# Is the Age of Oil Over?

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# Introduction: global economic growth and its ecology

- The past four decades have witnessed rapid increases in world population, real GDP, foreign direct investment, urban population, primary energy use, fertiliser consumption, water use, paper production, transportation, international tourism.

- The global community now needs to deal with the environmental and societal consequences of these developments, or, in short, to stay within ecological boundaries whilst continuing to develop. Recent earth system trends are – an increase in carbon dioxide, nitrous oxide, methane, stratospheric ozone, a rise in surface temperature, ocean acidification, coastal nitrogen, tropical forest loss, and terrestrial biosphere degradation.

# Introduction: global initiatives to combat climate change

- The Paris Climate Change Agreement reset the factory settings for generation development decisions to put renewables first.
- In 2015 investments in renewable technology exceeded those in conventional power generation for the first time.
- By the end of 2016 renewables comprised an estimated 30% of the world's power generating capacity and 24.5% of global electricity demand (of which 16.6% was hydropower, 4% wind, 2 % bio-power, and 1.5% solar PV).
- Renewable energy provided an estimated 19.3% of global final energy consumption (of which 10.2% are modern renewables, i.e. geothermal, hydropower, wind, solar, and biofuels for transport).
- Markets previously impervious to the fad for renewable energy deployment have now adapted clean energy policy.
- Battery and storage technologies are emerging rapidly.
- Infrastructure fund investors have changed their policy from investing only in built assets to investing in development projects with ever more appetite for emerging technology risk.

# EU Energy Policy

- The main aims of the EU Energy Policy are to secure an affordable, competitive, and reliable energy supply for households, and, to decouple economic growth from carbon emissions (since 1990 in the EU carbon emissions have fallen by 22%, whilst GDP growth has grown by 50%).
- The central pillars of the policy are:
  - a focus on transportation;
  - the creation of a common internal energy market by way of the establishment of a regulatory framework, the development of interconnection, and the application of software;
  - the improvement of energy efficiency;
  - the decarbonisation of the economy;
  - the move from centralised to more decentralised power systems; and,
  - the inclusion of the consumer in the energy market as a producer.

# The development of EU Energy Policy

- Security provided the initial impetus for the development of EU Energy Policy with the aim of connecting every Member State to three sources of gas supply.

- Sustainability and the 2020 20 Initiative has dominated the second stage with a 20% renewable energy production objective and the 20% energy efficiency targets established by the 2009 Renewable Energy Directive.

- With regards to the third phase the recent Clean Energy Package does not set such binding targets on Member States. The stated objective is that by 2030: 32% of electricity will be generated from renewable sources; energy efficiency will improve by 32.5%; and, greenhouse gas emissions will be reduced by 40%.

# The challenges faced going forward

- To achieve the above targets massive investments are need in utility scale PV solar projects, large offshore wind projects, in addition to EUR 330 billion in the grid.

- There is also a need for increased demand response, flexibility, and interconnection due to the intermittency of renewable energy.

- It should also be noted that whilst energy intensity, i.e. GDP pert unit of energy consumed, declined between 2006 and 2014, this can be largely be explained by the reduction in energy consumption due to the economic crisis of 2008.

# The rhetoric of restraint in an age of abundance

- In terms of global rhetoric the Paris Climate Agreement is symptomatic of trends over the past decade in which noble intentions are continuously proclaimed.
- In Europe electricity is being portrayed as the dominant final energy, the era of fire and combustion ending.
- Yet we are now entering what may be termed the an age of abundance in which there is an excess of energy available, from petroleum, natural gas, coal, wind, solar etc.
- Crucially, energy demand growth differs between industrialised and industrialising countries - we are witnessing a global energy shift with energy consumption in the OECD remaining flat and the increase in consumption shifting to the BRIC countries and Africa.

# 2014 oil price collapse as a ‘perfect storm’

- The 2014 oil price collapse was the perfect storm of a number of trends that had been in gestation:
  - Chinese demand growth slowdown;
  - emerging market economic slowdown;
  - fuel switching and carbon efficiency;
  - the US shale revolution;
  - production growth from Canada, Brazil and the Gulf of Mexico;
  - decreasing disruptions, i.e. the production restart in Libya; and,
  - OPEC’s gambit to incur short-term pain to let the market find weak producers (OPEC gave market management over to financial markets with no suggestion of any price floor, the consequences being increased volatility, excessive price swings, and false consensus on clearing prices).

# The co – existence of short and long term cycles

**The supply side**

- Volumes of shale gas and liquids, and the surge in supply, have catalysed short - term cycles in oil markets.
- The oil price continues to respond to the drilling rig count, production in the US, and reports on inventories.
- Whilst the influence of the short - term market is significant for price formation, longer - term fundamentals should not be ignored.
- Due to the drop in the oil price investment projects have been cancelled or postponed with projects still on hold even with the recent price recovery.
- Coupled with the decline in legacy fields there is a need for an additional 20 million barrels of production a day to meet projected demand.

# The co – existence of short and long term cycles (cont.)

**The demand side**

- Only around 24% of the power generated is by renewables.
- The use of hydrocarbons in the transportation sector is actually growing (it is projected that in 2040 only 150 million out of 2 billion vehicles will be electric).
- Petrochemical production is growing at 3% a year.
- The one billion people who currently do not have access to energy will create a growth in energy demand, in addition to the two billion people whose consumption of energy is currently limited.
- Between 2015 and 2030 there will be significant changes in the twenty most populated countries and a significant increase in urbanisation, i.e. cities with populations over five million people.

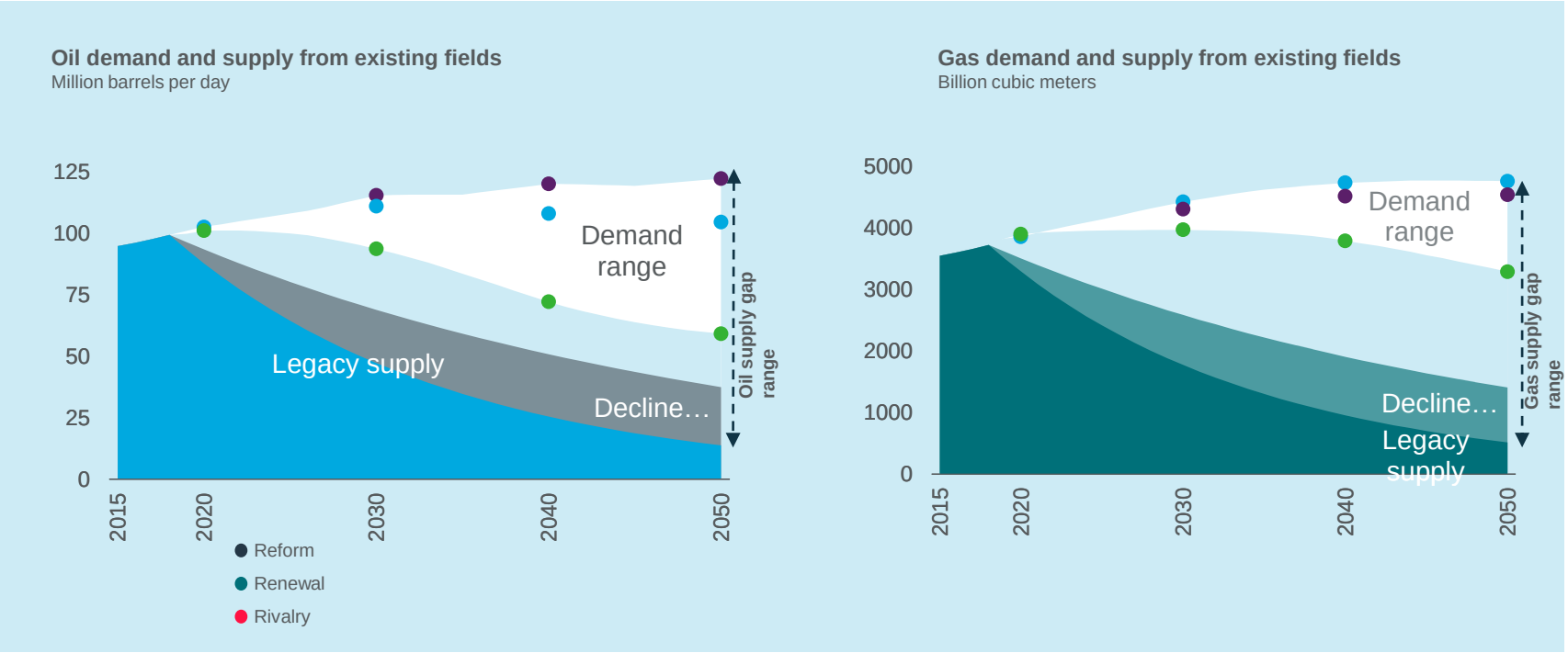
# Conclusion: the emergence of diverging paths

- Recent signpost show diverging paths in terms of growth, efficiency, cooperation, technology and, geopolitics:
  - higher carbon prices
  - booming electric vehicle sales
  - record solar and wind capacity
  - renewable costs are dropping
  - Paris Climate Agreement was adopted

  **But**
  - coal demand is up
  - LNG market is growing
  - energy demand was up over 2% in 2017
  - CO2 emissions are up
  - US China trade tensions and growing conflict in the Middle East

# What is the need for new oil and gas investments?

**Large investments in all scenarios, although significantly less in Renewal**




Source: IEA and BP (history), Equinor (projections)

# Conclusion: three scenarios – variations on a theme

- Three scenarios are being envisaged by the major E&P companies:
  - The Renewal Scenario is the successful adherence to the Paris two degrees target through global cooperation and technology advance.
  - The Reform Scenario is based on the  lowering of cost for renewables, technology advance, and some cooperation.
  - The Rivalry Scenario results from the lack of cooperation and the continuation of boom and bust cycles.
- Large investments in the exploration and development of new fields, and in particular gas, are needed by 2050 in all scenarios.
- There is a growing demand for fossil fuels with the growing demand for petrochemical products, and the growing demand from the transportation sector.
- Even in the Renewal Scenario demand is significantly higher than legacy supply with a reduced depletion decline.

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Louis Skyner, an English qualified solicitor, headed the Russia & CIS oil & gas practice of a large international law firm from July 2013 to April 2017. He joined Dentons as Partner on 1 May 2017.

His practice has primarily been based on advising international oil & gas companies on their participation in upstream and downstream projects in Russia & the CIS,  Russian oil companies on their activity outside Russia, and joint ventures / operators on a variety of regulatory and contractual issues. This work has involved the structuring and financing of projects being developed under concession, production sharing, and risk service agreements, and the structuring of the sales arrangements used by them.

In addition, over the past couple of years, he has advised the project sponsors of a number of renewable power generation projects in the CIS on their structuring and financing.

Prior to July 2013 Louis worked as leading legal counsel at Statoil, based in Oslo, Dubai and then from 2010 in Moscow. In this position he supported Statoil's participation in oil, gas and LNG projects in both Russia and the Middle East.

Aside from his legal practice Louis has authored numerous articles on Eurasian energy market regulation, economics and politics, from 2005 to 2011 as an associate fellow at Chatham House in London, from 2012 to 2014 as adjunct professor of the New Economic School in Moscow, from 2015 to 2016 as associate professor of the European University in St Petersburg, and from 2016 as an associate fellow of the Forum for Central Asian Studies at the University of Cambridge. Louis was awarded a doctorate by the University of Cambridge in 2002.