Energy Perspectives 2018
Long-term macro and market outlook

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Senior vice president and Chief economist
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Agenda

Our scenarios
Common beliefs
Results
Final messages
In which direction is the energy world moving?

Recent signposts show diverging paths, in terms of:

- Growth
- Efficiency
- Cooperation
- Technology
- Geopolitics
Scenarios capture different development paths

- **Renewal**
  - Policy driven
  - Global cooperation
  - Fast transition
  - 2°C target

- **Reform**
  - Current trends and policy direction
  - Market and Technology driven NDCs

- **Rivalry**
  - Geopolitical volatility
  - Boom and bust cycles
  - Destructive market rule
  - Lack of cooperation
What are common beliefs about the future?

- Global demand for energy dependent goods, services, and activities is growing
- The world is undergoing an energy transition
- Large investments needed in the energy system
How will economic growth and energy demand develop?

Energy efficiency drives a wedge between economic development and energy demand

Source: IEA (history), Equinor (projections)
Significant fuel mix changes in all scenarios

**World energy demand per fuel**

- **2015**: Ref (18 billion toe), Ren (-6%), Riv (+30%)
- **2050**: Ref (+25%), Ren, Riv

**Total final consumption per fuel**

- **2015**: Ref (+31%), Ren, Riv
- **2050**: Ref, Ren (-1%), Riv (+32%)

Source: IEA (history), Equinor (projections)
Growth in position of new renewables and electricity across all scenarios
Sufficient speed and scope only in Renewal – fossil fuels keep their share in Rivalry

Source: IEA (history), Equinor (projections)
Energy demand and CO₂ emissions develop very differently across scenarios
Demand declining in developed economies – decline in emissions in Renewal driven by energy efficiency and changing fuel mix

Source: IEA (history), Equinor (projections)
Will the energy transition affect CO₂ emissions?
Yes, but only Renewal shows a sustainable development – and there is an urgent need for action

World energy-related CO₂ emissions
Billion tons

CO₂ emission reductions 2015-2050 in Renewal

<table>
<thead>
<tr>
<th>Region</th>
<th>Reduction</th>
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<tbody>
<tr>
<td>EU</td>
<td>-80%</td>
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<tr>
<td>North America</td>
<td>-82%</td>
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<tr>
<td>China</td>
<td>-67%</td>
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<tr>
<td>India</td>
<td>-19%</td>
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Source: IEA (history), Equinor (projections)
Will the energy transition affect CO₂ emissions?

Yes, but only Renewal shows a sustainable development – and there is an urgent need for action

### World energy-related CO₂ emissions

- Billion tons

### Year 2050

<table>
<thead>
<tr>
<th></th>
<th>Renewal</th>
<th>No CCS</th>
<th>Delay 2025</th>
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</thead>
<tbody>
<tr>
<td>Net CO₂ emissions - Gt</td>
<td></td>
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<tr>
<td>Annual growth TPED 2025-50</td>
<td>-0.5%</td>
<td>-0.5%</td>
<td>-1.3%</td>
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<tr>
<td>Oil demand - mbd</td>
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<tr>
<td>Gas demand - bcm</td>
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<tr>
<td>Coal demand - mtoe</td>
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<tr>
<td>Solar/wind generation - TWh</td>
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<td>Solar/wind share</td>
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</tbody>
</table>

Source: IEA (history), Equinor (projections)
Strong electricity demand growth in all scenarios
Generation mix develops very differently; solar and wind growing strongly

Source: IEA (history), Equinor (projections)
Massive changes in road transport – efficiency and fuel mix
But less certain what is the alternative to oil in shipping and aviation

Source: IEA (history), Equinor (projections)
Transition moving slower in other sectors

No silver bullet, efficiency and electrification the primary measures

**Industrial demand TFC**

- 2015
- 2050
- Million toe

**Residential and commercial demand TFC**

- 2015
- 2050
- Million toe

**Non-energy demand TFC**

- 2015
- 2050
- Million toe

Source: IEA (history), Equinor (projections)
Growth or decline in oil and gas demand growth determined by scenario

Transport key sector for oil, and power for gas; non-energy demand important for both – growth irrespective of scenario

Source: IEA (history), Equinor (projections)
What is the need for new oil investments?
Large investments in all scenarios, although significantly less in Renewal.

Source: IEA and BP (history), Equinor (projections)
And what about new gas supply?
Large investments in all scenarios, although significantly less in Renewal
Enormous investments needed in solar, wind and batteries

Large investments to grow and maintain solar/wind capacity; battery market to expand by 10 to 35 times by 2030

Source: Various sources (history), Equinor (projections)
What does Energy Perspectives say about the common beliefs?

- It is not a given that global energy demand will continue to grow
- The energy transition is currently limited to two sectors and moves too slowly
- All scenarios call for large investments in new supply capacity in the energy system
Energy Perspectives 2018
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