



# World Energy Investment 2018

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17 July 2018

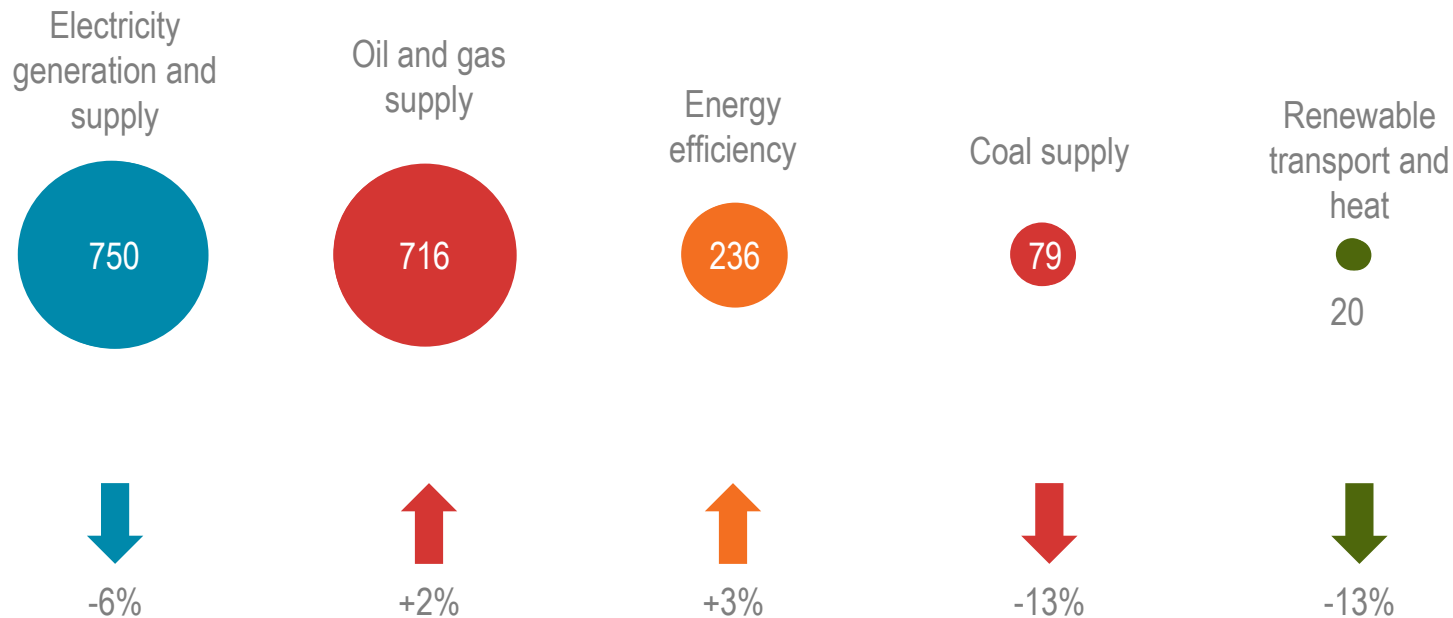
Economics and Investment Office, International Energy Agency



# Global energy investment was USD 1.8 trillion in 2017, led by electricity



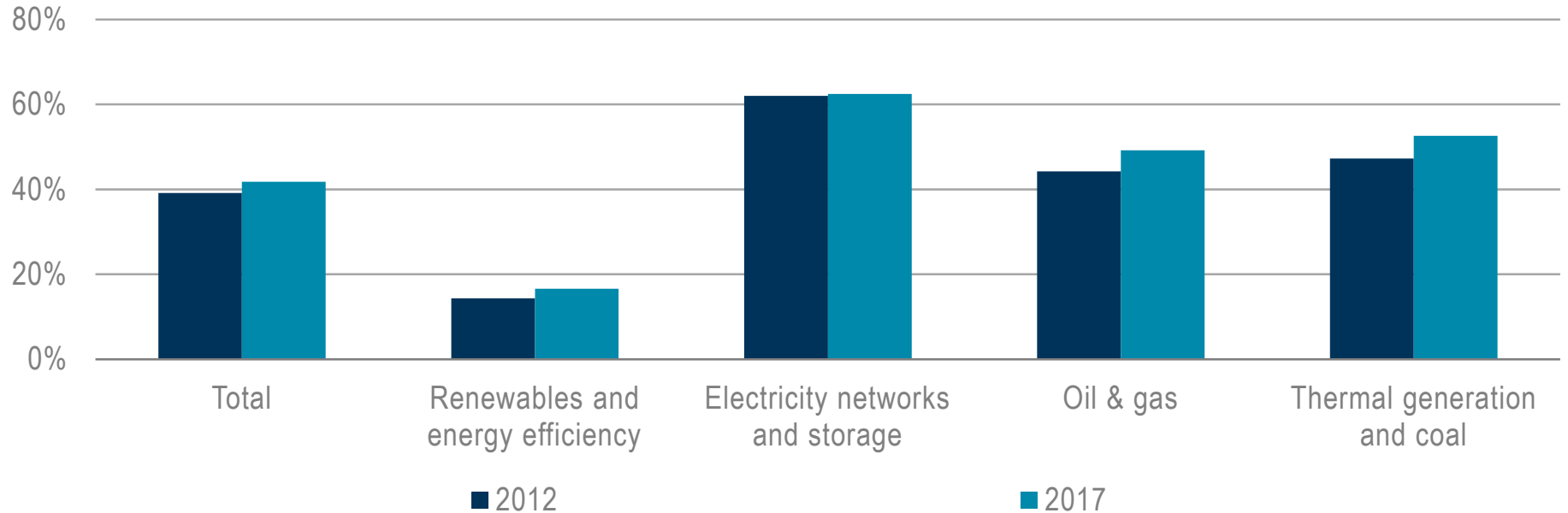
Global energy investment, 2017 (billion USD)



**For the 3<sup>rd</sup> consecutive year energy investment declined in 2017, by 2%, due to less power generation investment, lower costs and continued prudence in the oil and gas sector. Energy efficiency was a lone growth area.**

# The share of state-backed energy investment has edged up

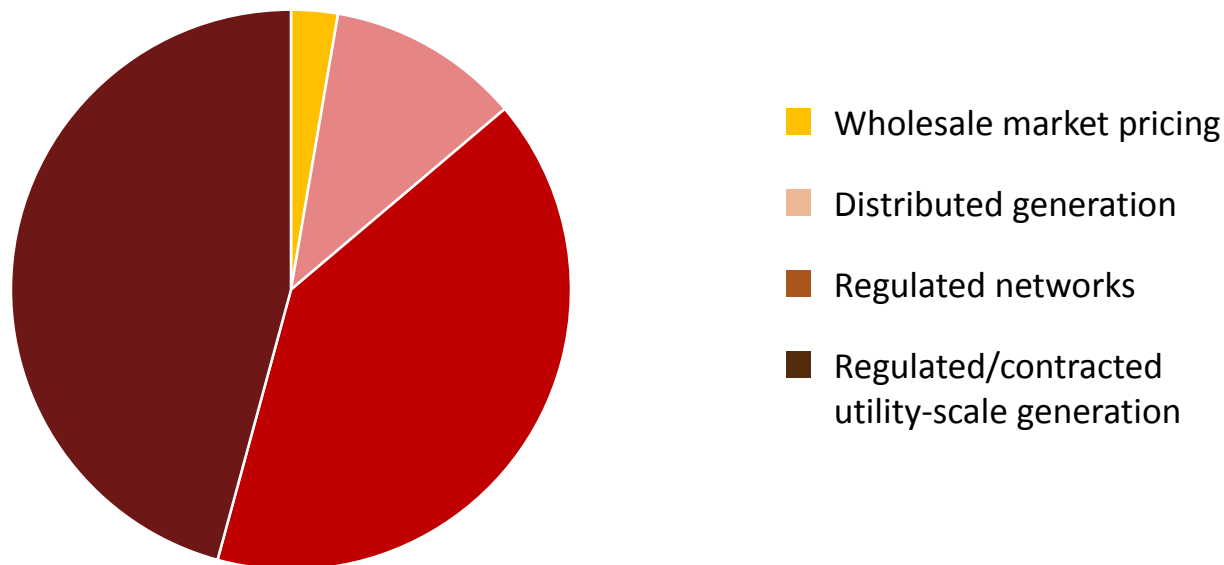
The share of government/SOEs ownership in energy investment by sector, 2012-17



**Despite a growing role for clean energy investment, which is mostly led by private actors, the share of energy investment from NOCs and state-owned thermal power rose by more over the past five years.**

Global power sector investment by main remuneration model

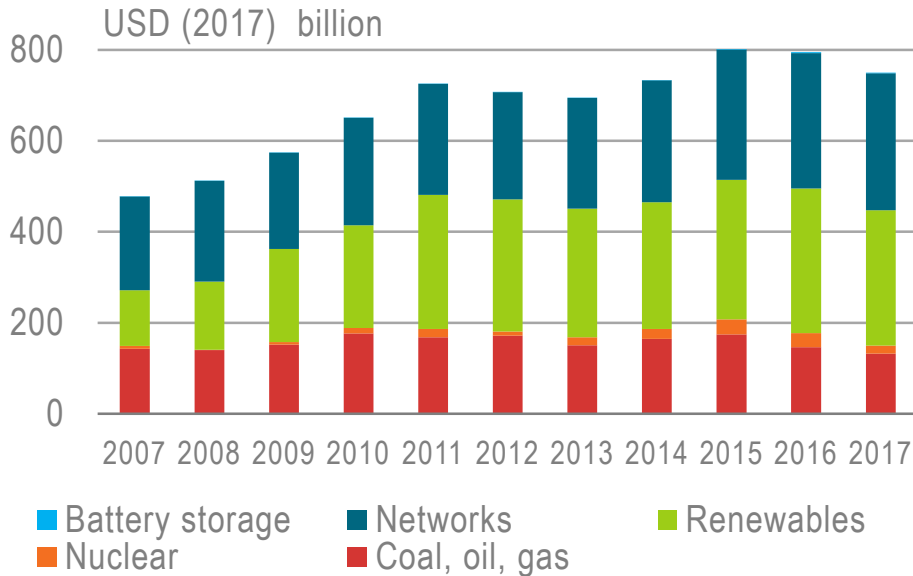
Total power sector investment in 2017:  
USD 750 billion



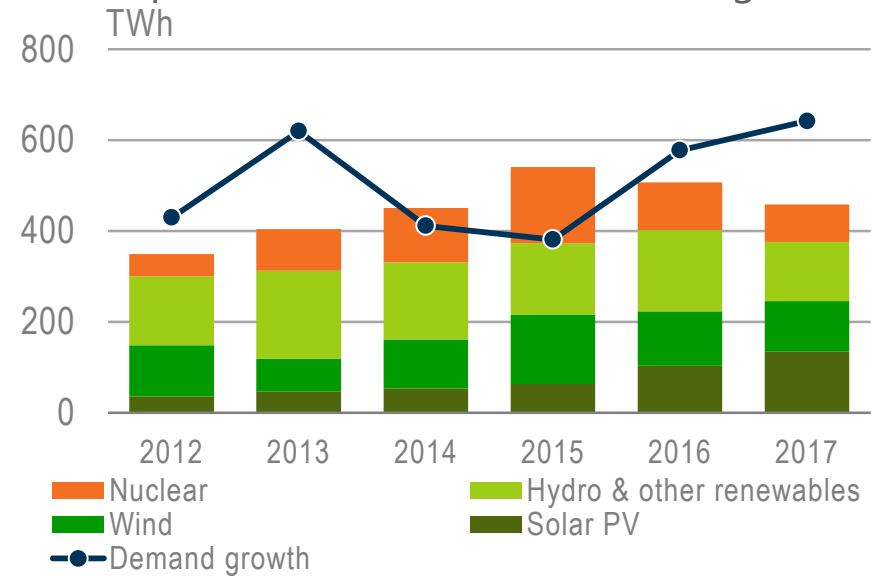
**Over 95% of power sector investments rely on regulation or contracts beyond short-term wholesale markets for their main remuneration, as regulators pursue adequacy and environmental aims.**

# The power sector is becoming more capital intensive

## Global power sector investment



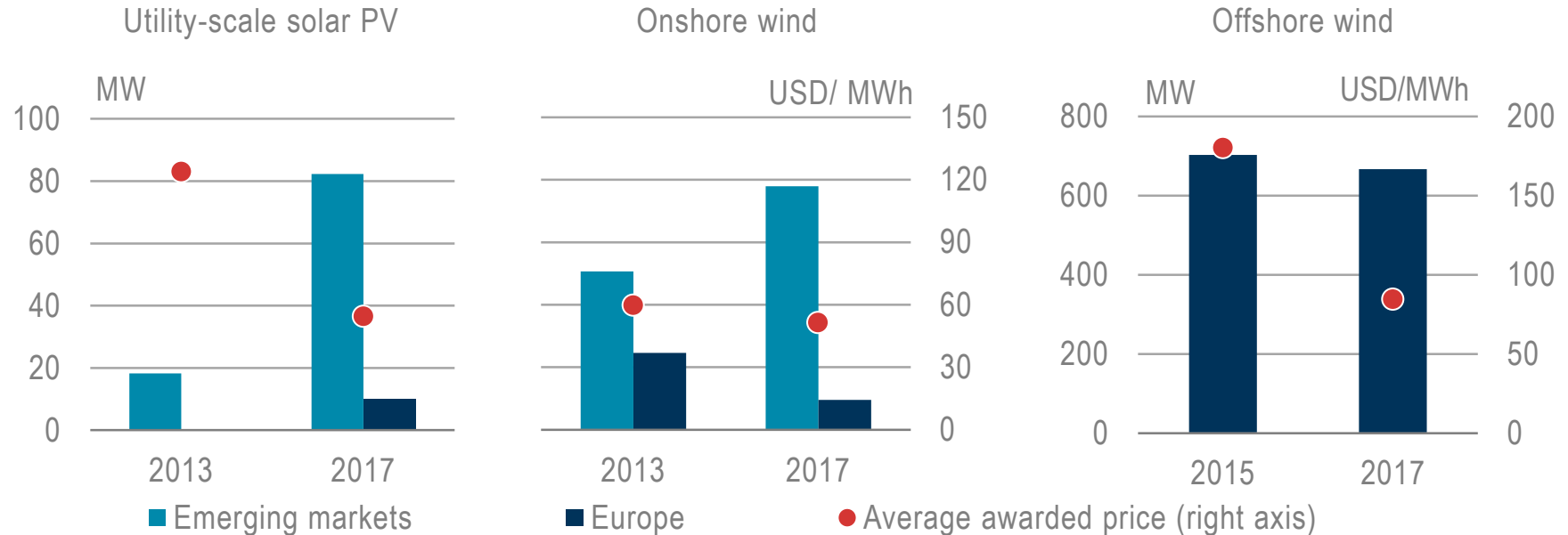
## Expected generation from low-carbon power investments vs demand growth



**Electricity investment has shifted towards renewables, networks and flexibility. Yet expected output from low-carbon power investments fell 10% in 2017 and did not keep pace with demand growth.**

# Tenders have facilitated economies of scale for renewables

## Average size of awarded projects in solar PV and wind auctions

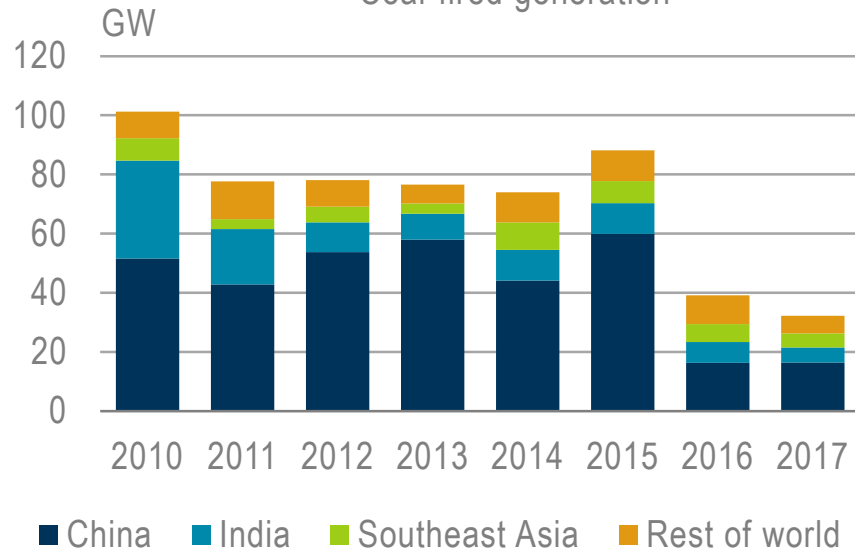


**In emerging economies the average size of awarded solar PV projects rose by 4.5 times while that of onshore wind rose by half over 2013-17. In Europe, tendered large projects are mainly in offshore wind.**

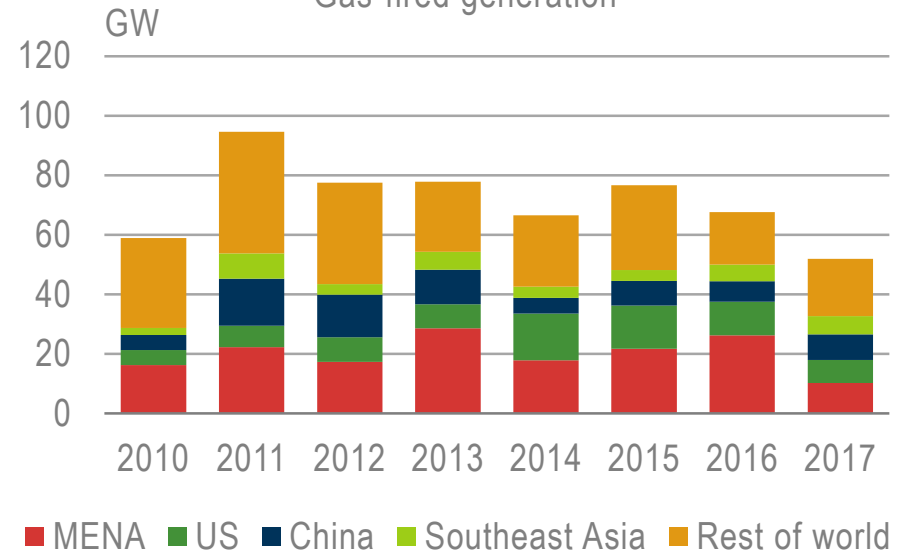
# Thermal power FIDs continued to decline

## Thermal generation capacity subject to a FID by plant type

### Coal-fired generation



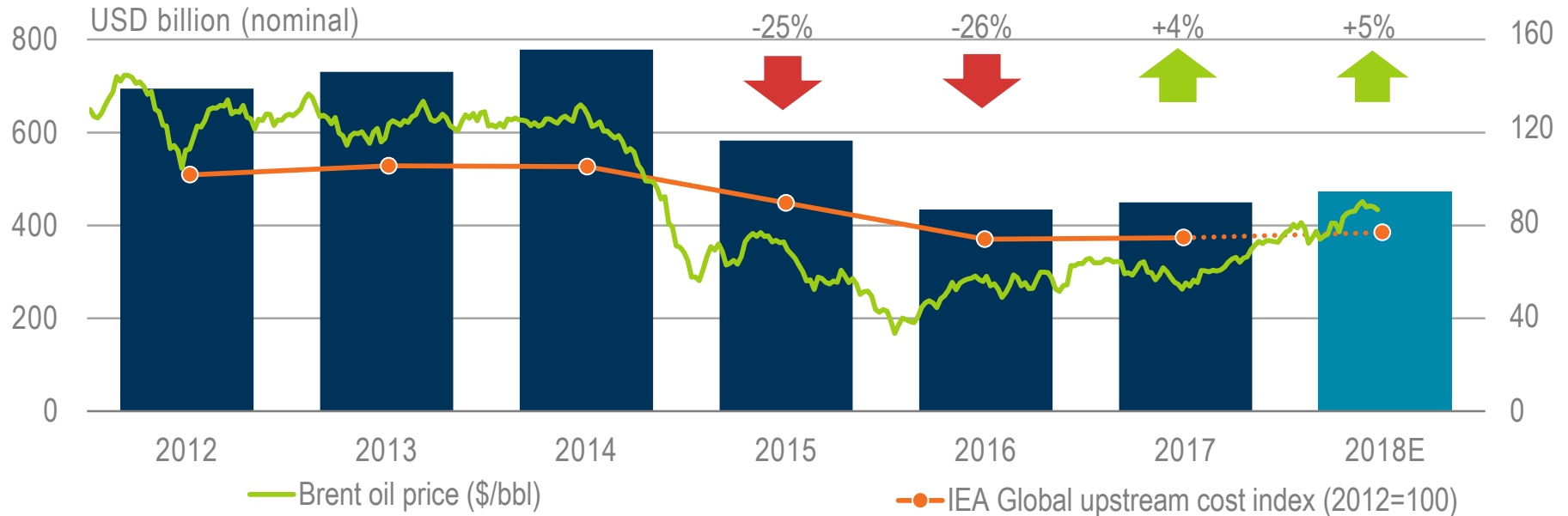
### Gas-fired generation



**In 2017 newly sanctioned coal power fell 18% to a level one-third that of 2010, driven by a slowdown in China, India & SE Asia. Sanctioned gas power fell nearly 23%, due to the MENA region & the US.**

# Lower upstream spending could lead to tighter markets

## Global oil and gas upstream capital spending 2012-18

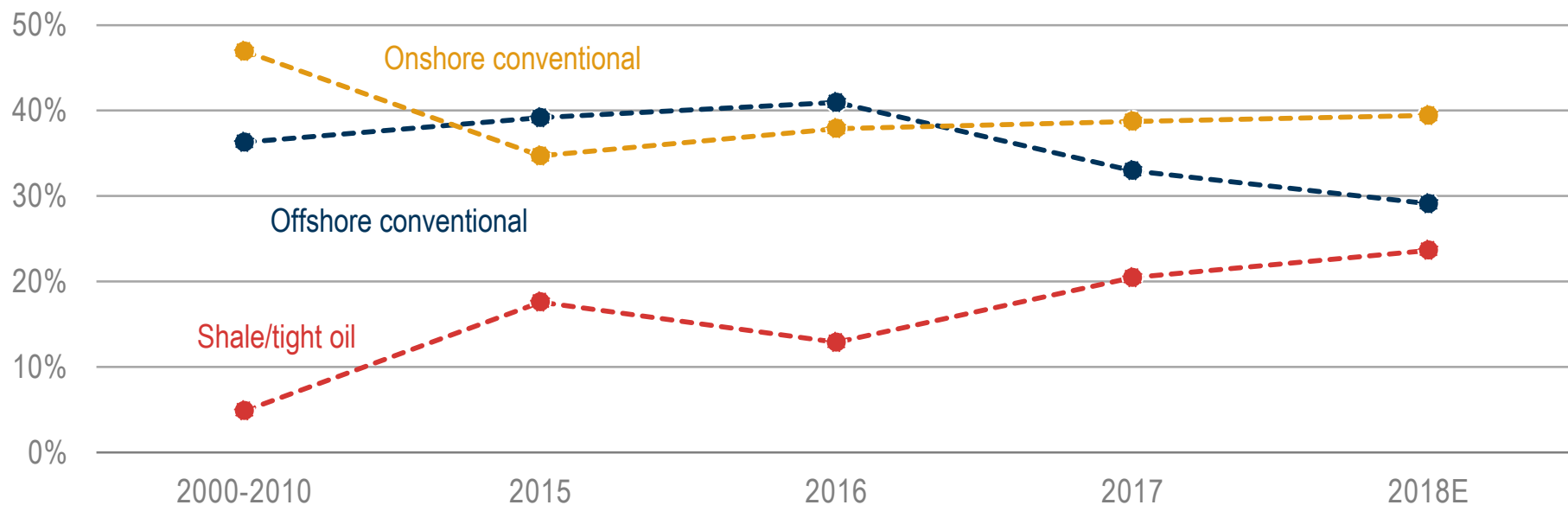


**Outside US shale, upstream investment continue to recovery very modestly with companies able to keep costs under control.**



# Changing dynamics in the oil and gas industry

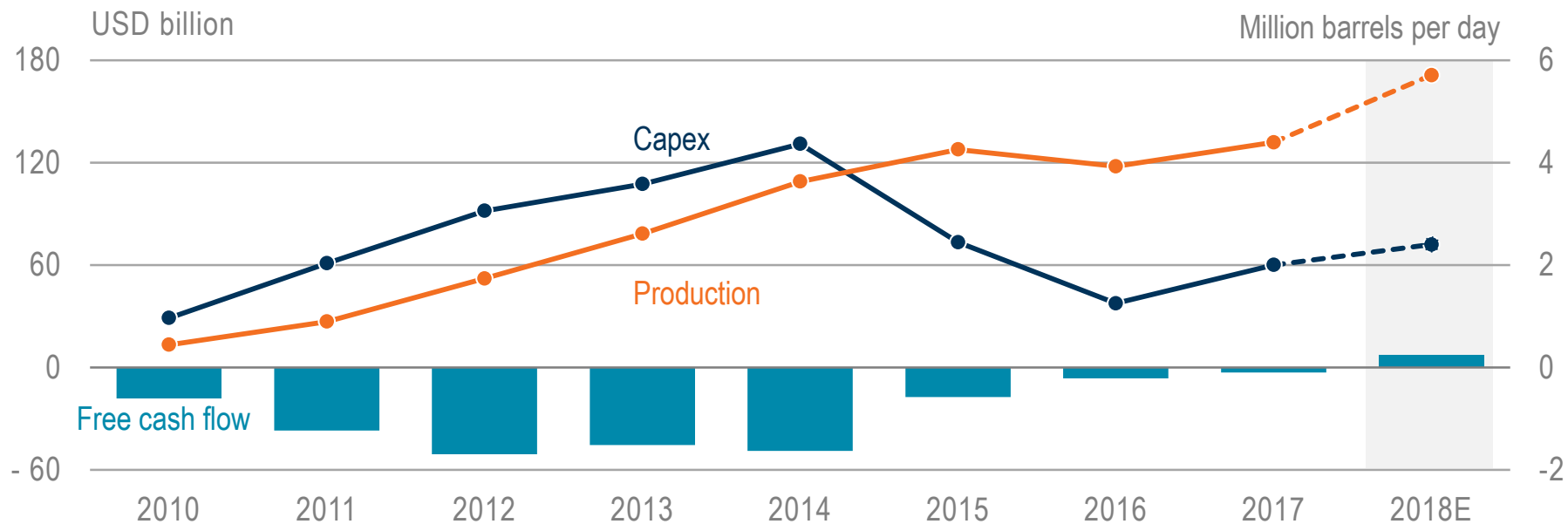
Share of global upstream oil and gas investment by asset type



**The shift of investment towards short cycle projects and assets with high production decline rates suggests more volatility ahead in the markets.**

# The US LTO journey towards a financially sustainable business

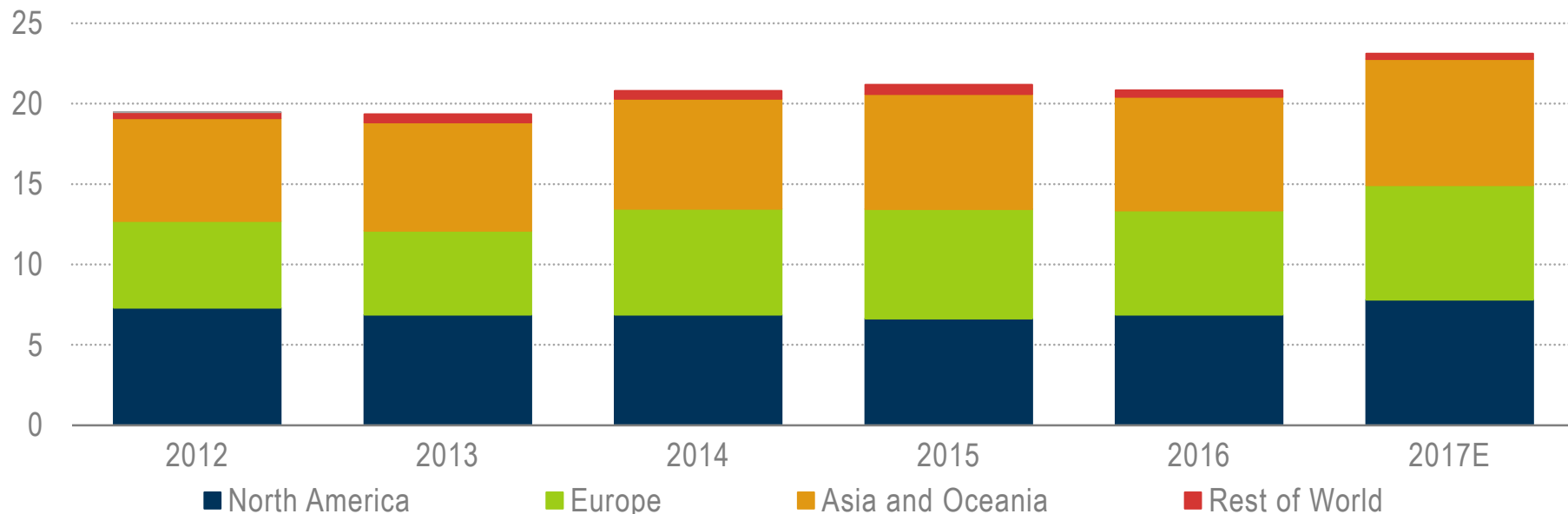
## US LTO production, capital investment and free cash flow



**IEA estimates that US LTO sector is on track in 2018 to generate positive free cash flow for the first time ever, but downside risks remain.**

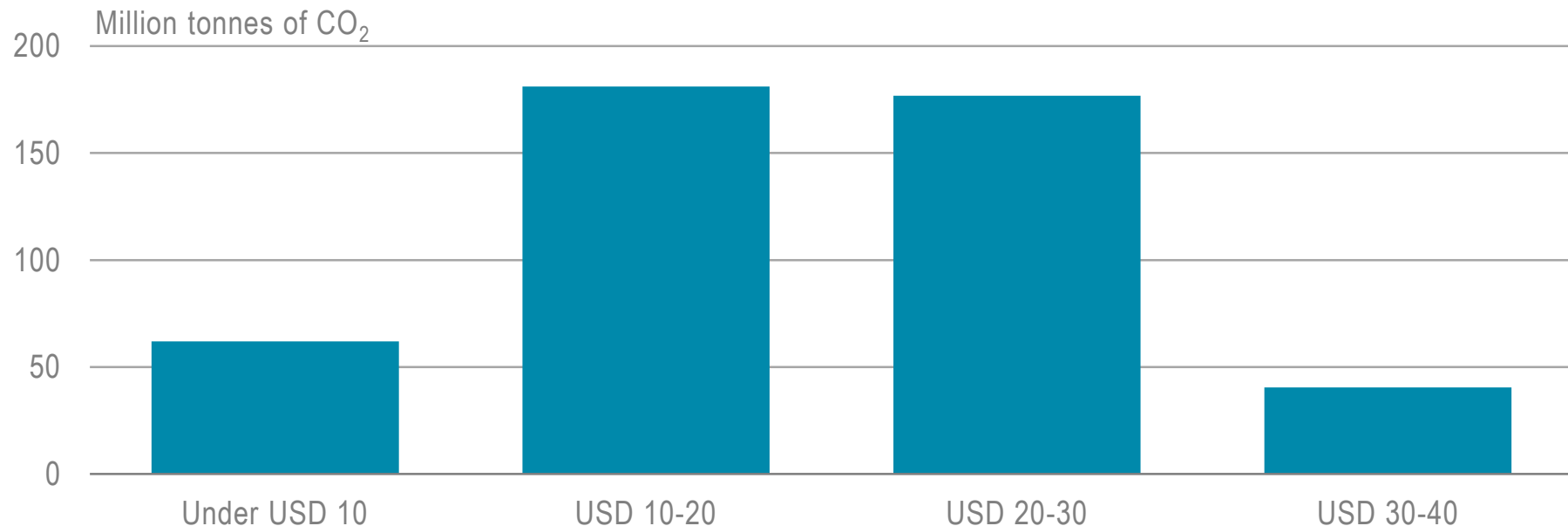
# Clean energy R&D investment is finally on the rise...

Total public spending on low-carbon energy technology RD&D (in billion USD)



**Public spending on R&D for low-carbon technologies rose 13% to USD 22 billion in 2017 after several years of stagnation; however, this is just 0.1% of public spending in major countries.**

Global potential for CO<sub>2</sub> capture and storage (or use) at low incentive levels

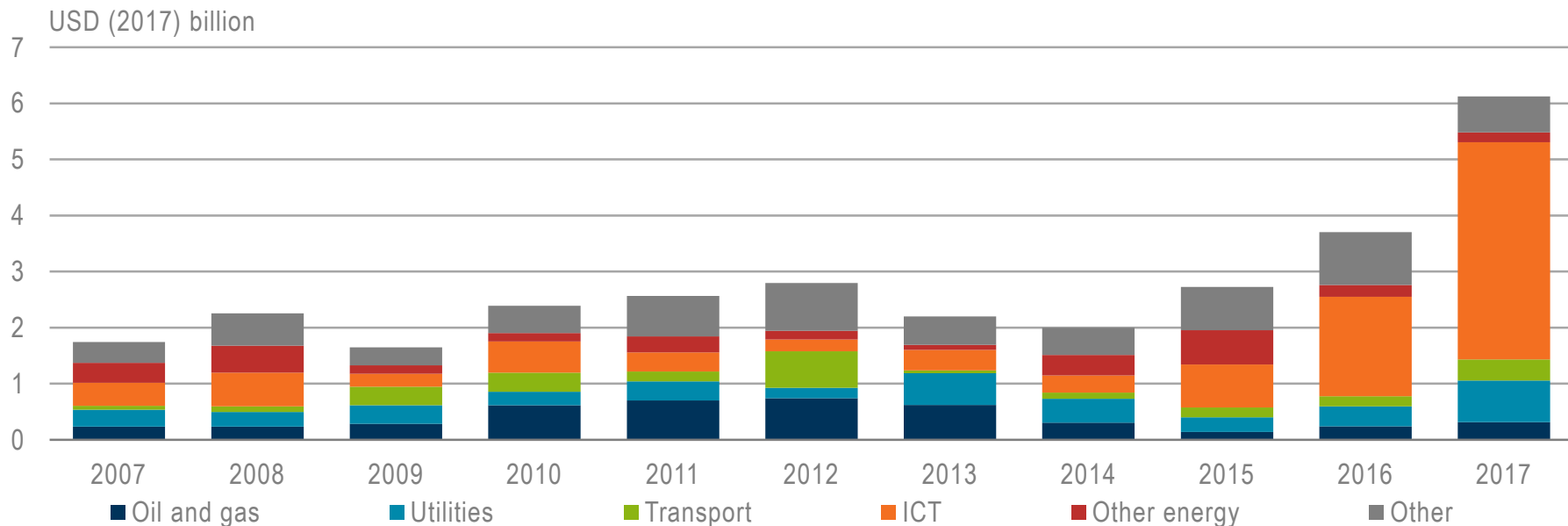


**CCUS is vital to tackling climate change, but sustainable deployment needs investment in “low-hanging fruit” today; 450 million tonnes of CO<sub>2</sub> per year (equal to all emissions growth in 2017) can be captured and stored for USD 40/tonne.**

# Companies invest more in energy tech startups, led by ICT sector



Corporate investments in new energy technology companies, by sector of investing company



**Corporate venture capital and growth equity for energy tech startups reached USD 6 billion in 2017; companies are taking strategic positions in a changing energy system, digital firms above all others.**

- The share of state-backed energy investment has risen, with more dependence on SOEs across the energy system; policies play a growing role in driving private investment
- Electricity was the largest sector for the second year running, sustained by networks and renewables; but recent trends raise a risk of slowing low-carbon supply investment
- The oil and gas industry is shifting towards short-cycle projects and assets with rapidly declining production, potentially signaling market volatility ahead
- Government R&D funding has risen, but more public & private efforts are needed; scaling up private capital will be key for renewables, energy efficiency and CCUS
- Overall energy investments risk being insufficient for meeting energy security goals and are not spurring an acceleration in technologies needed for the clean energy transition