

FLAME CONFERENCE 2017

GEOPOLITICS, TECHNOLOGY + THE GAS INDUSTRY

**FALLING PRICES + DECARBONISATION + ELECTRIFICATION =
THE END GAME FOR FOSSIL FUEL COMPANIES**

DIETER HELM

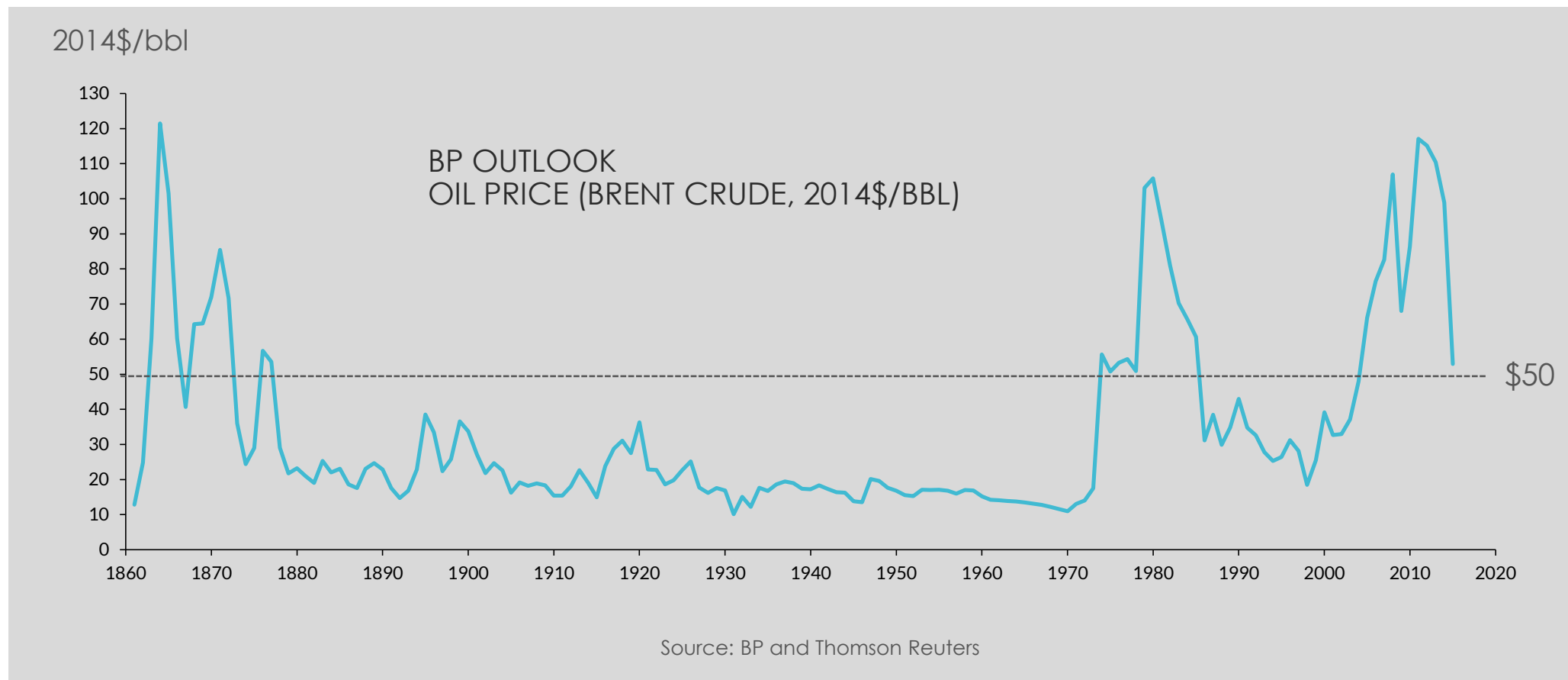
Professor of Energy Policy, University of Oxford
10th May 2017



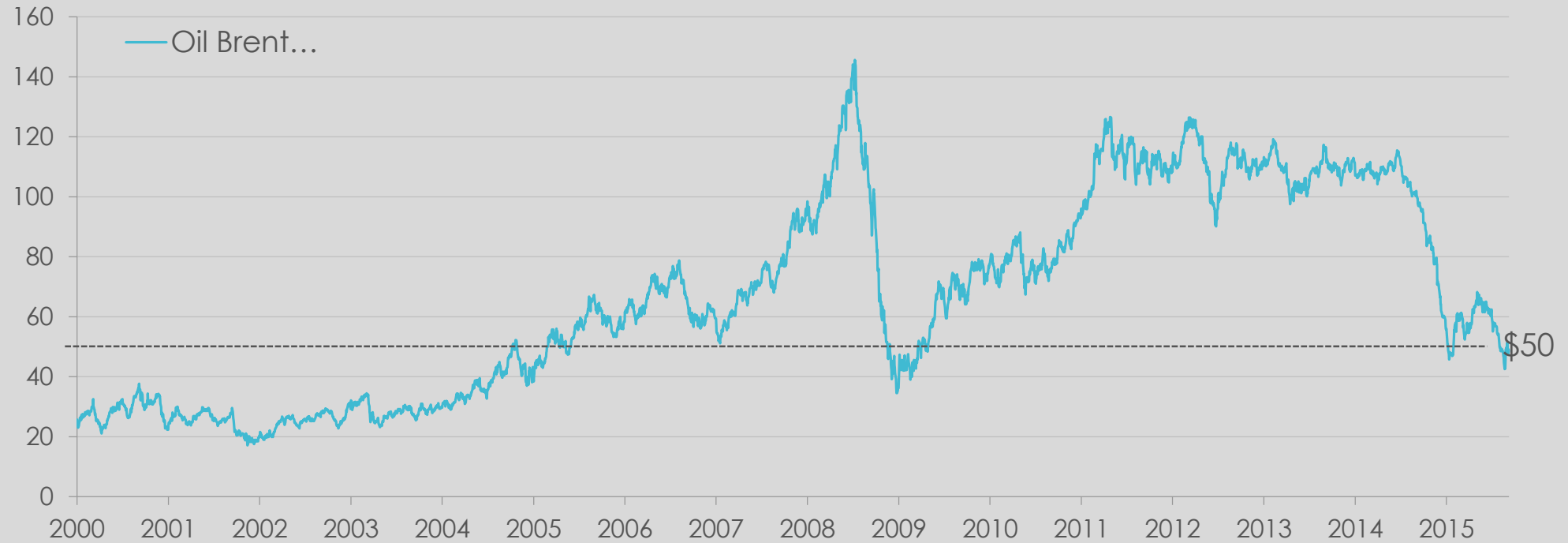
THREE FUNDAMENTAL GAME CHANGERS

- The end of the commodity super-cycle & falling oil price – for ever
- Decarbonisation & the next generation of renewable technologies
- Digitalisation & the transformation of demand

END OF THE COMMODITY SUPER-CYCLES



BACK TOWARDS \$50



Source: Thomson Reuters

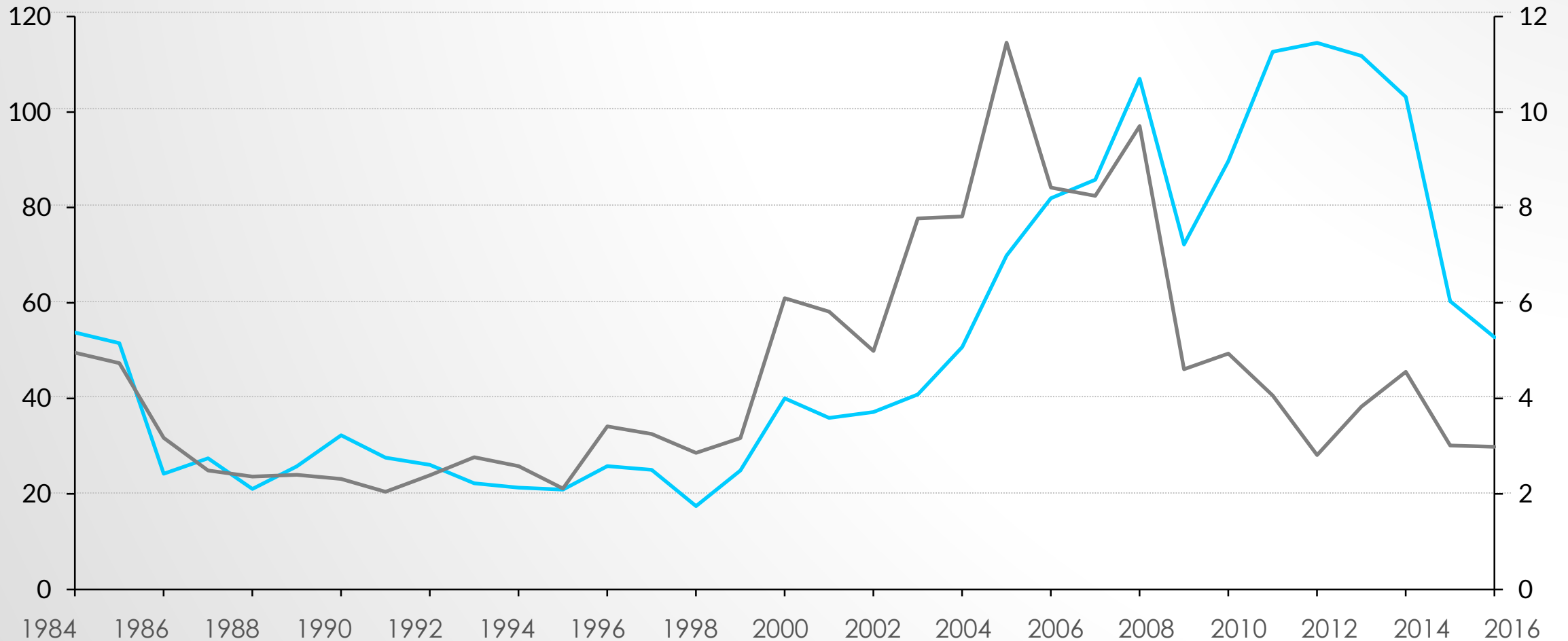
US GAS PRICE IN RELATION TO THE OIL PRICE

Oil price,¹
2016\$/bbl

— Brent Crude Oil Price

— Henry Hub Gas Price

Henry Hub Gas price,
2016\$/mmbtu



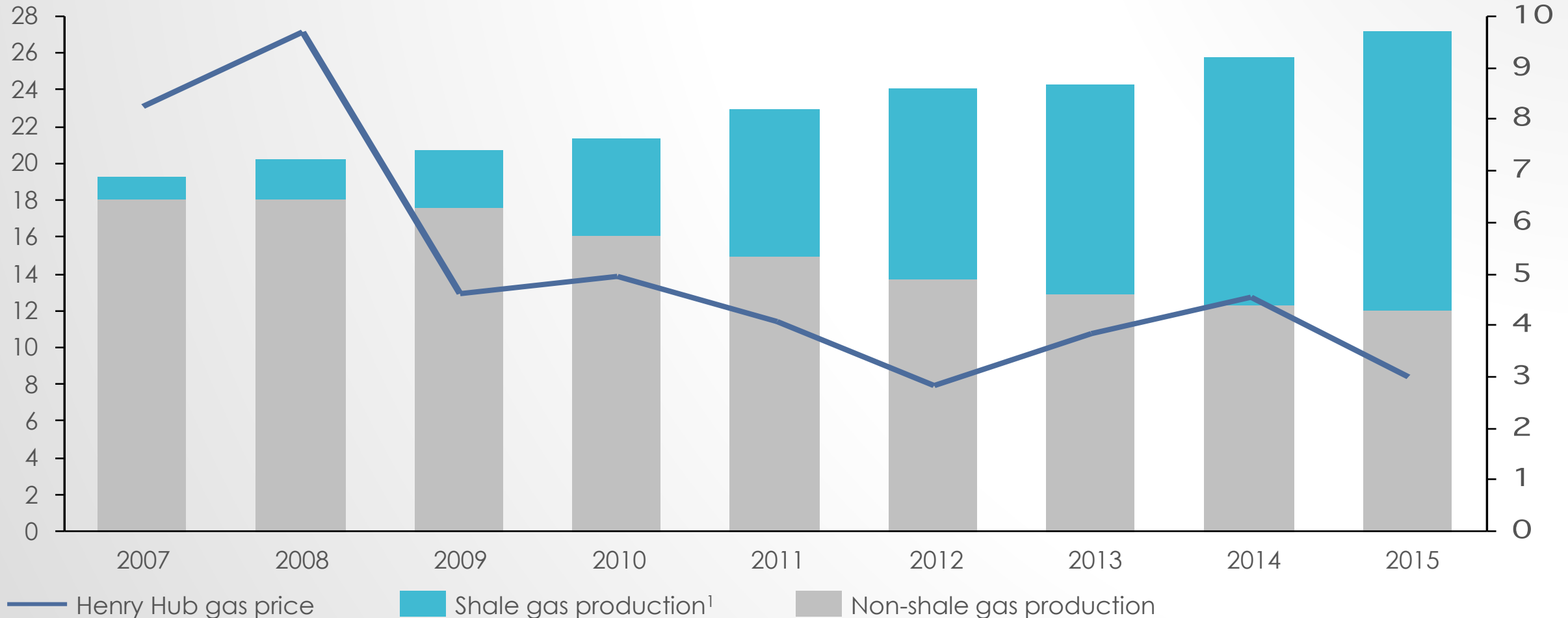
Notes: 1. Oil price shown is Brent Crude

Sources: World Bank, Aurora Energy Research

US SHALE PRODUCTION HAS PUSHED DOWN PRICES, AS WELL AS SUPERSEDING REINVESTMENT IN CONVENTIONAL GAS PRODUCTION

US gas production,¹
tcf

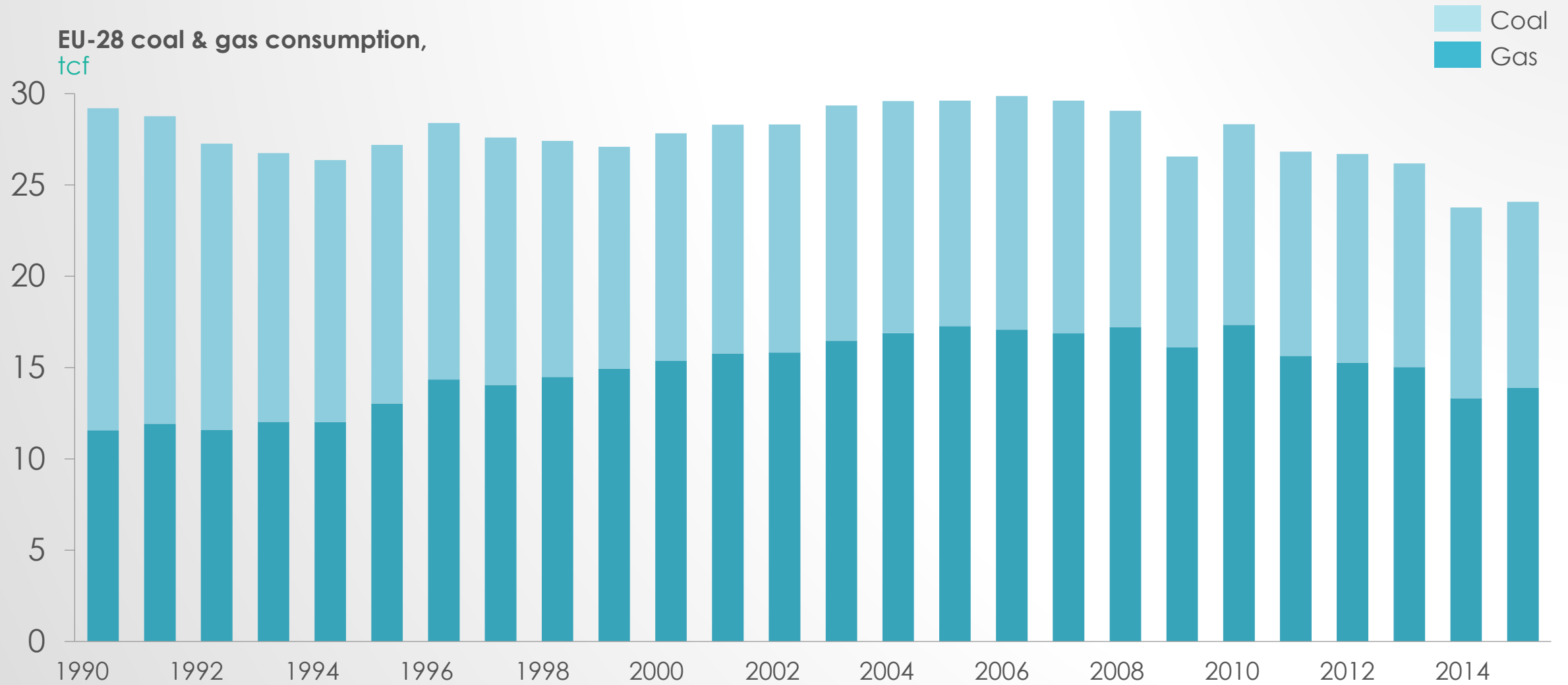
Henry Hub Gas price,
2016\$/mmbtu



Notes: 1. Non-shale gas production includes conventional, coal bed methane and tight gas production

Sources: World Bank, IEA, Aurora Energy Research

TOTAL EUROPEAN GAS DEMAND HASN'T CHANGED DRAMATICALLY OVER THE LAST 25 YEARS



Notes: Consumption shown here is the gross inland consumption per fuel type.

Sources: Eurostat, Aurora Energy Research

WHY OIL PRICES WILL CONTINUE TO FALL

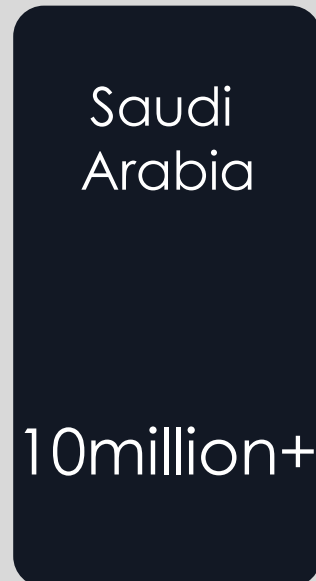
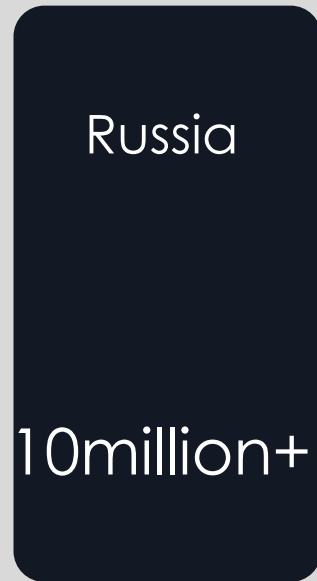
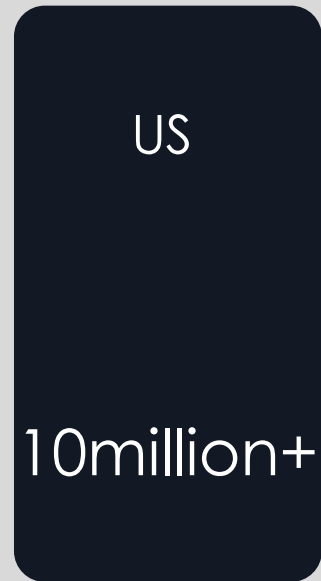
DEMAND

- Transportation – electric vehicles - gas
- Petrochemicals – gas

SUPPLY

- US production
- Russian production
- Iran & Iraq

5 X 10MBD COUNTRIES



GAS GAINS BEFORE DYING DOWN

DEMAND STRONGER

- Gas for electricity
- Gas for petrochemicals
- Gas for heating

SUPPLY ABUNDANT

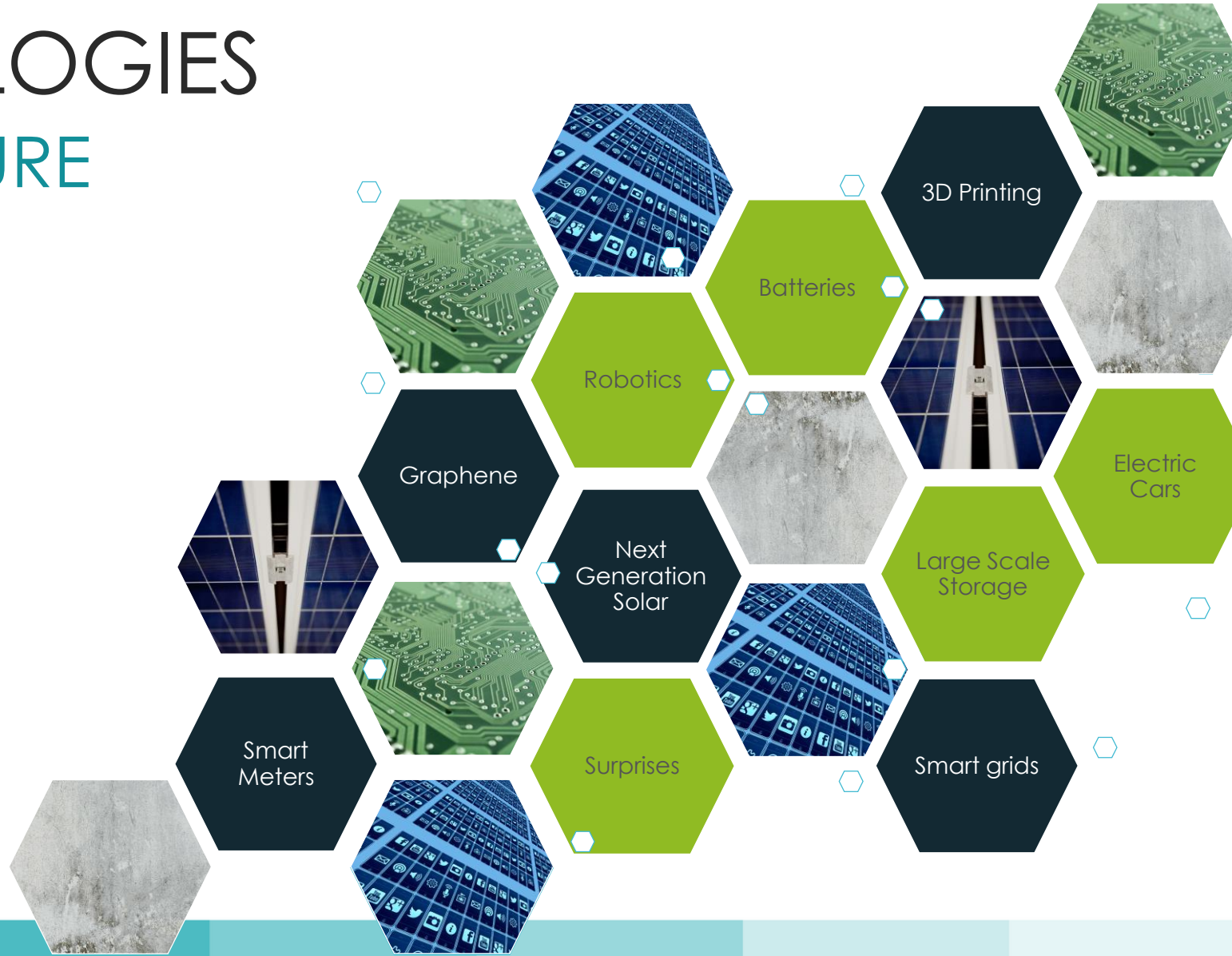
- US exports not imports
- Qatar & Iran & Australia
- LNG global supply chains

NEW TECHNOLOGIES OUR DIGITAL FUTURE

ROBOTS

3D PRINTING

ARTIFICIAL
INTELLIGENCE



DIGITAL WORLD IS ELECTRIC

- Future energy markets dominated by electricity
- Next generation solar delivers
- Digital & renewables all zero-marginal cost



- **CAPACITY NOT WHOLESAL MARKET**
- **CCGTs & OCGs, NEED TO BID CAPACITY**
- **CONTRIBUTION FROM BATTERIES & STORAGE & DEMAND SIDE**

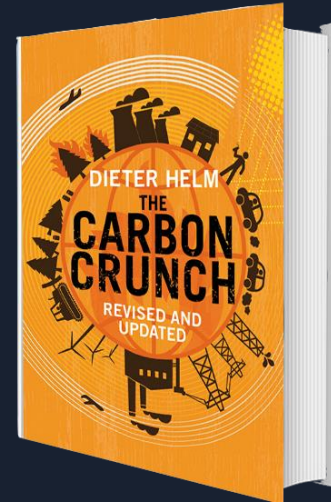
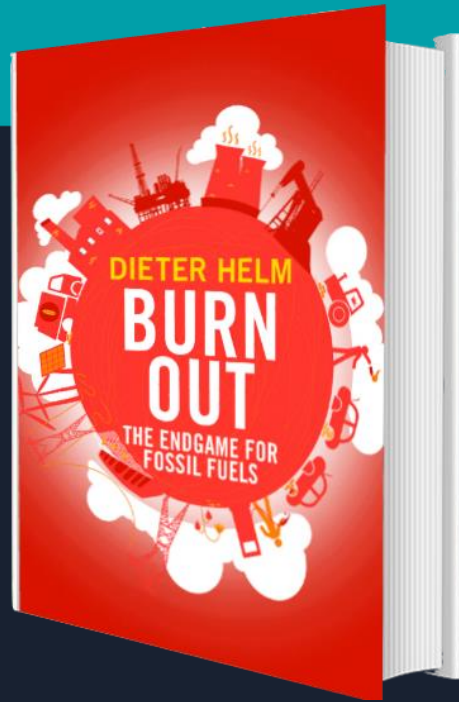
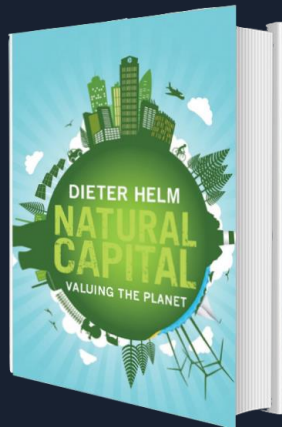
CORPORATE STRUCTURES UNDER PRESSURE

- Oil companies – harvest-and-exit
- Electricity companies – vertical break-up
- Lots of new entrants – car companies, battery companies, broadband hubs supply points

FOR GAS COMPANIES LOTS OF OPTIONS

- Into CCGTs & OCGs
- Into petrochemicals
- Into LNG
- Into fixed priced capacity contract

But almost all are derivative on electricity markets



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Energy Futures Network Paper 24.

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Dieter Helm
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Dieter Helm
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- Greg Clark's energy agenda, Paper 20, Sep 16
- Flawed in almost all its parts – the final CMA report on electricity markets, Paper 19, Jul 16
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- The CMA Energy Market investigation: Companies 5-0 CMA? Paper 17, Mar 16
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- Energy Policy and the Coalition, Paper 10, March 15
- What should oil companies do about climate change? Paper 9, Feb 15
- Competition in the British electricity sector: a set or practical measures, Paper 8, Feb 15