

World Energy Investment | 2016

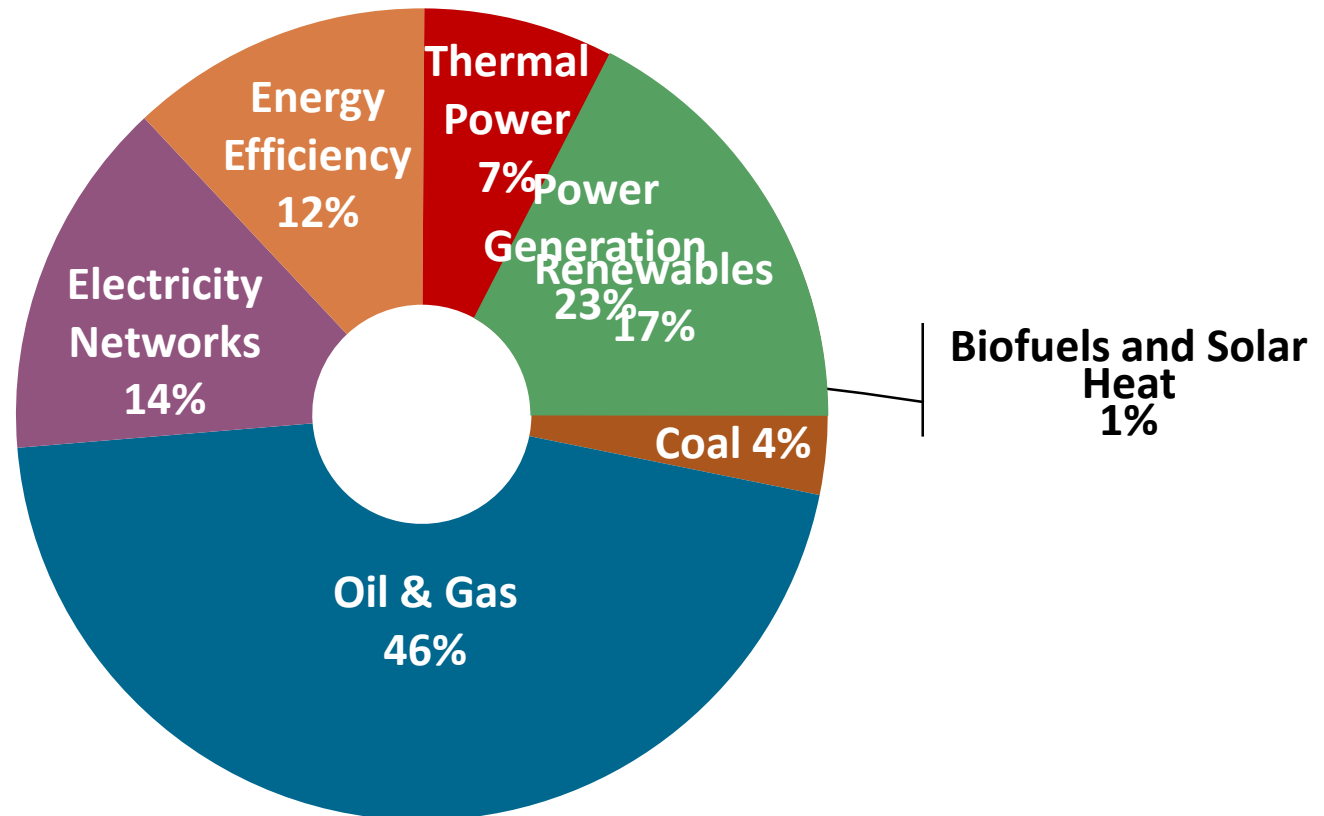
London

December 2016

Investment flows signal a reorientation of the global energy system

Global Energy Investment, 2015

USD 1.8 trillion



An 8% reduction in 2015 global energy investment results from a \$200 billion decline in fossil fuels, while the share of renewables, networks and efficiency expands

Energy efficiency and low fossil fuel prices

The three



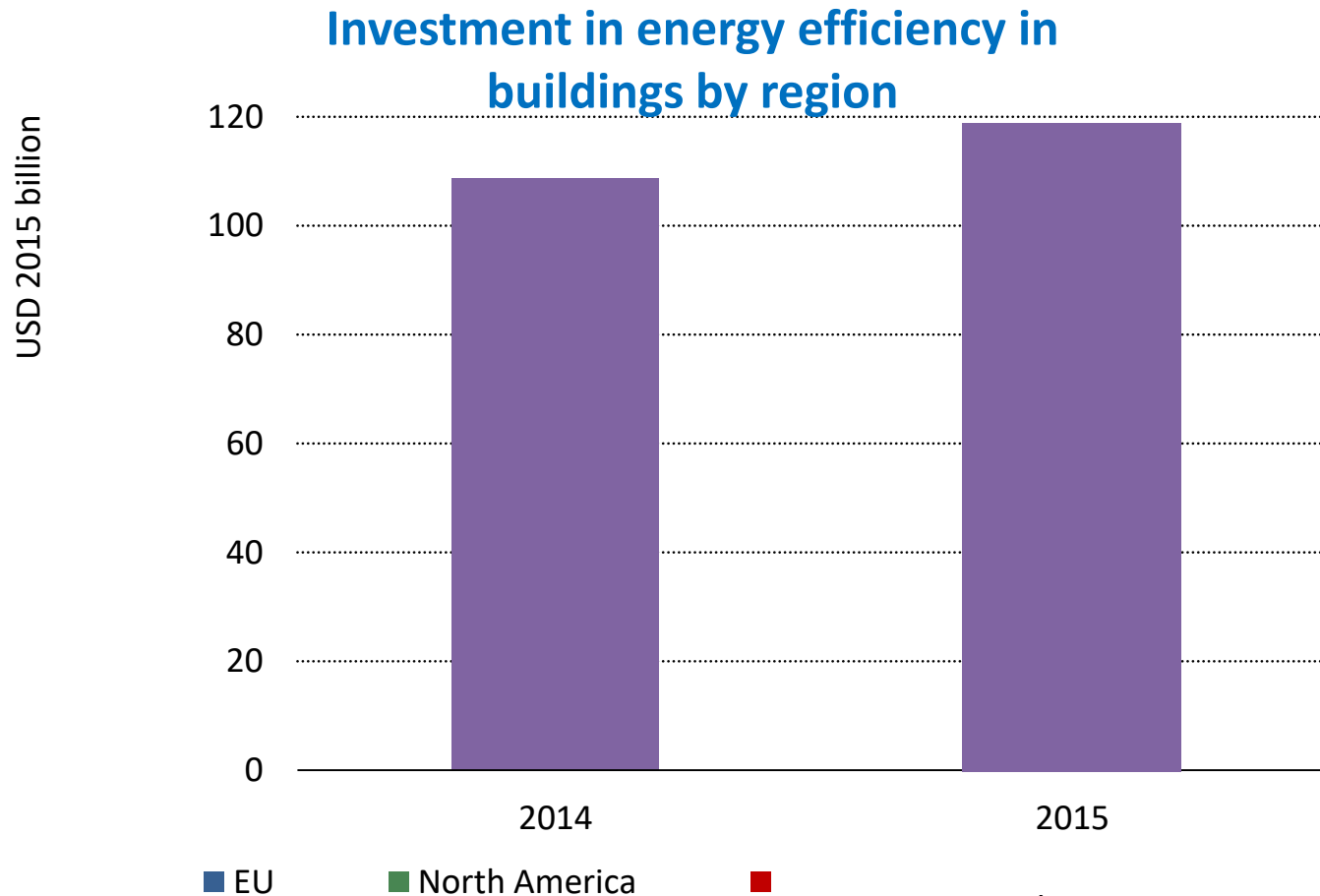
in America in 2015



Appliance standards lock in efficiency improvements despite declining electricity prices

Europe, North America and China dominate global investment in building efficiency

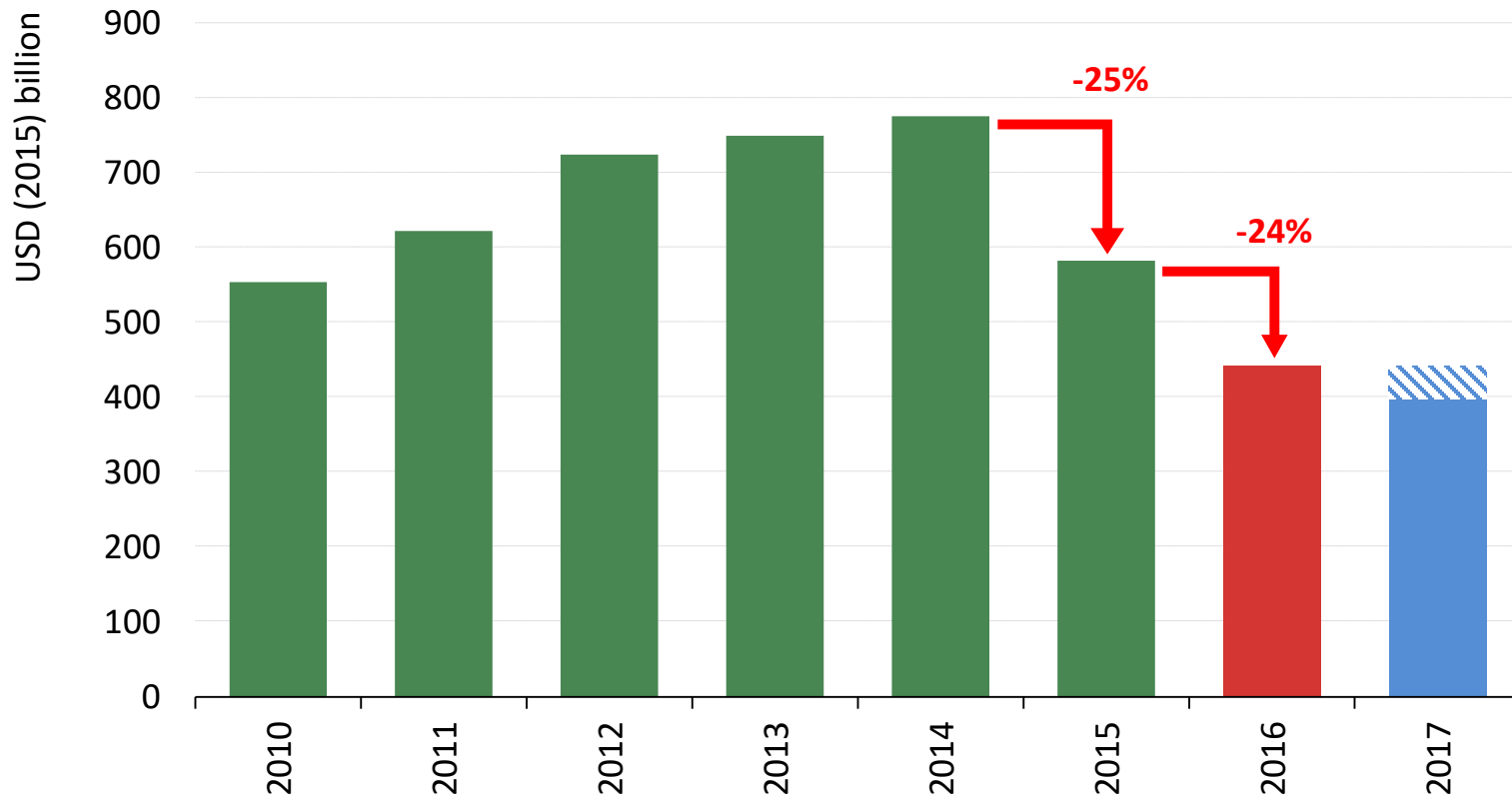
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Better insulation, efficient heating systems and cogeneration deliver energy savings and air quality benefits

Unprecedented wave of investment cuts in the upstream oil and gas industry

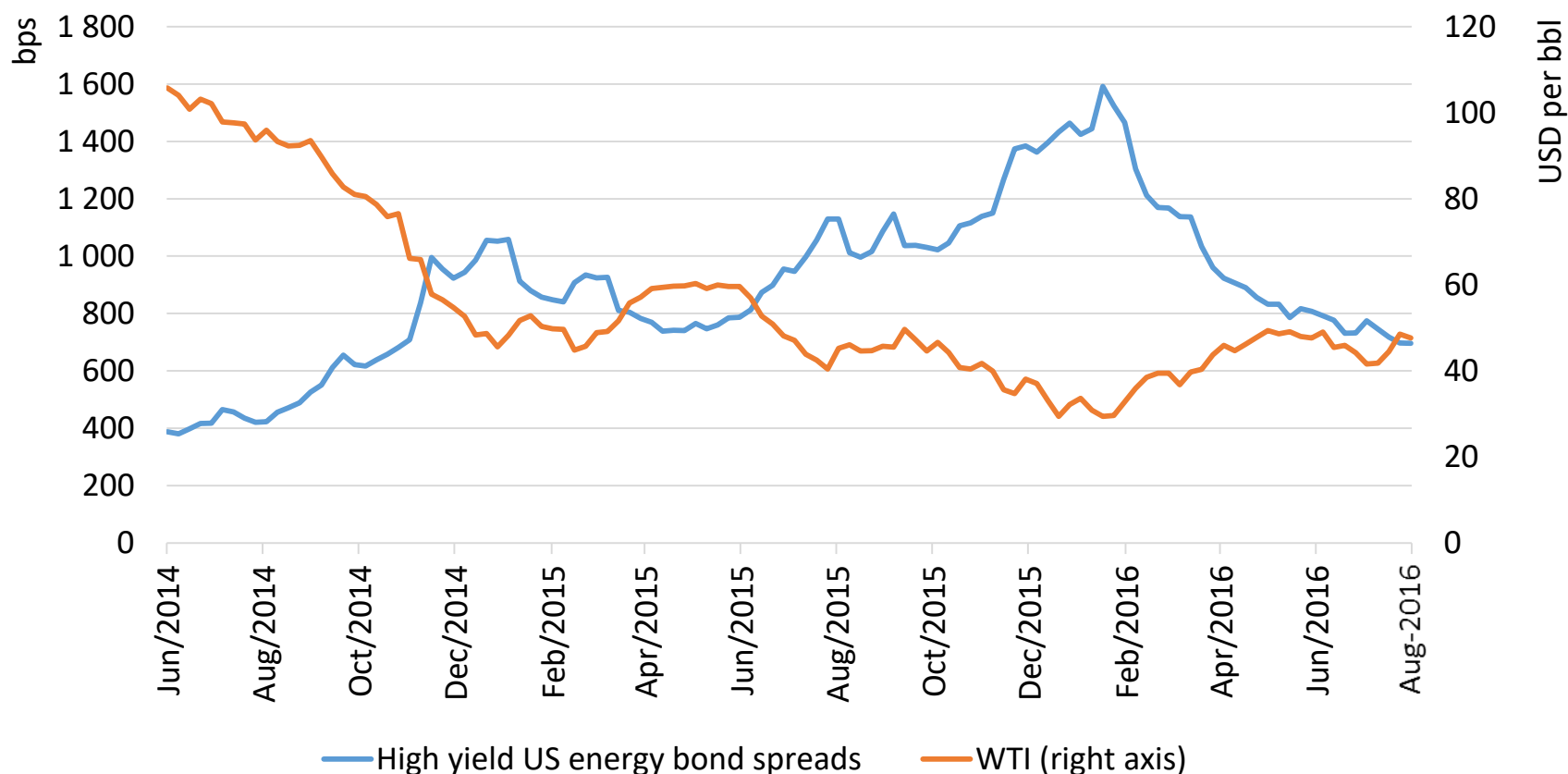
Global upstream capital spending 2010-2017



Cost deflation, efficiency improvements and reduced activity levels might lead for the first time to a three consecutive years of investment decline

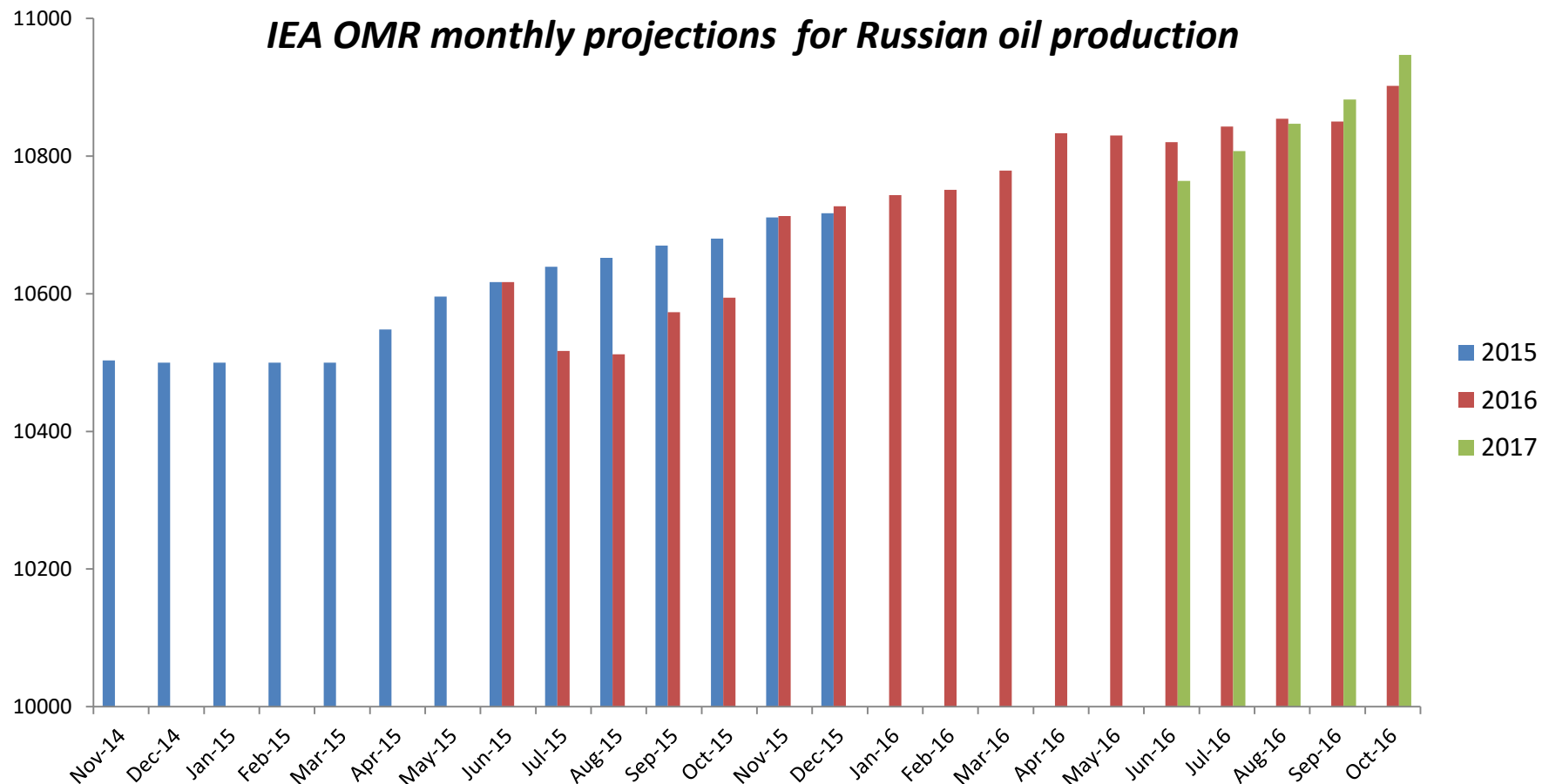
US shale leveraged business model increases investment volatility

Bond spreads vs. Oil prices, Jun 2014 – Aug 2016



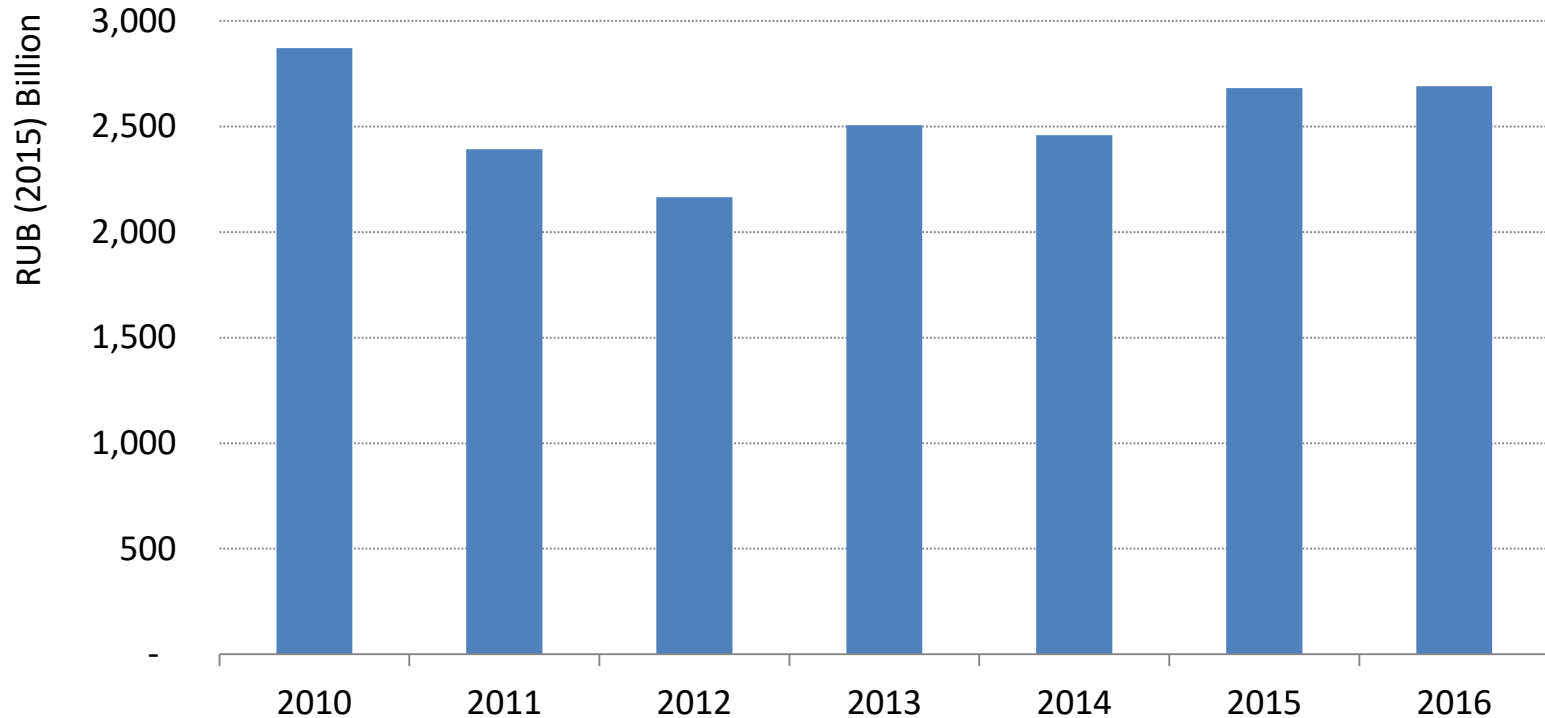
Debt costs soared for leveraged US shale companies as oil prices fell, resulting in bankruptcies; more resilient operators, with the majority of production, now remain

Russian oil upstream keeps defying expectations



Oil and gas investment in Russia is defying challenges

Russian oil and gas upstream investment, in Roubles 2010-2016



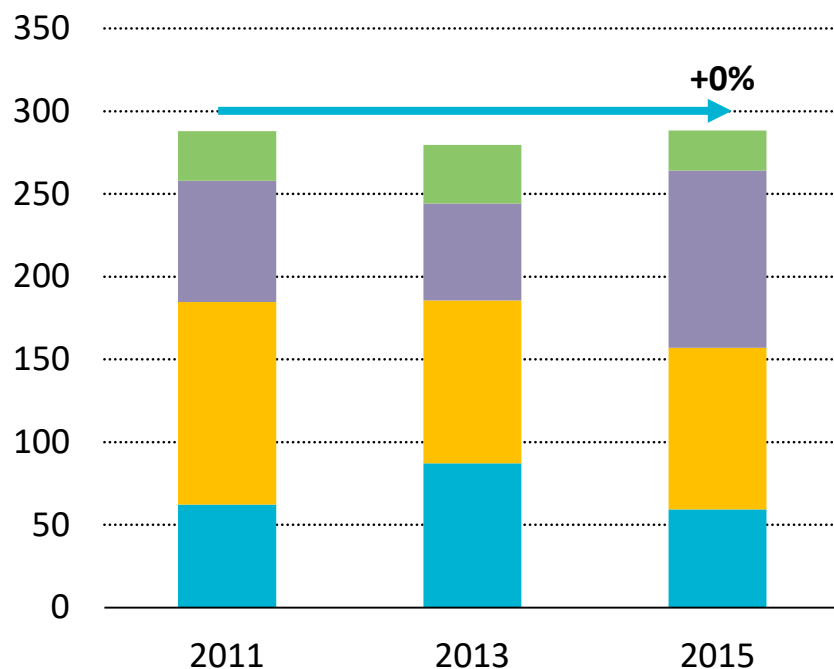
80-90% of capital spending is Rouble based due to a large domestic service industry and focus on conventional brownfield development

Renewables investment buys much more electricity

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Global renewable power investment

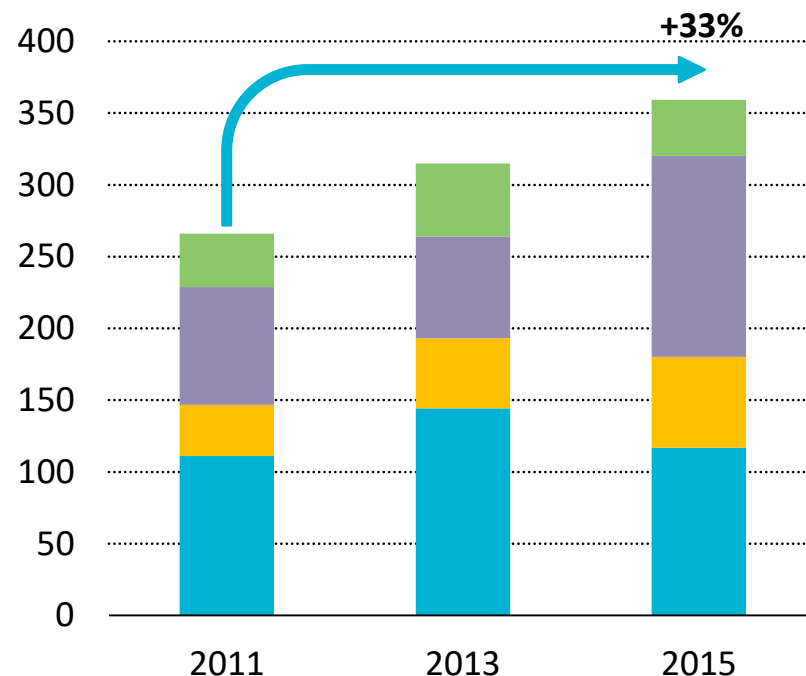
USD 2015 billion



■ Hydropower ■ Solar PV ■ Wind ■ Other renewables

Generation from investment in capacity

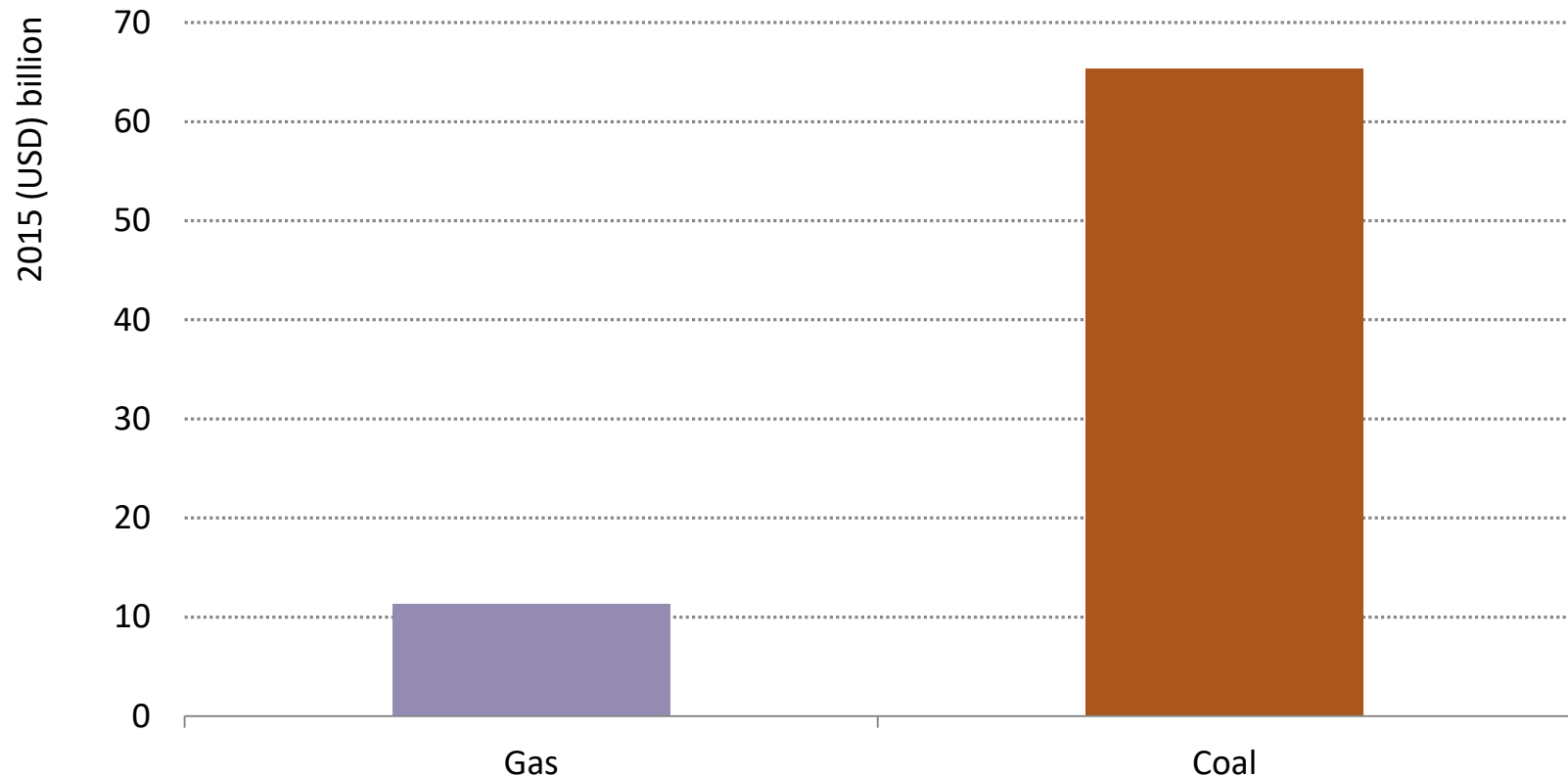
TWh



Investment from renewables-based capacity more than covers 2015 global electricity growth. Wind leads, surging 35% in 2015 on economics and record offshore growth.

Infrastructure costs favour coal power over gas in Asian energy importers

Coal and gas-fired power investment in Asian markets (2015)



Asian markets comprised 85% of global coal power investment, while N. America and Middle East, with robust infrastructure, favoured gas for new fossil fuel power

Global nuclear investment is driven by China and Russia



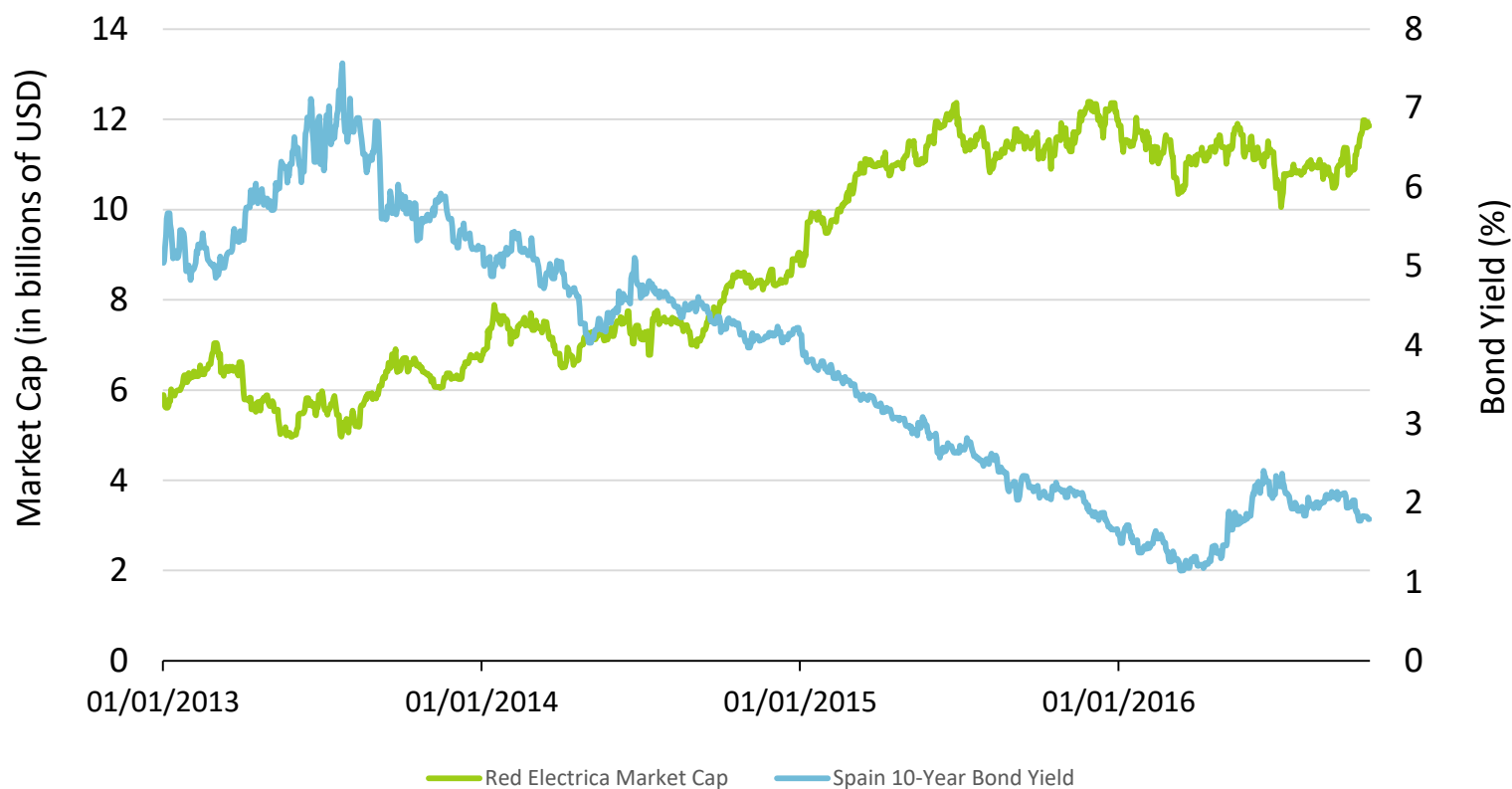
- ✓ China: a new reactor every quarter
- ✓ Rosatom: 9 reactors under construction in Russia with vertical integration
- ✓ Technology + construction + finance agreements in Vietnam, Turkey, Belarus, Egypt etc
- ✗ Are the financing packages sustainable at 50 \$/barrel?

In Europe and the US new construction failed to compensate for decomissionings

Decentralised and centralised electrification in India

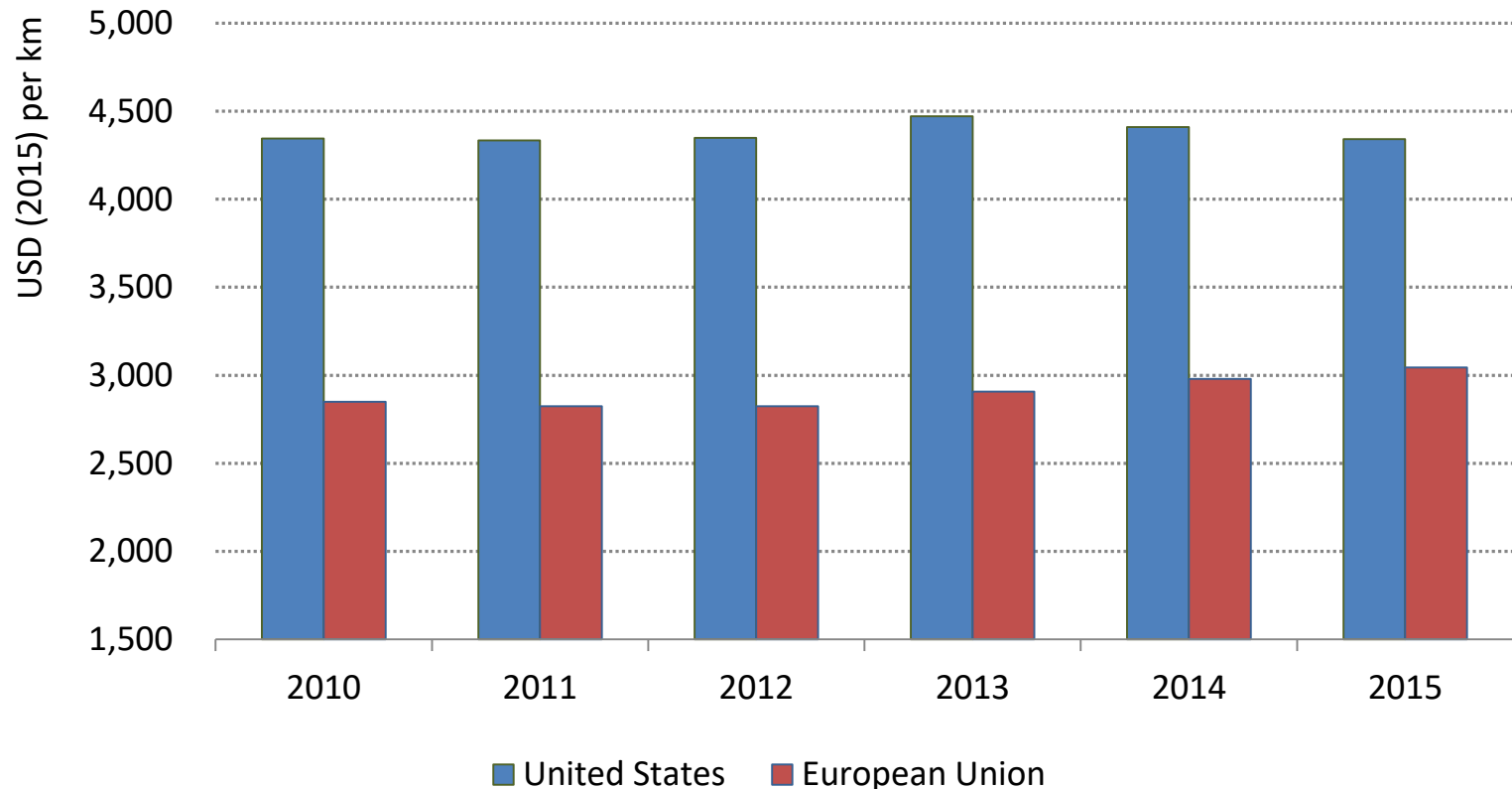


Red Electrica Market Cap and Spain 10-year bond yields, 2013-2016



Despite attractive valuations, physical investment is stagnating

Electricity networks investment per total network length, 2010-15



Most renewable deployment is integrated into a legacy network

Backup