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How institutional investors can unlock the potential of next-generation sustainable infrastructure

Pensions for Purpose

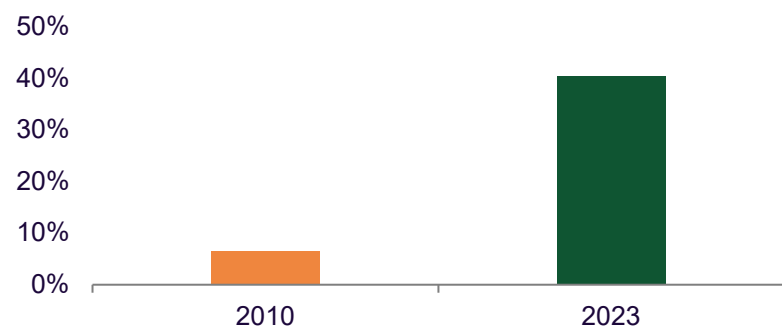
4 July 2024



octopusinvestments
A brighter way

We've made a good start with renewables

UK renewables penetration¹



Octopus Renewables FUM²



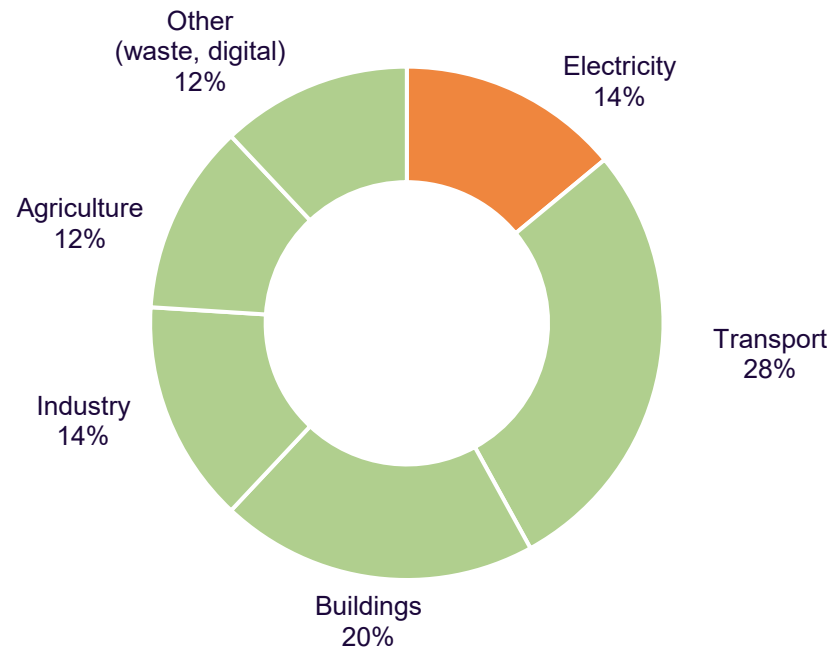
¹ Source: National Grid (2023) Future Energy Scenarios. ² Source: Octopus Renewables Limited, as at 31 December 2023. Funds under management data includes undrawn commitments, funds under advisory, and funds monitored.



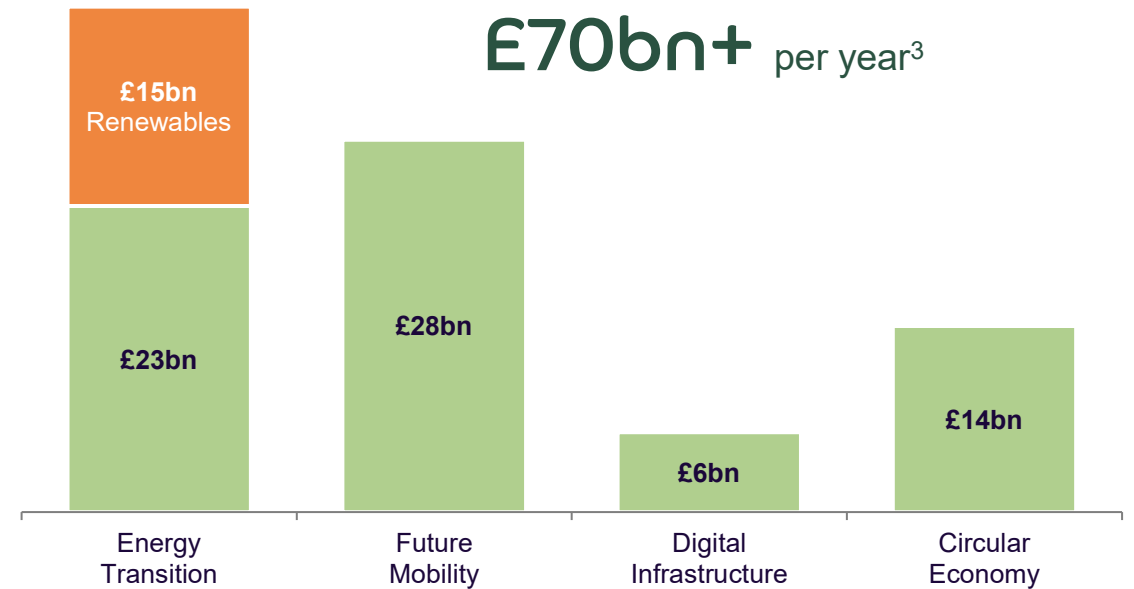
But more needs to be done

Hitting net zero will require decarbonising the whole economy – not just the power sector

UK 2022 GHG Emissions (MtCO₂e) by sector¹



Infrastructure investment per year required to hit net zero by 2050²



¹ Source: UK 2022 UK Government Emissions Data. ² PwC (2020): Unlocking capital for Net Zero infrastructure. ³ Source: National Infrastructure Commission (2023), Second National Infrastructure Assessment: Unlocking capital for Net Zero infrastructure, Climate Change Committee (2020), Sixth Carbon Budget.

A large part of carbon reduction is linked to utilities used by all of us

Path to decarbonisation

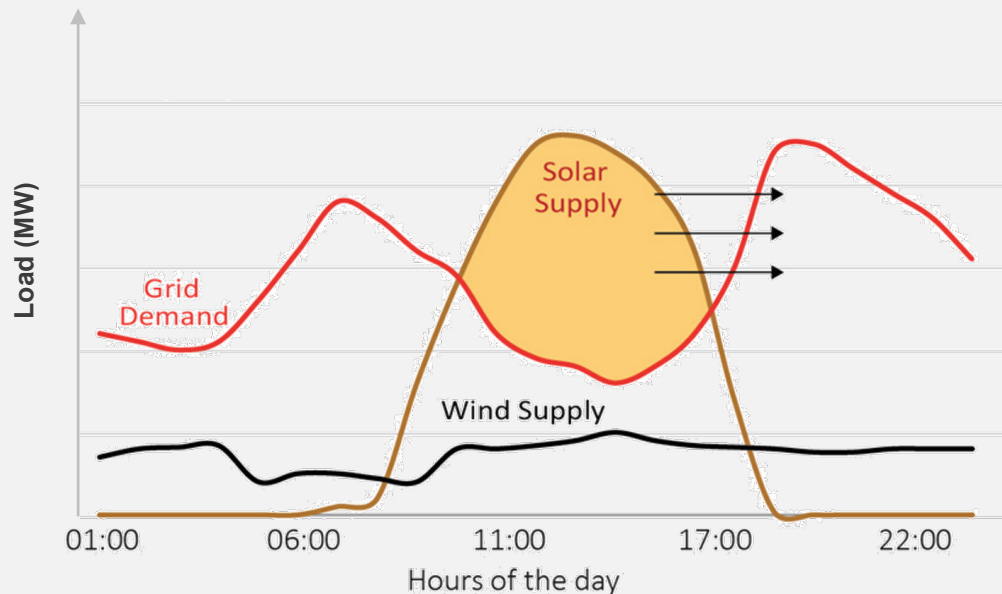
- Electricity** —> Renewables and storage
- Heat** —> Electrification
- Transport** —> Electrification and sustainable fuels
- Digital** —> Energy efficiency (liquid-cooled datacentres)
- Waste / water** —> Reduce, re-use, recycle



Energy Transition: enabling infrastructure

Full renewables penetration can't be achieved...

Illustrative profile of daily supply and demand mismatch



Source: Battery storage: The answer to renewable energy intermittency ([Link](#)).



... without new storage and network infrastructure



Energy storage:
Short and long duration

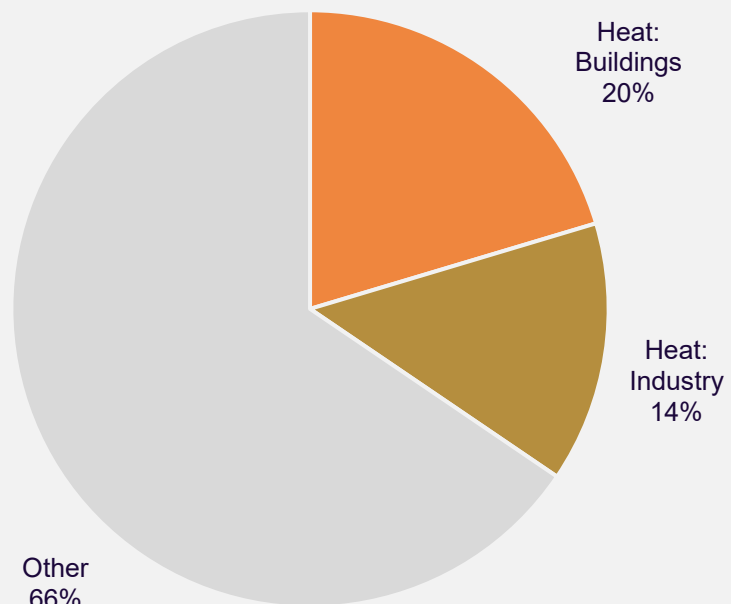


"Smart" electricity network:
Modernised and multidirectional

Energy Transition: heat

Heating accounts for 34% of UK
GHG emissions¹...

UK GHG Emissions (2022)¹



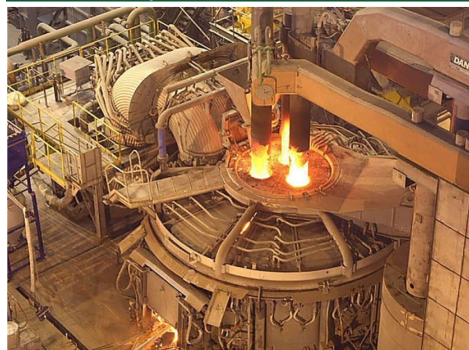
... but proven green solutions exist!



<200°C Heat:
Heat Pumps – domestic and industrial



Heat Networks:
Waste heat capture



<200°C Heat:
Thermal storage and electric arc furnaces



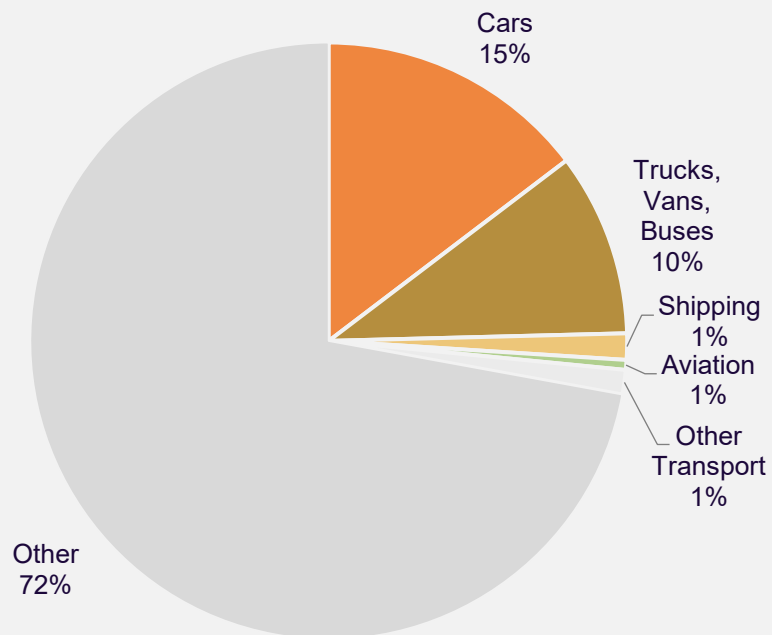
¹ Source: UK 2022 UK Government Emissions Data.



Future Mobility

All forms of transport will need to decarbonise...

UK GHG Emissions (2022)¹



¹ Source: UK 2022 UK Government Emissions Data for territorial emissions (excluding international aviation). International aviation accounts for 8% of total UK greenhouse gas emissions, as per Department for Business, Energy and Industrial Strategy (2021); Final UK greenhouse gas emissions national statistics: 1990-2019.

... requiring supporting infrastructure (mostly electric, but also sustainable fuels)



EV charging



Heavy vehicles charging



Clean fuel production



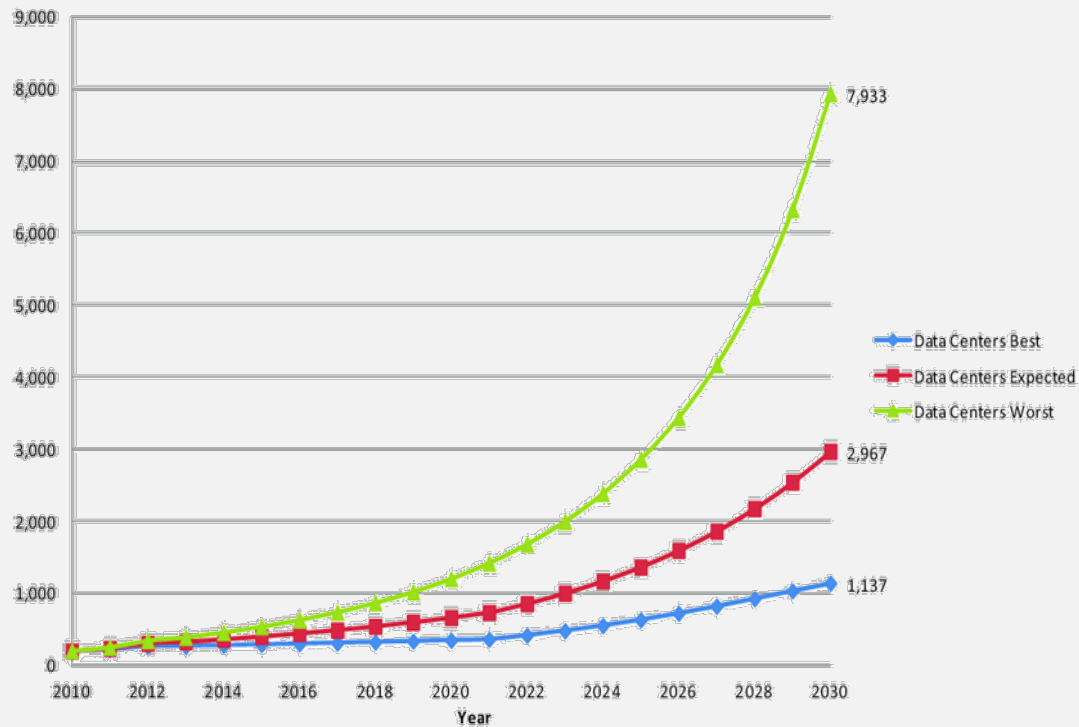
Digital Infrastructure

Exponentially growing data use means exponentially growing electricity demand...

... meaning digital infrastructure will need to become far more efficient



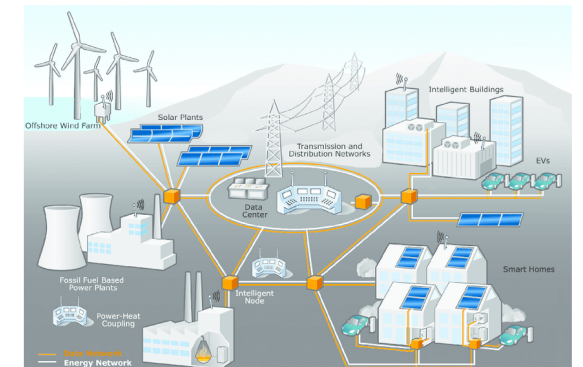
Electricity usage (TWh) of Data Centers 2010-2030



Source: Researchgate; Global electricity demand of datacentres 2010-2030.



Liquid cooled data centres



Private networks

Circular Economy

Waste accounts for 5% of emissions¹...



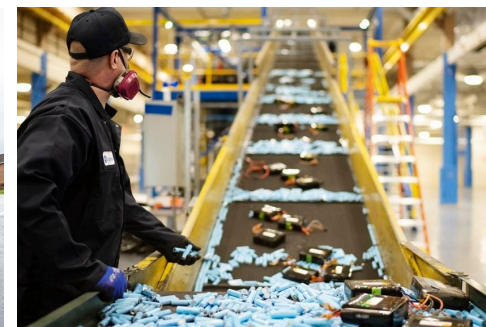
... encouraging re-use reduces CO₂ needed to produce new material



... moving to a circular economy will require...



Collection



Sorting



Processing



¹ Source: UK 2022 UK Government Emissions Data.

Near term sectors with investable asset classes



Future Mobility

EV charge
point operator

Construction Equipment
Rental

Heavy Goods Vehicles
Service Stations



Energy Transition

Long Duration Energy
storage

Heat networks

Grid infrastructure



Digital Infrastructure

Energy efficient edge data
centre operator

5G Infrastructure



Circular Economy

Plastic recycling

Battery recycling

Investable sectors with high growth potential and clear “Trigger Points”

Future Mobility

EV Charging Infrastructure¹

6x

by 2030

‘Trigger Point’:

Sale of new petrol and diesel vehicles banned in UK from 2035

Sustainable Aviation Fuel⁵

50x+

by 2030

‘Trigger Point’:

UK will require a % of aviation fuel to be SAF

Energy Transition

Energy Storage²

>8x

by 2035

‘Trigger Point’:

2024 government support for long-duration energy storage

Heat Networks⁶

10x

by 2050

‘Trigger Point’:

UK 2025 zoning regulation guarantees demand and offtake

Digital Infrastructure

Edge Datacentres³

20%

CAGR

‘Trigger Point’:

AI / cybersecurity trends requires data to be stored nearer end users

5G Cell Towers⁷

8x

subscription share growth to 2027

‘Trigger Point’:

UK government target of standalone 5G in all populated areas by 2030

Circular Economy

Plastic Recycling⁴

3.5x

UK market growth by 2030

Trigger Point:

2022 Plastics Tax and corporate ESG pledges to 2030-35

Battery Recycling⁸

10x

by 2030, creating large-scale waste stream

Trigger Point:

Sale of new petrol and diesel vehicles banned in UK from 2035

Sources: ¹ UK Department for Transport Target; ² Aurora Energy (2022): Long Duration Electricity Storage in GB; ³ PwC (2018): Edge data centres: how to participate in the coming boom; ⁴ British Plastics Foundation (2021): Recycling Roadmap; ⁵ ICF (2023): Report for UK Sustainable Aviation; ⁶ UK Infrastructure Bank (2023) Heat Networks Strategy Update; ⁷ Verdict Article (2023): UK telcos to increase 5G mobile subs to 69.6% by 2027; ⁸ Nomura Greentech analysis (2023).

Tell us your thoughts



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