International Energy Agency
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Seventh IEA-IEF-OPEC Symposium on Energy Outlooks

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The global energy context today

World Energy Outlook 2016

- **Key points of orientation:**
  - *Middle East share in global oil production in 2016 at highest level for 40 years*
  - *Transformation in gas markets deepening with a 30% rise in LNG*
  - *Additions of renewable capacity in the power sector higher in 2015 than coal, gas, oil and nuclear combined*
  - *Energy sector in the spotlight as the Paris Agreement enters into force*
  - *Billions remain without basic energy services*
- **There is no single story about the future of global energy; policies will determine where we go from here**

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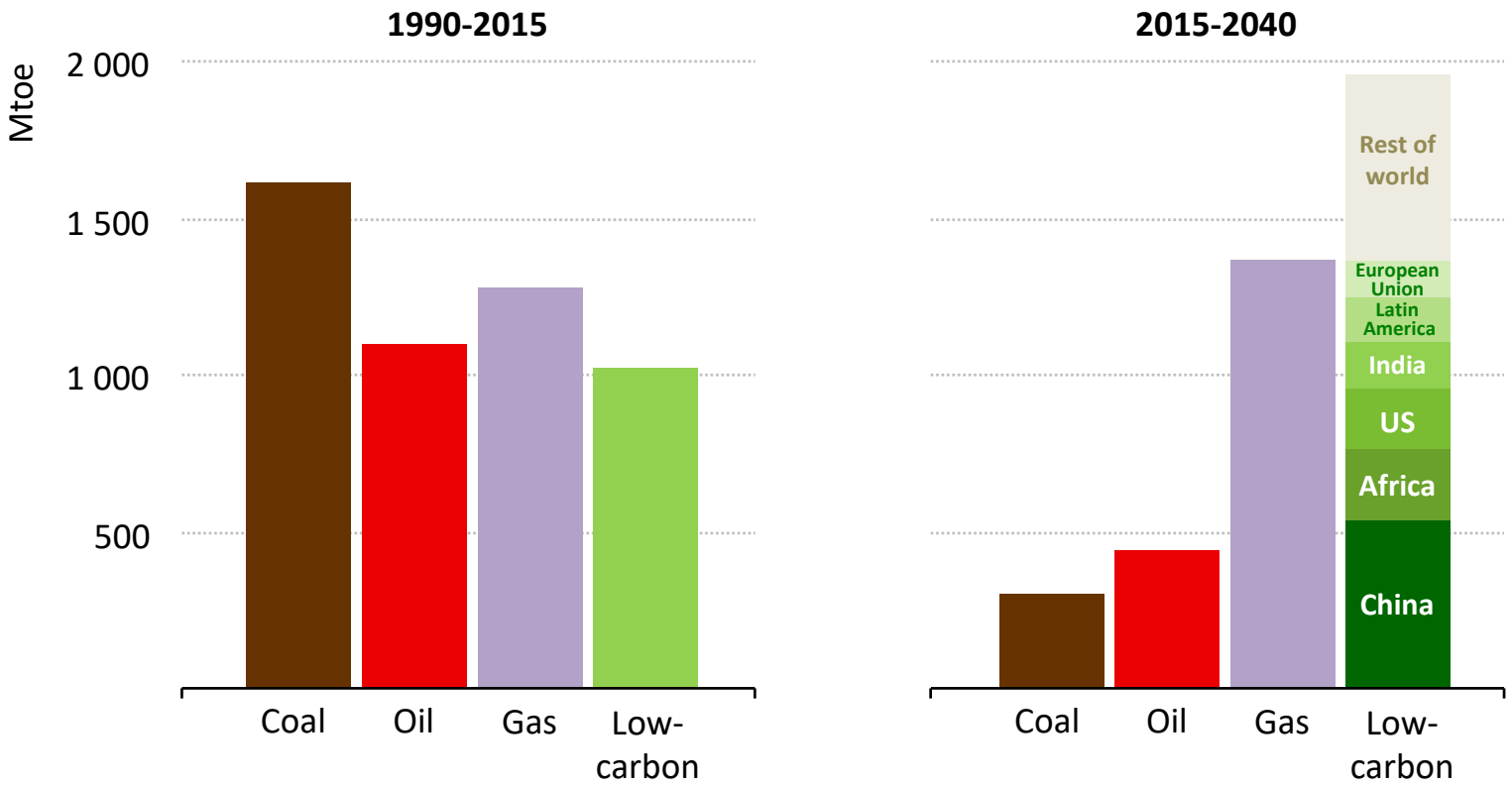
A new ‘fuel’ in pole position

World Energy Outlook 2016

Change in total primary energy demand



Low-carbon fuels & technologies, mostly renewables, supply nearly half of the increase in energy demand to 2040

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No peak yet in sight, but a slowdown in growth for oil demand

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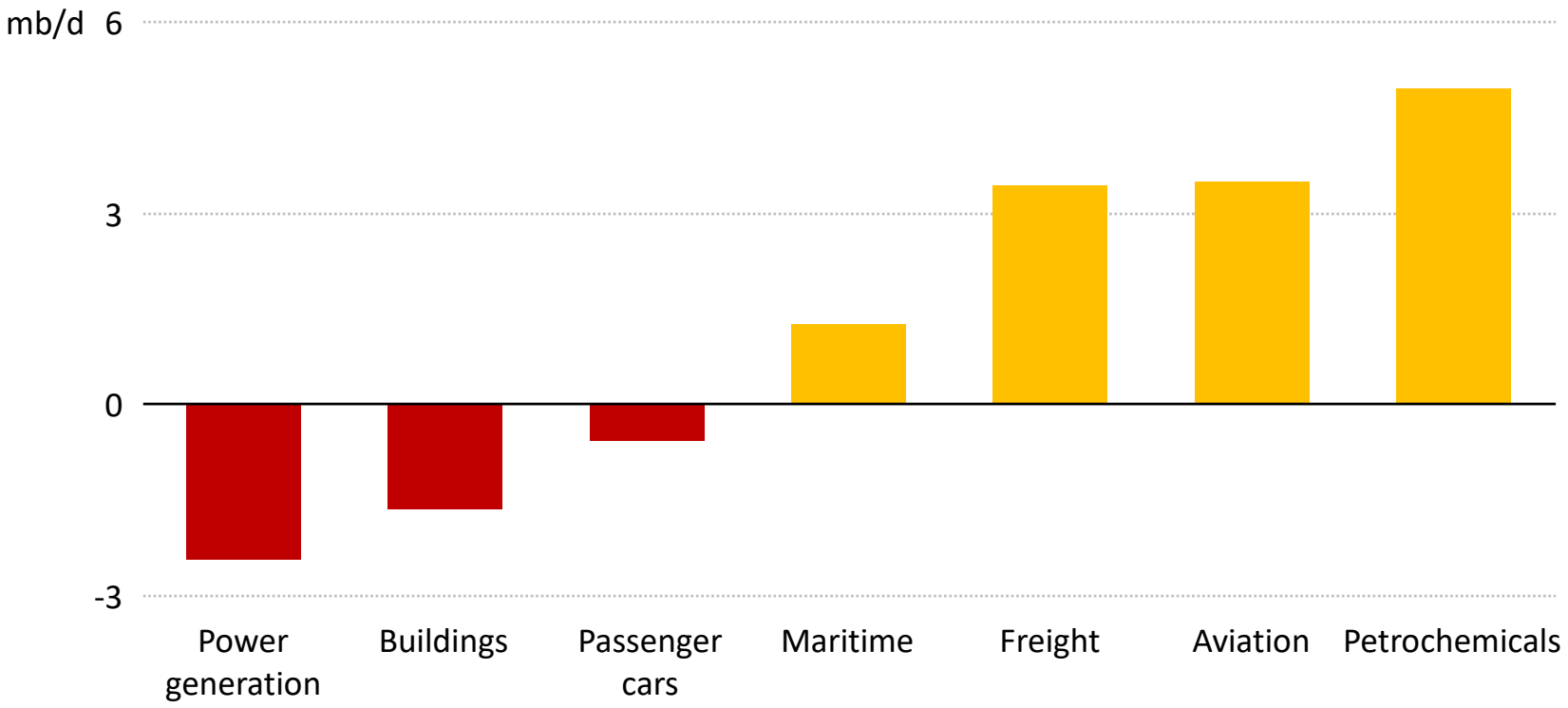
Change in oil demand by sector, 2015-2040



The global car fleet doubles, but efficiency gains, biofuels & electric cars reduce oil demand for passenger cars; growth elsewhere pushes total demand higher

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Entering a period of greater oil market volatility

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- 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
- All eyes are on US tight oil; cost reductions & a short investment cycle mean a quick response to short-term price signals
- But tight oil cannot be relied upon to cover a major medium-term shortfall in the 'baseload' of oil supply

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The need for new investment

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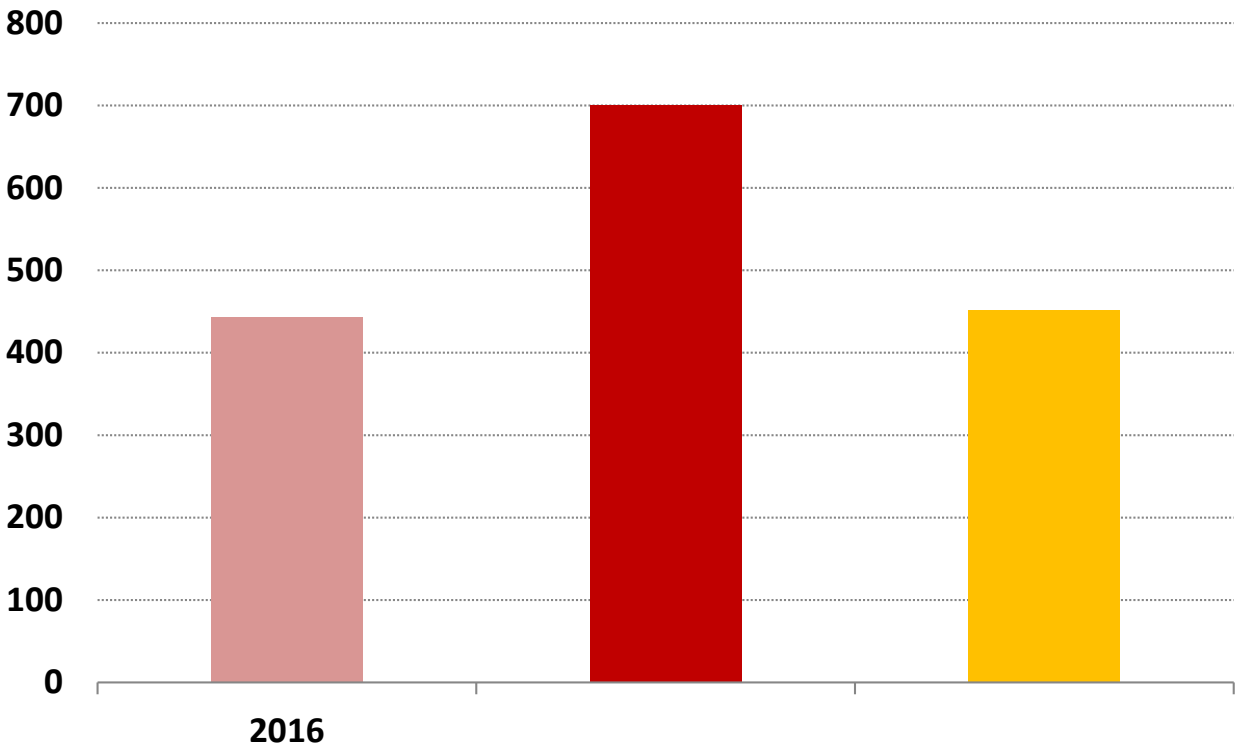
Average annual oil and gas upstream investment 2017-2040, by scenario



Upstream oil & gas investment remains significant even in a decarbonisation scenario to 2040, to compensate for major declines in output from existing fields

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A wave of LNG spurs a second natural gas revolution

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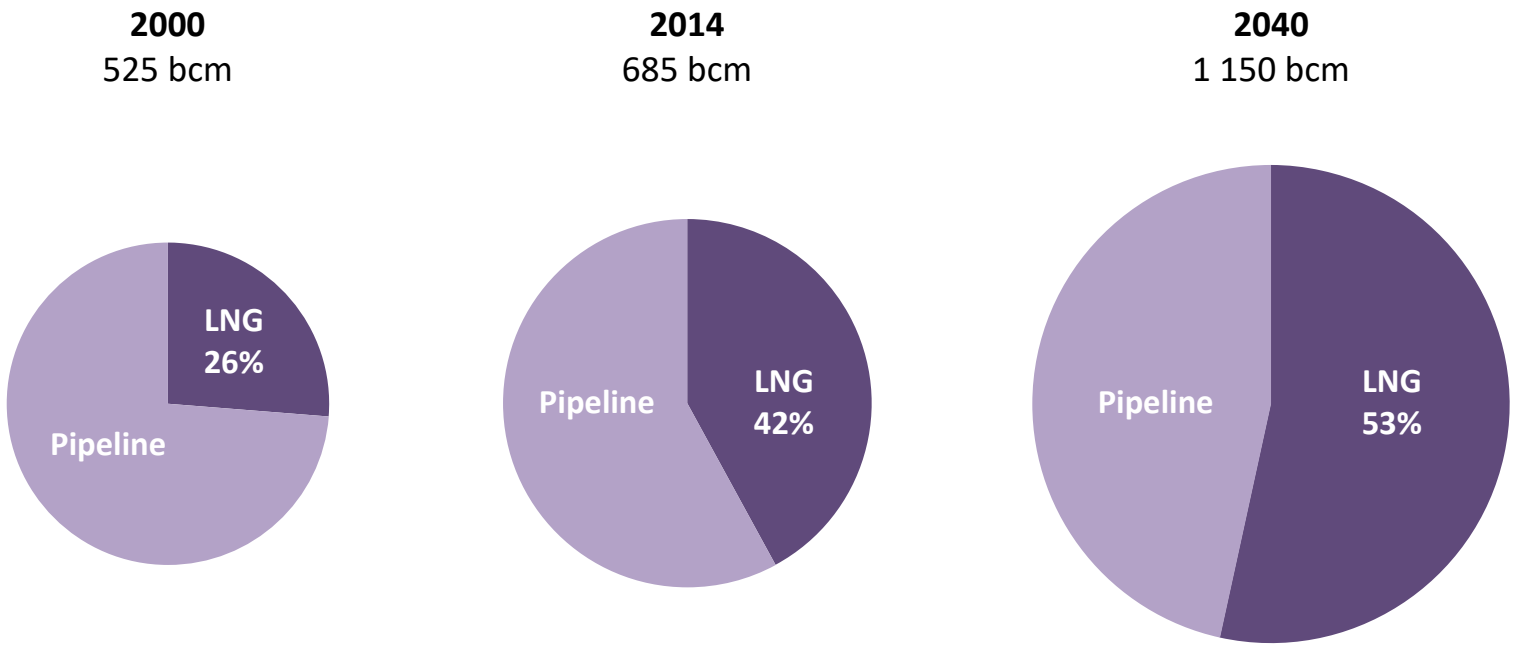
Share of LNG in global long-distance gas trade



Contractual terms and pricing arrangements are all being tested as new LNG from Australia, the US & others collides into an already well-supplied market

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Every silver lining has a cloud

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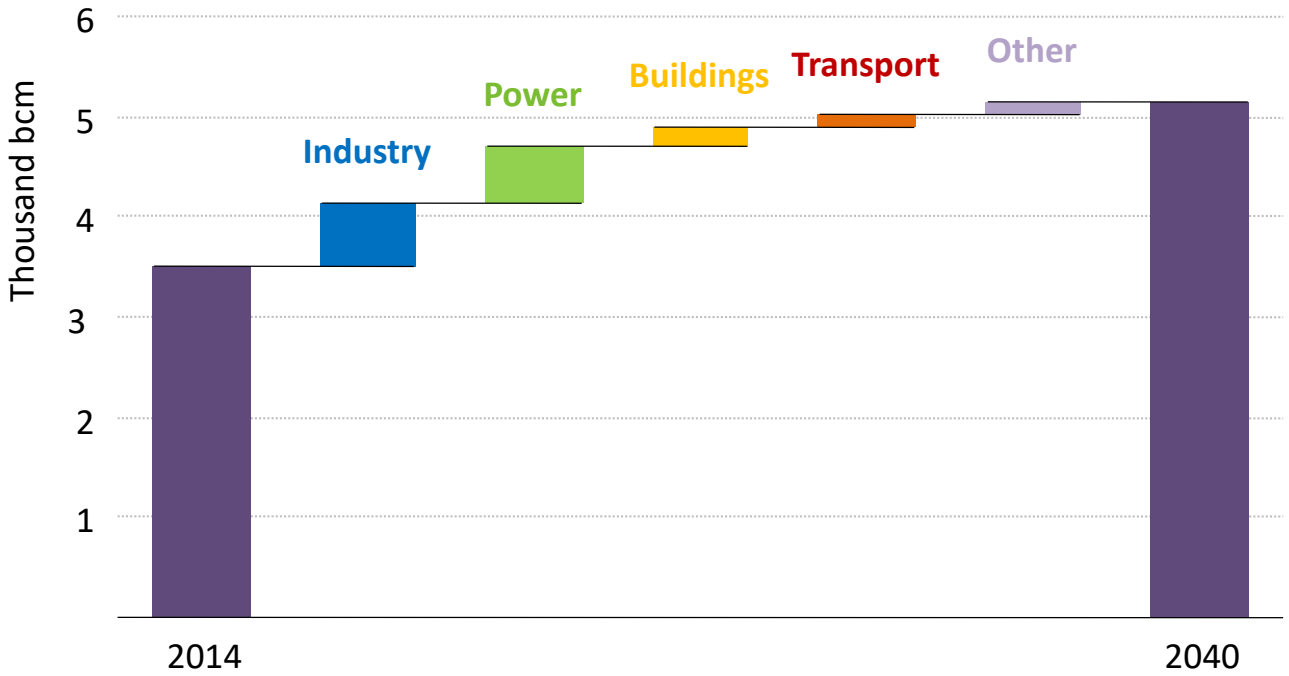
World gas demand growth by sector in the New Policies Scenario



Power generation and industry hold the key to global gas demand growth; but competition from coal and renewables is strong

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Renewables are increasingly competitive in all markets

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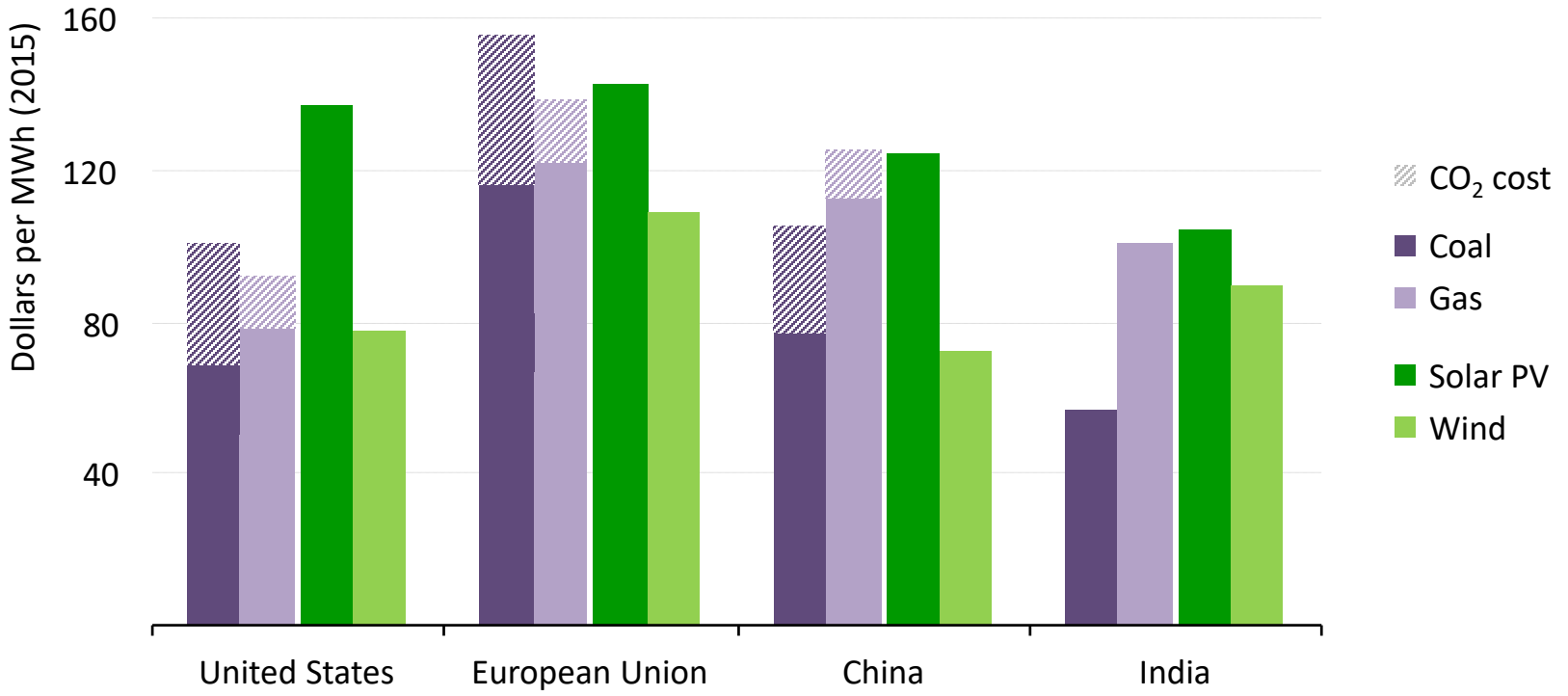
Levelised cost of electricity by selected technologies, 2040



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

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The vital role of energy efficiency

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- Energy efficiency is the one energy resource all countries possess in abundance, and is an essential part of delivering all energy goals.
- Global efficiency gains are accelerating, even in the low price environment.
- 2015 saw global investment in energy efficiency grow 6% to $221 billion.
- Energy efficiency is now at a scale to influence global energy markets.
- Strong government policies are essential to deliver the energy efficiency improvements the world requires.
- Countries can learn from each other on energy efficiency. The IEA will continue to lead global analysis and knowledge exchange.

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Energy intensity is improving but not fast enough

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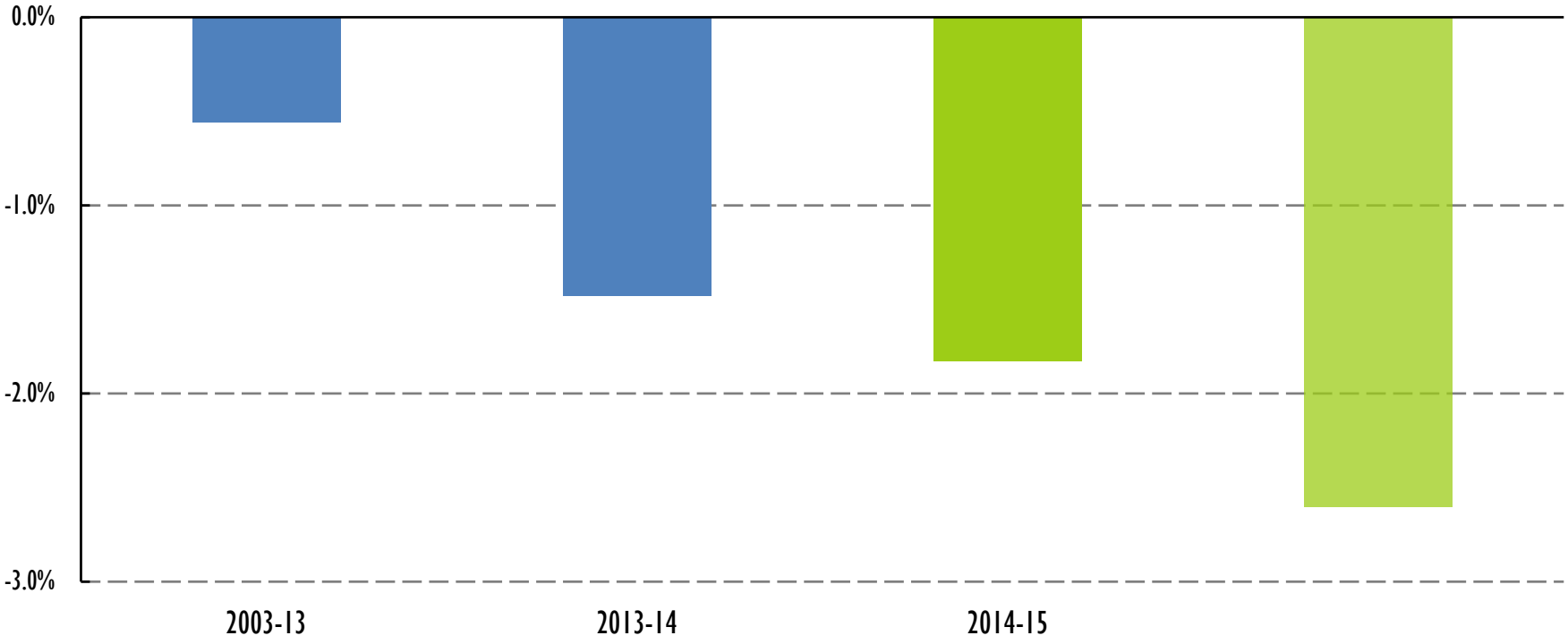
Global annual energy intensity gains



In 2015, global intensity improved by three times the average of the last decade, despite a low price environment. Intensity gains need to increase to 2.6% to achieve our climate goals.

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Efficiency gains have been driven by the expansion of policy

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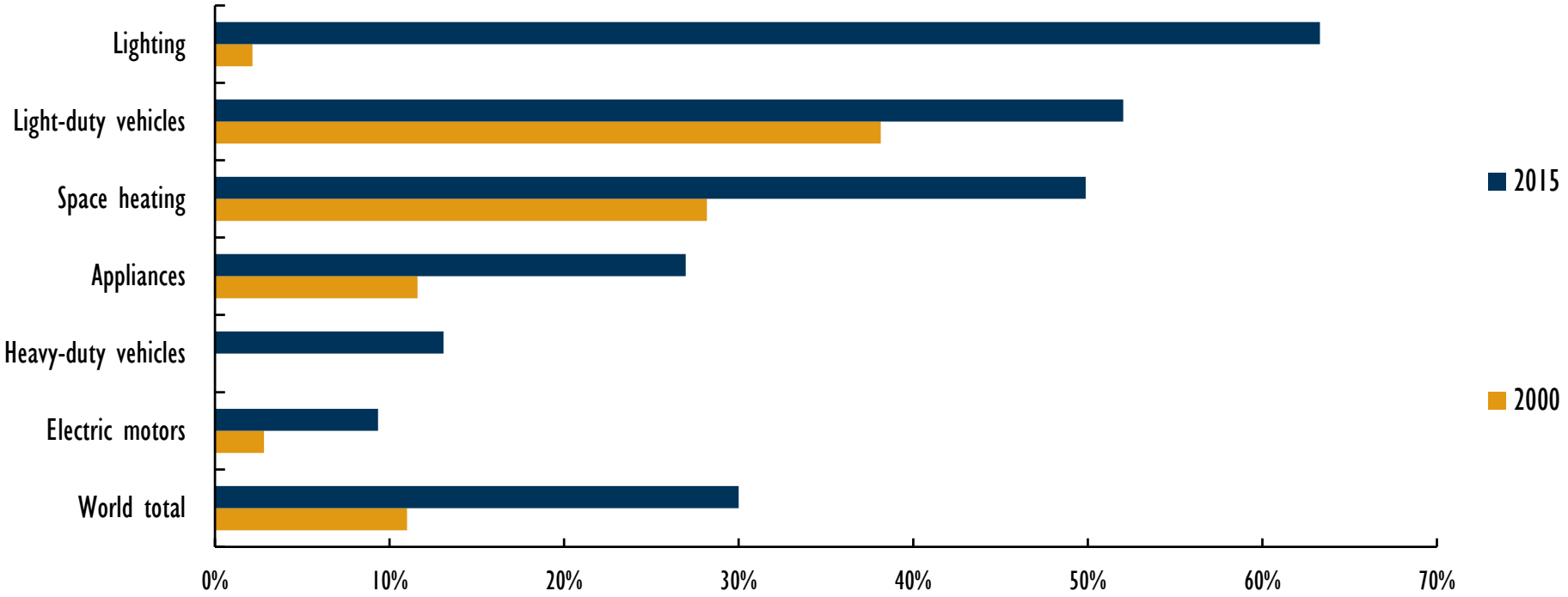
Share of global energy use covered by mandatory standards and regulations



30% of the world's energy consumption is now covered by mandatory standards and regulations, up from 11% in 2000.

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Decoupling growth in the economy, energy & emissions

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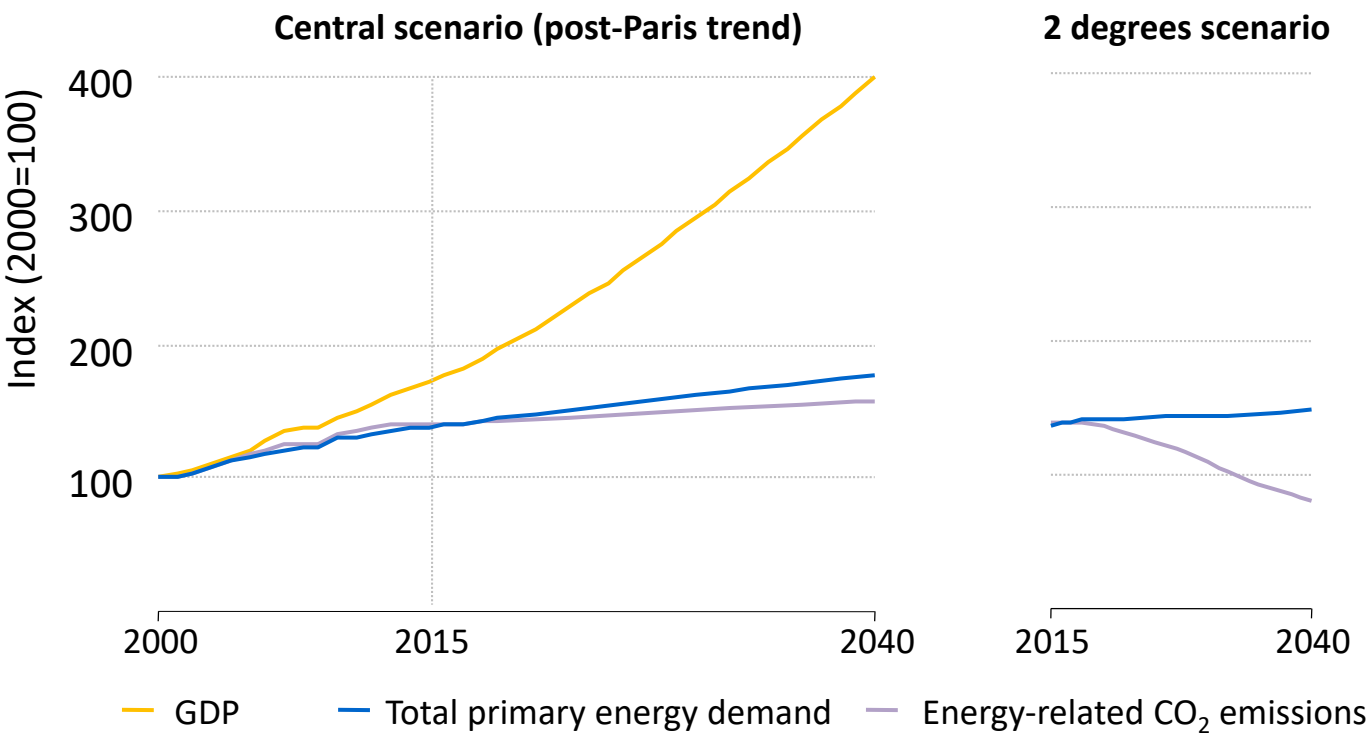
GDP, energy demand & energy-related CO_2 emissions



The decoupling of growth in GDP, energy demand & emissions is limited in the Central Scenario, but needs to be much stronger to meet climate objectives

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Conclusions

World Energy Outlook 2016

- Changing oil market dynamics & subdued upstream investment are ushering in a period of greater market volatility
- Continued investment in oil & gas remains an important component of a smooth, least-cost energy transition
- A wave of LNG is the catalyst for a second natural gas revolution, with far-reaching implications for gas pricing & contracts
- Falling costs and rising electricity prices lead more renewables to be competitive
- Energy efficiency is now at a scale to influence global energy markets

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