



Shell Advanced Biofuels towards lowering Carbon foot print

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Disclaimer

This presentation contains data from Shell's new Sky Scenario. Unlike Shell's previously published Mountains and Oceans scenarios, the Sky Scenario is targeted through the assumption that society reaches the Paris Agreement's goal of holding global average temperatures to well below 2°C. Unlike Shell's Mountains and Oceans scenarios which unfolded in an open-ended way based upon plausible assumptions and qualifications, the Sky Scenario was specifically designed to reach the Paris Agreement's goal in a technically possible manner. These scenarios are part of an ongoing process used in Shell for over 40 years to challenge executives' perspectives on the future business environment. They are designed to stretch management to consider even events that may only be remotely possible. Scenarios, therefore, are not intended to be predictions of likely future events or outcomes and investors should not rely on them when making an investment decision with regard to Royal Dutch Shell plc securities.

Additionally, it is important to note that Shell's existing portfolio has been decades in development. While we believe our portfolio is resilient under a wide range of outlooks, including the IEA's 450 scenario (World Energy Outlook 2016), it includes assets across a spectrum of energy intensities including some with above average intensity. While we seek to enhance our operations' average energy intensity through both the development of new projects and divestments, we have no immediate plans to move to a zero emissions portfolio over our investment horizon of 100 years. Although, we have no immediate plans to move to a zero emissions portfolio, in November of 2017, we announced our ambition to reduce our net carbon footprint in accordance with society's implementation of the Paris Agreement's goal of holding global average temperature to well below 2°C above pre-industrial levels. Accordingly, assuming society aligns itself with the Paris Agreement's goals, we aim to reduce our net carbon footprint, which includes not only our direct and indirect carbon emissions, associated with producing the energy products which we sell, but also our customers' emissions from their use of the energy products that we sell, by 20% in 2035 and by 50% by 2050.

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IH2® - A Large Technological Solution to significantly lower Carbon foot print

- Woody Biomass (Forestry residues)
- Agri residues (Bagasse, Paddy straw etc.)
- Sorted & segregated MSW (upto 15-20% plastics)

Biomass to Drop in Hydrocarbons



GHG Emissions Reduction based on Life Cycle Analysis : upto 92%
Energy recovery : upto 72%

Gasoline/Diesel Mode	TPD
Feed (MAF) Basis	1000
Gasoline	180-210
Diesel	78-90

Jet Mode	TPD
Feed (MAF) Basis	1000
Jet	90-100
Gasoline	120-130
Diesel	30-50

Other byproducts	TPD
Biochar	130-150
CO2	300-350
Water	200-300

Key Solutions for India Business

Advanced Biofuels:

IH2® - Large quantity waste with moisture <40%- IH2® Technology

- Deployment in waves
- Several plants to come up in the current decade in India/ globally
- First wave to have woody biomass and Agri-residue
- Various Business models including strategic partnerships invited

BioCNG/RNG:

Low quantity wet waste (200 TPD) with moisture >70% Anaerobic Digestion Technologies

- Deployment in waves
- Several plants to come up in the current decade in India/ globally
- Proximity to wet waste & Industrial BioCNG markets
- Various Business models including strategic partnerships invited



We Value To Work With

- Like Minded companies
- Shared values with respect to safety, Honesty, Integrity and respect for people
- Shared Business principles
- Bringing value to the Business
 - Feedstock
 - Operation
 - Capital & Risksharing



