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# Planning for the infrastructure of tomorrow: **towards a next generation of EU infrastructure policies?**

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# Outline



1. European network planning today
2. Energy system opportunities
3. Why change the way we plan now?
4. Towards a next generation of infrastructure policies?

# European energy network planning today



- Guided by the **Trans-European Networks for Energy (TEN-E) regulation** from 2013. Priorities based on European Commission modelling from 2009.
- **Projects of Common Interest (PCI) process:** projects assessed separately for gas and electricity based on the criteria of Security of supply, Cross-border market integration, Competitiveness, Sustainability
- **Ten-Year Network Development Planning (TYNDP) led by the transmission system operators for gas and electricity:**
  - Planning done with a view to 2040
  - Most recent scenarios show electricity use increasing and gas use (largely) decreasing, but very little variation, 2040 emissions still >500mt CO<sub>2</sub>e
- **Funding:**
  - European Investment Bank estimates gap of **€18bn** annually in energy networks infrastructure alone
  - **Regulated Asset Base approach** dominant in the EU
  - EU funding instruments: Connecting Europe Facility – 65%, European Fund for Strategic Investments – 13% on high-carbon infrastructure

# Energy System Opportunities

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# Decarbonisation



- 1 A **deeper path for decarbonisation** than expected a few years ago  
Paris Climate Change Agreement 2015:
  - **Art. 2 (1):** “Holding the increase in the global average temperature to **well below 2 °C** above pre-industrial levels and pursuing **efforts to limit the temperature increase to 1.5 °C**”
  - **Art. 4(1):** “...to achieve a **balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases** in the second half of this century.”→ Decarbonisation of transport & heat, role of gas?
- 2 A **steeper path for decarbonisation** than expected a few years ago
  - Low carbon technology costs have fallen or are falling, most importantly those of renewables energies & batteries
  - Coal is becoming uneconomic, gas has also been on decline
  - Carbon Capture and Storage has not come forward at the rate expected – in 2011 we expected 6 demonstration plants to be up and running by now→ Energy system expected to decarbonise first

# Decentralisation



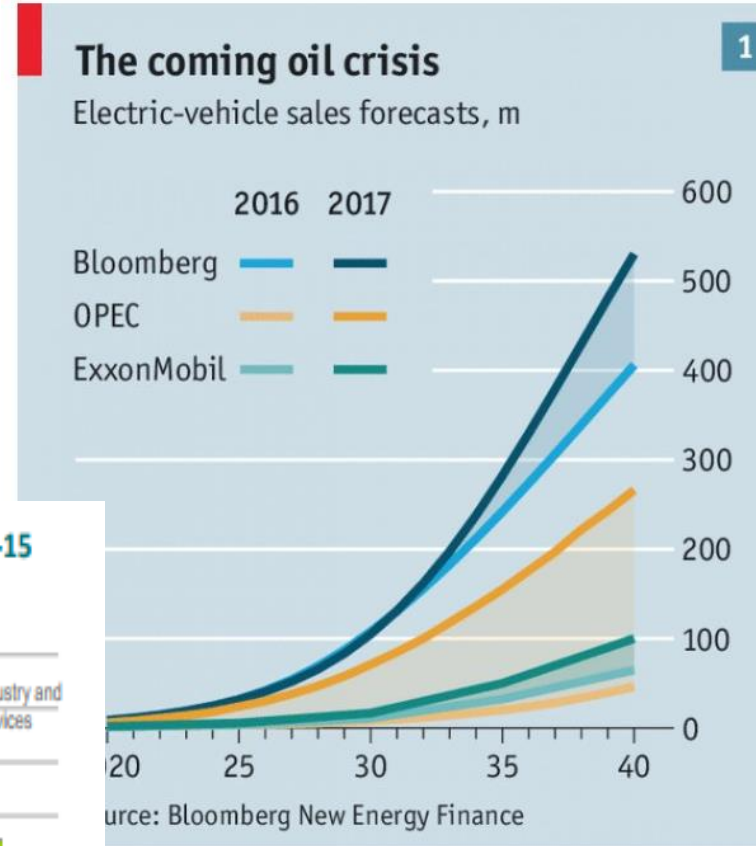
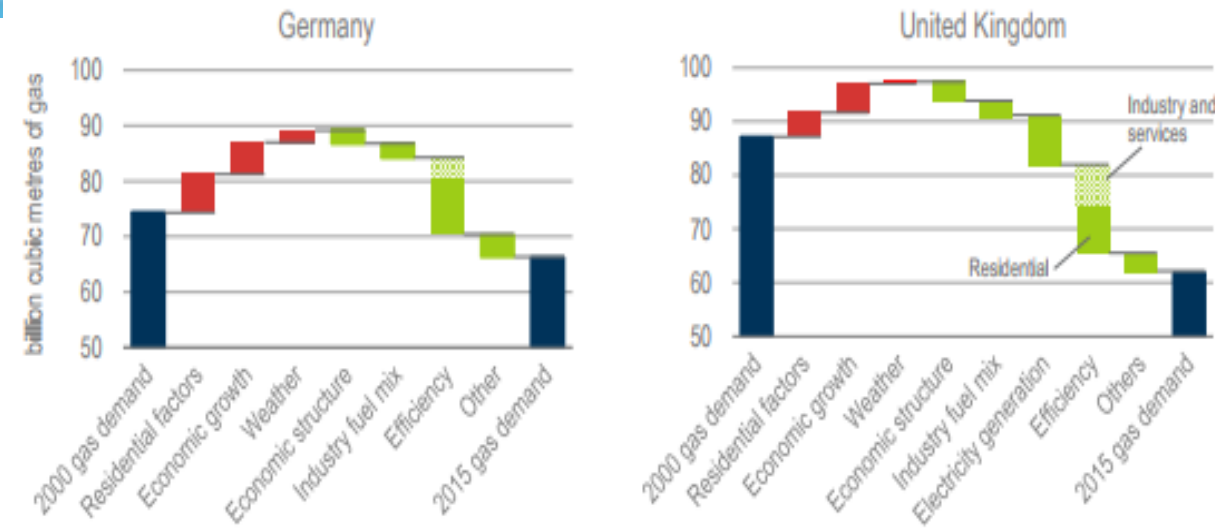
- **New installations dominated by renewables:** Of the 24.5GW of power generation capacity added in 2016, 21.1GW was renewables
- 90% of renewable energy sources are **connected to the distribution grids**
- Demand-side response & local generation mean **balancing at a smaller system level**

- **Digitisation as an enabler:**
  - Enables **shift from centralised fossil-fuel power generation to intermittent & more distributed generation**
  - Helps to **reduce overall electricity demand** through enabling demand side response
  - Allows for **better utilization of existing infrastructure** and a reduced need for new, centralised large-scale infrastructure investments
- **Obstacles to digitisation:**
  - Funding not covered through a **regulated asset base**
  - Brings **cyber security risk** with it

# Redefinition of energy infrastructure



Figure 1.19 Decomposition of gas demand in Germany and the United Kingdom, 2000-15



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# Why change the way we plan now?

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# Infrastructure lifetime

The infrastructure policies of today need to be suitable to build the infrastructure for the long term:

Infrastructure type	Estimated operating life span
Gas transmission grid	80 years
High voltage AC transmission network	60-80 years (40 years for overhead lines)
Nuclear power station	60 years
High voltage DC (HVDC) interconnector	40 years (20 years for valves & systems)
Gas-fired power station (CCGT)	30 years
Onshore windfarm	20 years

Sources: National Grid<sup>[1]</sup>, EDF<sup>[2]</sup>, Policy Exchange<sup>[3]</sup>, Dodds and McDowall (2013)

<sup>[1]</sup> National Grid, [www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=13784](http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=13784)

<sup>[2]</sup> EDF, <https://www.edfenergy.com/energy/nuclear-new-build-projects/hinkley-point-c/news-views/gas-blog>

<sup>[3]</sup> Policy Exchange, <https://policyexchange.org.uk/publication/powering-up-the-future-of-onshore-wind-in-the-uk/>

- Review – not revision - of the **TEN-E regulation** this year
- European Commission due to propose headlines of **next multi-annual financial framework** (“MFF”/”EU budget”) in 2018
- Development of **EU 2050 decarbonisation roadmap** and **national energy and climate change plans** (NECPs) opportunity to map out clear pathways

# Towards a next generation of infrastructure policy policies?

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# Challenges for the gas & electricity transmission networks



- Gas networks
  - Decrease in gas demand and managing a declining gas network
  - Understanding the value of alternative gas
- Electricity networks
  - Uncertainty on volumes and profile of demand, particularly related to electrification of transport and heat
  - Location and type of renewables incl timing and extent of decentralised/demand-side tech
  - Increased need for “soft” infrastructure investment

# Towards a next generation of infrastructure policies?



- **Who makes choices?**
  - Transmissions system operators not well placed to make cross-sectoral & integrated choices, need for a more comprehensive, long term perspective
- **How to best make the choices?**
  - Need for an updated, cross-sectoral 2050 picture in line with the recent decarbonisation trend
  - Focus on promoting innovation, piloting, testing, exchange of best practise
  - Redefine the notion of energy security
- **How to fund future infrastructure?**
  - Review role of the CEF to align with decarbonisation trend & lack of electricity projects
  - Need to channel funding into “soft” infrastructure → dedicated funding + regulatory change
  - Who will pay for underutilised gas infrastructure?



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## About E3G

E3G is an independent climate change think tank operating to accelerate the global transition to a low carbon economy. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. In 2016, E3G was ranked the number one environmental think tank in the UK.

More information is available at [www.e3g.org](http://www.e3g.org)