



DIGITAL TWINNING FOR TRANSPORT DECARBONISATION

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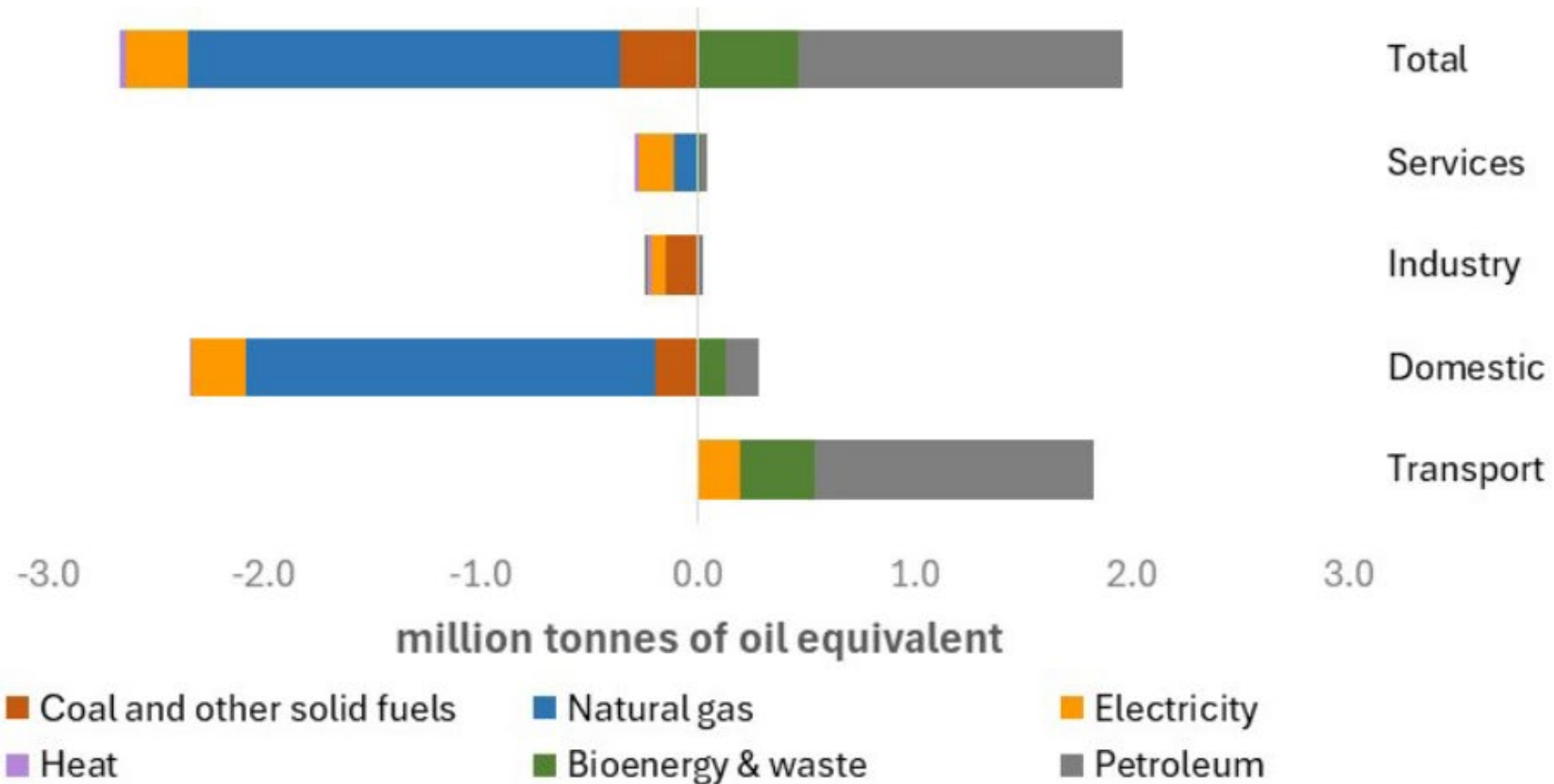
Durham
University



Engineering and
Physical Sciences
Research Council

Energy Consumption in the UK

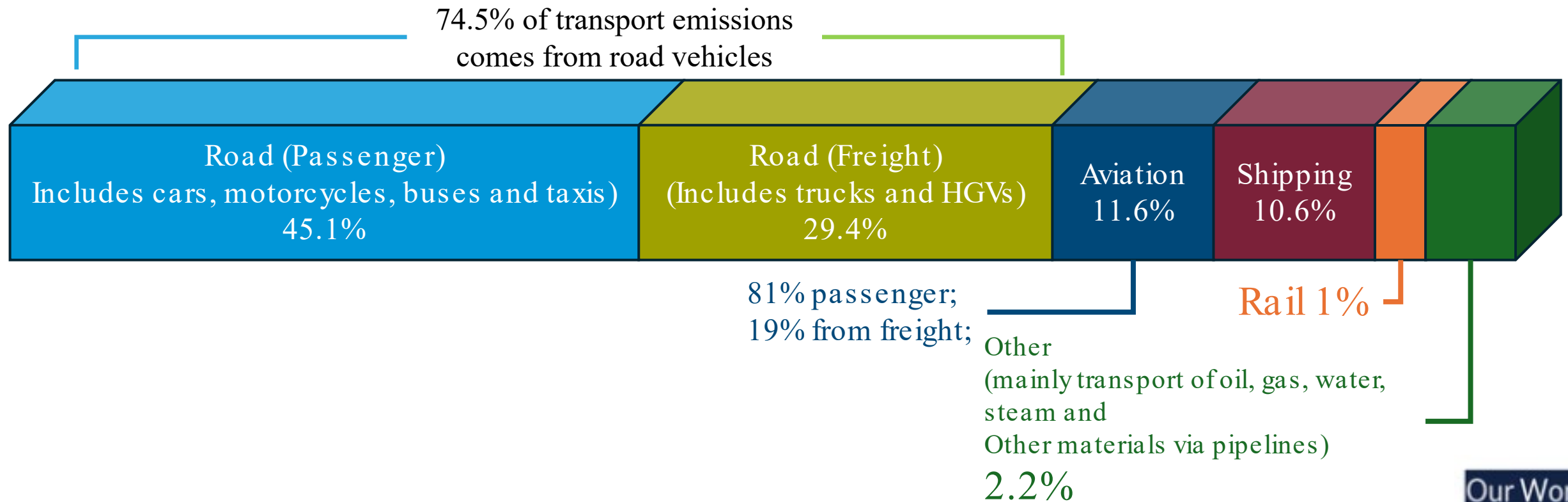
Chart 1.1 Change in consumption by sector and fuel, 2022 to 2023 (Table C1)



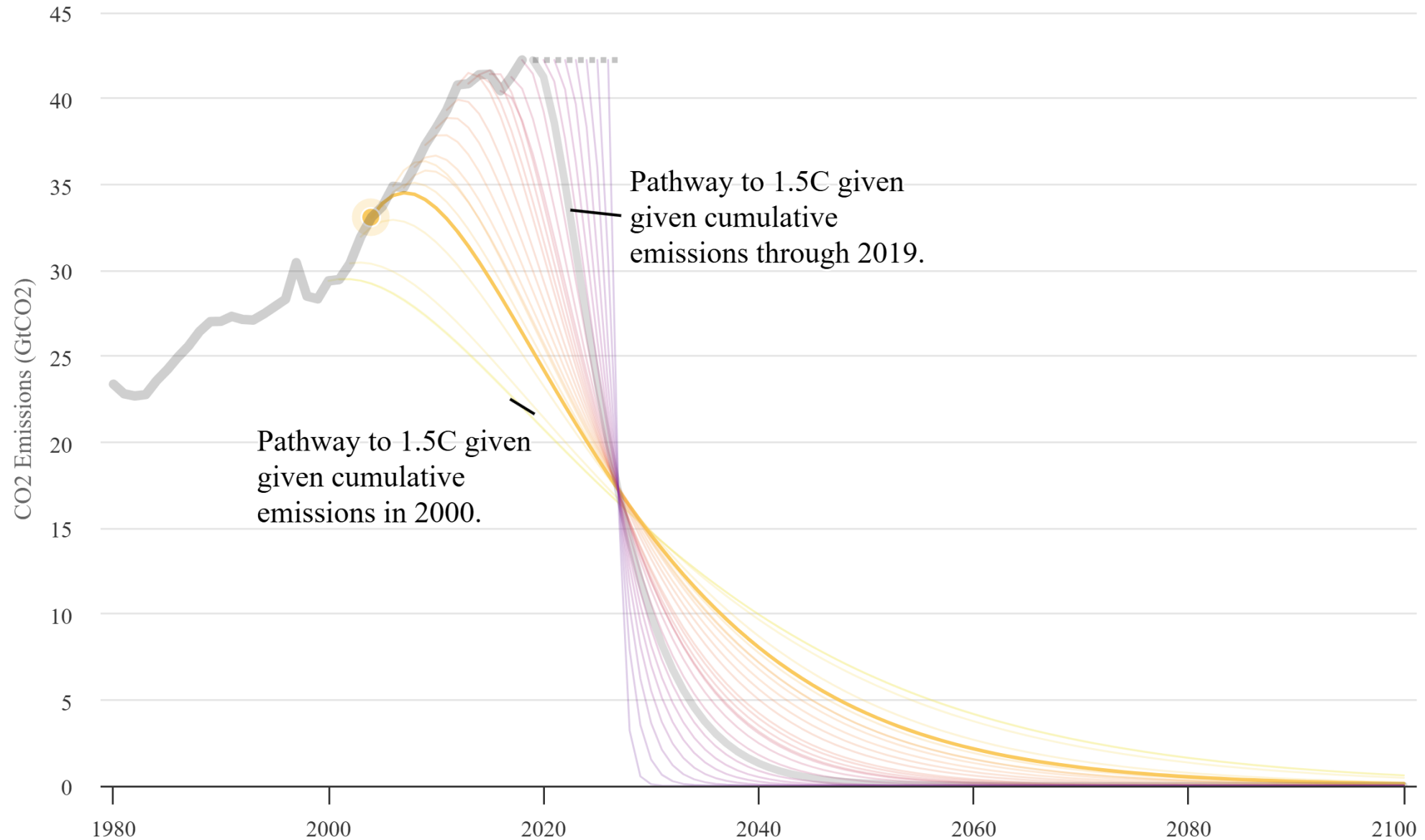
(Statistical Release 26 September 2024, DESNZ)

Global CO₂ emissions from transport

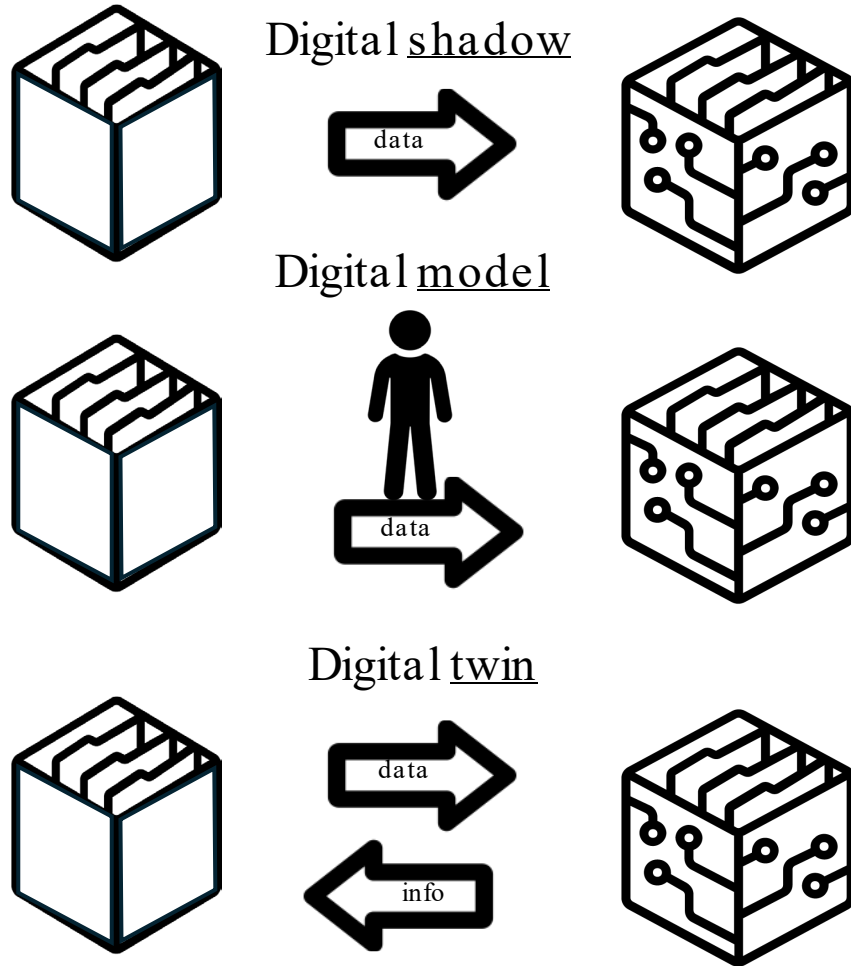
This is based on global transport emissions in 2018, which came to a total of 8 billion tonnes of CO₂.
Transport accounts for 24% of CO₂ from energy.



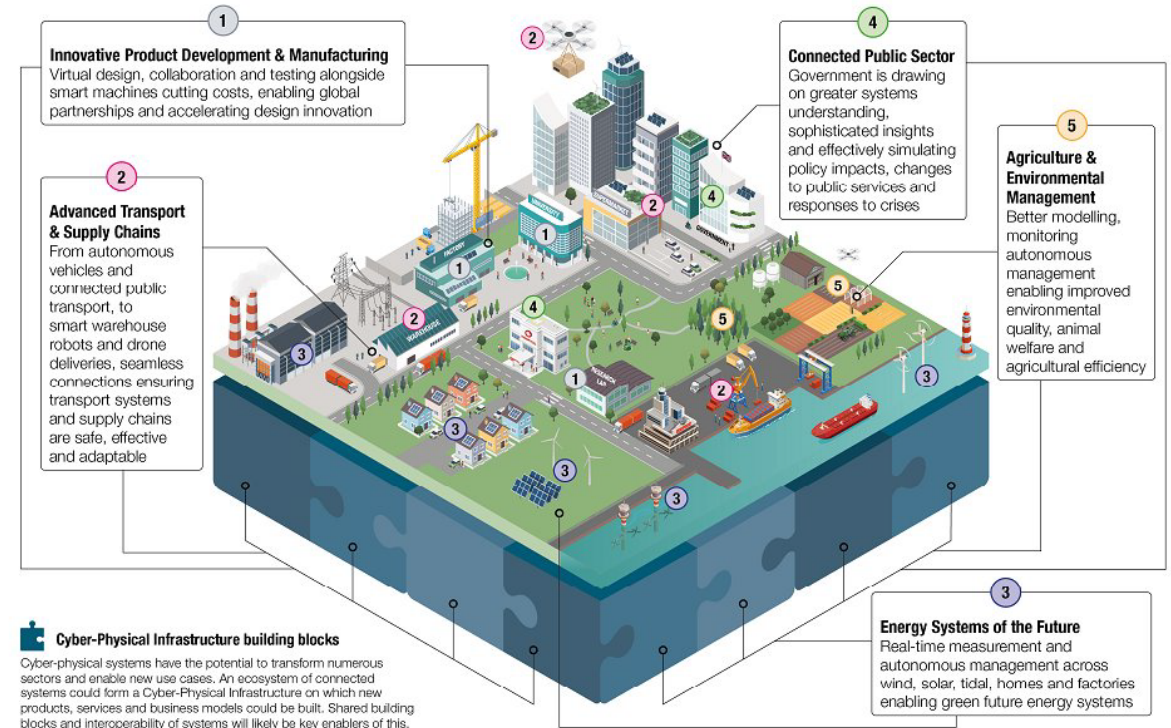
Limiting warming to 1.5C is increasingly difficult without large-scale negative emissions



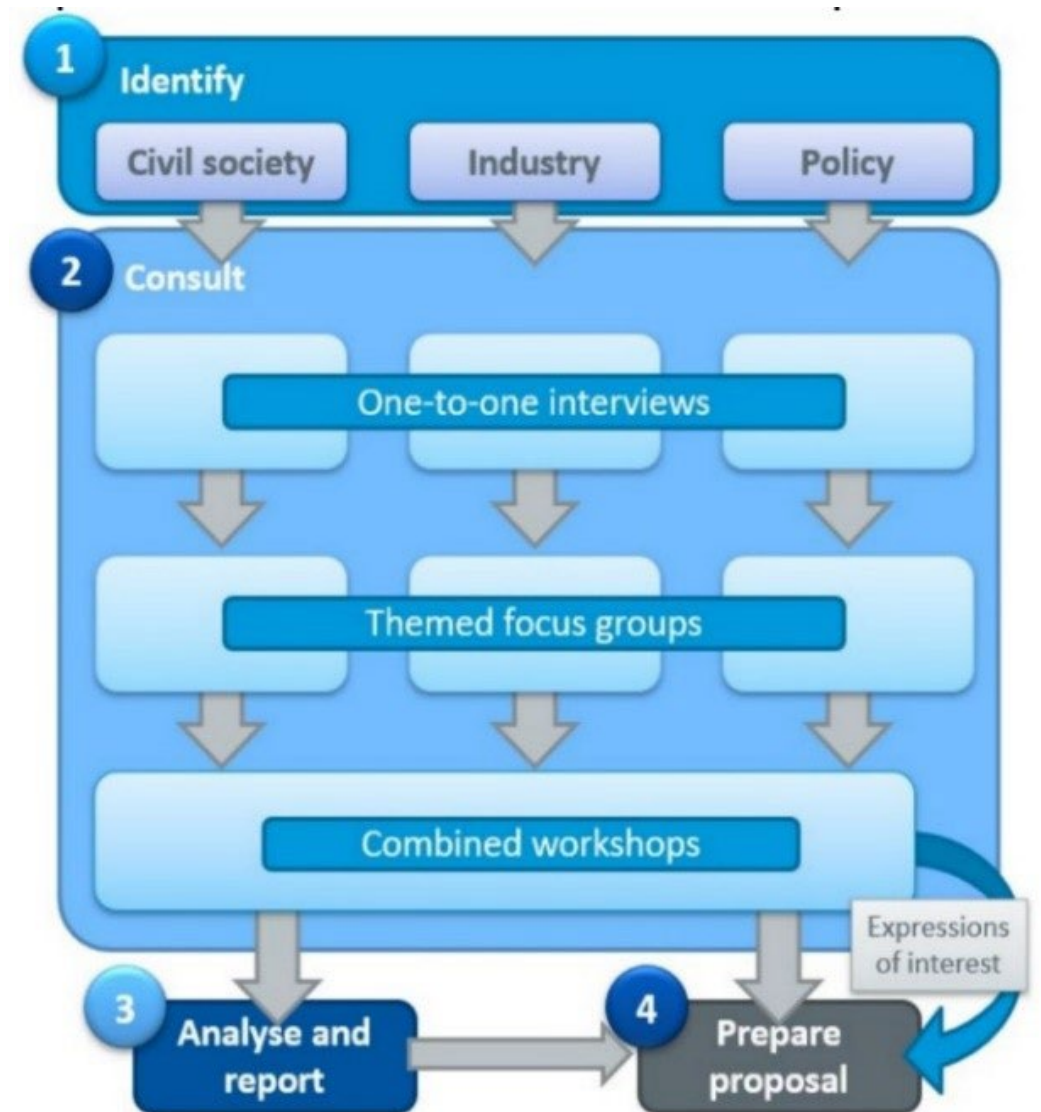
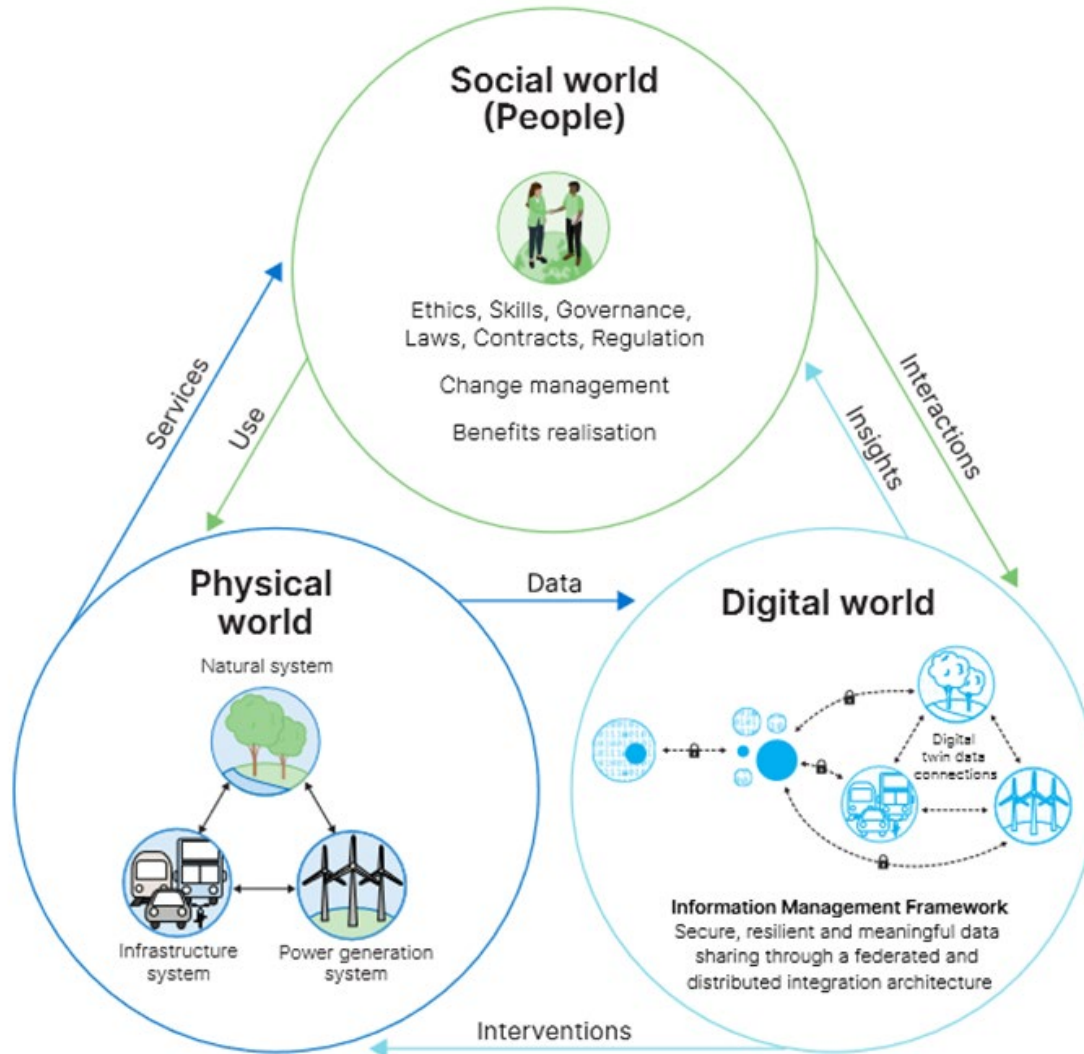
<https://www.carbonbrief.org/unep-1-5c-climate-target-slipping-out-of-reach/>



Applications of Cyber-Physical Infrastructure



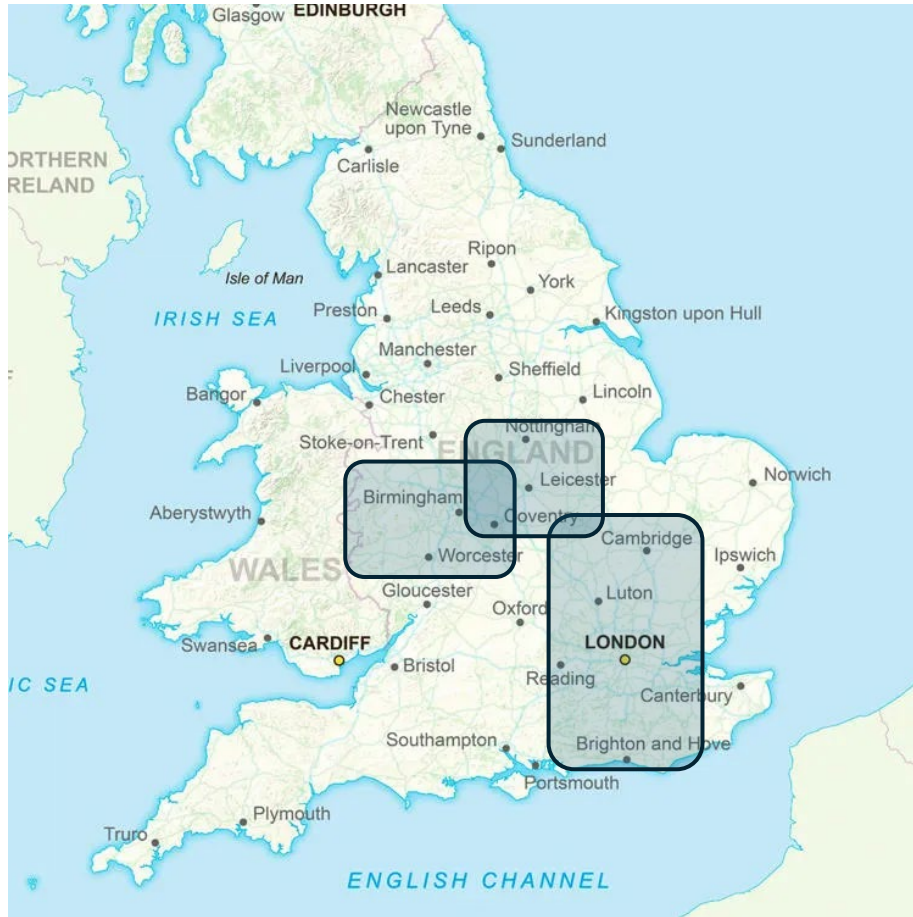
Creating the Vision for Transit



TransiT's 70 Partners



Challenge Led Demonstrators: Learning by Doing



- CLD 1: Port operations, Road Freight (Food and Automotive)
- CLD 2: West Midlands: Personal mobility, Public Transport, Integrated transport system, parcel and grocery last mile deliveries
- CLD3: Air transport (parcels), Parcel trunking and last mile deliveries

Vision:

A national digital twinning hub to deliver the thought leadership and coordination of an emergent digital twinning capability for UK decarbonisation and integration of transport solutions.

WP 6: Digital Twin
Challenge Led
Demonstrators



ROAD



MARITIME



RAIL



AIR



ASSET

*CLD1: Maritime +
Road Freight DT*

*CLD2: Rail + Road
Passenger DT*

*CLD3: Air
+ Road DT*

*CLD5: Asset
Operations DT*

WP 1: Knowledge
Graphs and Ontology

WP 2: Symbiotic
Digital Twins -
Human Factors

WP 3: Cyber-Physical
Security, Resiliency
and Connectivity

WP 5: Transport
Policy and Future
Transport Economy

WP 4: Digital Twin
and Federated
Network Design

*CLD4: All Modes
Integrated DT*

Federated System Of Systems

Deliverables

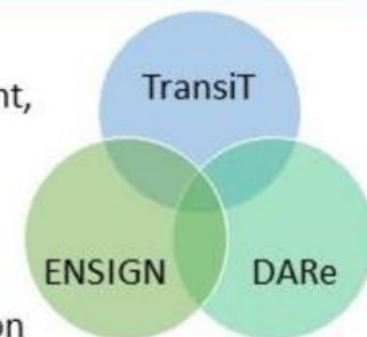
Knowledge Graph & Ontology Map;
Data Governance Framework & Database
Model; Interoperability Requirements

Human factors analysis; Behaviour &
decision models; Human-in-the-loop
interface

Comms requirements & CPI test bed;
Cyber Security strategy & network
architecture

Regulatory framework; Business model
canvassing; Decision-support tools;
Legal/liabilities landscape survey

WP 7: Management,
Governance and
Coordination of
National Digital
Twinning Strategy
for Decarbonisation





UK Research Hub

Digital Twinning for Transport Decarbonisation



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