<tr>
<td>2016</td>
<td>Wuppertal Geisingen</td>
<td>DE</td>
</tr>
<tr>
<td>2017</td>
<td>London: Cobham</td>
<td>UK</td>
</tr>
<tr>
<td>2018</td>
<td>Vancouver</td>
<td>CA</td>
</tr>
<tr>
<td>2015</td>
<td>UK</td>
<td>15-20 H2 Mobility stations</td>
</tr>
<tr>
<td>2018</td>
<td>USA</td>
<td>2 stations operating in California, 7 more planned</td>
</tr>
</tbody>
</table>

Copyright of Shell International B.V.
Electricity currently makes up 20% of final energy consumption and that figure could increase to as much as 50% by 2060. To help meet this demand, Shell aims to make electricity a significant business.

**Supply and generation**
- Wind, solar, and selected gas and storage assets
- Third-party offtake agreements to buy power
- 15+ years of experience in wind power
- Interests in wind farms with potential to generate over 5GW once fully built
- Solar generation capacity – operating and signed – of over 1.6GW through our Silicon Ranch and Cleantech Solar platforms
- 10K+ megawatts of managed power generation capacity in North America with 1/3+ from renewables

**Optimisation**
- Leverage portfolio flexibility and arbitrage opportunities
- Power trading in 20+ countries
- Analysing intermittent supply and demand

**Customers at the centre**
- Commercial, industrial and residential customers
- Innovative behind the meter solutions focused on energy efficiency and flexibility
- Electric vehicle infrastructure for charging flexibility
- On-site generation and storage solutions