World Energy Investment 2017

Economics and Investment Office

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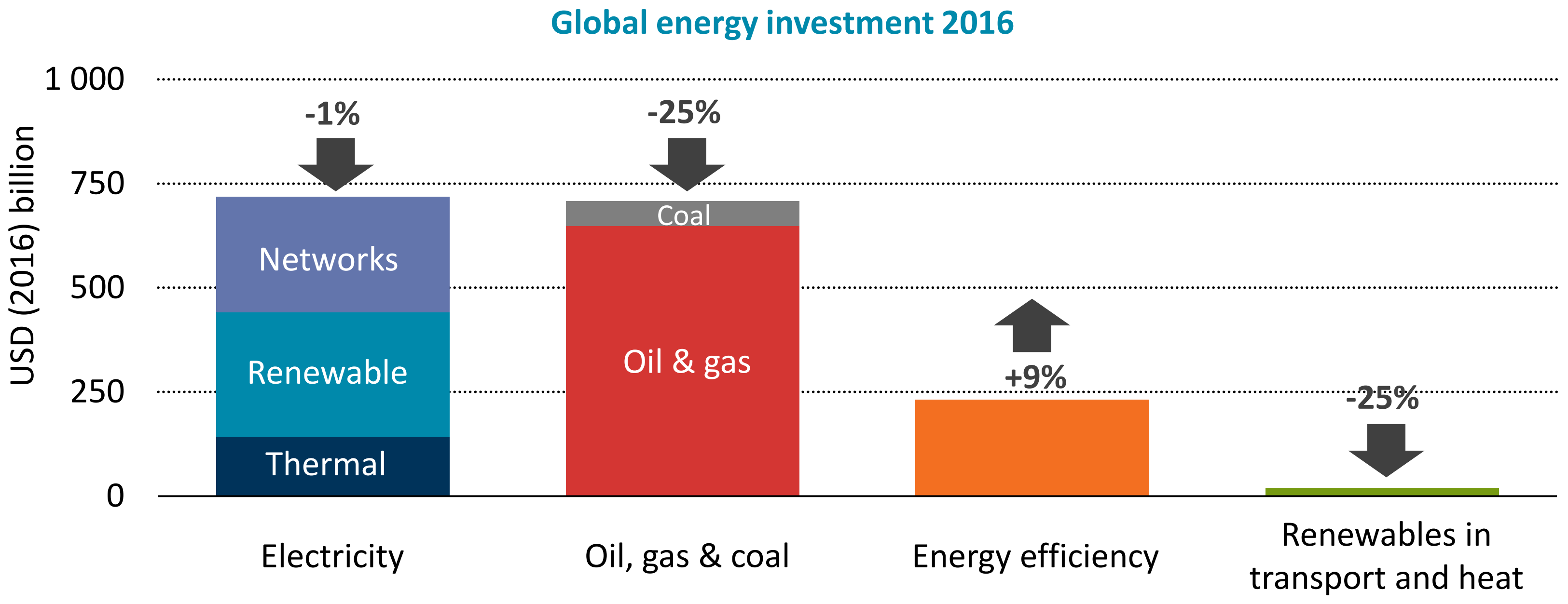
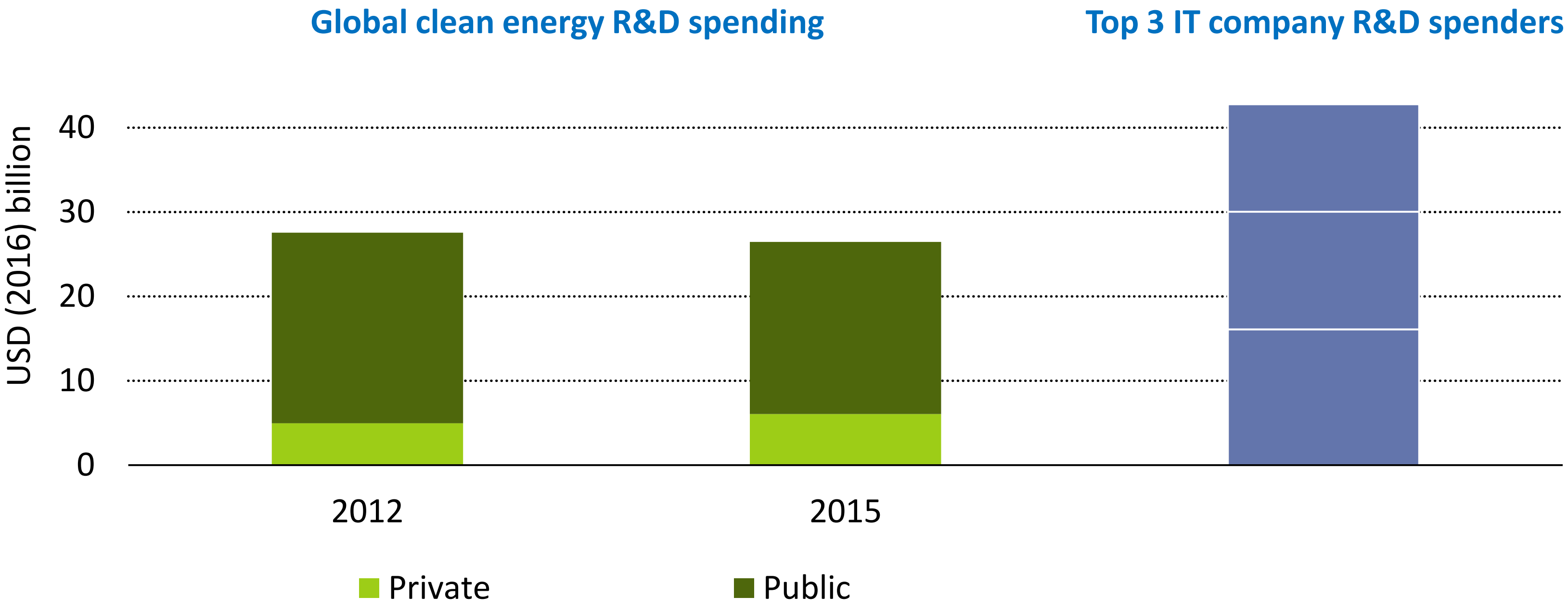
IEA

Global energy investment fell 12% in 2016, a second consecutive year of decline



Electricity sector investment overtook oil and gas for the first time

Global clean energy R&D funding needs a strong boost

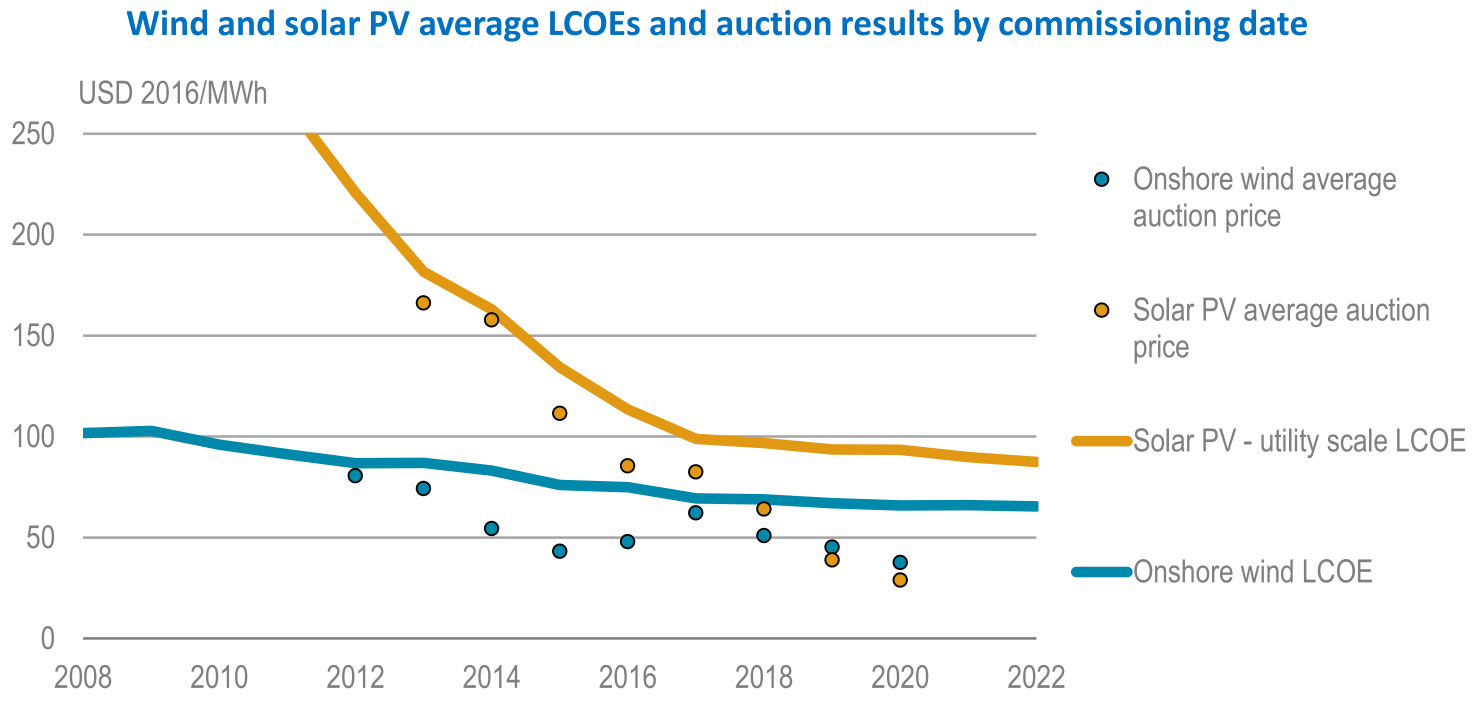


Global R&D spending on clean energy plateaued at $26 billion/year, with much room for growth from the private sector. As a share of GDP, China's leads spending on energy R&D, after overtaking Japan

Appliance standards lock in electricity end use efficiency

Electricity demand shows similar stagnation in the US and Europe despite very different end user prices

Wind and solar costs continue to plummet

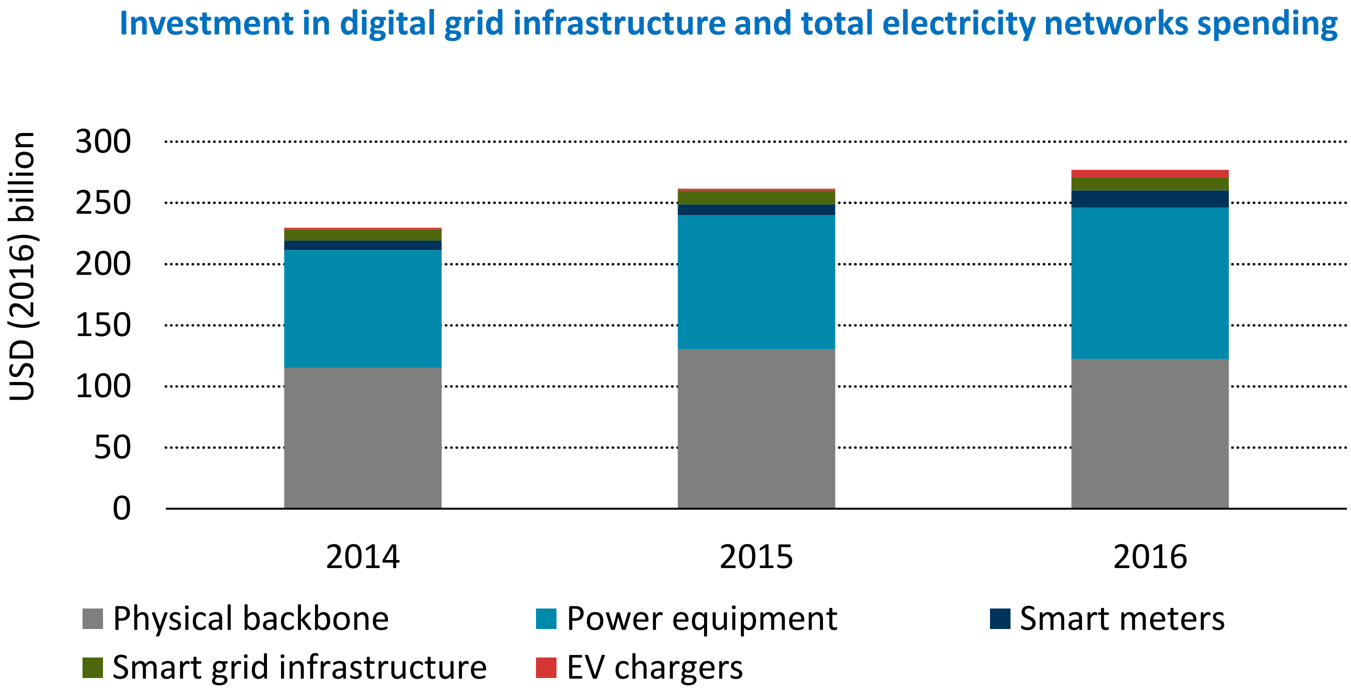


Competitive auctions combine technology incentives with ultra low cost of capital

The so called “decentralised” renewables

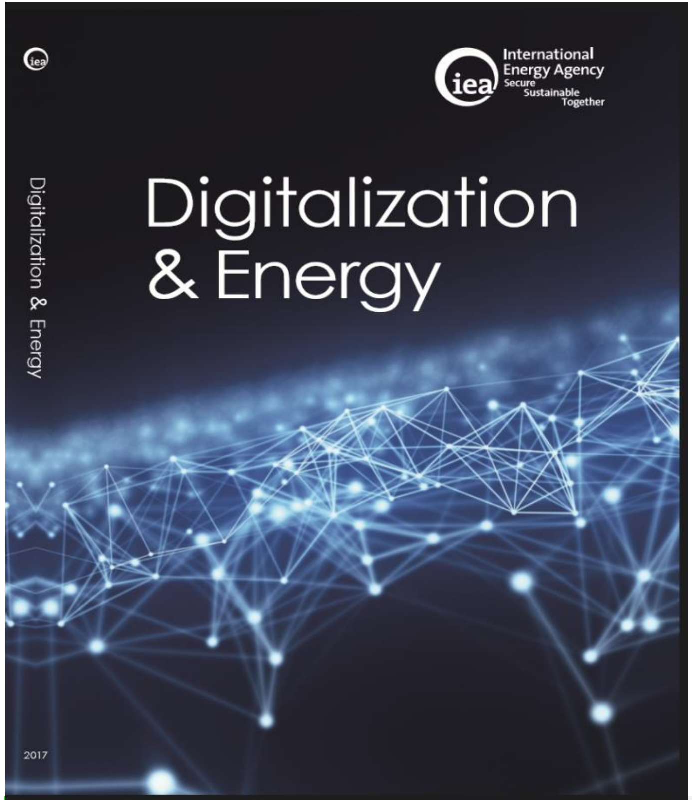
All of wind and the large majority of solar deployment relies on an interconnected network

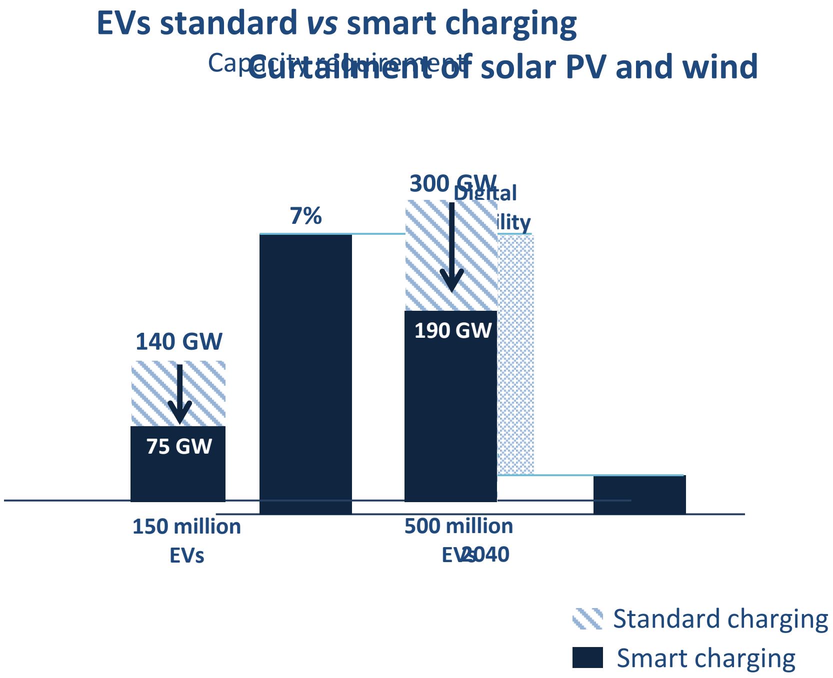
Smarter networks are the key to address flexibility gaps



Networks spending is dominated by lines and power equipment, but digital grid infrastructure now accounts for over 10% of networks investment.

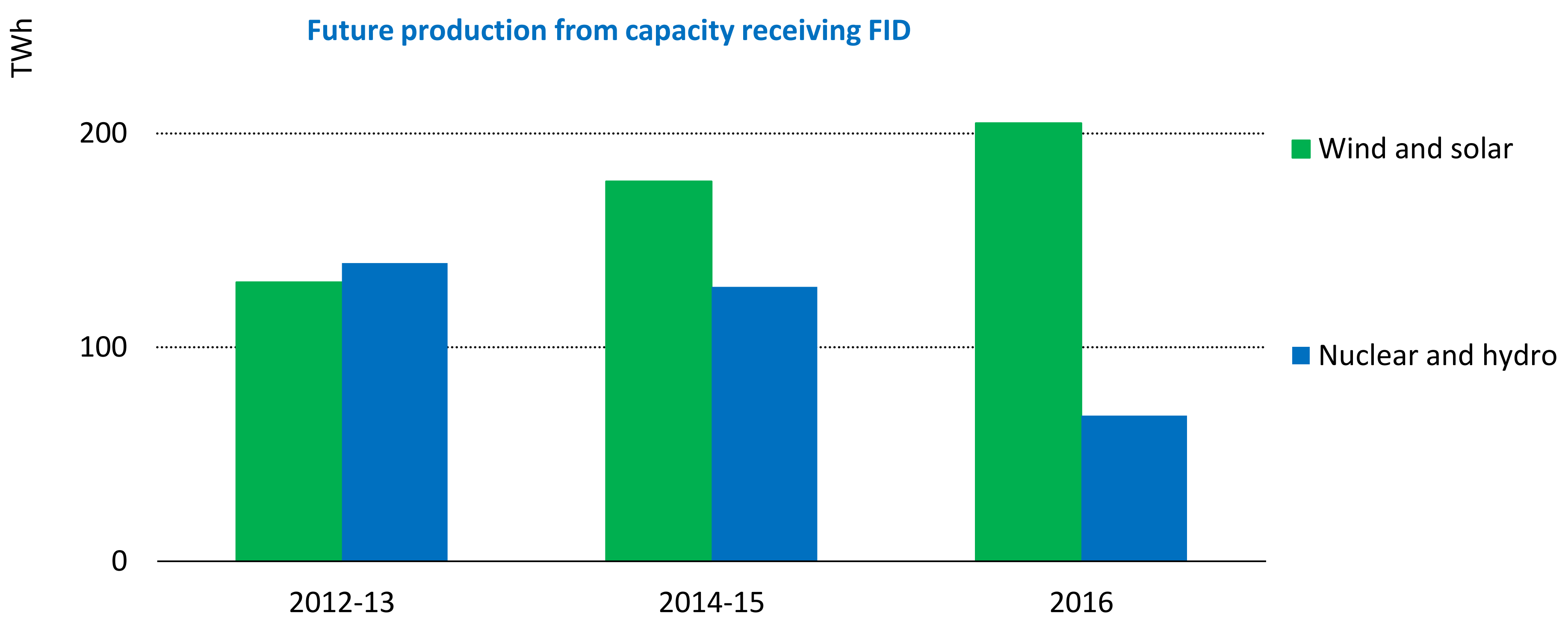
Digitalization, decarbonisation and electrification





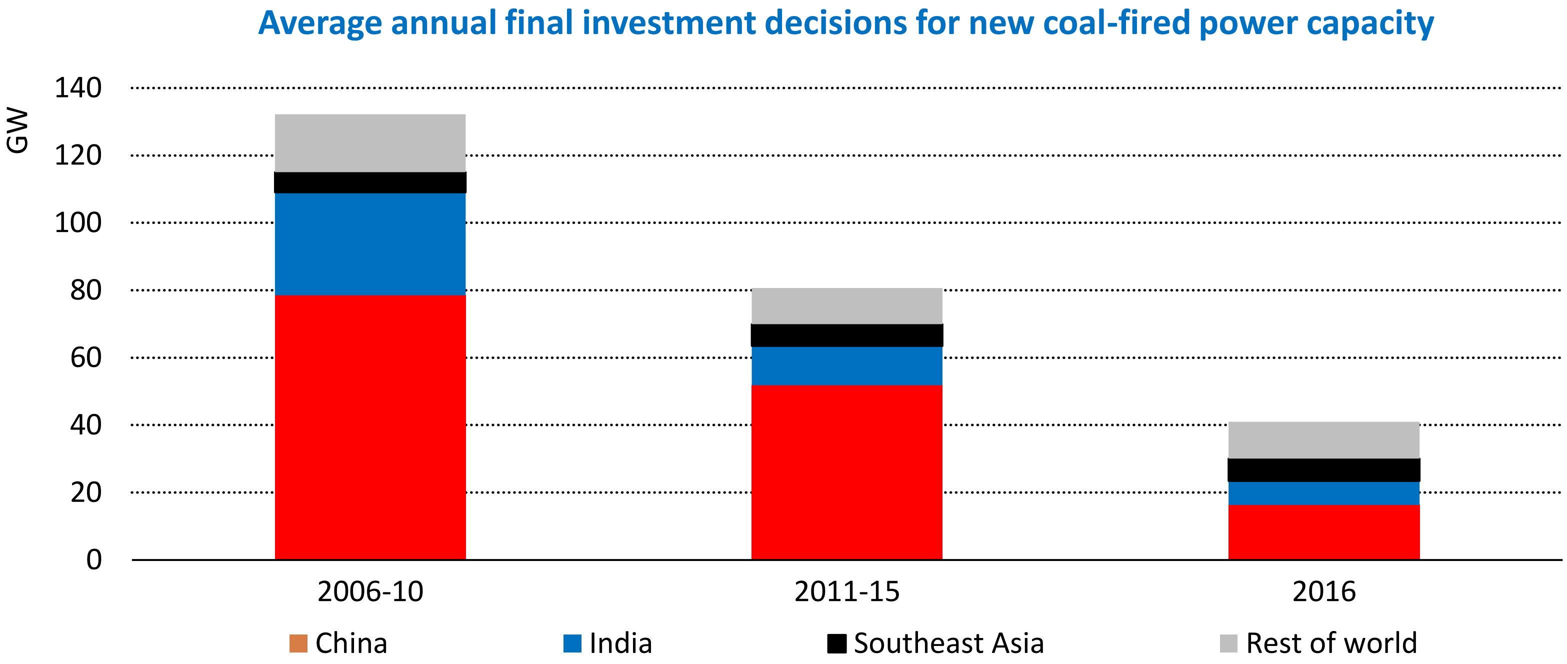
Digitalization unlocks flexibility to facilitate renewable integration and turn EVs into flexible grid assets

The headwind of the hydro and nuclear slowdown



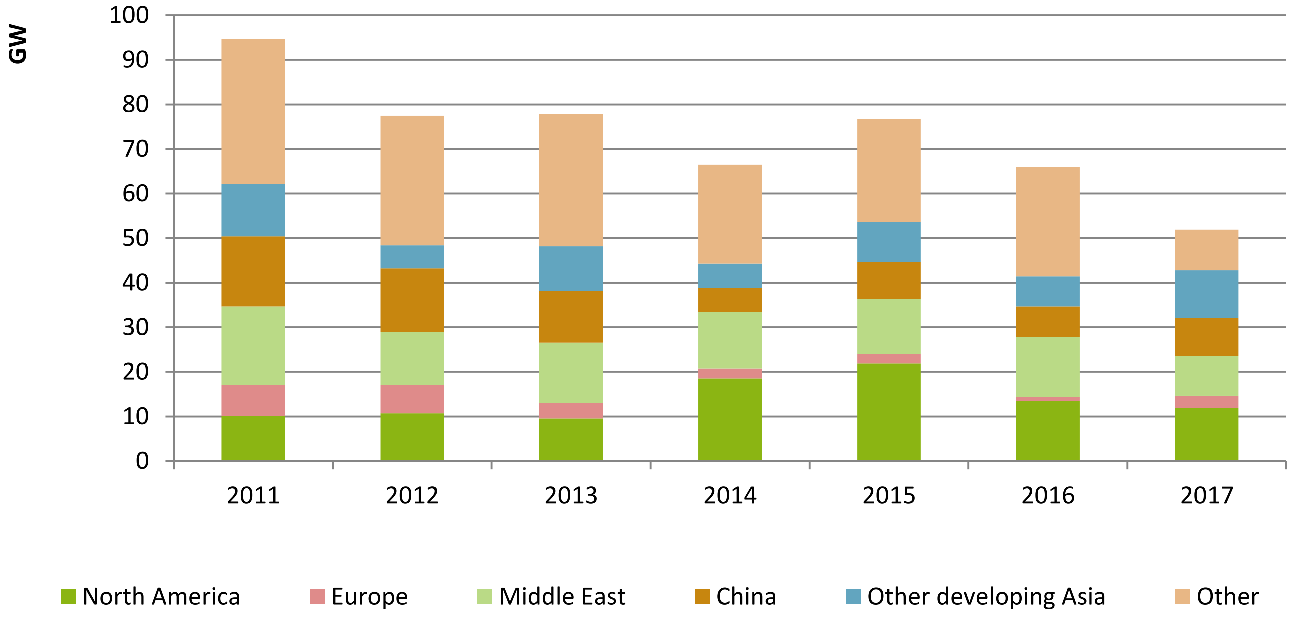
New low carbon investment covers only around half of the global electricity demand increase

A wave of coal power investment is coming to a pause



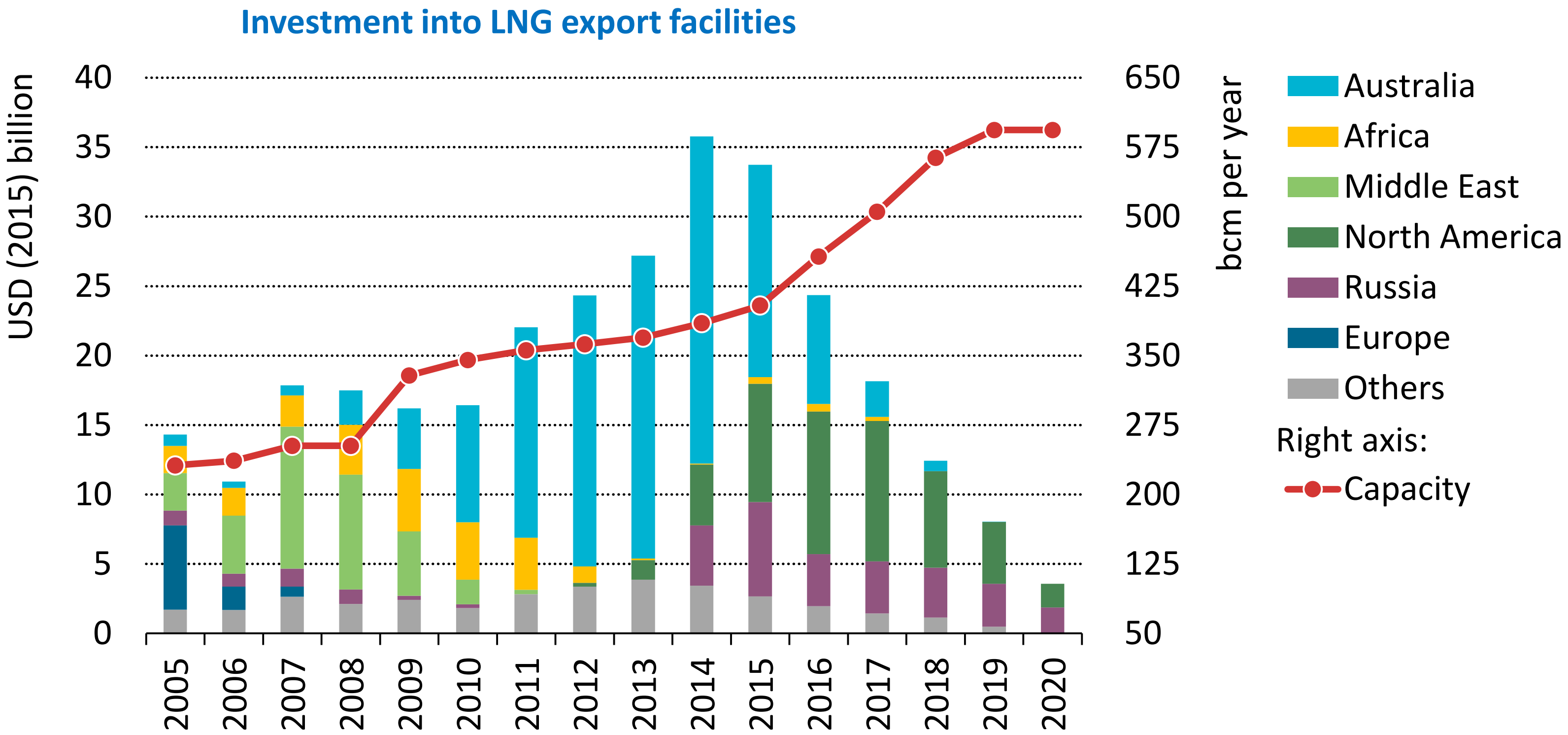
In 2016 the sanctioning of new coal power fell to the lowest level in nearly 15 years, hampered by competition from renewables and environmental challenges. Gas power FIDs surpassed coal for only the second time in the past decade.

Gas turbine orders the lowest since the financial crisis – but this time with a booming global economy



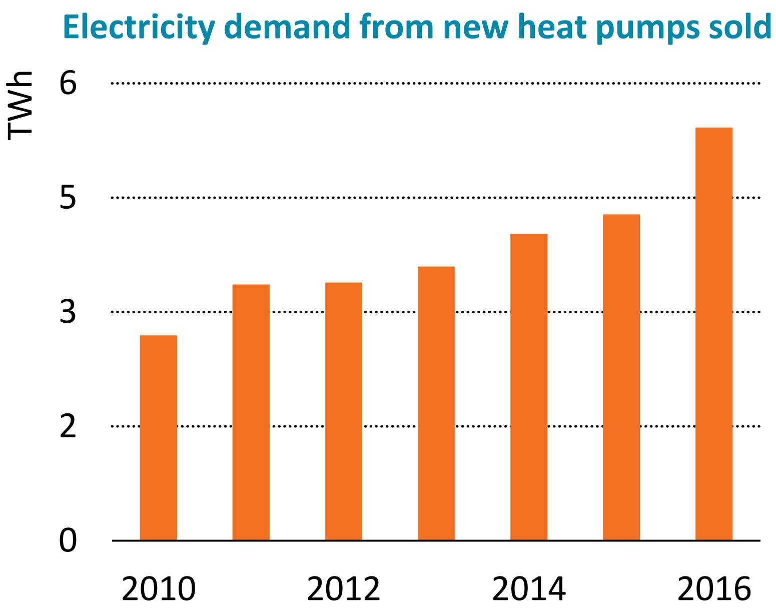
Weak electricity demand, competition from renewables and inadequate electricity market design weights on gas plant investment.

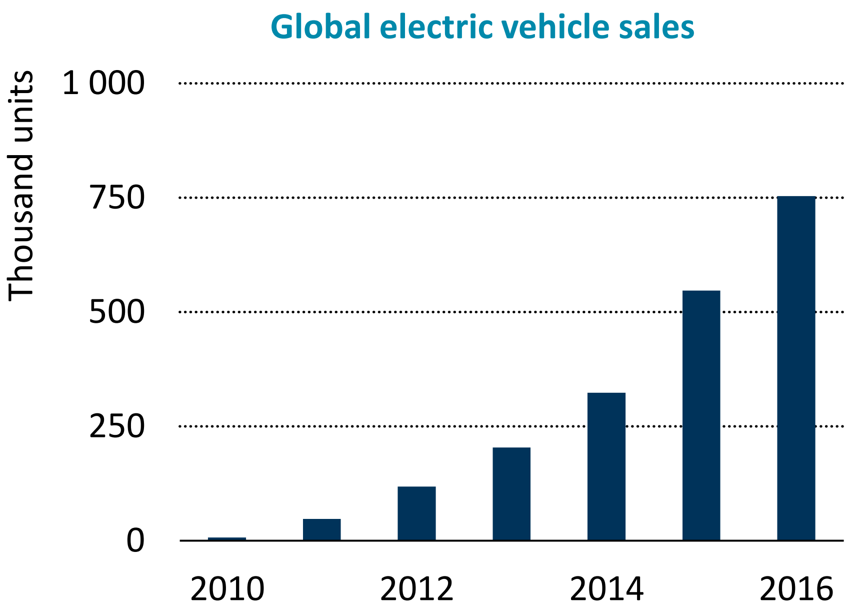
LNG investment: past the peak?



Lack of FIDs since 2015 indicate a rapid decline of investment

Electrification of transport and heat is progressing



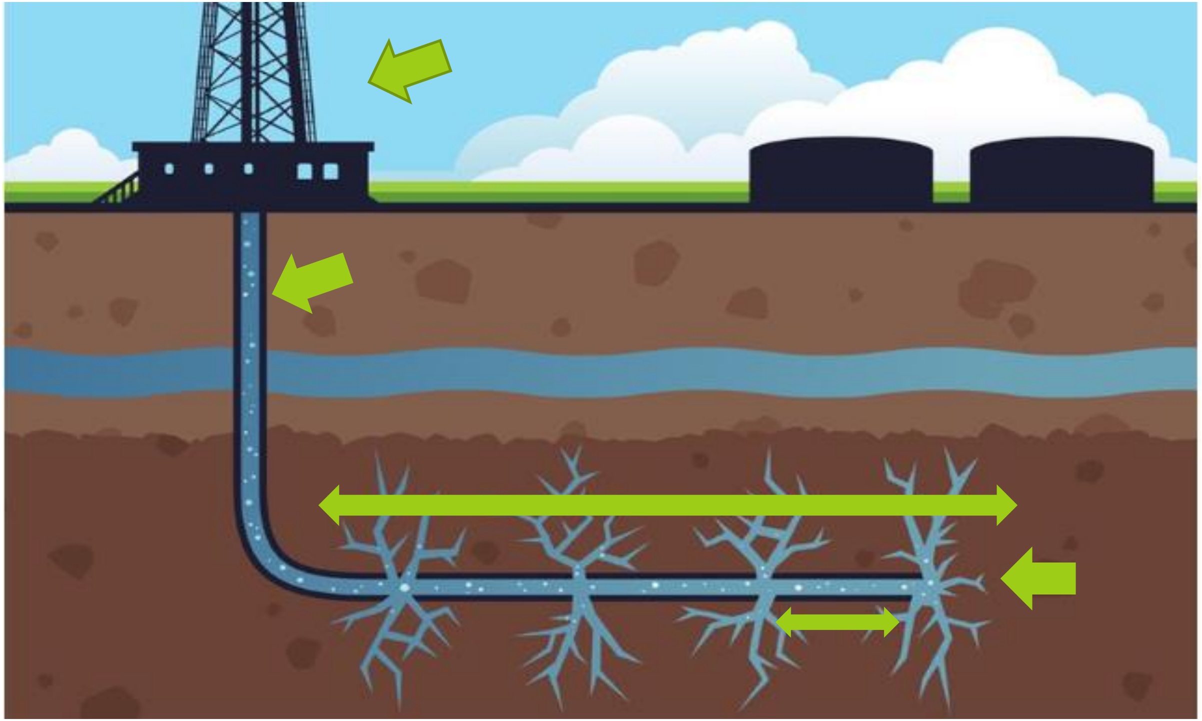


Electric vehicle (EV) sales grew 38% in 2016 and, at $6 billion, now represent 10% of all transport efficiency spending. Another $6 billion was spent globally on EV charging stations.

Cheap oil shifts consumer preferences towards big cars

The three best selling vehicles in North America

North American shale: a digitalization and technology success



3D seismic data for geologic modelling

Multi-well pad drilling

Walking rig

New chemical agents to reduce the use of sand

Longer lateral

Tighter spacing

Fracture design and evaluation software

Improved robotics

Sources: original image from the Texas Tribune

Russia: drivers of investment resilience

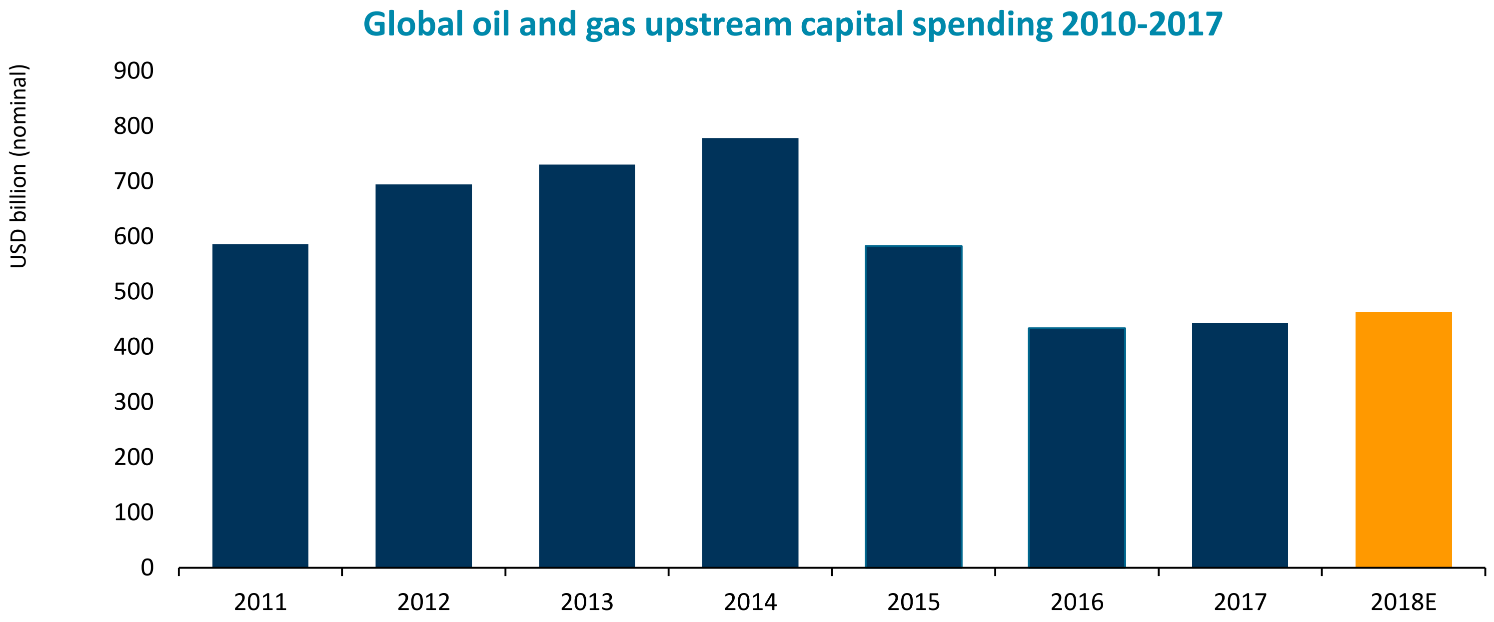
West Siberia brownfield: domestic service capabilities, costs are in rouble

Power of Siberia: Strong project management expertise with pipelines, Made in Russia components

Yamal LNG: Chinese equity and project finance, EU and Japanese technology providers

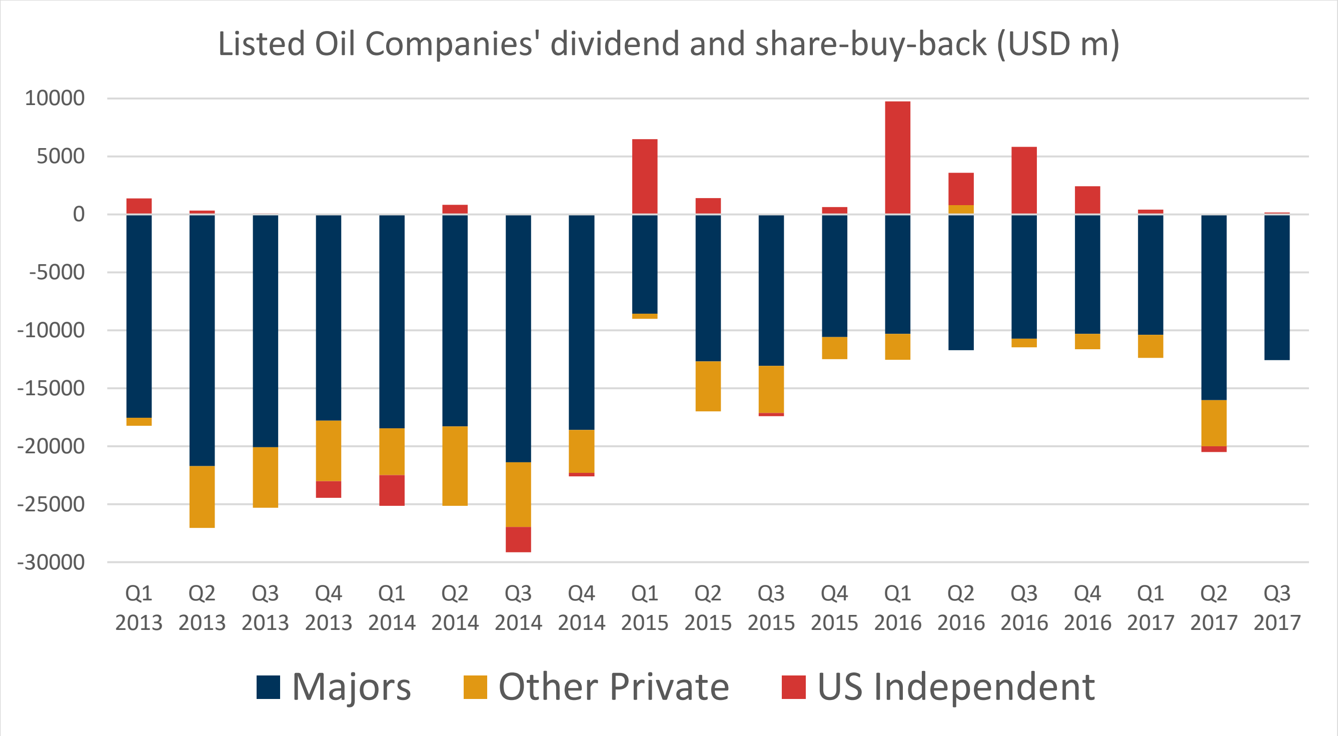
Russian oil production stabilized at a level 0.6 mB/day higher than 2014 expectations

Upstream investment stabilizes at half the peak



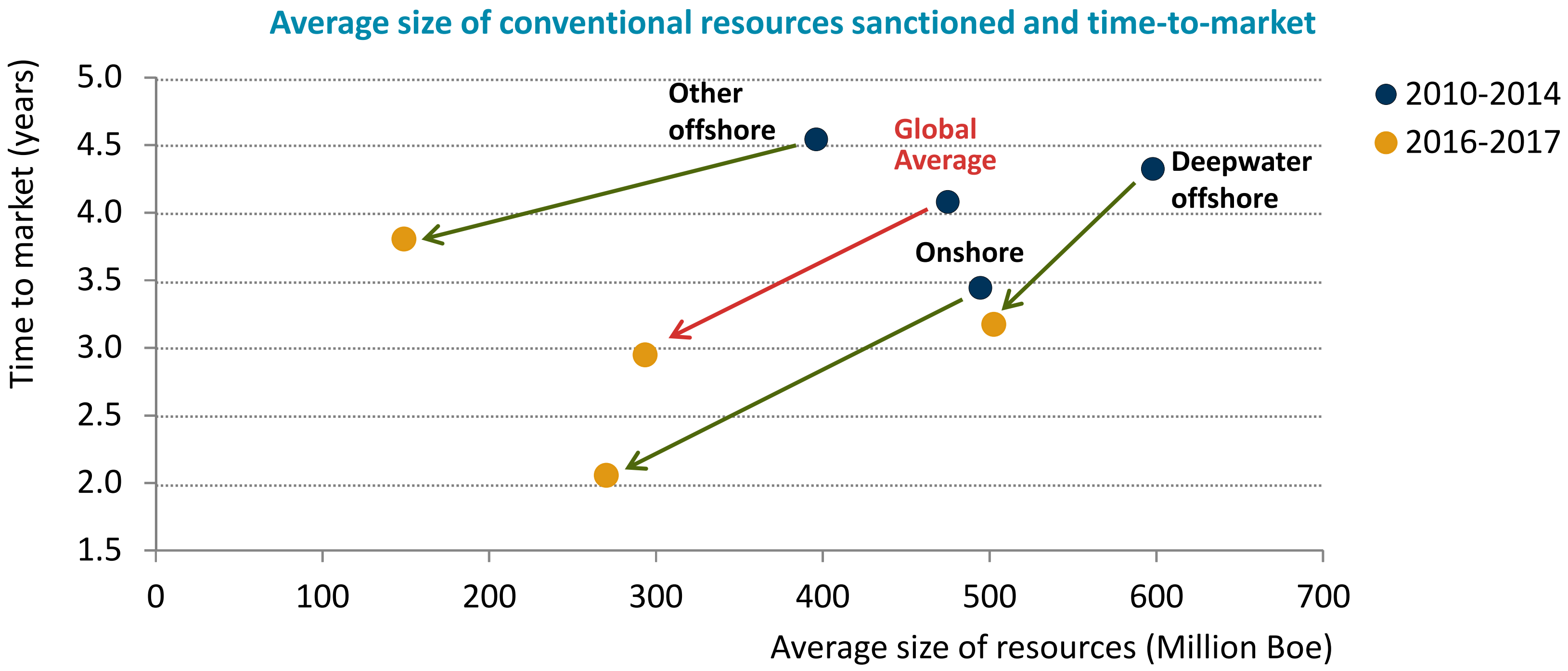
A two speed recovery unfolded driven by shale and from 2017 deep offshore

Oil and gas industry returns capital to equity markets



US independents rely on equity funding, but have a hedged, short cycle business model with very low stranded asset risk

Conventional oil and gas projects becoming faster and smaller



A shift in company strategies and technology developments leads to shorter project cycles across all the oil and gas industry

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