



THE ENERGY TRANSFORMATION SCENARIOS

2015 2025 2035 2045 2050
2020 2030 2040 2050

Jeremy Bentham

VP Global Business Environment and
Head of Shell Scenarios

www.shell.com/transformationscenarios
#ShellScenarios



2095
2100



Warning: Uncertainties Ahead

Shell's scenarios are not intended to be projections or forecasts of the future. Shell's scenarios, including the scenarios contained in this presentation, are not Shell's strategy or business plan. When developing Shell's strategy, our scenarios are one of many variables that we consider. Ultimately, whether society meets its goals to decarbonise is not within Shell's control. While we intend to travel this journey in step with society, only governments can create the framework for success. The **Sky 1.5** scenario starts with data from Shell's **Sky** scenario, but there are important updates. First, the outlook uses the most recent modelling for the impact and recovery from COVID-19 consistent with a **Sky 1.5** scenario narrative. Second, it blends this projection into existing **Sky** (2018) energy system data by around 2030. Third, the extensive scale-up of nature-based solutions is brought into the core scenario, which benefits from extensive new modelling of that scale-up. (In 2018, nature-based solutions required to achieve 1.5°C above pre-industrial levels by the end of this century were analysed as a sensitivity to **Sky**. This analysis was also reviewed and included in the IPCC Special Report on Global Warming of 1.5°C (SR15).) Fourth, our new oil and natural gas supply modelling, with an outlook consistent with the **Sky 1.5** narrative and demand, is presented for the first time. Fifth, the **Sky 1.5** scenario draws on the latest historical data and estimates to 2020 from various sources, particularly the extensive International Energy Agency energy statistics. As with **Sky**, this scenario assumes that society achieves the 1.5°C stretch goal of the Paris Agreement. It is rooted in stretching but realistic development dynamics today, but explores a goal-oriented way to achieve that ambition. We worked back in designing how this could occur, considering the realities of the situation today and taking into account realistic timescales for change. Of course, there is a range of possible paths in detail that society could take to achieve this goal. Although achieving the goal of the Paris Agreement and the future depicted in **Sky 1.5** while maintaining a growing global economy will be extremely challenging, today it is still a technically possible path. However, we believe the window for success is quickly closing.

Shell's operating plan, outlook and budgets are forecasted for a ten-year period and are updated every year. They reflect the current economic environment and what we can reasonably expect to see over the next ten years. Accordingly, Shell's operating plans, outlooks, budgets and pricing assumptions do not reflect our netzero emissions target. In the future, as society moves towards netzero emissions, we expect Shell's operating plans, outlooks, budgets and pricing assumptions to reflect this movement. Also, in this presentation we may refer to Shell's "Net Carbon Footprint", which includes Shell's carbon emissions from the production of our energy products, our suppliers' carbon emissions in supplying energy for that production and our customers' carbon emissions associated with their use of the energy products we sell. Shell only controls its own emissions. The use of the term Shell's "Net Carbon Footprint" is for convenience only and not intended to suggest these emissions are those of Shell or its subsidiaries.

This presentation contains forward-looking statements (within the meaning of the U.S. Private Securities Litigation Reform Act of 1995) 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 "aim", "ambition", "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, or delays or advancements in the approval of projects and delays in the reimbursement for shared costs; (m) risks associated with the impact of pandemics, such as the COVID-19 (coronavirus) outbreak; and (n) changes in trading conditions. No assurance is provided that future 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 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 Form 20-F for the year ended December 31, 2019 (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 **April 28, 2021**. 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.

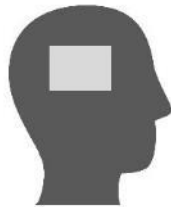
We may have used certain terms, such as resources, in this presentation that the U.S. Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. Investors are urged to consider closely the disclosure in our Form 20-F, File No 1-32575, available on the SEC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

Why scenarios?

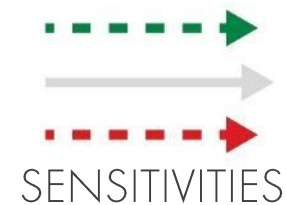
Stretch mindsets for better-informed decisions

Help to improve judgment in the face of radical uncertainties

The Present



The Path



The Future



The Energy Transformation Scenarios



Waves Late, but fast decarbonisation



- Wealth first – repair the economy
- Surge in energy use and emissions
- Growing inequality and more frequent and extreme weather events
- Social pressures; issues intensify
- Backlash forces rapid policy-driven reductions in fossil fuels
- 2.3°C above pre-industrial levels by the end of this century

Islands Late and slow decarbonisation



- Security first – growing nationalism
- Frictions in collaboration and trade
- Economies stagnate; growth in energy demand stalls
- Global climate action slows
- Cleaner technology makes slow progress
- 2.5°C above pre-industrial levels by 2100, and still rising



Sky 1.5 Accelerated decarbonisation now



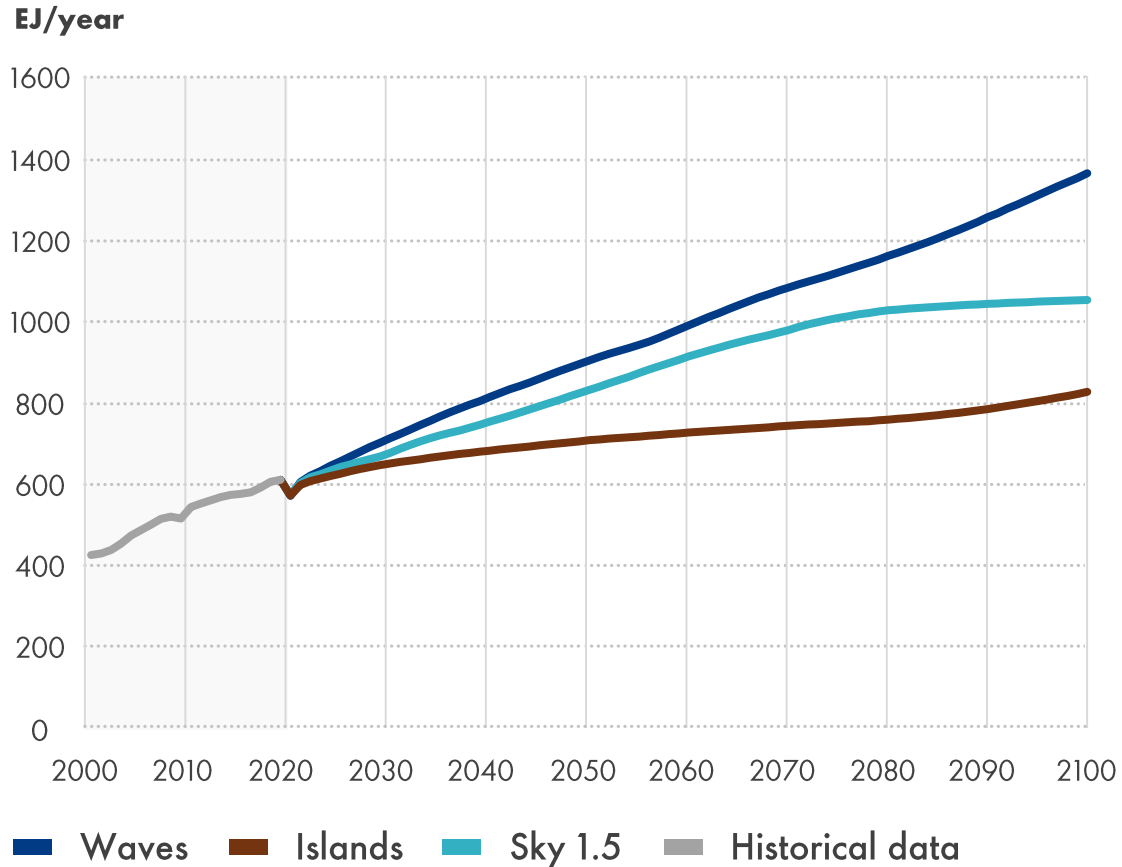
- Health first – well-being is the priority
- People proceed cautiously, economies reopen slowly but steadily
- Recognition of value in alignments
- Green investment reshapes energy system
- Deep structural changes lower emissions
- 1.5°C above pre-industrial levels this century, in line with Paris goal



Energy demand grows and the energy system decarbonises

Energy demand rises, with Sky 1.5 levelling off late-century

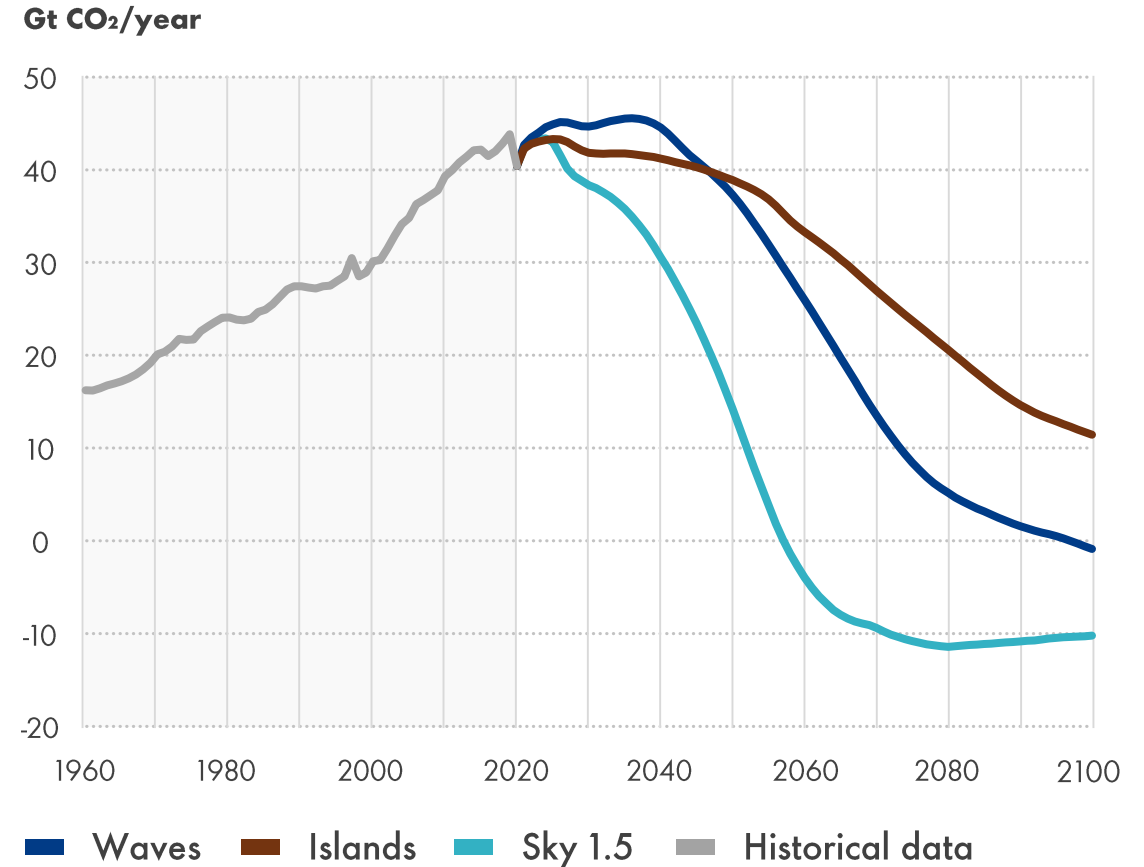
Total primary energy



Source: Shell analysis based on data from the IEA (2020) World Energy Balances ([Link](#)), all rights reserved

CO₂ emissions decline towards net-zero, but the pace varies

CO₂ emissions



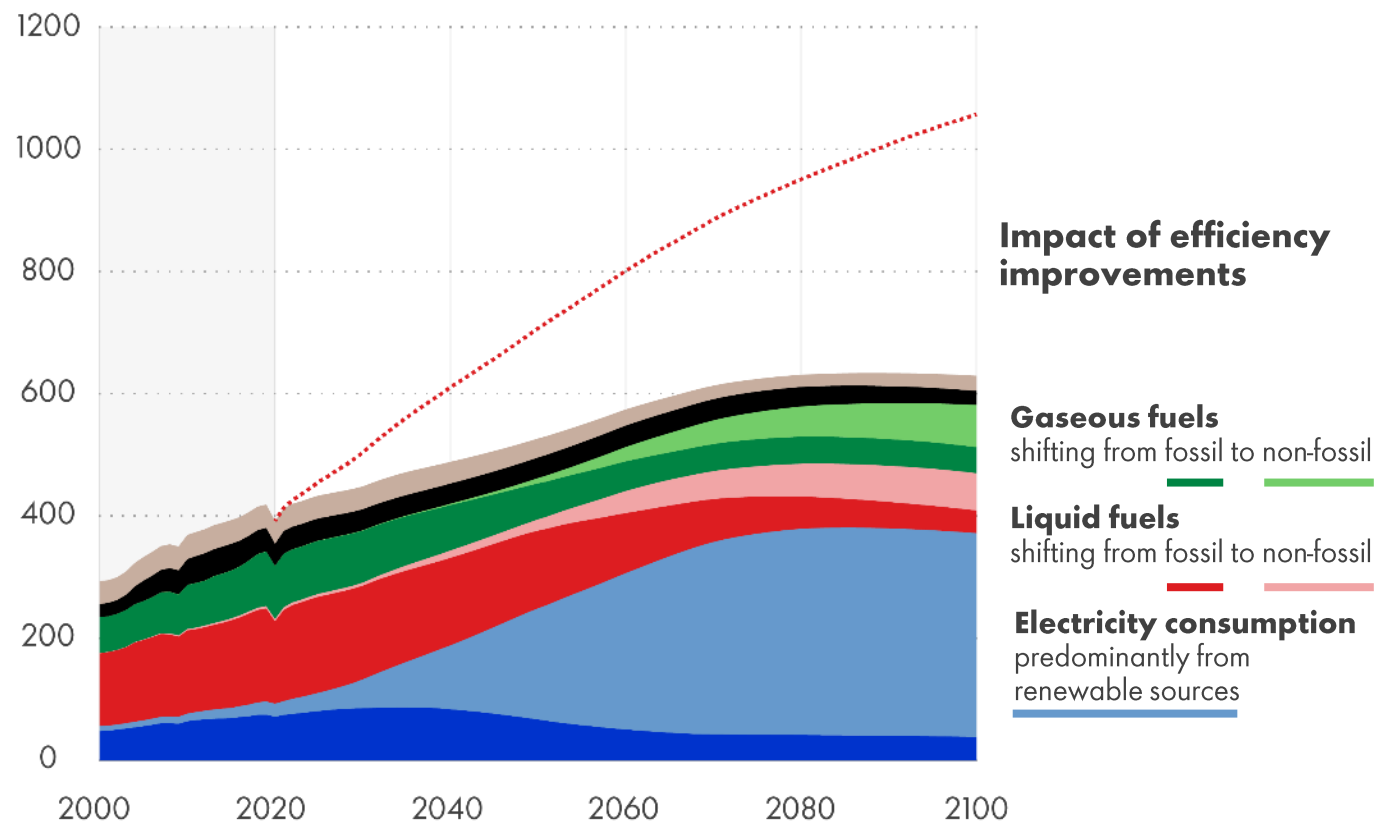
Source: Shell analysis based on data from Global Carbon Project (2020) and the IEA (2020) World Energy Balances ([Link](#)), all rights reserved

5 common energy trends across all outlooks – the issue is speed

1. Growing energy needs and efficiency
2. Deep electrification from Renewable sources
3. Need for molecular fuels in hard-to-electrify sectors – increasingly decarbonised
4. Oil and natural gas remain important in key services
5. Emissions removal makes a contribution

Example: Total final consumption of energy – Sky 1.5 scenario

EJ/year (final energy)

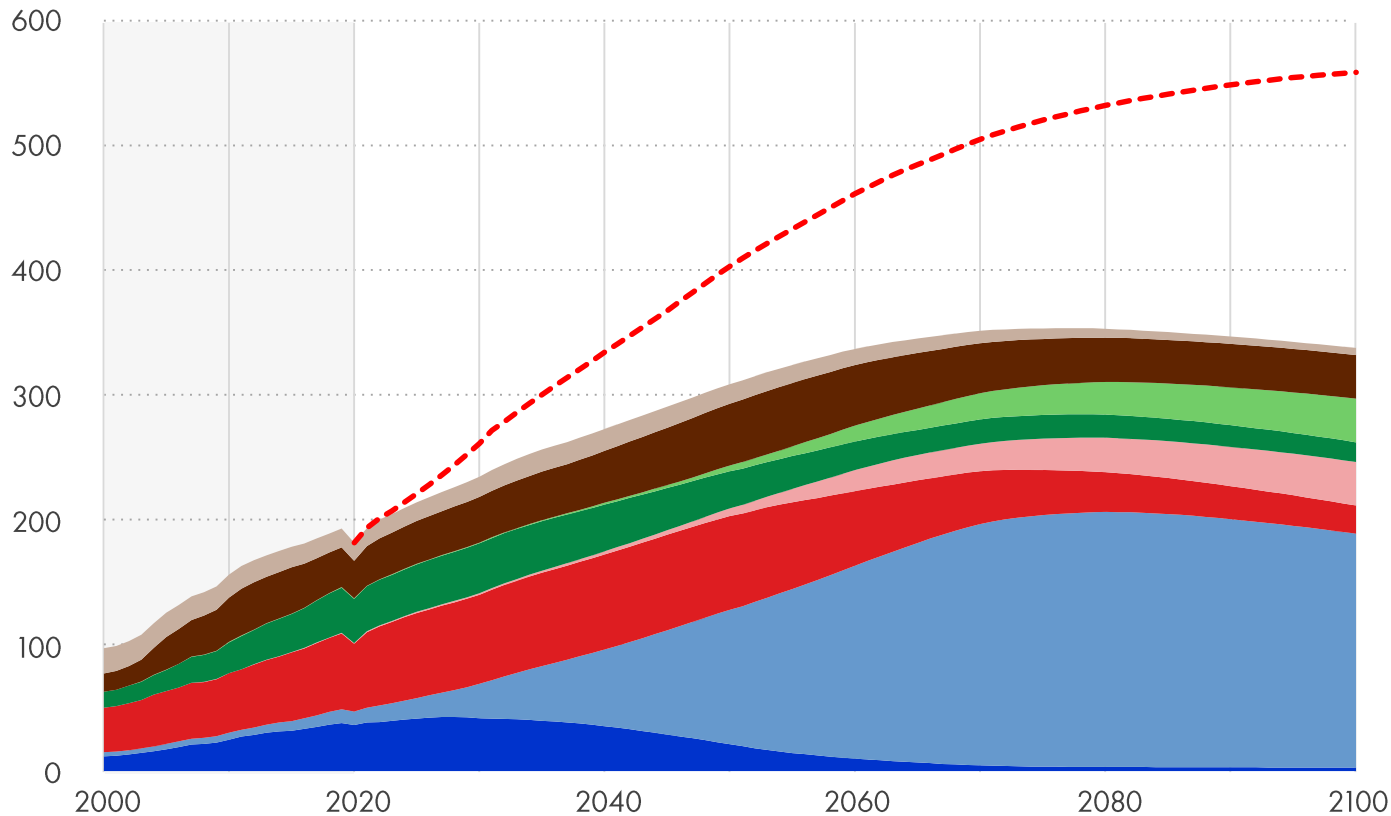


Source: Shell analysis based on data from the IEA (2020) World Energy Balances, all rights reserved

Specific example: Asia

Example: Total final consumption electricity and fuels – Sky 1.5 scenario

EJ/year (final energy)



Impact of efficiency improvements

Gaseous fuels
shifting from fossil to non-fossil

Liquid fuels
shifting from fossil to non-fossil

Electricity consumption
predominantly from renewable sources

*Electricity includes commercial heat

Source: Shell analysis based on data from the IEA (2020) World Energy Balances, all rights reserved

THE ENERGY TRANSFORMATION SCENARIOS

Copyright of Shell International B.V. | February 2021

Lessons from history & past crises

Action accelerators

Alignments

Policies, sectors,
customers

Smart policy
rules and
incentives

Pioneer
leaders

A person in a yellow jacket stands on a rocky cliff, looking out over a deep blue fjord. The fjord is surrounded by steep, rugged mountains. The sky is clear and blue. In the foreground, there are some green and yellow plants. On the right side, there is a yellow hexagonal graphic with white lines.

History has shown that crises can galvanise people into action.

Find out more

www.shell.com/transformationscenarios

Watch the videos:

Accelerating to net-zero emissions

Scenario overview

**50
YEARS**

#ShellScenarios



