COVID-19: A shock with profound impact
On human beings, societies, economies, and markets

Global GDP, oil and gas demand
Indexed, 2019 = 100

Countries in recession in 2020
Real GDP growth, annual percent change

- No data
- Less than -3%
- -3% to 0%
- 0% to 3%
- 3% to 6%
- 6% or more

Source: Equinor
Source: International Monetary Fund
Signs of recovery

Recessions receding, trade levels back, signs of bottlenecks in markets

**GDP growth 2020/21**
Real % change y/y

**Global goods trade**
Indexed, July 2008 and December 2019 = 100

**Global commodity prices**
Index 2019 = 100 (lhs) and USD/bbl (rhs)

Source: Equinor
Source: CP8 Netherlands Bureau for Economic Policy Analysis, Refinitiv Datastream
Source: OECD
Energy use is increasing

CO₂ emissions in China have rebounded, with others likely to follow; still potential for further increases

Change in CO₂ emissions 2019-20

<table>
<thead>
<tr>
<th>Country</th>
<th>Change in CO₂ emissions (Mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>-500</td>
</tr>
<tr>
<td>European Union</td>
<td>-400</td>
</tr>
<tr>
<td>India</td>
<td>-300</td>
</tr>
<tr>
<td>Japan</td>
<td>-200</td>
</tr>
<tr>
<td>Russia</td>
<td>-100</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-80</td>
</tr>
<tr>
<td>Brazil</td>
<td>-40</td>
</tr>
<tr>
<td>China</td>
<td>-20</td>
</tr>
</tbody>
</table>

Community movement

% difference from pre-crisis. Average of retail, workspace and transit related movement of people.

Source: IEA

Source: Our world in data
An unbalanced world...

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

Source: United Nations, IEA, Equinor
An unbalanced world...

Industrialised countries emitting far more CO₂ per capita than those in the emerging economies; resource use too high.

CO₂ emissions per capita in 2018

- Australia
- Saudi Arabia
- US
- Russia
- Japan
- Norway
- EU-27
- China
- UK
- World
- Mexico
- Brazil
- India
- Nigeria
- Bangladesh
- Ethiopia

Sources: United Nations, Global Footprint Network
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

- Vaccine nationalism
- Weakening of international institutions
- Uneven recovery between rich and poor economies
- Traditional economic stimulus taking priority in policy
- Solar capacity growth slowing
- Volatility in commodity prices
- Net zero ambitions by governments and companies
- Growing support for CCS and Hydrogen
- USA taking leadership on climate issues
Two scenarios that capture where the world could be heading...

Reform
- Economic growth prioritised
- Market and technology driven
- Current policy momentum

Rivalry
- Focus on energy security
- Geopolitical uncertainty and volatility
- Trade tensions and isolationism
... and a path to a sustainable future

Rebalance

- Immediate and coordinated international action
- Consistent with well below 2°C Paris agreement target
- UN sustainable development goals met
The energy world in 2050

1.8 – 1.9x
Size of the global economy compared to 2019

50 – 115 mbd
Global oil demand compared to 100 mbd in 2019

32 – 52%
Share of solar and wind in the global electricity generation mix, up from 7% in 2019

9 – 32 Gt
Global energy-related CO₂ emissions compared to 33 Gt in 2019

3,100 – 4,750 Bcm
Global gas demand compared to 3,900 Bcm in 2019

0.5 – 1.3 Billion
Electric light duty vehicles on the road, equivalent to 30% – 90% of the total fleet
Growing economies, massive improvement in energy efficiency

Only Rebalance delivers a sufficient energy transition and avoids energy addition

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**Global GDP**
Indexed to 100 in 2018, constant USD

200
180
160
140
120
100
80
2015 2020 2025 2030 2035 2040 2045 2050

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**World energy intensity development**
Index, 2000=100

120
100
80
60
40
20
0
2000 2010 2020 2030 2040 2050

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**Total primary energy demand**
Billion toe

2018
2050

16
12
8
4
0

Fossil fuel Other New renewables

Source: Equinor
Several pathways for energy-related CO₂ emissions

Reaching net zero in 30-50 years is a massive challenge and requires policies, behavioural changes, technology and investments.

Source: Equinor
Several pathways for energy-related CO₂ emissions

Reaching net zero in 30-50 years is a massive challenge and requires policies, behavioural changes, technology and investments.

Source: Equinor
What does it take to get to net zero by 2050?

IEA NZE scenario compared with Rebalance
Where are energy markets moving?

Electrification is the key element of the energy transition, and a major factor in efficiency improvements.
Transition moving too slowly in some sectors
No silver bullet; efficiency and electrification are the primary measures

Industrial demand
Billion toe

Buildings demand
Billion toe

Non-Energy demand
Billion toe

Source: IEA, Equinor
The impact of adding hydrogen to Rebalance

H₂ could be an important part of the transition to a net zero economy

Demand by sector

Supply of Hydrogen

Global CO₂ emissions and CCS

Source: Equinor
Wide outcome space for oil and gas demand

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

Oil demand and supply from existing fields

- **Demand range**
- **Cumulative supply gap >283 bn bbls**
- **Supply without new fields**

Gas demand and supply from existing fields

- **Demand range**
- **Cumulative supply gap >60 Tcm**
- **Supply without new fields**

Source: IEA, Equinor
What does the energy transition hold?

Continued growth and little change in fuel mix over preceding 30 years, then rapid change in Rebalance

Source: IEA, Equinor
What does the energy transition hold?

Continued growth and little change in fuel mix over preceding 30 years, then rapid change in Rebalance

Source: IEA, Equinor
Investments in the IEA’s Net Zero scenario
Gradually less investments in fossil fuels, massive growth elsewhere, with opportunities for incumbent players in oil and gas

Global average annual investments
Trillion USD (2019)

- **Fuels**
  - 2016-20
  - 2021-30
  - 2031-40
  - 2041-50

- **Electricity**
  - 2016-20
  - 2021-30
  - 2031-40
  - 2041-50

- **Infrastructure**
  - 2016-20
  - 2021-30
  - 2031-40
  - 2041-50

- **End-use**
  - 2016-20
  - 2021-30
  - 2031-40
  - 2041-50

Average annual investment needs
Billion USD (2019)

- **Oil**
- **Natural gas**
- **Coal**
- **Low-emission fuels**
- **Fossil fuels without CCUS**
- **Fossil fuels with CCUS**
- **Nuclear**
- **Renewables**
- **Battery storage**
- **Fossil fuels**
- **Electricity grids**
- **EV chargers**
- **Hydrogen infrastructure**
- **Direct air capture**
- **CO2 transport and storage**
- **Renewables**
- **Hydrogen**
- **Efficiency**
- **Electrification**
- **CCUS**

Source: International Energy Agency (2021), Net Zero by 2050, IEA