



Net Zero and the impact of electrification

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strategy&

Part of the PwC network

Net Zero: investment drivers are strengthening

Policy and regulation

Global deal on climate, rapidly strengthening national regulation and legislation including over one hundred countries committing to become “net zero by 2050”. **COVID-19 impact may be positive**

Investor demand

Over \$35Tn AUM (one third of tracked AUM, and counting) committing to portfolio decarbonisation targets and/or investing in low carbon funds and holdings.

Consumer demand

The impact of social influencers such as Greta Thunberg and David Attenborough is finally starting to increase the understanding and drive a **demand for more climate-friendly products and services**

Corporate demand

Net zero transformation commitments from over 200 major corporations, and growing. Companies are not just looking to buy in decarbonisation solutions but also to invest in corporate VC themselves

Technology and infrastructure

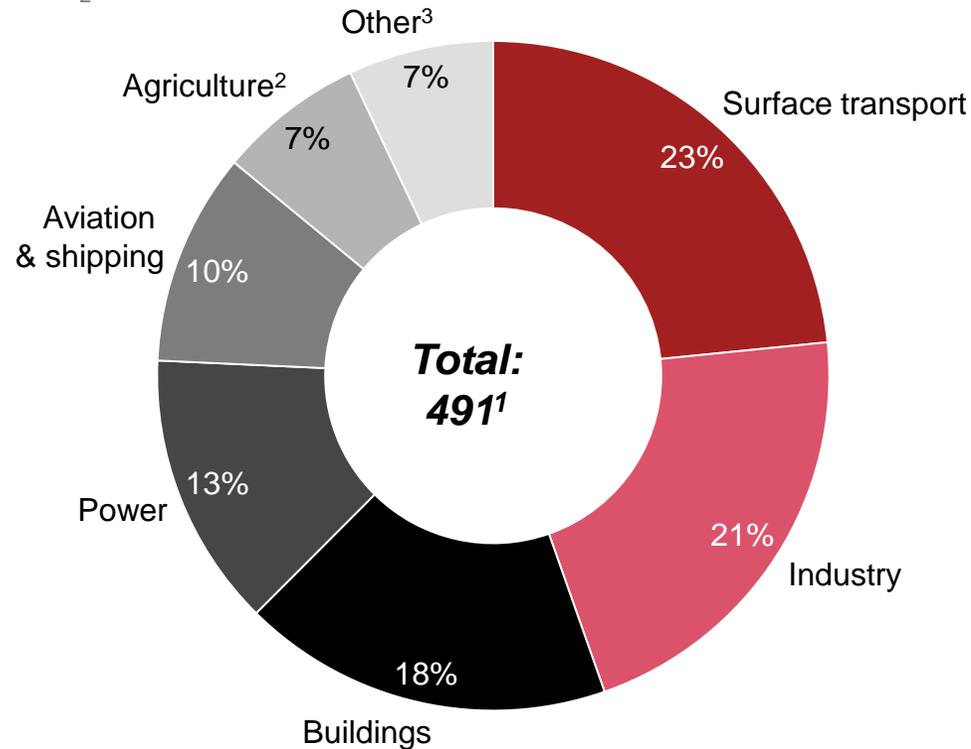
Technology advances and infrastructure investment have driven costs down and new technologies - like AI, cloud, and sensors - are **enabling scaling, optimisation and entirely new business models.**

Action is needed across sectors: in the UK, emission reductions have been happening already, but are not evenly spread

UK GHG emissions

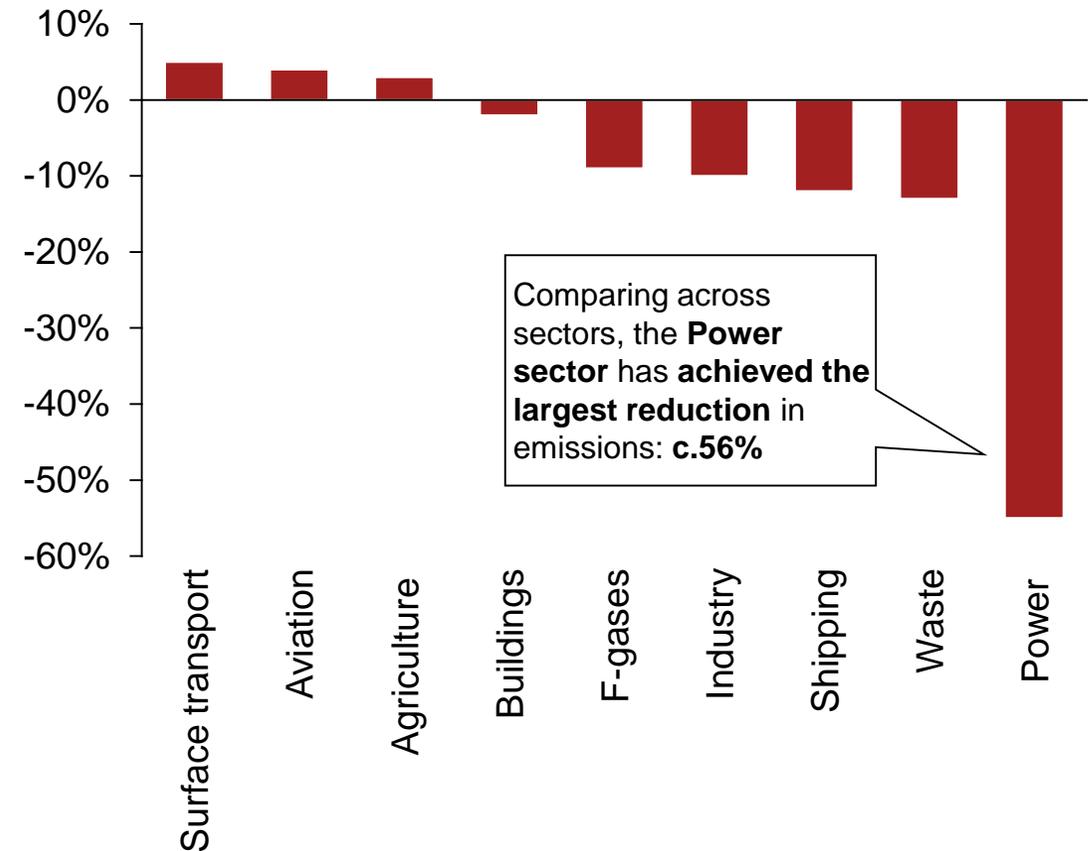
Emissions in 2018

MtCO₂e



Change in emissions

2013 - 2018



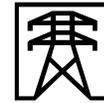
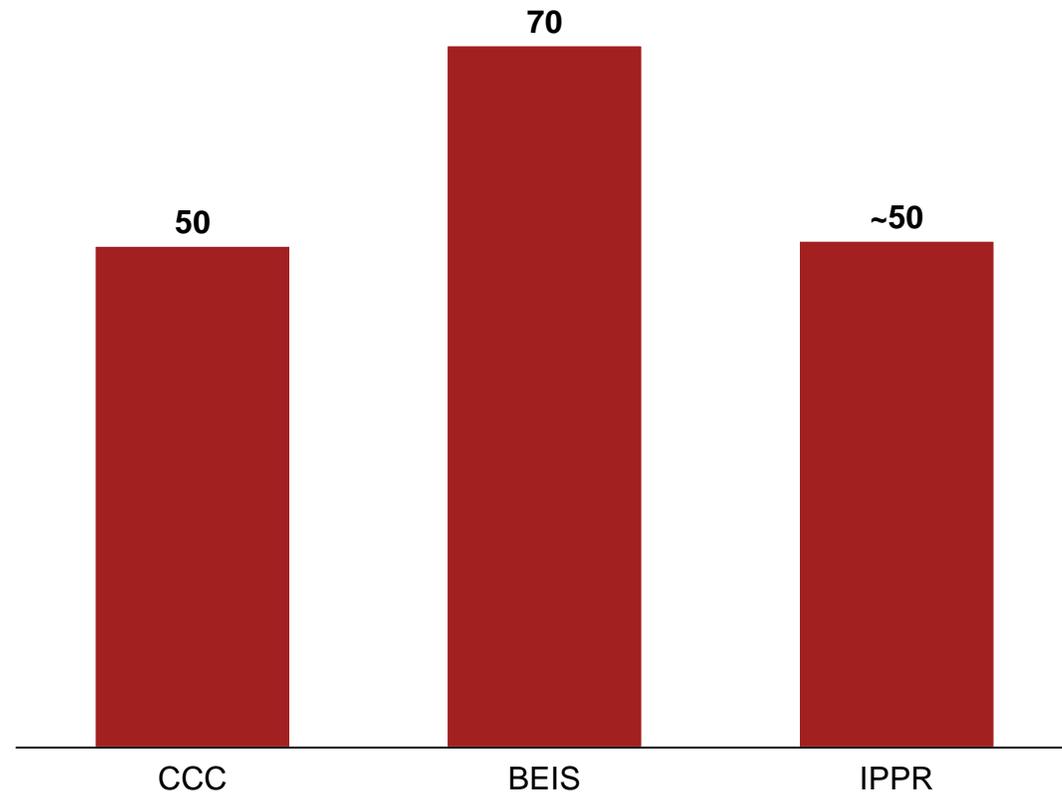
Comparing across sectors, the **Power sector** has achieved the **largest reduction** in emissions: **c.56%**

The UK transition will require investments of £50-70bn p.a.

UK Net Zero investment requirement

Investment requirement/cost to deliver on UK Net Zero targets

£bn p.a.



Power

Clean energy is projected to require an additional **c.£10bn p.a.**



Building

CCC estimates that buildings will require c.£15-20bn p.a. higher investment levels in 2050 than would have been required under business-as-usual



Transport

To support a electrified or alternative fuel transport system, significant investments are required into **new supporting infrastructure**



Industry

Largely dependent on higher adoption of carbon-capture storage and a switch to hydrogen use. IPPR estimates c. 2-5bn p.a. investment required

2. Role of electrification & the impact on investment



Power sector infrastructure

Higher power demand from electrification of heat and transport will have number of implications



Low carbon power

- Continued need for more clean power generation capacity
- Reducing subsidies mean new business models required for investment



Grid infrastructure

- Grid reinforcement
- Anticipatory investment
- Smarter grid infrastructure and systems
- DNOs now managing two-way flows and new load patterns



Flexibility

- The system requires flexible power sources
- Batteries
- Peaking plants
- Interconnectors
- Other storage
- CCGTs



Demand side

- Demand side management and response technology to run the system efficiently: matching demand with supply
- Aggregation of distributed energy sources



Distributed power

- Distributed power generation will be a major feature of new power sources
- Centralised fossil fuelled power plants are increasingly less viable

Buildings and Industry

Substitution of electricity for heat in buildings and more dynamic energy management

1

Heat pumps

- Alongside alternatives such as hydrogen, biogas and heat networks
- Particularly in new-build domestic premises
- Retrofit may lead to reduced demand for gas

2

On-site generation

- Increased reliance on power as key source of energy
- Desire for greater energy security alongside
- Reducing costs of technology

3

Energy Services

- Increased electrification drives a desire to reduce power costs
- Energy efficient technologies
- Greater optimisation of on-site energy usage

4

Smart Meters

- Combined with time of use tariffs, smart meters can lead to lower bills – particularly relevant as EVs become more mainstream
- Increased home working may drive greater take-up in domestic premises

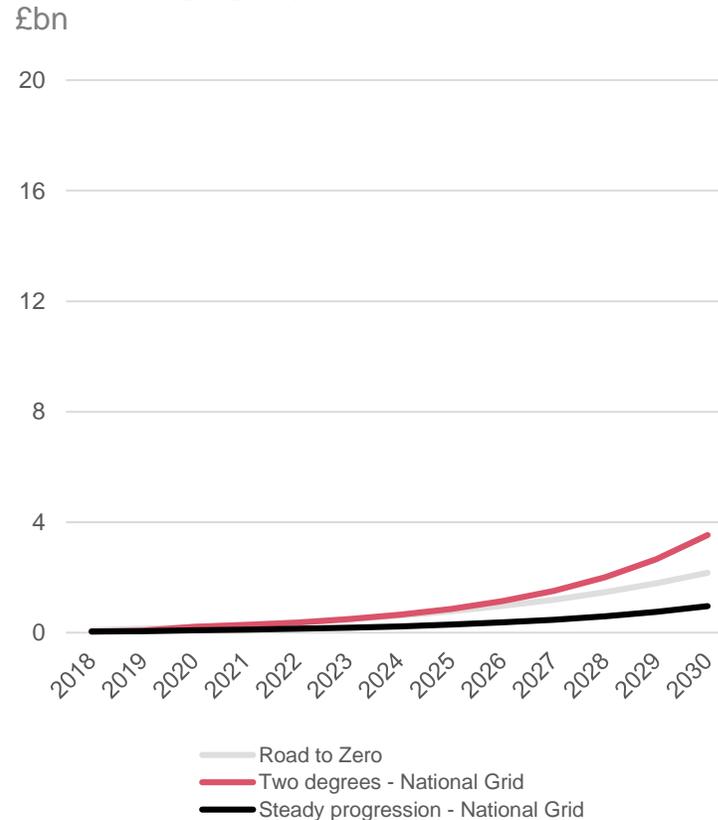
Transport infrastructure

Demand for EVs is rising and new charging infrastructure will replace need for conventional fuelling

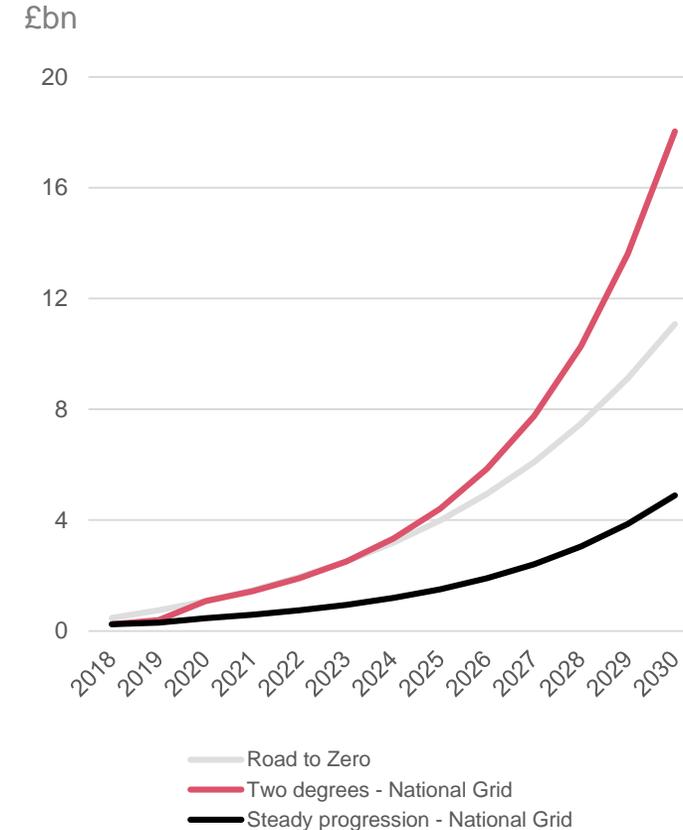
Key investment themes:

1. Different business models for different charging locations
2. Most charging will take place at home but public chargers required at destinations and SRN
3. Fleet charging presents greatest near-term opportunity

Home charging capex investment



Public charging capex investment



Sources: (1) European Environment Agency recommends 10 EVs per charging point (“Electric Vehicles in Europe” report), currently there are 17 EVs per connector based on ZapMap statistics. (2) “The Provision of Rapid Charging Points in London”, Analytically driven 2017 estimates £40 - £50k per device, and the TfL press release “Electric Vehicle Scheme” implies £60k a device. (3) PwC 2018 report “Charging Ahead”. Calculation assumes that each EV owner who charges at home will have one charging device. (4) Assumption based on market data points, including research from EV Charging Solutions website.

Thank you

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