

bp Energy Outlook 2022

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1. Initial considerations

Initial considerations

The aim of the Energy Outlook is to explore the key uncertainties surrounding the energy transition

- The Energy Outlook is based on scenarios. These scenarios are not predictions of what is likely to happen or what bp would like to happen.
- These scenarios are based on existing and developing technologies.
- The many uncertainties mean that the probability of any one of these scenarios materializing exactly as described is negligible.
- They do span a wide range of possible outcomes and so might help to inform a judgement about the uncertainty surrounding energy markets out to 2050.
- The Outlook was largely prepared before the military action by Russia in Ukraine.
- The Energy Outlook is produced to inform bp's strategy and is published as a contribution to the wider debate about the factors shaping the energy transition.

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1. Initial considerations

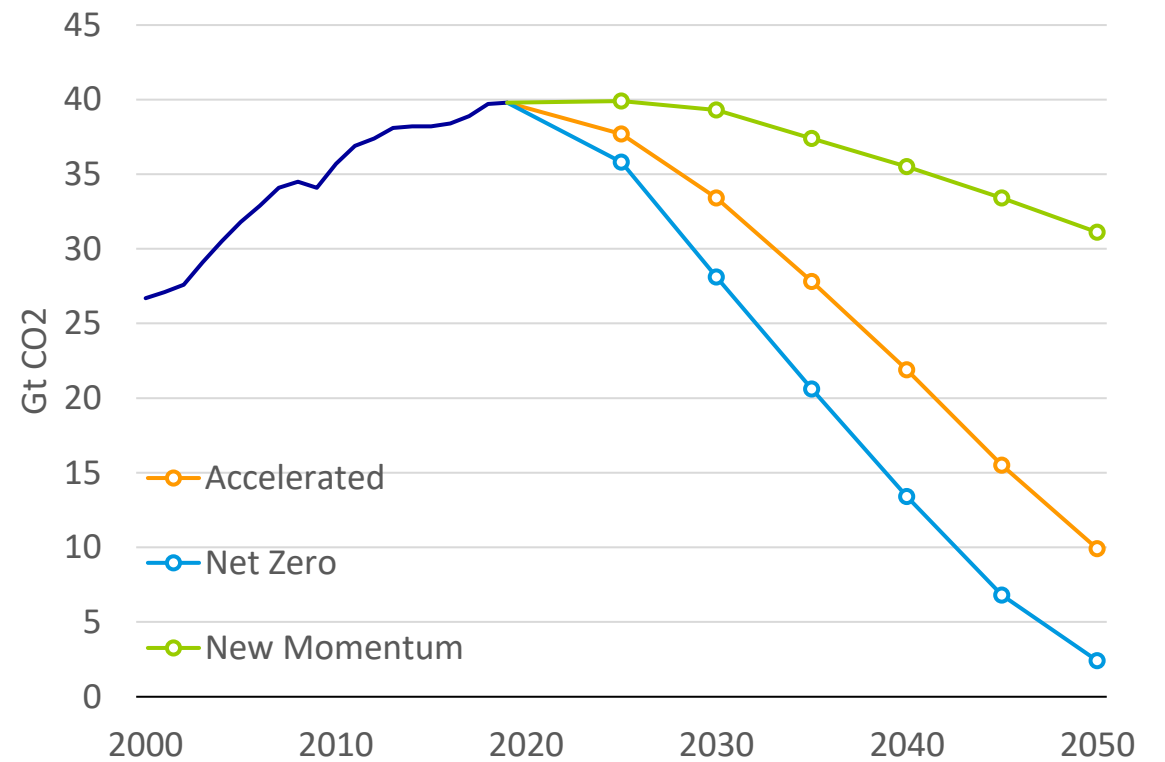
2. Three scenarios to explore the energy transition

Emissions

Emissions decline in all scenarios

- Accelerated and Net Zero explore how different elements of the energy system might change to achieve a substantial reduction in carbon emissions.
- Emissions in Accelerated and Net Zero peak in the early 2020s and by 2050 are around 75% and 95% below 2019 levels respectively.
- New Momentum is designed to capture the broad trajectory along which the global energy system is currently progressing.
- CO₂e emissions in New Momentum peak in the late 2020s and by 2050 are around 20% below 2019 levels.

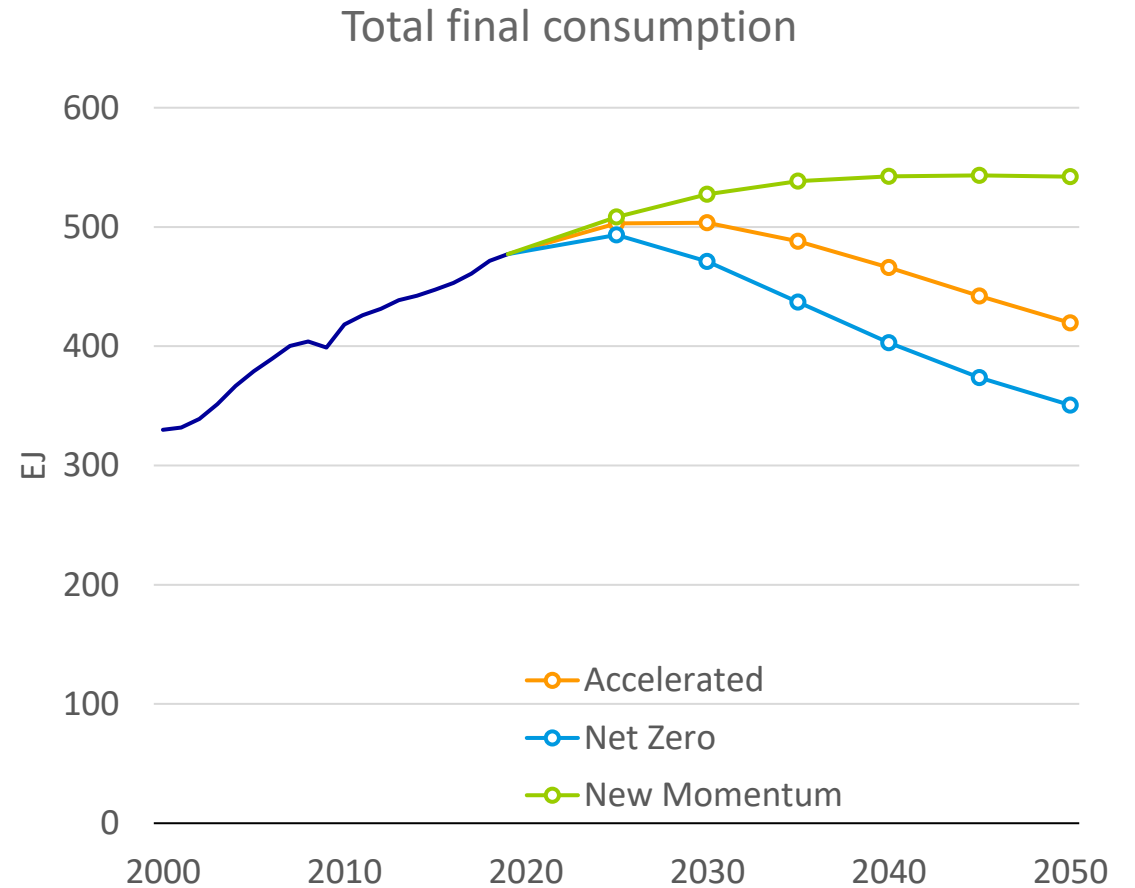
Carbon Emissions from energy



Energy demand

Demand peaks in all scenarios

- The global pace of improvement in energy efficiency is much quicker in all three scenarios than over the past 20 years.
- The prosperity in emerging economies means energy demand within emerging economies is far stronger than in the developed world.
- Total final consumption across all emerging economies grows by around 35% and 5% by 2050 in New Momentum and Accelerated and falls by 10% in Net Zero. In comparison, total final consumption within the developed world falls by 25-50% by 2050 across the three scenarios.



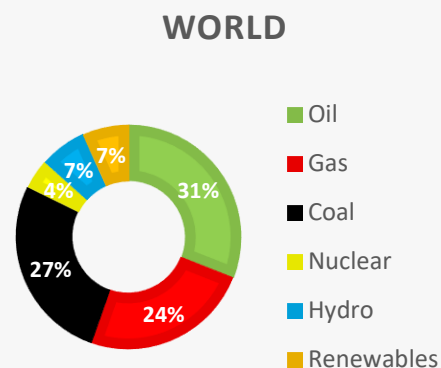
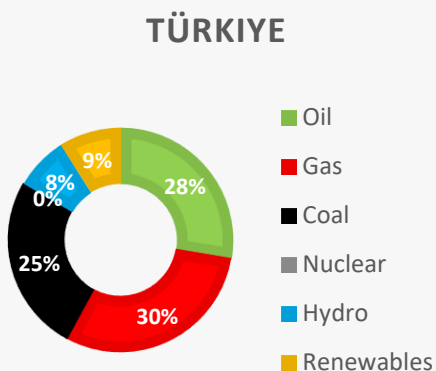
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An overview

Türkiye represents around 1% of the global energy system 2021

- The energy mix has a higher share of natural gas compared to the global one.
- The other difference is nuclear energy



Primary energy consumption in 2021

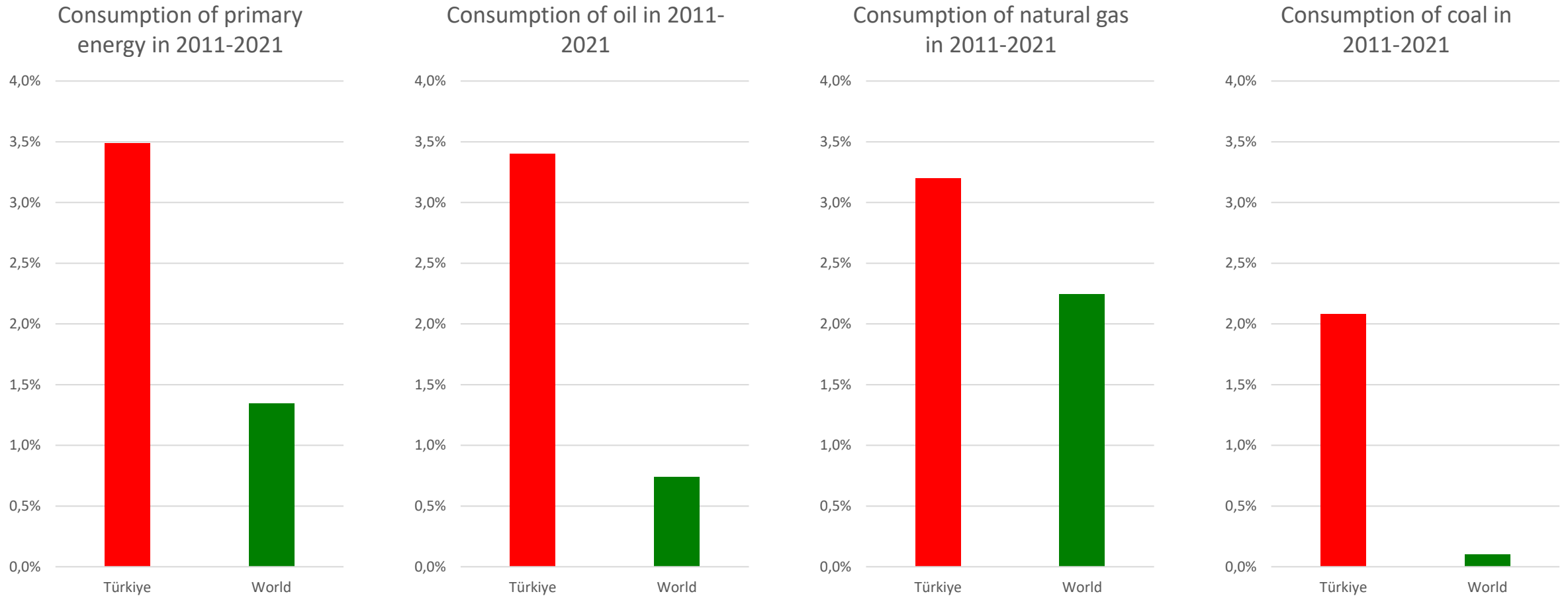
	Volume	Global Ranking	Global share
Primary energy	6.8 EJ	15	1.1%
Oil	939 Kbd	23	1.0%
Natural gas	57 bcm	16	1.4%
Coal	1.7 EJ	12	1.1%
Hydropower	0.5 EJ	14	1.3%
Renewables	0.6 EJ	12	1.5%

The big picture of the energy policy

- Akkuyu nuclear power plant expected to enter into operation 2023-2026
- Development of giant Sakarya Natural gas field: 540 bcm
- Boost in domestic PV panel manufacturing capacity
- Reinforce of natural gas pipelines & re-gasification capacity and international diversification of imports
- Focus on geothermal potential

Growth of primary energy in the last decade

Energy demand grew strongly fostered by economic growth, 5.8% compared to 3.2% globally



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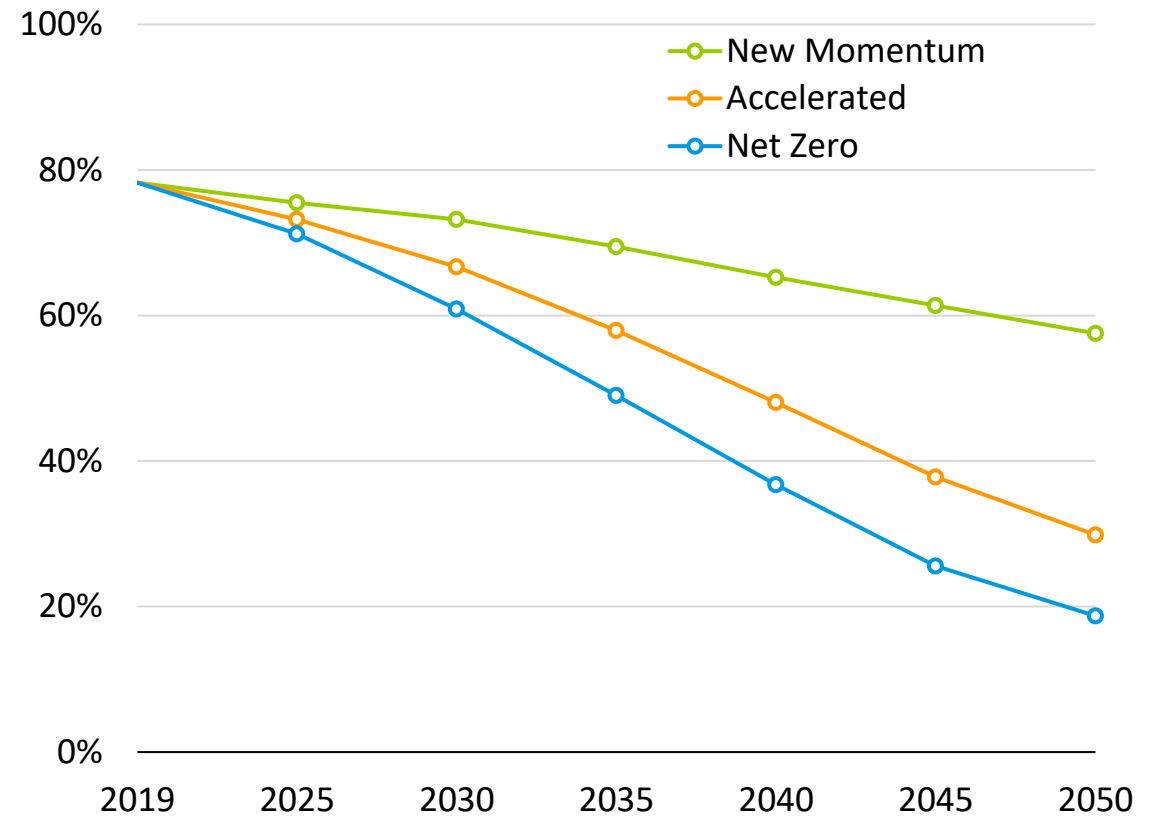
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Fossil fuels

Gradual decline in the role of hydrocarbons in all scenarios

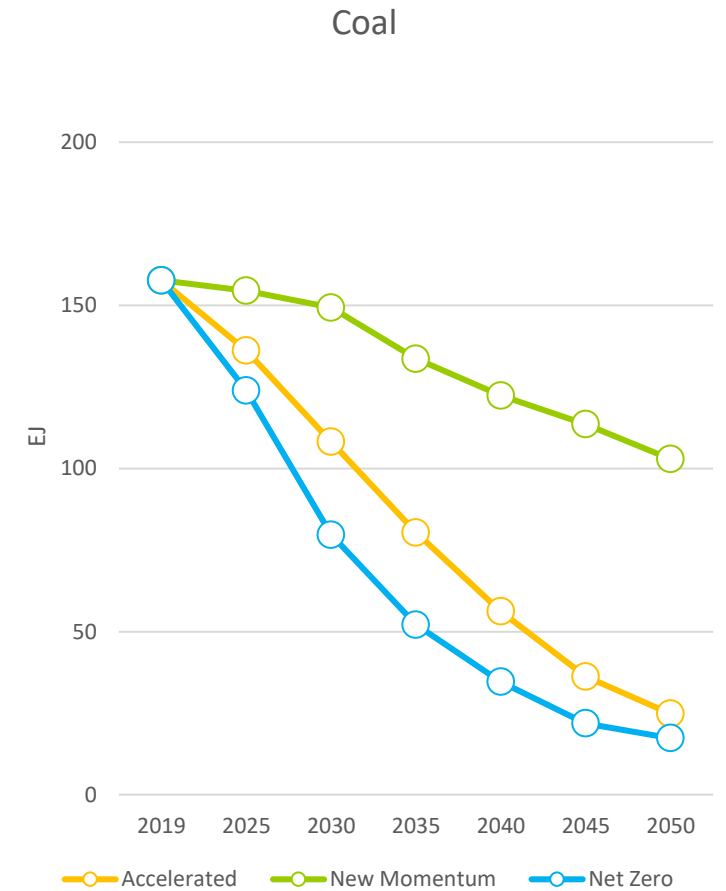
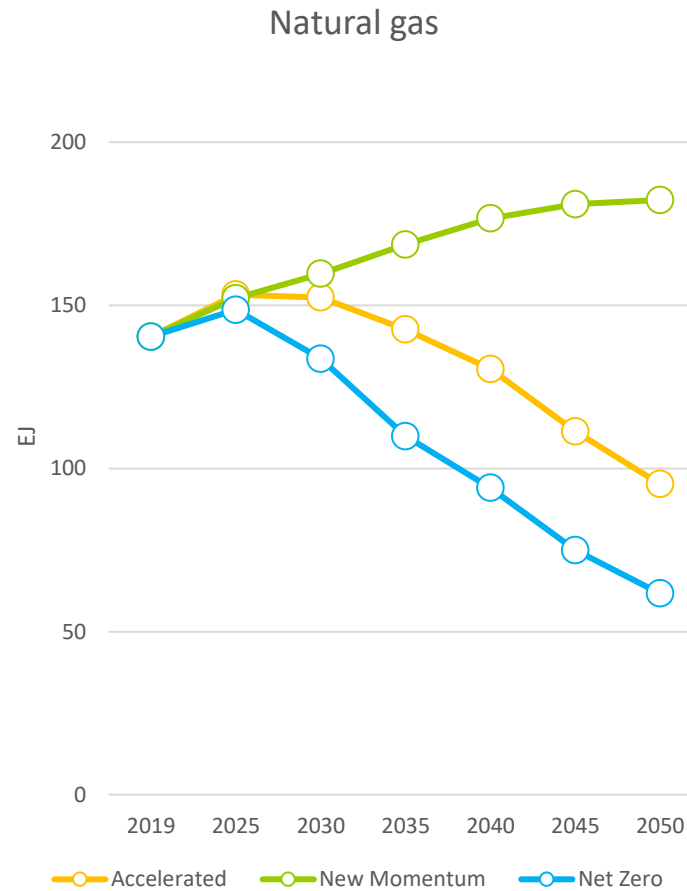
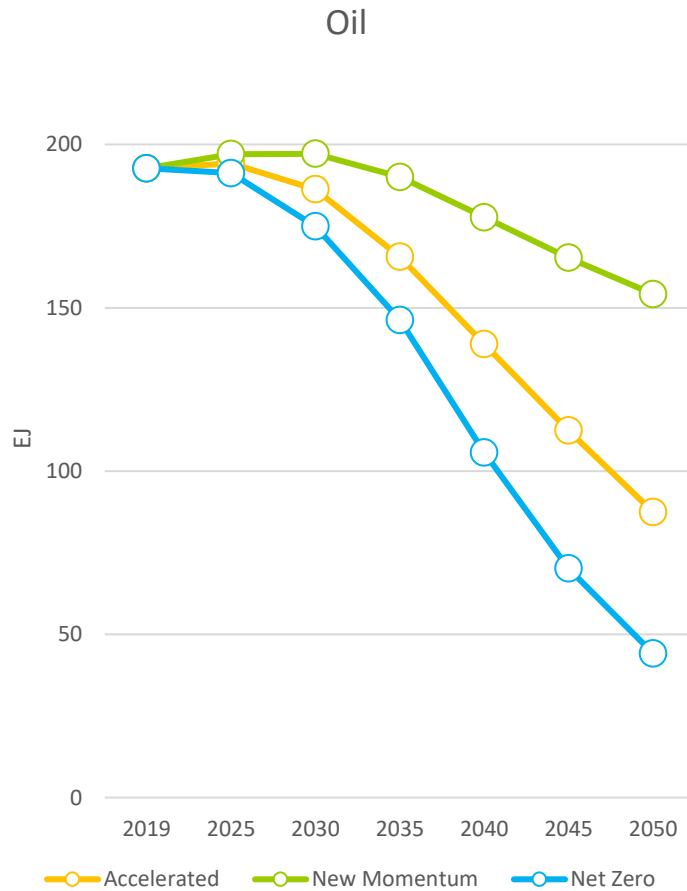
1. The role of hydrocarbons gradually declines as the world transitions to lower carbon energy sources.
2. Fossil fuels in 2019 accounted for around 80% of global primary energy. In the three scenarios, that share declines to between 60% and 20% by 2050.
3. This would be the first time in modern history that there is a sustained fall in the demand for any fossil fuel.

Fossil Fuels: Share of primary energy



Oil, natural gas, and coal

The use of natural gas is supported, at least for a period, by increasing demand in fast-growing emerging economies

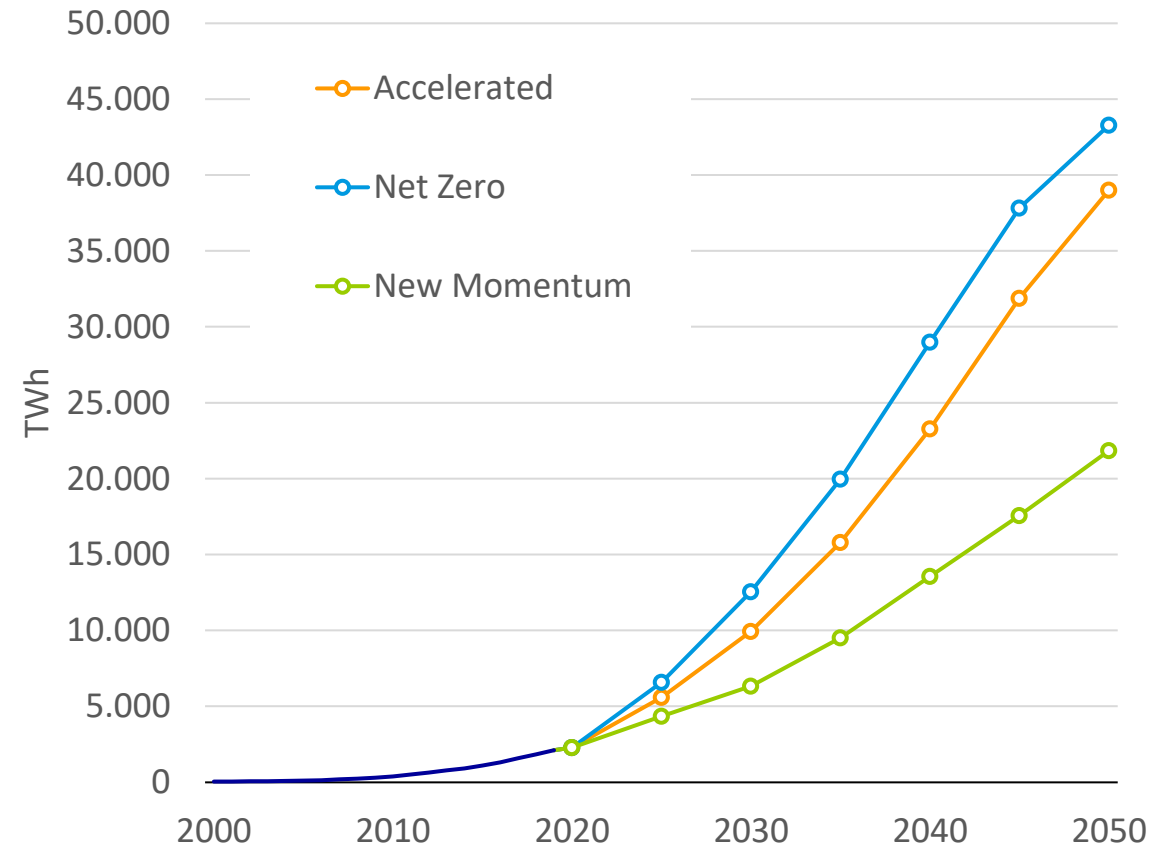


Renewable energy

Rapid deployment of wind and solar energy

1. In all three scenarios, the pace at which renewable energy penetrates the global energy system is quicker than any form of fuel in history.
2. Wind and solar power generation increases by around 20-fold in Accelerated and Net Zero, accounting for the entire growth in global power generation.
3. The increasing importance of renewable energy is supported by the continuing electrification of the energy system. The share of electricity in total final energy consumption increases from around 20% in 2019 to between 30% and 50% by 2050 in the three scenarios.

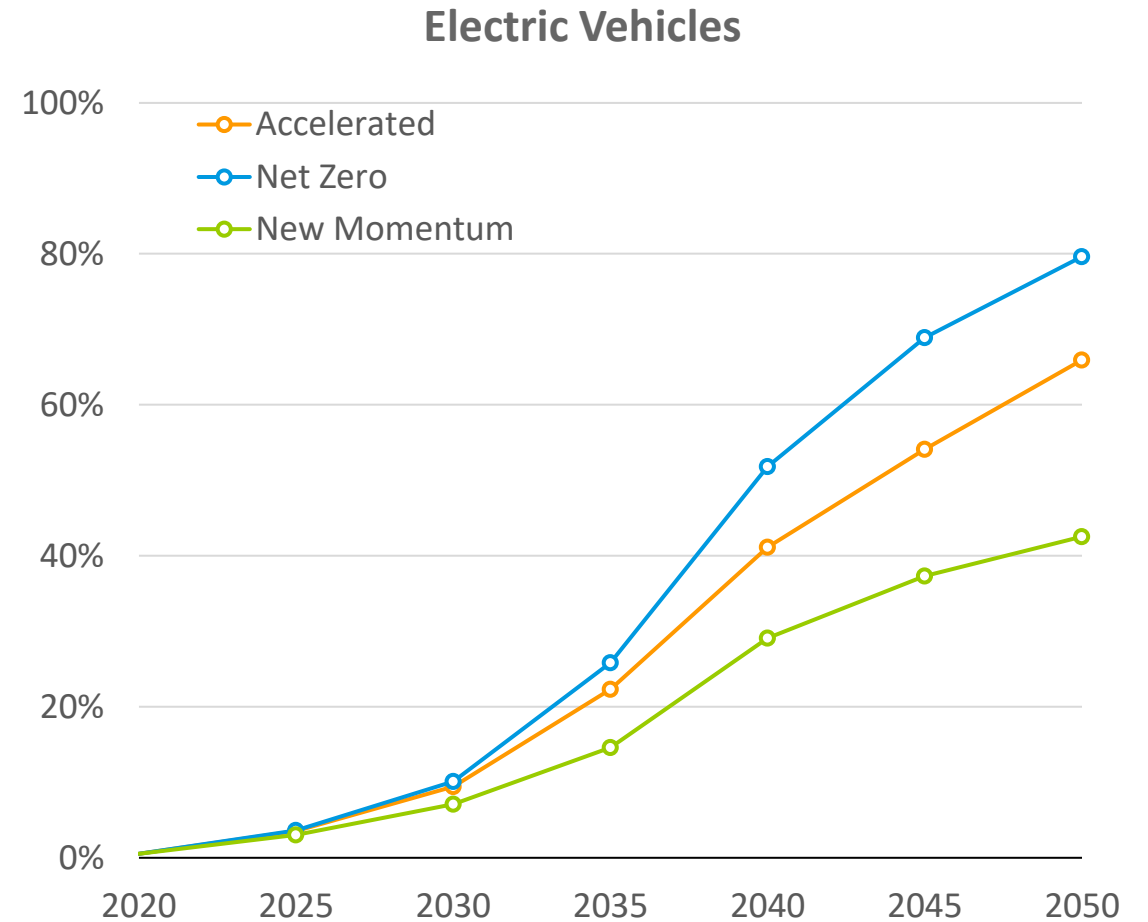
Power generation by wind and solar



Electric vehicles

An increasing electrification in road transportation.

1. The share of electric vehicles (pure battery electric vehicles and plug-in hybrids) in new vehicle sales increases from 2% in 2019 to 25-30% in 2030 and around 90% in 2050 in Accelerated and Net Zero.
2. In these two scenarios, there are around 2 billion or more electric vehicles in the global vehicle parc by 2050, compared with 7 million in 2019.
3. But some end-uses and processes are difficult or prohibitively costly to electrify. The decarbonization of these hard-to-abate uses and processes can be aided by the use of biofuels and hydrogen.

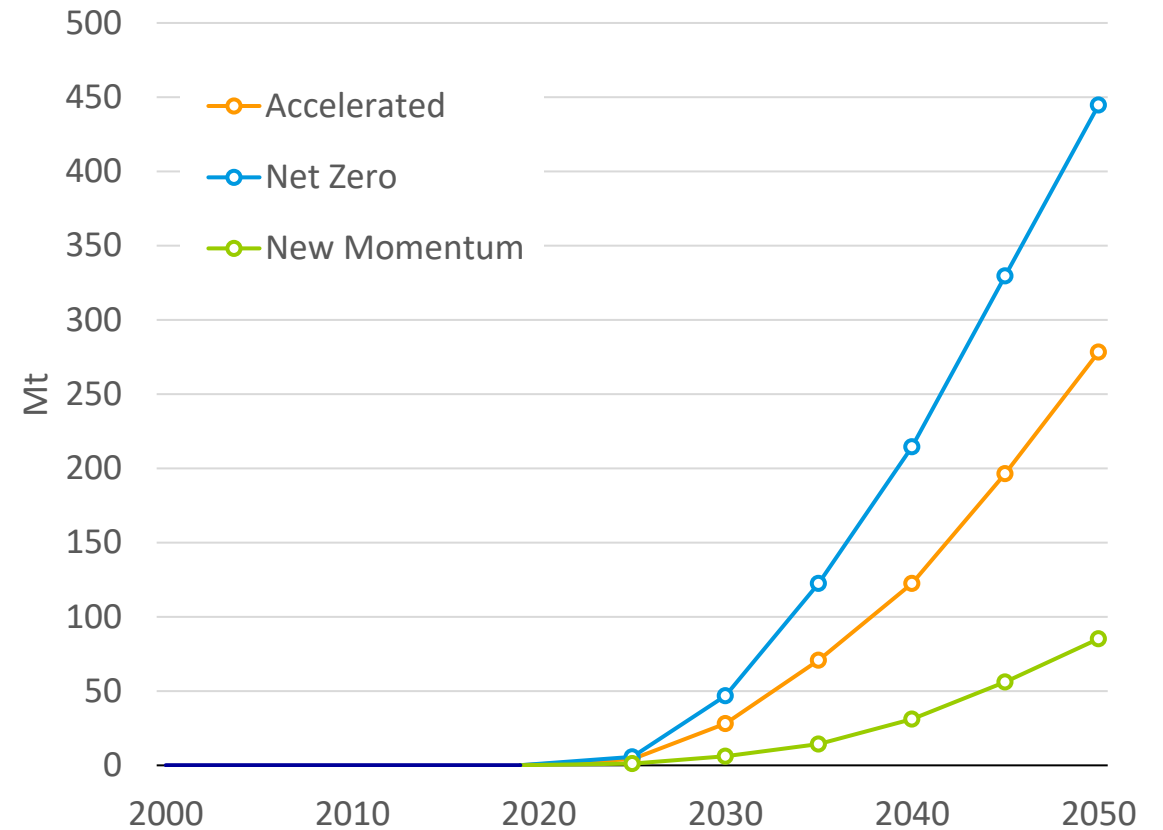


Hydrogen production

Low-carbon hydrogen emerges in the 2030s to decarbonise hard-to-abate sectors

1. Low-carbon (blue and green) hydrogen helps to decarbonize parts of industry and transport.
2. Within industry, the use of low-carbon hydrogen is concentrated in areas of heavy industry which rely on high-temperature processes, such as iron and steel, chemicals, and cement.
3. In transportation, hydrogen (and hydrogen-derived fuels) are used as an alternative to fossil fuels in long-distance marine, aviation, and heavy-duty road transportation.

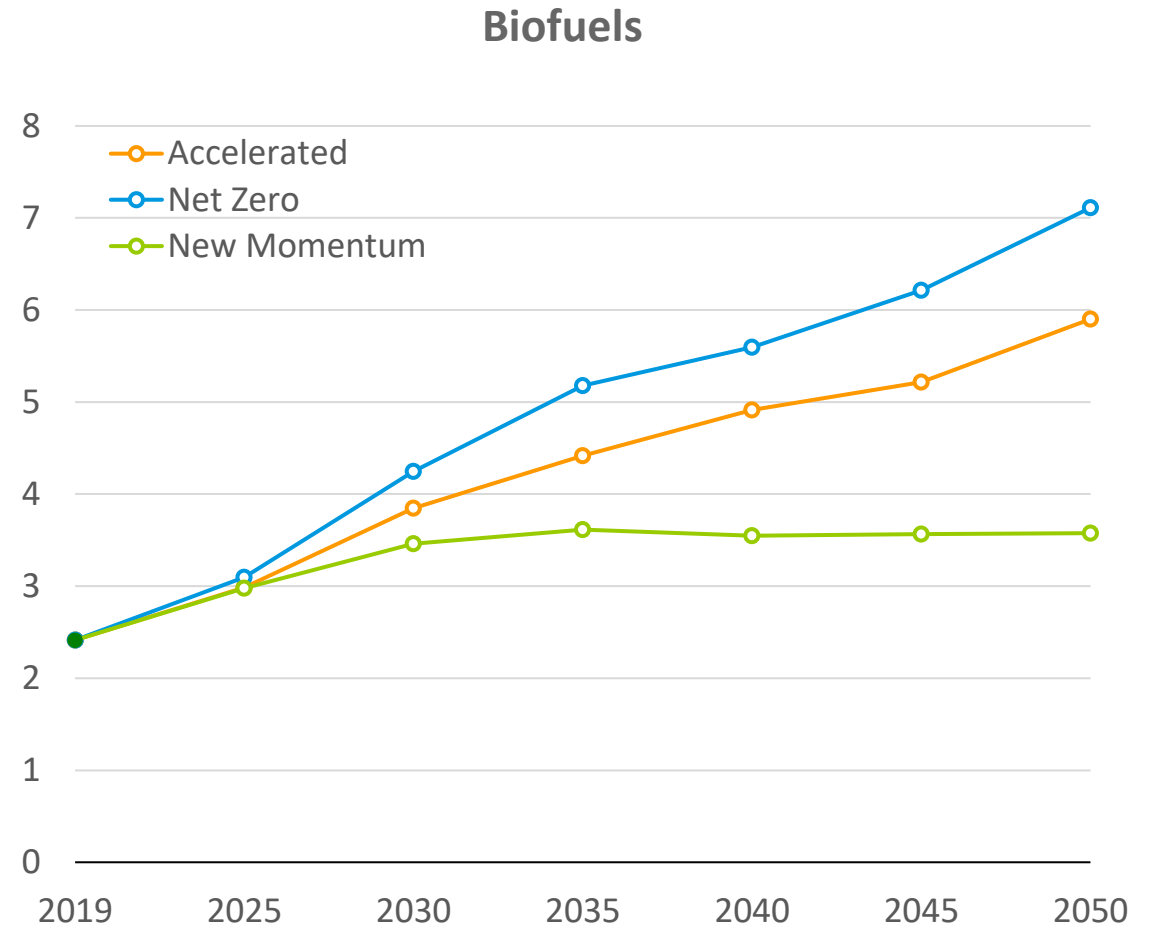
Low Carbon Hydrogen



Biofuels

Biofuels increases more than 2-fold over the outlook in Accelerated and Net Zero

1. The use of biofuels (including biomethane) increases in Accelerated and Net Zero to 6-7Mb/d by 2050.
2. Biofuels play a particularly important role helping to decarbonize the aviation sector, with bio-based sustainable aviation fuel accounting for around 30% of aviation fuel demand in Accelerated by 2050 and 45% in Net Zero.



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Thank you

