World Energy Investment 2017

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

Electricity sector investment overtook oil and gas for the first time.
China remains the first destination of energy investment in 2016

Half of global energy investment is now concentrated in China, United States and Europe, backed by higher spending on electricity networks and efficiency in China
The role of state actors in energy investments has increased

Sources of finance by financing mechanism and type of organisation for world energy investment in 2016

- **Project finance**: 93%
- **Balance sheet**: 7%

**Government/SOEs**: 42%
- **Private sector**: 47%
- **Households, communities and self-consumption**: 11%

The share of state actors in total energy investment rose from 39% in 2011 to 42% in 2016, largely thanks to state-owned enterprises in electricity sector investment, notably in China, and NOCs in upstream oil & gas.
Appliance standards lock in electricity end use efficiency

But cheap oil shifts consumer preferences towards big cars
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.
After two years of unprecedented decline, global upstream investment is expected to recovery modestly by 3% in 2017, but downside risks remain.
Corporate bond markets amplify shale investment volatility

Access to and cost of bond pricing is directly influenced by the oil price
US shale: equity market interest and assets sales to new entrants keep independents going

Cost deflation and stronger balance sheets keep investment robust despite low oil prices
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
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.
Europe: gas retirements exceed FIDs by a wide margin

Compressed load factors, low wholesale prices and market design uncertainty disrupt the investment model of gas plants
Investment in low-carbon electricity is not keeping pace with demand

While the annual contribution of new solar PV and wind has grown by three quarters, FIDs for nuclear and hydropower have sharply slowed, leaving expected low-carbon generation 35% short of average demand growth the past five years.
Policies play an important role in electricity sector business models

Generation investments mostly have contracted pricing that allows for long-term cost recovery of assets. Competitive mechanisms play growing role in setting renewables remuneration, at 36% of utility-scale investment vs 28% in 2011.

Top 10 areas of generation investment and their main funding models, 2016

- China solar PV
- US solar PV*
- China coal power
- China onshore wind
- China hydropower
- Europe onshore wind
- India coal power
- Japan solar PV
- US onshore wind*
- China nuclear

USD (2016) billion

*US renewables benefit from federal tax credits in addition

Contracted pricing - administrative mechanism
Contracted pricing - competitive mechanism
Wholesale pricing
Distributed generation
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.
Storage investment depends on regulation and market design

The expansion of grid-scale batteries hinges on policies to reward multiple services.
Residential solar PV and coal-fired generation are most labour-intensive while regional differences can be significant.
Global clean energy R&D spending 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.