

## Press

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### **Rapid technological shifts could wipe \$21 Trillion of fossil fuel company revenues by 2040**

- The rapid pace of change in energy technologies - such as electric vehicles and renewables - is causing radical shifts in the global energy system
- Electric vehicles and improved fuel efficiency cause oil demand to peak in the mid 2020s - resulting in \$19 Trillion in lost revenue for oil companies in the period 2018 to 2040
- As coal power generation is phased out in many countries around the world, coal prices collapse to less than half the current price
- Gas and power become increasingly important energy vectors, comprising 52% of final energy consumption in 2040 (up from 39% today)
- Technological developments are at least as effective in reducing carbon emissions as the current nationally set carbon targets under the Paris Agreement

In a new report released today, Aurora Energy Research, the leading energy market analytics firm, has evaluated the impact of widespread digitalisation, greening of the economy and the shift in consumer preferences on global commodities markets – building on the narrative presented in Professor Dieter Helm’s book *‘Burnout: the Endgame for Fossil Fuels’*.

The report describes the structural shifts in the way we produce and consume energy – and what this means for commodity prices, and for fossil fuel producing companies and nations. It challenges commonly held assumptions about the drivers of change in energy markets and suggests that technological change and consumer engagement are at least as important in tackling climate change as the carbon targets set under the Paris Agreement.

Aurora has analysed the demand and supply effects of a ‘Burnout’ scenario. On the demand side, the report describes a world of widespread electrification - with 540 million electric vehicles on the road by 2040 - and the widespread use of digital technologies in the ‘internet of things’ increasing demand for power and the role of services in the global economy. On the supply side, the report describes how new technologies allow oil and gas companies to extract resources more cheaply in the future. Conversely, the phasing out of coal power generation in many countries for climate and air quality reasons causes a decline in the demand for coal, whilst more onerous mine repatriation requirements leads to higher costs of production.

The consequences of the 'Burnout' scenario for commodities markets are enormous:

- Demand destruction from electric vehicles and improvements in fuel efficiency leads to oil demand peaking in the mid-2020s. As it becomes clear that oil demand is in decline, and a barrel of oil may be worth more today than in the future, OPEC's strategy changes from one of restricting supply in order to prop up prices, to a strategy of increasing production to gain market share. With demand declining in the 2030s, the Burnout scenario predicts that oil prices could fall to \$32 per barrel in 2040 (in today's money) - in line with the long run historic price and less than half the current price.
- The decarbonisation of power - with an increasing share of low carbon sources and phasing out of coal in many countries – leads to a collapse in coal prices to \$28 per tonne by 2040, barely above the marginal cost of production and transport.
- On the flipside, gas emerges as the main fossil fuel 'winner' in a Burnout scenario – continuing to play an important role in balancing renewables in the growing power sector and acting as a substitute for oil within the petrochemicals sector – with long term gas demand increasing by 15% (or 750 bcm) relative to a Business as Usual Scenario.

The impact of such a scenario on fossil fuel producing companies and nations is enormous – challenging current business models and current investment plans. Revenues from oil consumption in particular decrease from \$1.5 Trillion in 2016, to \$1.1 Trillion in 2040 (in real terms), whilst gas revenues more than double to 2040 as both prices and supply volumes increase. Total fossil fuel revenues are 40% lower in 2040 than a Business as Usual scenario. Overall, cumulative fossil fuel revenues are \$21 Trillion lower over the period 2018-40 than in a Business as Usual Scenario, of which 90% of the decline is in oil and the remainder in coal.

Finally, the Burnout scenario challenges commonly held assumptions about the role of policy as the principal driver to combat climate change. Aurora's analysis shows that rapid technological changes and consumer engagement could prove more effective than the Paris Agreement carbon targets in reducing greenhouse gas emissions. The shift from oil and coal towards gas and power mean that total CO<sub>2</sub> emissions from fuel use in the Burnout scenario are 7% lower than a scenario in which the Nationally Determined Contributions are achieved, and almost 25% lower than a Business-As-Usual scenario. The implication of this analysis is that Government climate policies should be at least as much about spurring technology innovation and consumer engagement as they are about target setting or carbon pricing.

Richard Howard, head of research at Aurora Energy Research comments on the significance of Burnout for policy makers, businesses and investors in the future:

“Our new analysis points to a possible energy future of mass electrification, digitalisation, and new technologies, in which the rise in electric vehicles and continued improvements in fuel efficiency lead to peak oil demand occurring in the mid-2020s, and oil prices falling to less than half their current level by 2040. Indeed, this flips the very idea of “peak oil” – previously hypothesised for the supply side – as electricity grows in importance as a transport energy source.”

“Gas and power will become increasingly important energy vectors in the future, whilst the shift away from coal power generation in many nation states leads to a collapse in coal demand and prices. Taken together, these trends could reduce the revenues of fossil fuel producing companies and nations by more than \$20 Trillion between now and 2040, compared to a Business as Usual Scenario. At the same time, our analysis suggests that these rapid technological shifts are likely to prove more effective in combating climate change than the national carbon targets set under the Paris Agreement.”

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**Notes to editors**

Aurora Energy Research is a leading independent energy market modelling and analytics company founded in 2013 by University of Oxford Professors and economists. Aurora provides deep insights into European and global energy markets supported by cutting edge models and data driven analytics to support project development and investment decisions. Services include subscription-based forecasts, reports, forums and bespoke consultancy services. Aurora Energy Research has offices in Oxford and Berlin.