



Energy Perspectives

2020

Long-term macro and market outlook

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17 November 2020

10th Anniversary of Energy Perspectives

Major energy market changes during the last decade, and how EP11 compared to reality



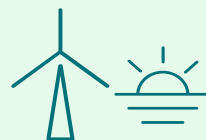
Global growth

Energy demand and population have increased 11%, while the economy has grown 27%



Shale revolution

USA has become the world's largest producer, disrupting markets



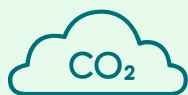
Cheap renewables

82% and 67% drop in the costs of solar and wind generation



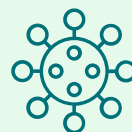
Oil and gas demand

Oil and gas demand grew by 11% and 16% pre-pandemic



CO₂ emissions

9 COP conferences later, global energy-related CO₂ emissions up



COVID-19 Pandemic

Around 50 million confirmed infected and more than 1 million deaths, leading to massive global recession

EP11 forecast vs 2019 reality

Oil demand	-7%
Wind and solar generation	-2%
Gas demand	+2%
Energy demand	+4%

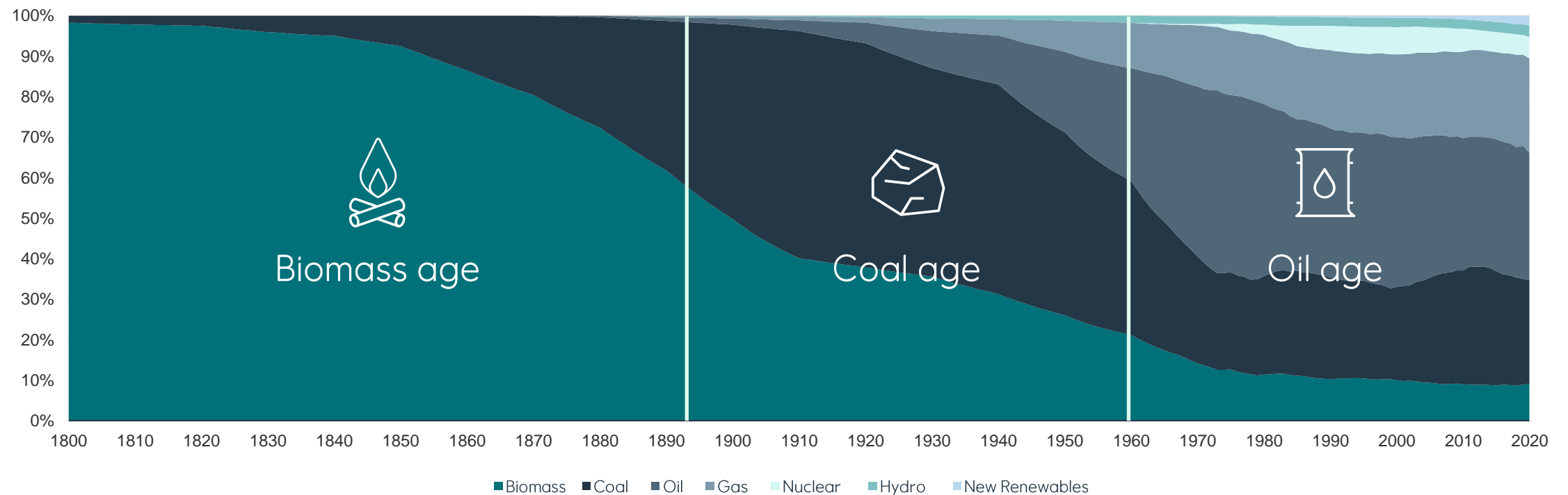
Prediction:
 "...after 2030 we expect coal demand growth to dwindle towards zero..."

Reality:
 Coal demand peaked 2 years later in 2013

The energy transitions story...

The world has gone through three energy transitions

Total primary energy fuel mix



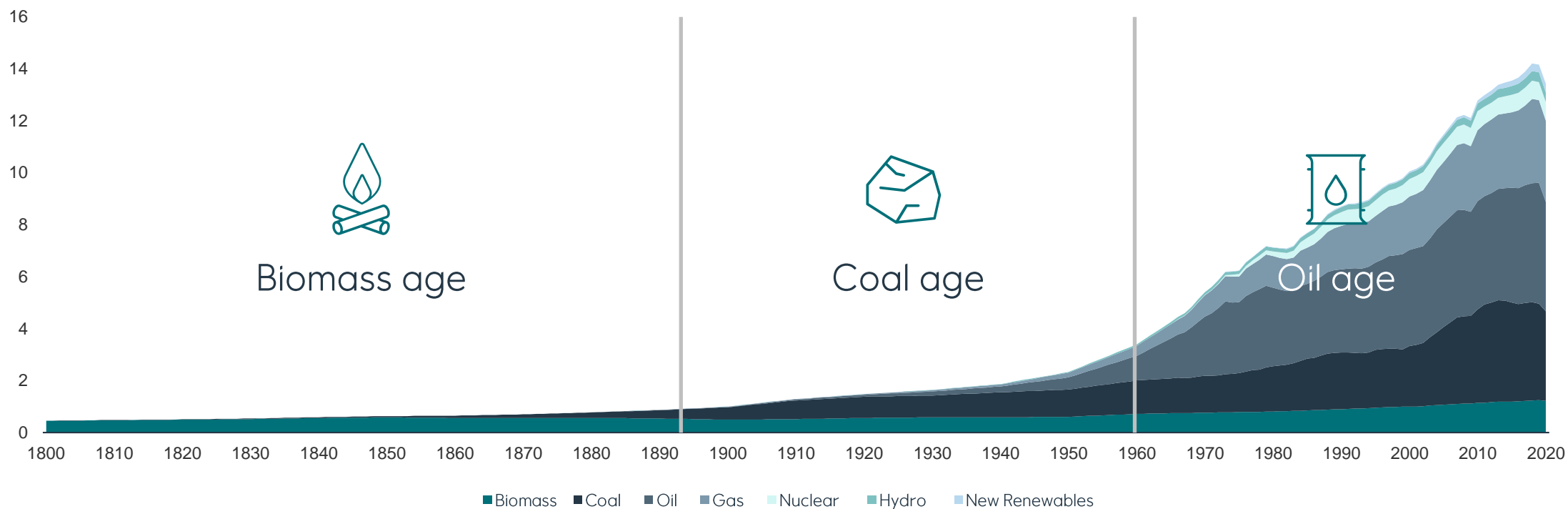
Source: Our World in Data, Equinor

...the energy additions reality

Energy demand has only increased, while we find new fuels to meet that demand

Total primary energy demand

Billion toe



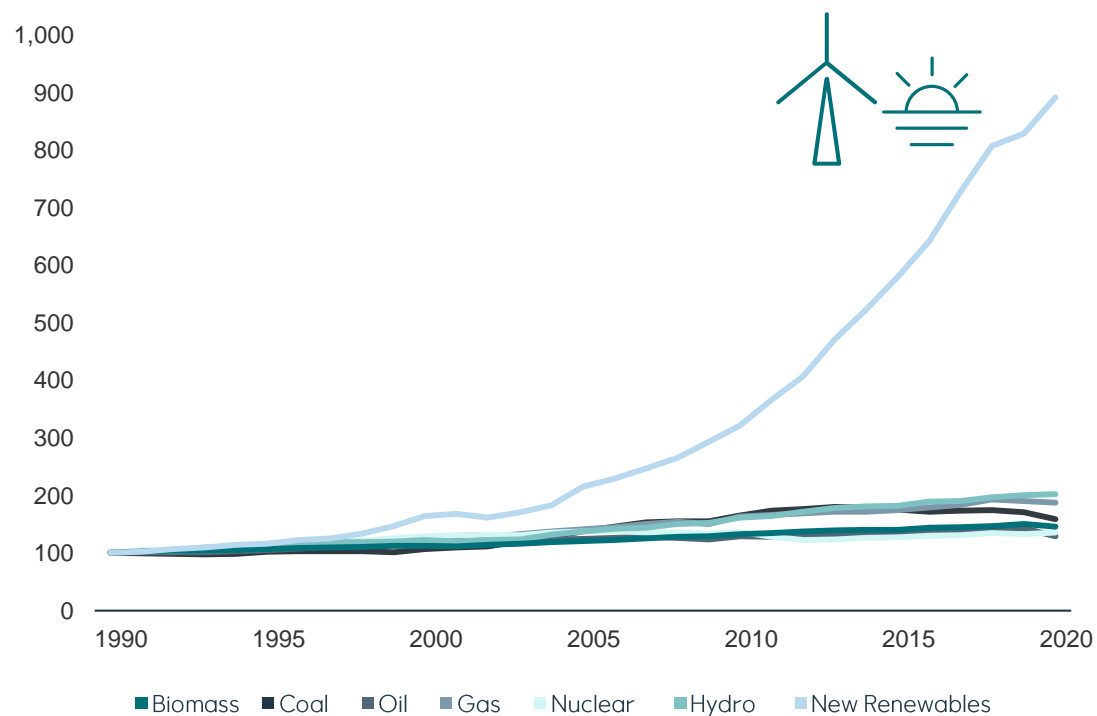
Source: Our World in Data, Equinor

Energy demand over the last 30 years

Solar and wind have seen extraordinary growth, but still remain a tiny fraction of total demand

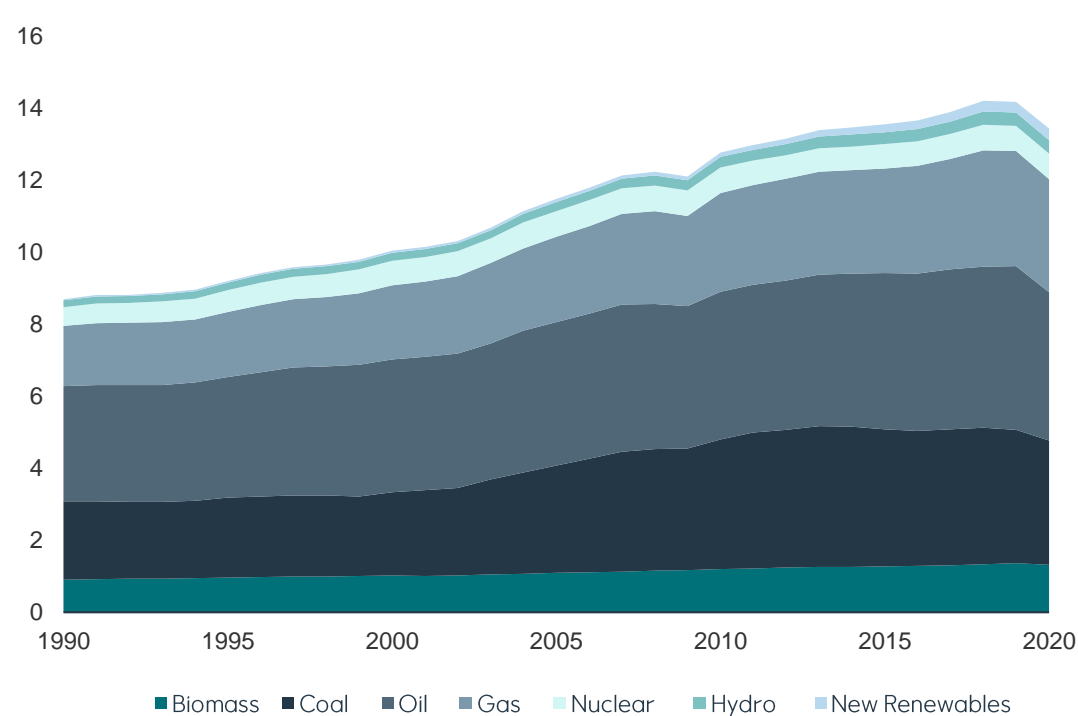
Growth in primary fuel demand

Normalised to 100 in 1990



Total primary energy demand by fuel

Billion toe



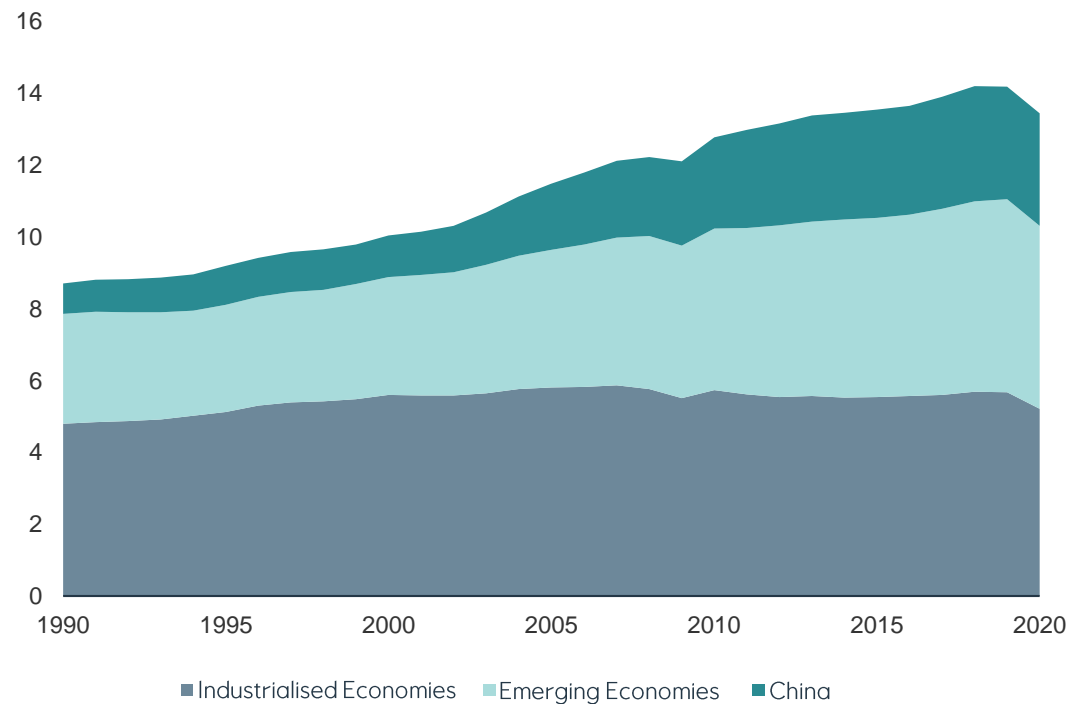
Source: IEA, Equinor

Energy demand over the last 30 years

Growth has been driven by the emerging economies, but particularly China, lead by the industry and transport sectors

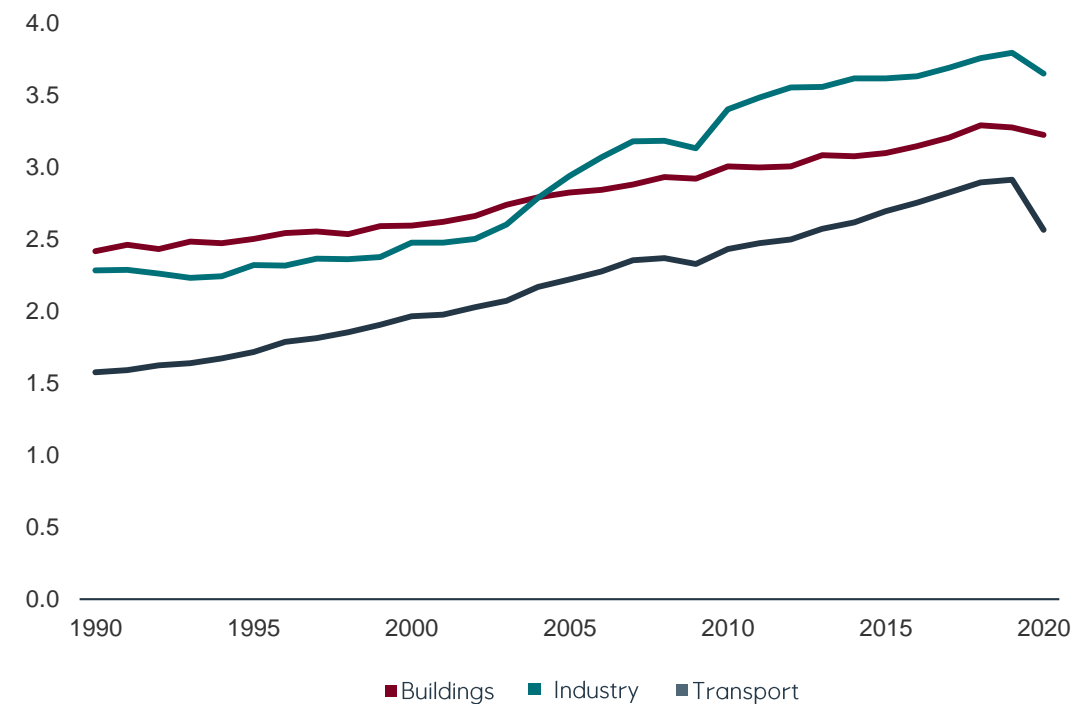
Total primary energy demand by region

Billion toe



Total final consumption by sector

Billion toe



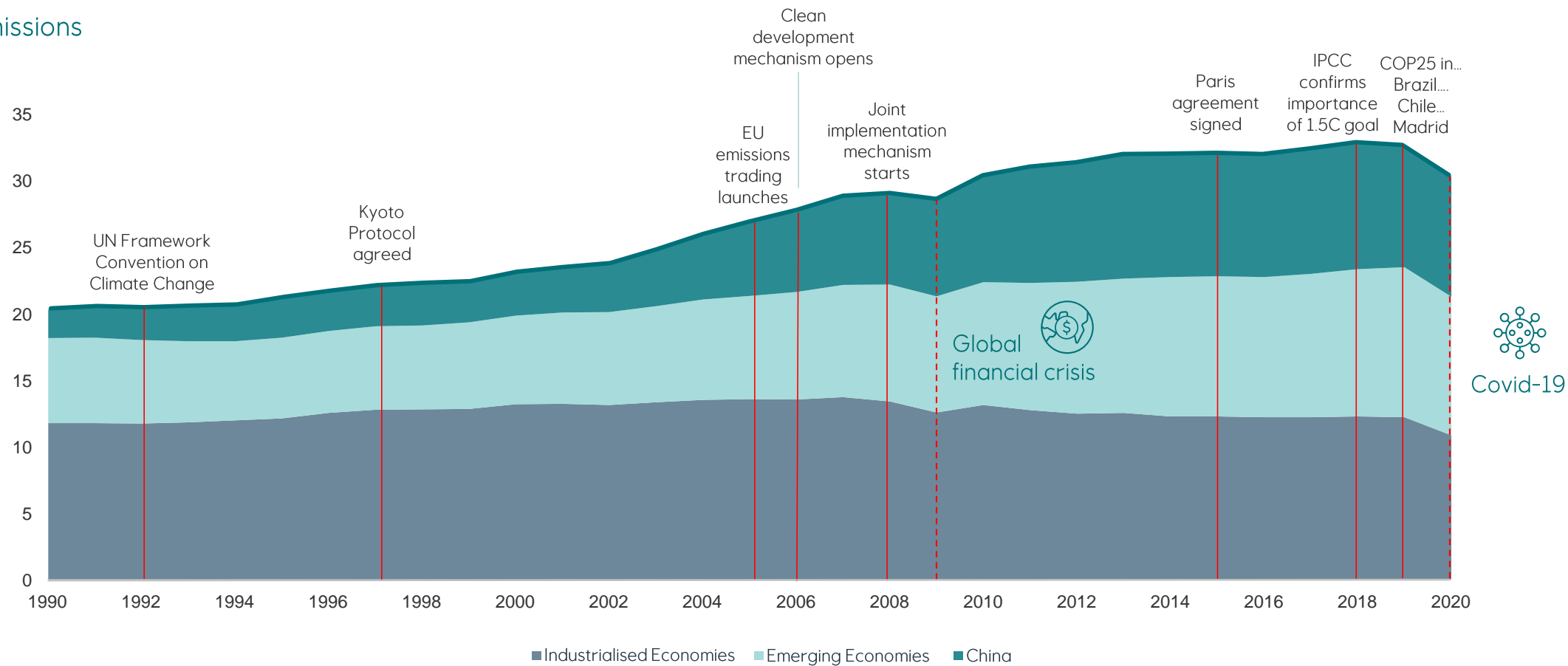
Source: IEA, Equinor

Global CO₂ emissions

Despite global efforts, emissions have continued to rise

CO₂ emissions

Giga tons



Source: IEA, Equinor

In which direction is the energy world moving?

Recent signposts show diverging paths, in terms of:

- Economic growth
- Energy efficiency
- Technology development
- Climate ambitions
- Market regulations
- Geopolitics

... and what will COVID-19 bring?



- **CO₂ emissions up**
- **US-China trade war**
- **Geopolitical tensions**

- Energy demand up
- Economic growth taking priority in policy
- New technology developments

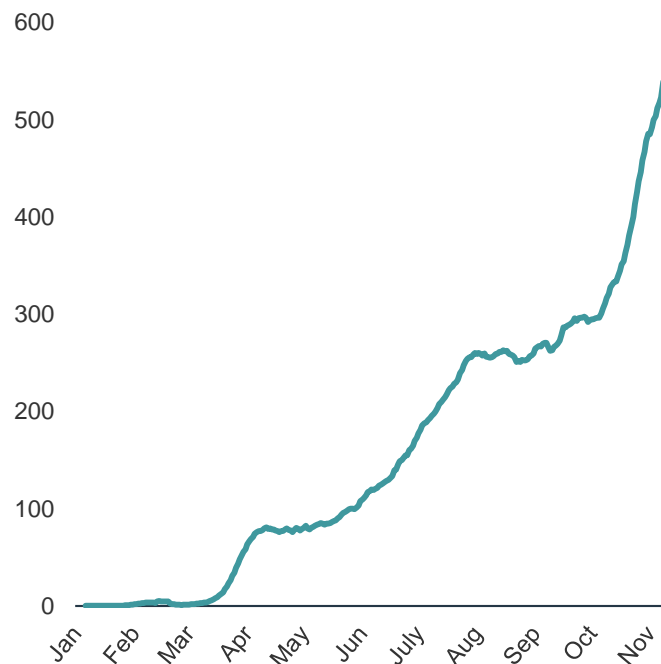
- Booming EV sales
- Record solar and wind capacity additions
- Net zero targets by governments and companies

COVID-19 pandemic

Around 50 million confirmed infected and more than 1 million deaths, leading to massive global recession

Global daily new cases

Thousand people



Source: World Health Organisation

Short term outlook:

- Lockdowns cause global economy to crash by -5.4% in 2020
- Vaccine development and opening of economies brings a 5% and 3.5% rebound in 2021 and 22
- Oil is hardest hit fuel with -9.4% drop in 2020, the largest in modern times
- Oil recovery continues, but will not return to 2019 levels until after 2022

Global GDP and oil demand

Indexed to 100 in 2019



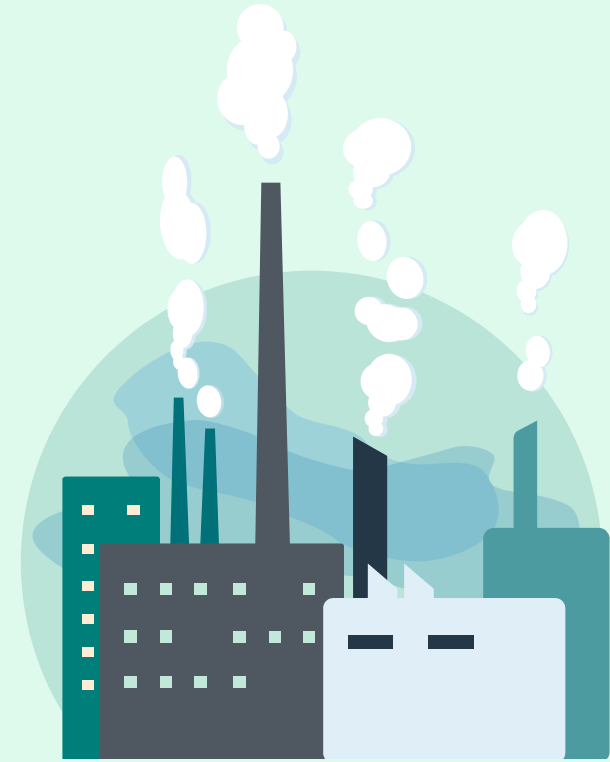
Source: Equinor

Two scenarios
that capture where
the world could be
heading...



Reform

- Market and technology drive
- Current policy momentum
- Economic growth prioritised



Rivalry

- Geopolitical uncertainty and volatility
- Focus on energy security
- Trade tensions and isolationism



... and one where the world needs to go

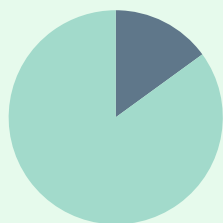
Rebalance

- Consistent with well below 2° target
- Focus on all UN sustainable development goals
- Industrialised countries focus more on well being
- Emerging economies begin to close the income gap and leapfrog to a sustainable path

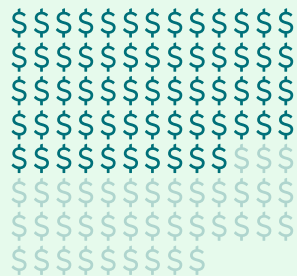
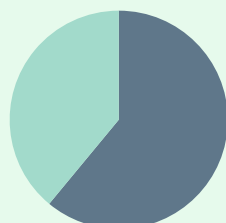
An unbalanced world...

15% of the world's population have 2/3 of the income and use more than 1/3 of the energy

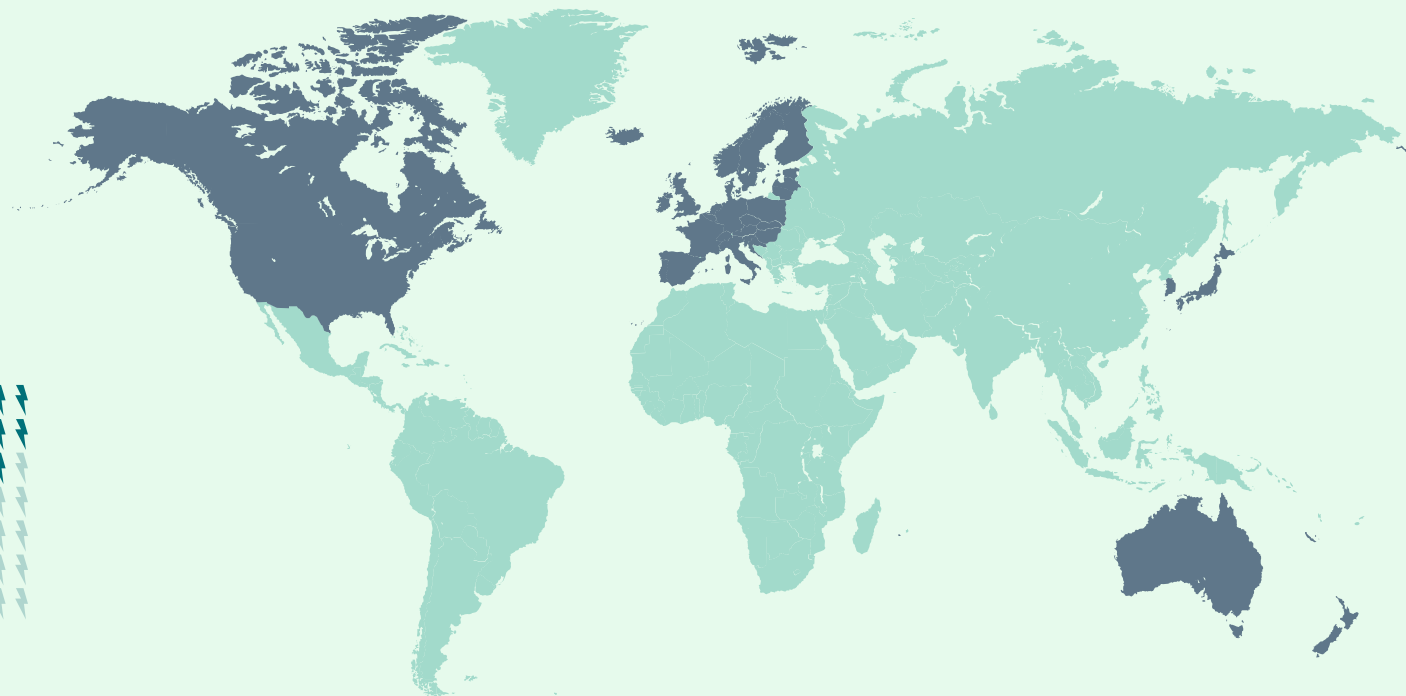
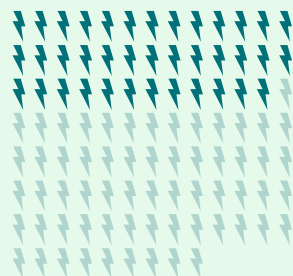
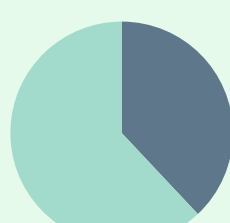
Population



GDP



Energy



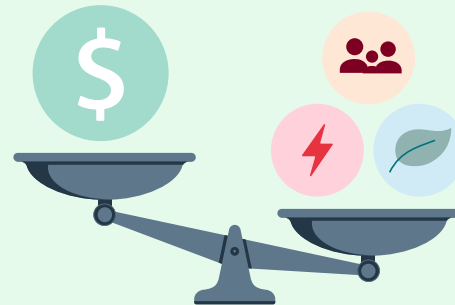
Rebalance – where the world needs to go

We live on a finite planet. Resource consumption, population and energy demand cannot grow forever



Economy

Industrialised countries pay the full price for goods, covering negative externalities. Emerging countries benefit and invest in sustainable development



Policy

Coordinated global policy that protects the environment, taxes emissions, promotes human wellbeing and the transition to a low-carbon energy system



Behaviour

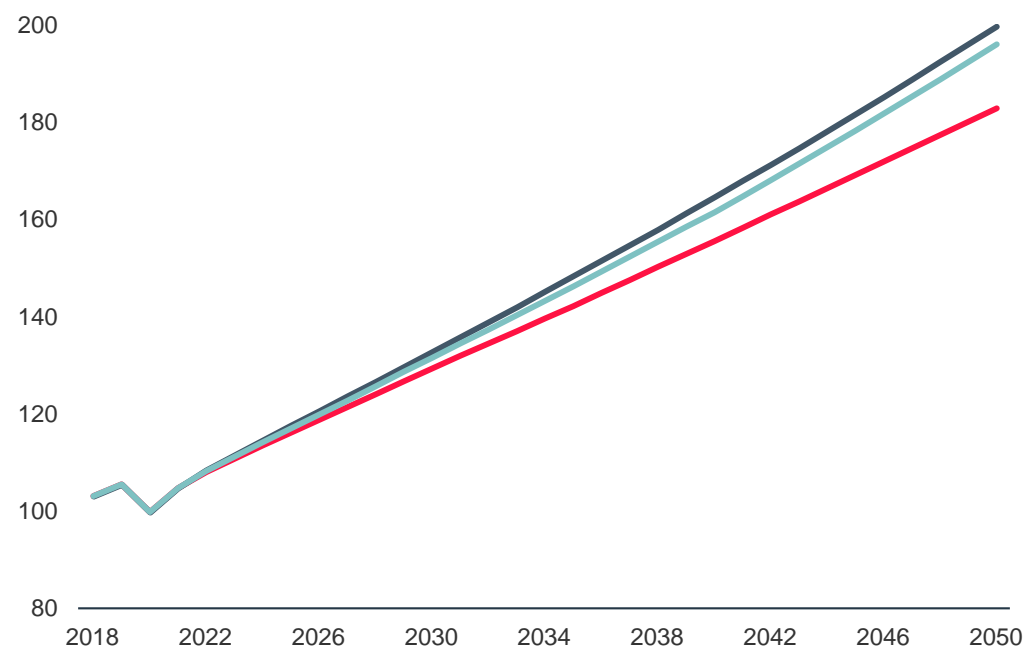
Radical change in consumer behaviour, work practises and lifestyle choices, to develop a sustainable way to live

Economic growth and carbon emissions

Three distinct paths for economic development and carbon emissions

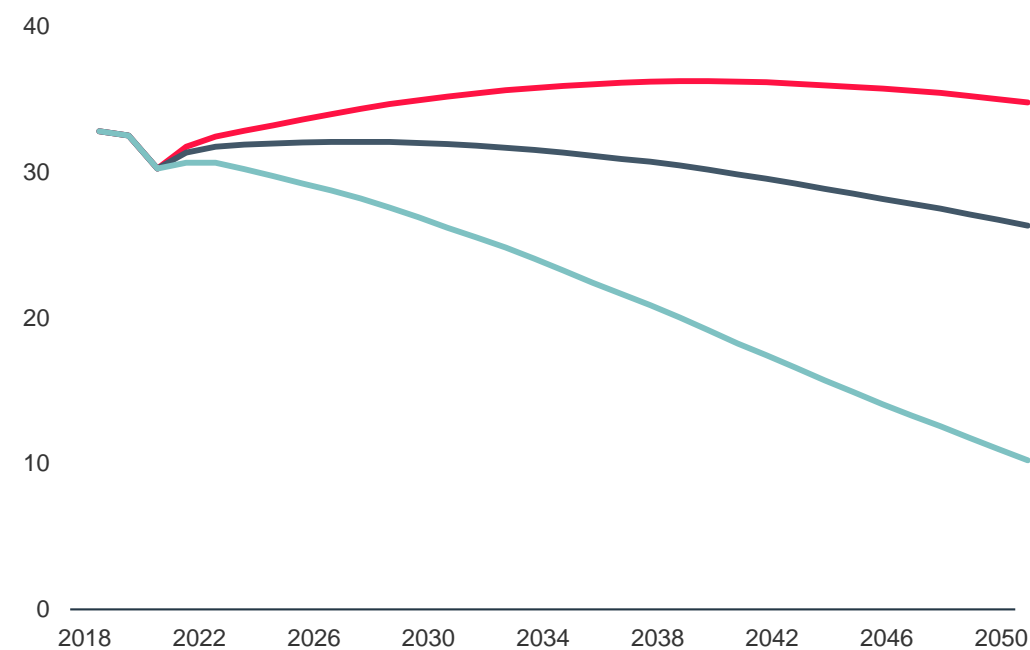
Global GDP

Indexed to 100 in 2018, constant USD



Global CO₂ emissions

Gt



— Reform — Rebalance — Rivalry

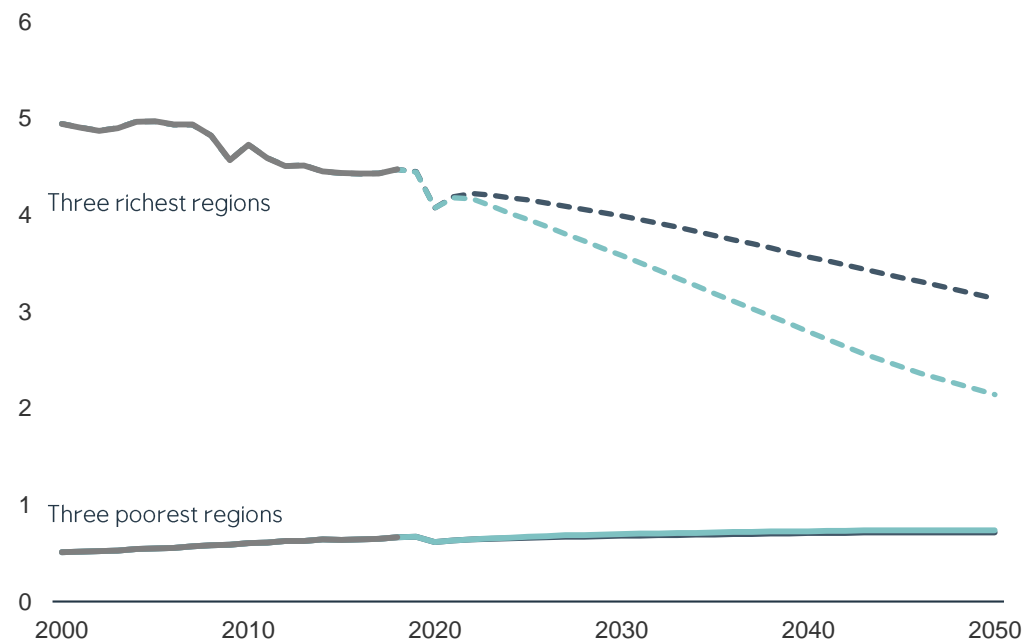
Source: Equinor

A pre-requisite for sustainable development: Convergence between rich and poor

Emerging regions begin to close the gap in terms of income and energy demand per capita in Rebalance

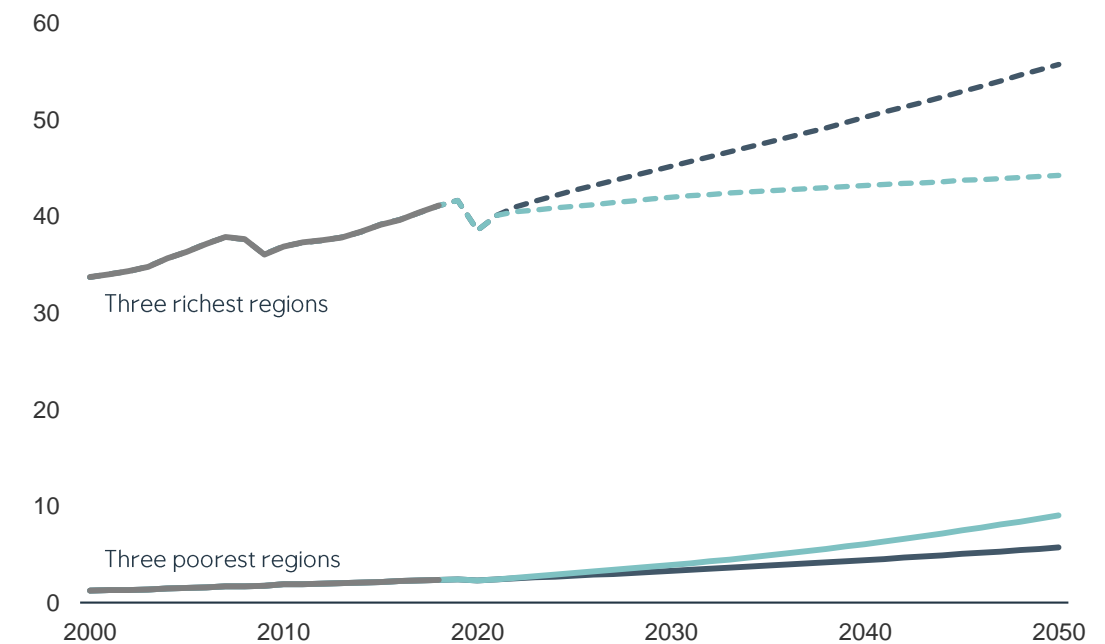
Primary energy demand per capita

toe per capita



GDP per capita

Real thousand USD at market exchange rates per capita



■ Rebalance ■ Reform ■ History

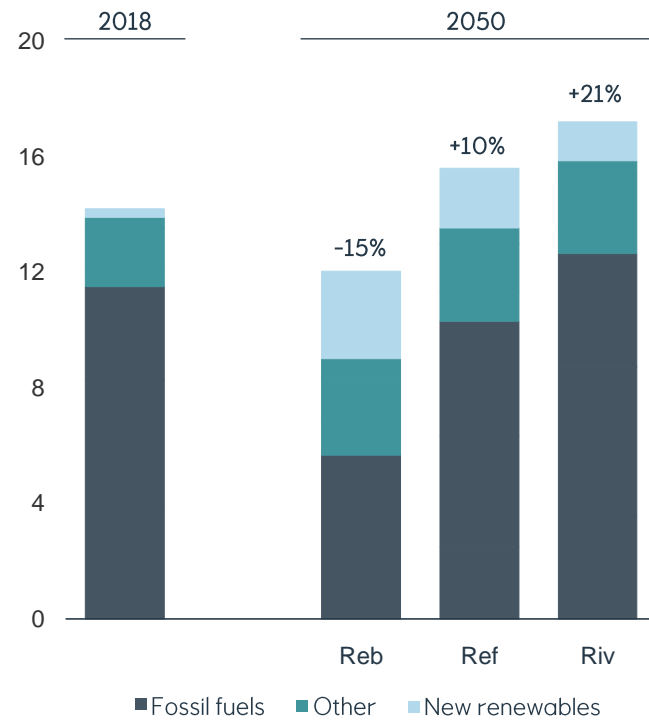
Source: IEA, World Bank, Equinor

Where are energy markets moving?

There is an energy transition in all scenarios, but only in Rebalance is it fast enough

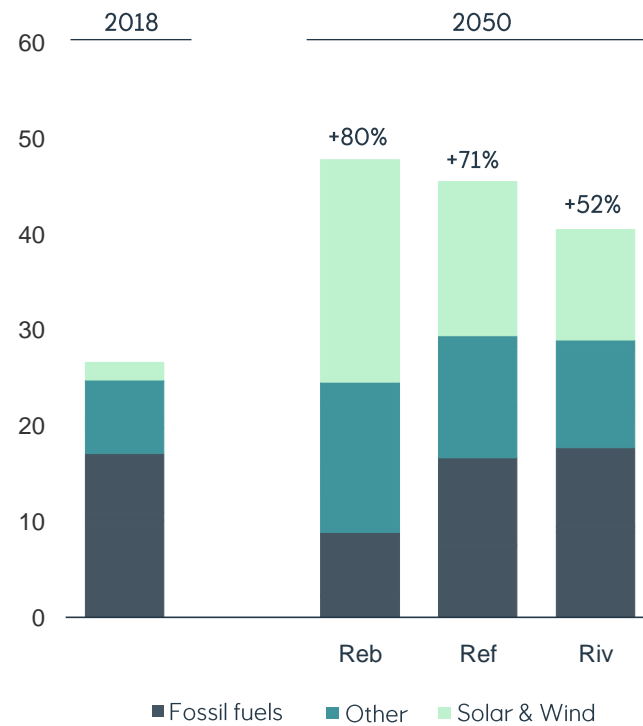
World primary energy demand

Billion toe



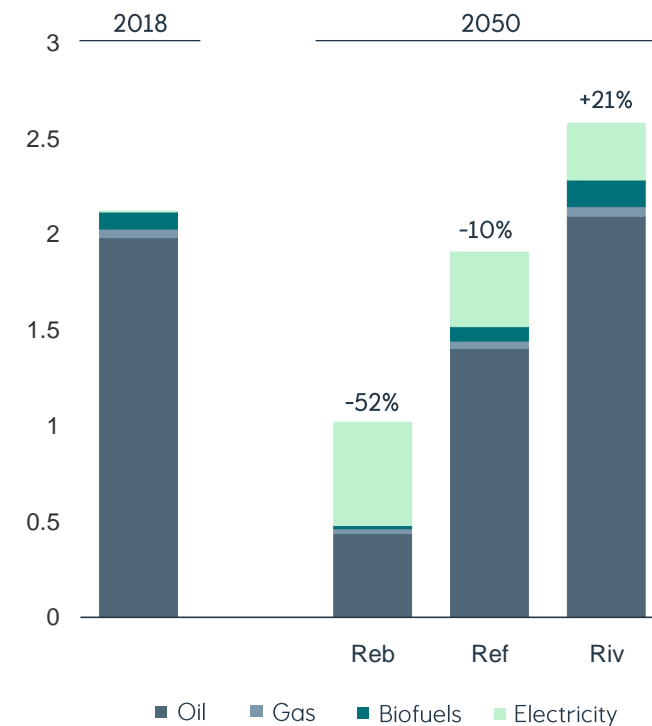
Electricity generation

Thousand TWh



Road transport fuel demand

Billion toe



Source: IEA, Equinor

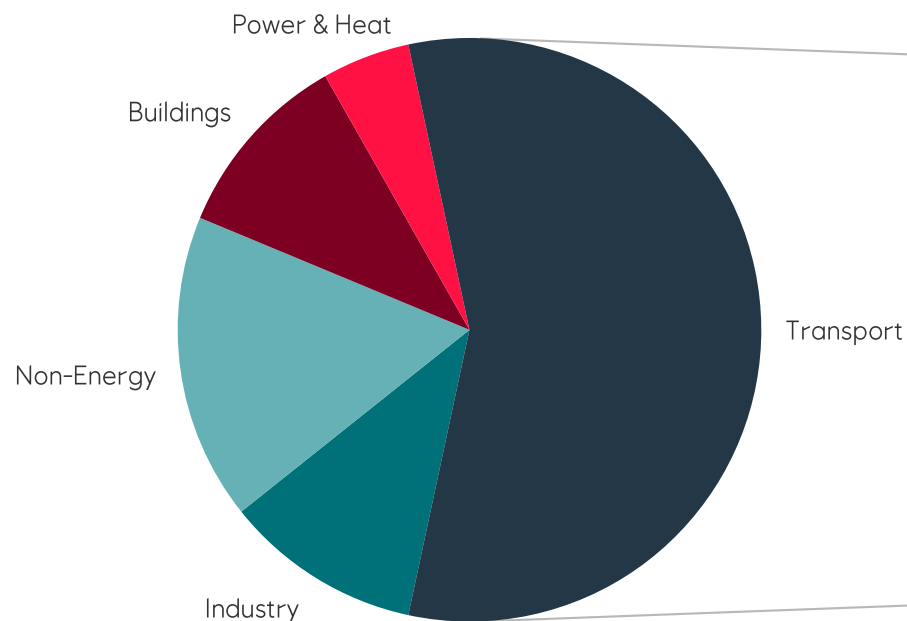
Where is oil demand today?

Transport is the key sector for oil demand today, with road demand making up 76%



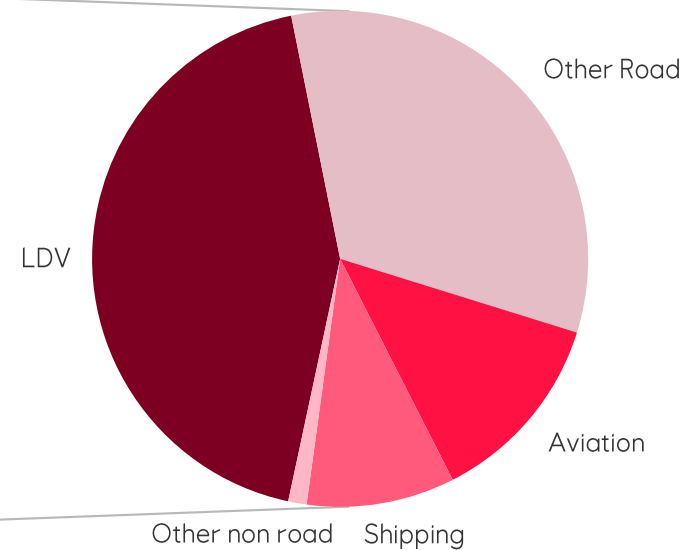
Oil demand in 2018

Oil demand was 97mbd, with 55mbd going to transport



Oil demand in transport sector

Light duty vehicles make up almost half of transport demand



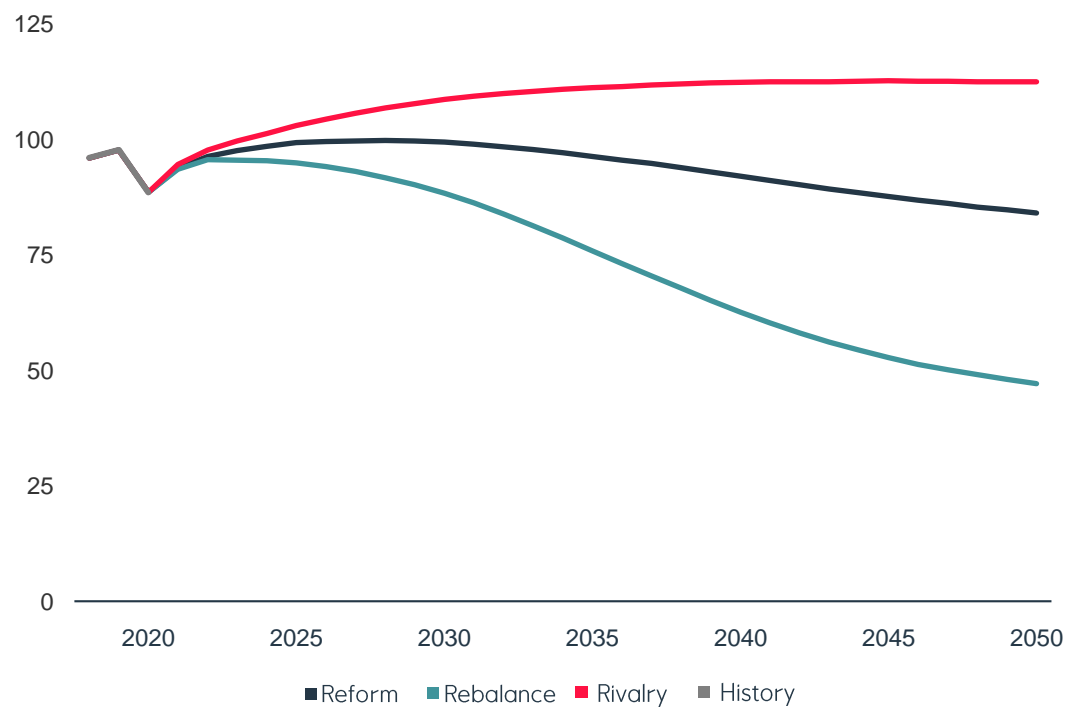
Wide outcome space for oil demand

Transport is the key sector for long-term oil demand



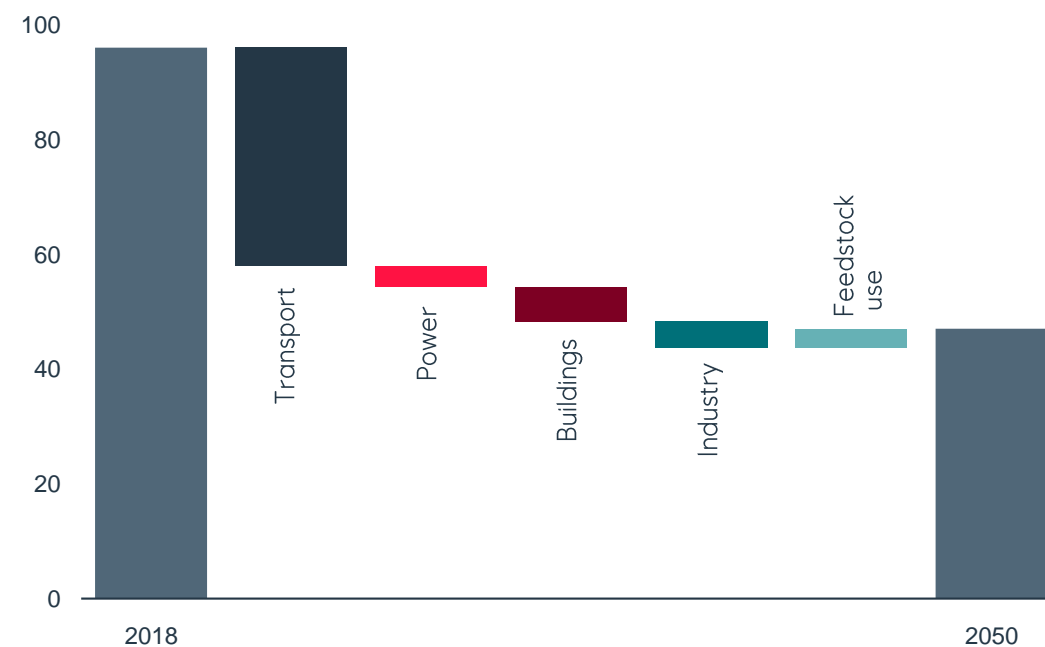
Oil demand by scenario, 2018-2050

mbd



Change in global oil demand by sector in Rebalance, 2018-2050

mbd



Source: IEA, Equinor

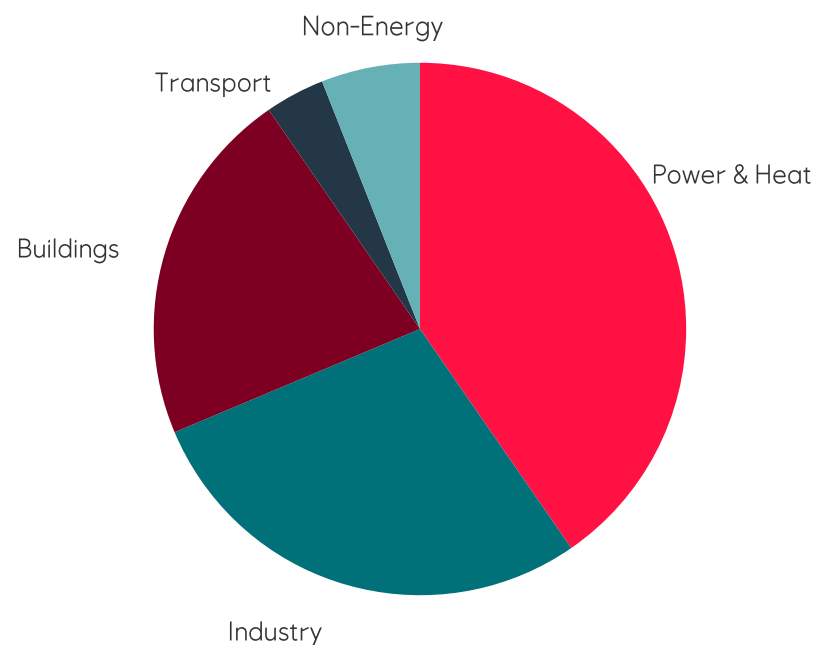
Where is gas demand today?

40% of gas demand is to the power and heat sector, though it has to compete with multiple other fuels



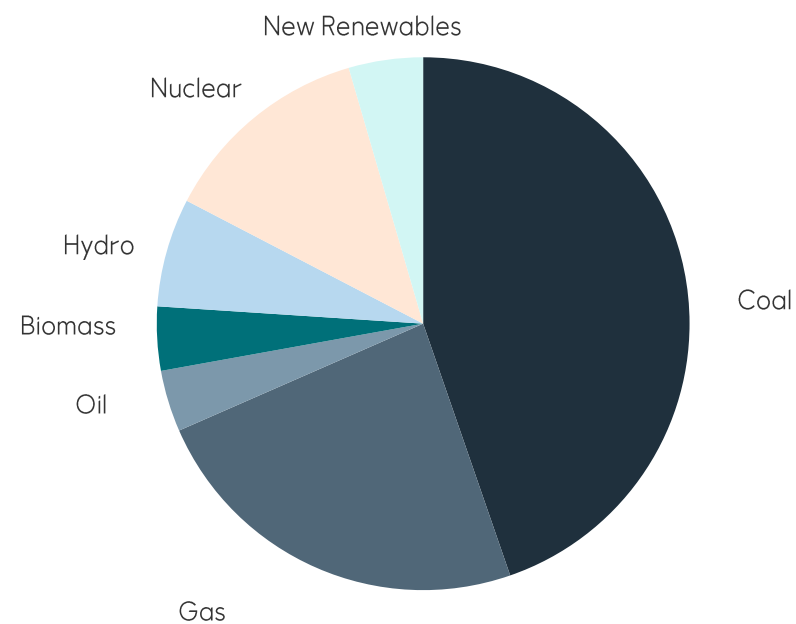
Gas demand in 2018

Gas demand was 3,900 bcm, with 1,600 bcm going to power & heat



Power & Heat fuel mix

Gas is 24% of the fuel supply for the power and heat sector



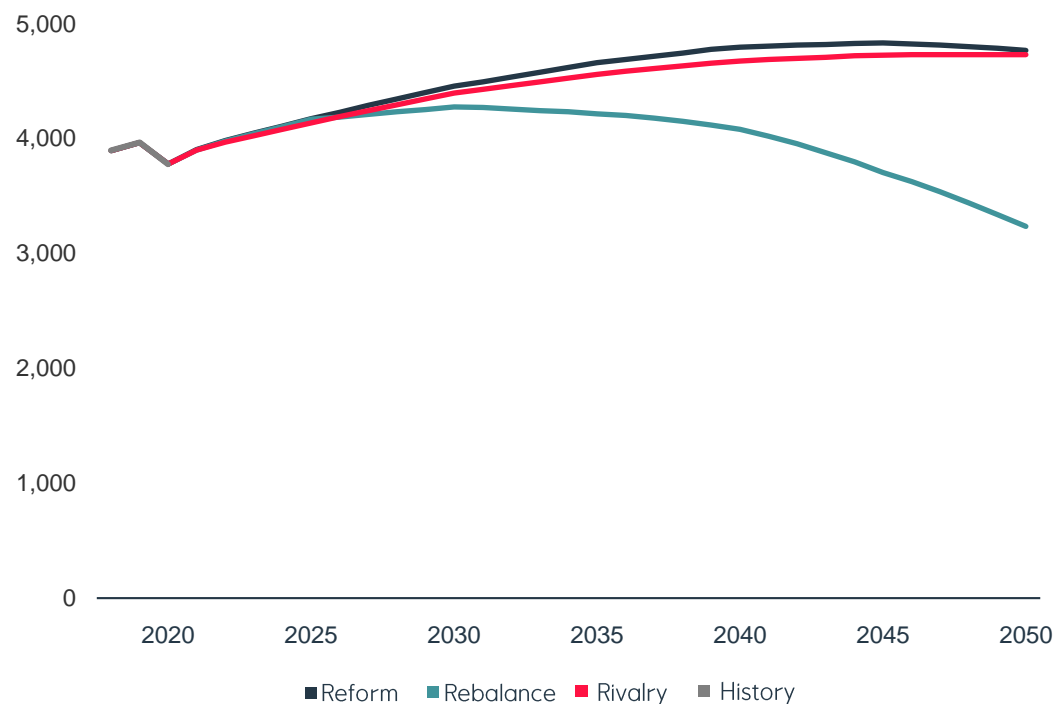
Natural gas – divergence beyond the 2020s

China and India key regions in Rebalance – gas supports coal phase-out



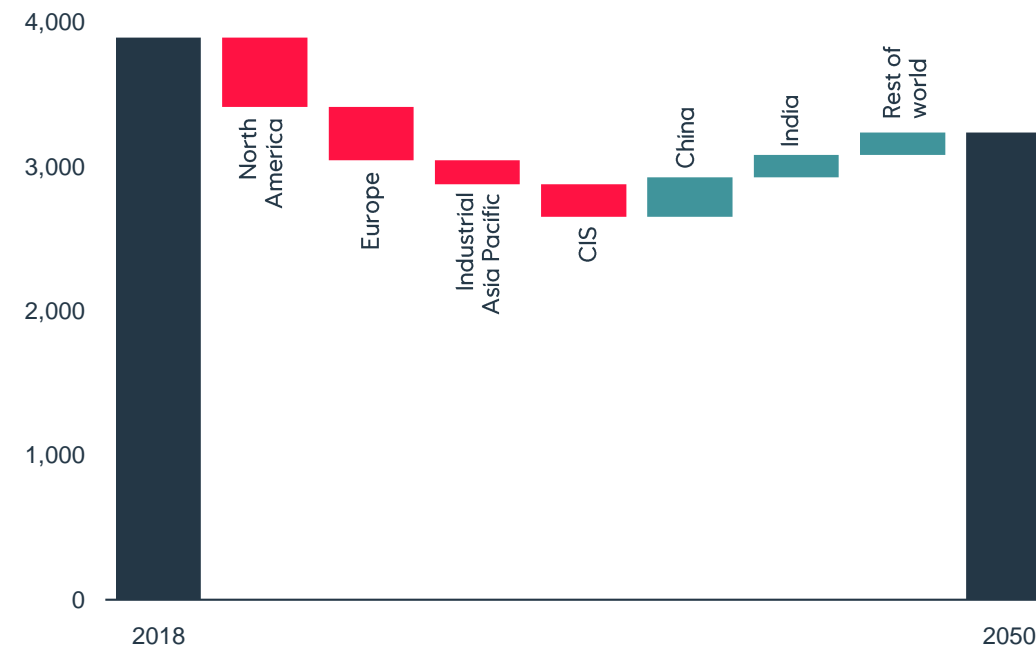
Change in gas demand by scenario, 2018-2050

Bcm



Change in global gas demand by region in Rebalance, 2018-2050

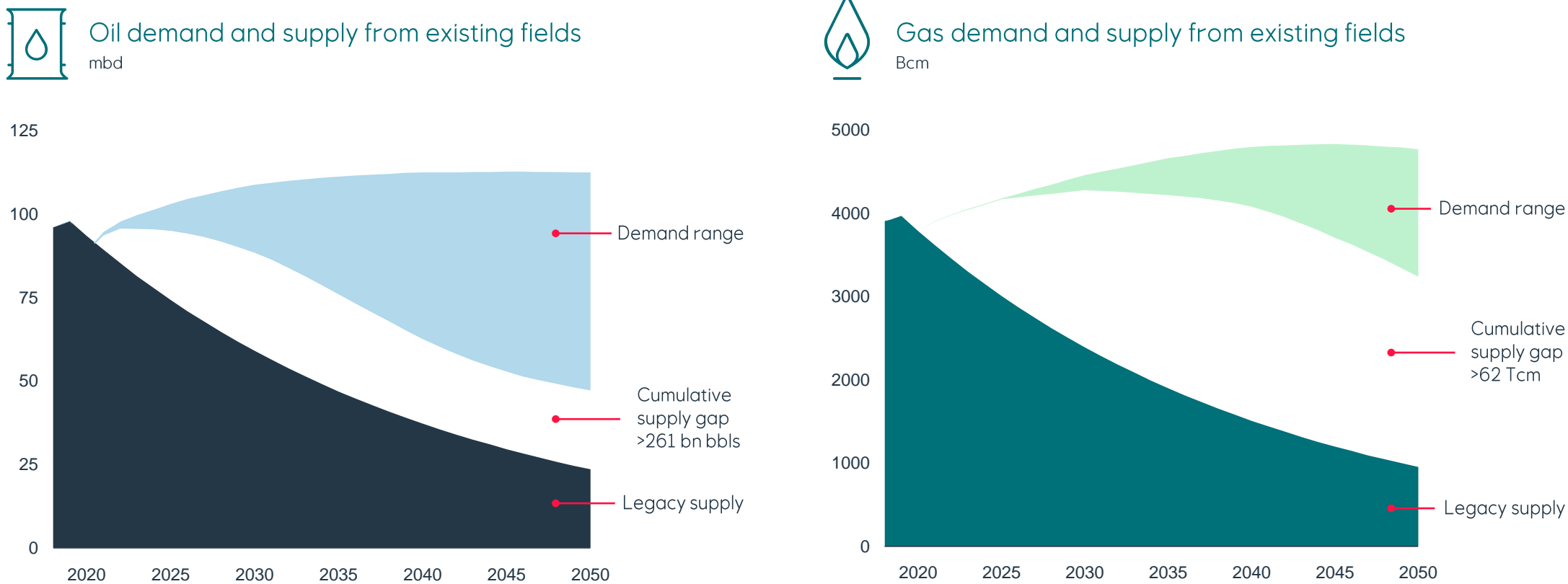
Bcm



Source: IEA, Equinor

What is the need for new oil and gas investments?

Large oil and gas investments in all scenarios, although significantly less in Rebalance



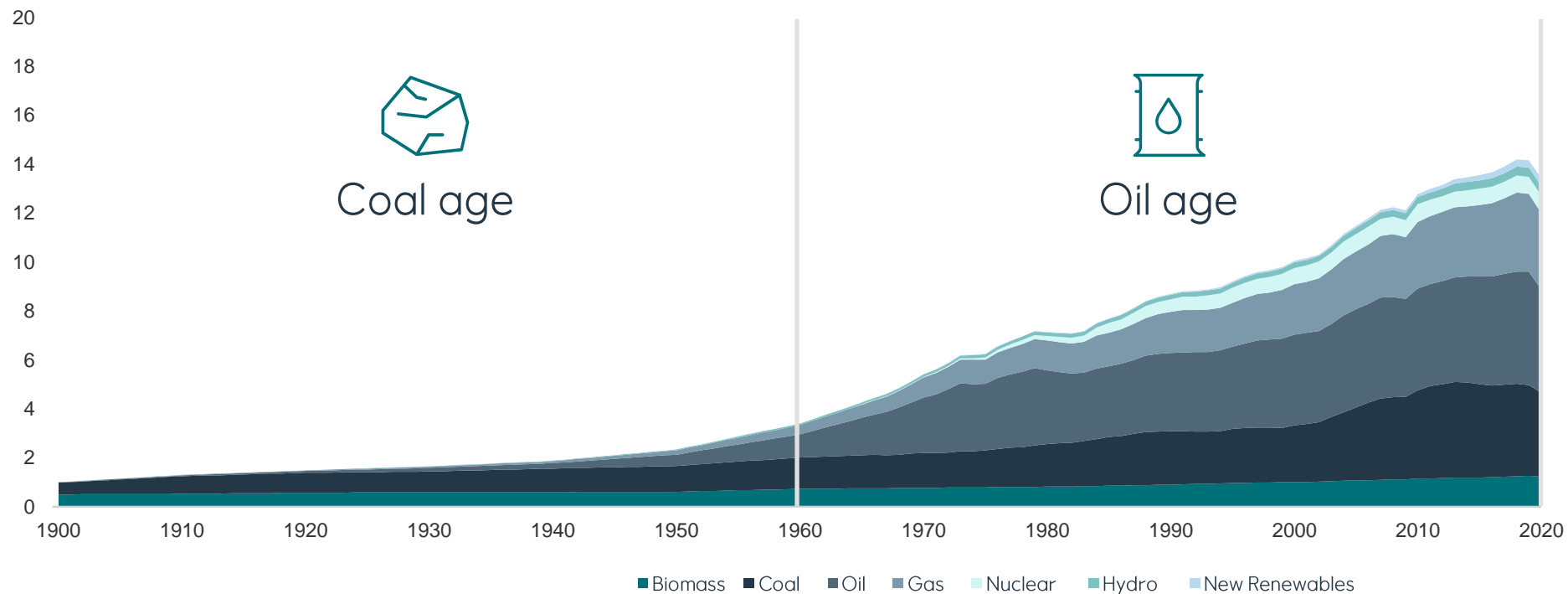
Source: IEA, Equinor

What does the energy transition hold...

A sustainable development requires a massive transition, and the avoidance of another addition

Total primary energy demand

Thousand Mtoe



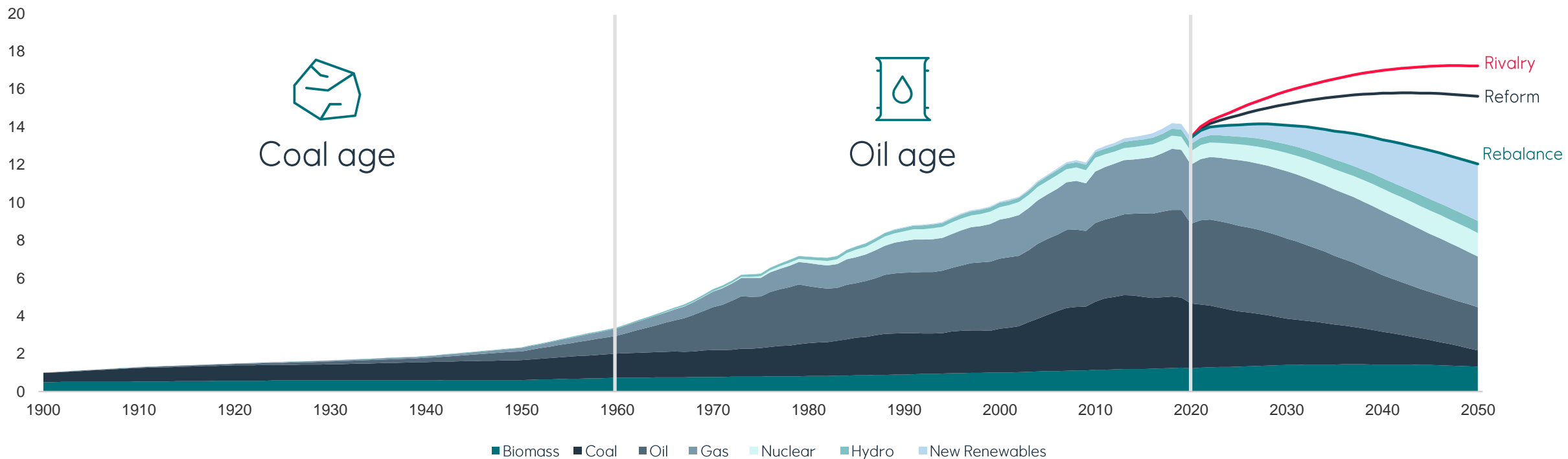
Source: Our World in Data, IEA, Equinor

What does the energy transition hold...

A sustainable development requires a massive transition, and the avoidance of another addition

Total primary energy demand

Thousand Mtoe



Source: Our World in Data, IEA, Equinor

Summary

Delivering a sustainable energy transition is a massive challenge and unlike anything that has gone before

- The COVID-19 pandemic will have a lasting effect on energy demand
- Global demand for energy dependent goods, services and activities will continue to grow
- Rebalancing the global economy, consumer choices and people's behaviour is key to a sustainable future
- An energy transition is happening, but too slowly to deliver on the ambitions in the Paris agreement
- Development in emerging economies will determine the outcome
- Electricity from wind and solar, and electrification of transport will have a huge impact, but are only part of the solution
- Large investments needed in the energy system, requiring focus on regulation and incentives





Energy Perspectives 2020

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