IEA analysis for 2016 shows that global CO₂ emissions did not increase for the third consecutive year in a row, even though the global economy grew.
Coal-to-gas switching, alongside strong growth in low-carbon fuels & technologies, has been instrumental to the fall in emissions in the United States & China.
But this is not (yet) a story about oil

Global oil demand growth, year-on-year

Demand growth has decelerated since 2015, but lower prices have helped to keep year-on-year growth in consumption well above 1 mb/d
Air pollution is an energy problem

Pollutant emissions, 2015

- **Nitrogen oxides** ($\text{NO}_x$): 108 Mt
  - Oil: 61%
  - Coal: 3%
  - Gas: 4%
  - Bioenergy: 2%
  - Other: 3%

- **Sulfur dioxide** ($\text{SO}_2$): 81 Mt
  - Coal: 43%

- **Fine particulate matter** ($\text{PM}_{2.5}$): 41 Mt
  - Biomass: 43%

*Source: WEO Special Report: Energy and Air Pollution*

*Energy is the single most important cause of emissions of all the main pollutants*
Rising access, incomes & urbanisation mean that emerging economies, led by India, account for all of the growth in global energy demand growth to 2040
A new ‘fuel’ in pole position

Change in total primary energy demand

Low-carbon fuels & technologies, mostly renewables, supply nearly half of the increase in energy demand to 2040
China’s economic transition re-shapes global trends

**Change in total final energy consumption in China**

- **1990-2014**
  - Energy-intensive industry
  - Light industry
  - Services
  - Residential
  - Transport
  - Other

- **2014-2040**
  - Energy-intensive industry
  - Light industry
  - Services
  - Residential
  - Transport
  - Other

*China’s energy-intensive industries are no longer the spur for future growth; the resulting fall in coal demand makes way for a strong rise in electricity & gas use*
Renewables are increasingly competitive in all markets

Levelised cost of electricity by selected technologies, 2040

Falling costs and rising electricity prices lead more renewables to be competitive; by 2040, nearly half of wind and solar PV do not require any subsidies
In 2Q17, if OPEC’s crude oil production level of 31.8 mb/d is maintained & nothing changes elsewhere in the balance, there is an implied stock draw of 0.7 mb/d
But things are changing elsewhere, notably in the US shale sector where, as of May, the rig count had doubled from a year earlier.
Approvals of new conventional crude oil projects in 2015-2016 have fallen to the lowest level since the 1950s.

If approvals remains low in 2017, an unprecedented effort will be needed to avoid a supply-demand gap in a few years’ time.

US tight oil provides a potential lifeline, but cannot be relied upon to cover a major shortfall in the ‘baseload’ of oil supply.

Without a pick-up in investment, or a rapid slowdown in demand growth, the stage is set for the next boom-and-bust cycle for oil.

Entering a period of greater oil market volatility
No peak yet in sight, but a slowdown in growth for oil demand

Change in oil demand by sector, 2015-2040

The global car fleet doubles, but efficiency gains, biofuels & electric cars reduce oil demand for passenger cars; growth elsewhere pushes total demand higher
A wave of LNG spurs a second natural gas revolution

Share of LNG in global long-distance gas trade

<table>
<thead>
<tr>
<th>Year</th>
<th>LNG</th>
<th>Pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>525 bcm (26%)</td>
<td>525 bcm (74%)</td>
</tr>
<tr>
<td>2014</td>
<td>685 bcm (42%)</td>
<td>685 bcm (58%)</td>
</tr>
<tr>
<td>2040</td>
<td>1 150 bcm (53%)</td>
<td>1 150 bcm (47%)</td>
</tr>
</tbody>
</table>

Contractual terms and pricing arrangements are all being tested as new LNG from Australia, the US & others collides into an already well-supplied market.
Current pledges fall well short of limiting the temperature increase to below 2 °C
Global oil demand in 2 °C scenario & decline in current supply sources

Production from today's fields declines much faster than the fall in oil demand in a 2 degree scenario, leaving a gap that needs to be filled with new investments.
Conclusions

- Energy security remains a major concern; potential vulnerabilities are growing, so too is the range of tools available to address them.

- New oil market dynamics & subdued conventional upstream investment are ushering in a period of greater market volatility.

- A wave of LNG is the catalyst for a second natural gas revolution, with far-reaching implications for gas pricing & contracts.

- The next chapter in the rise of renewables requires policies to push their role in heat & transport & changes in power market design.

- There is no single story about the future of energy: reaching energy & environmental goals depends on government policy actions.