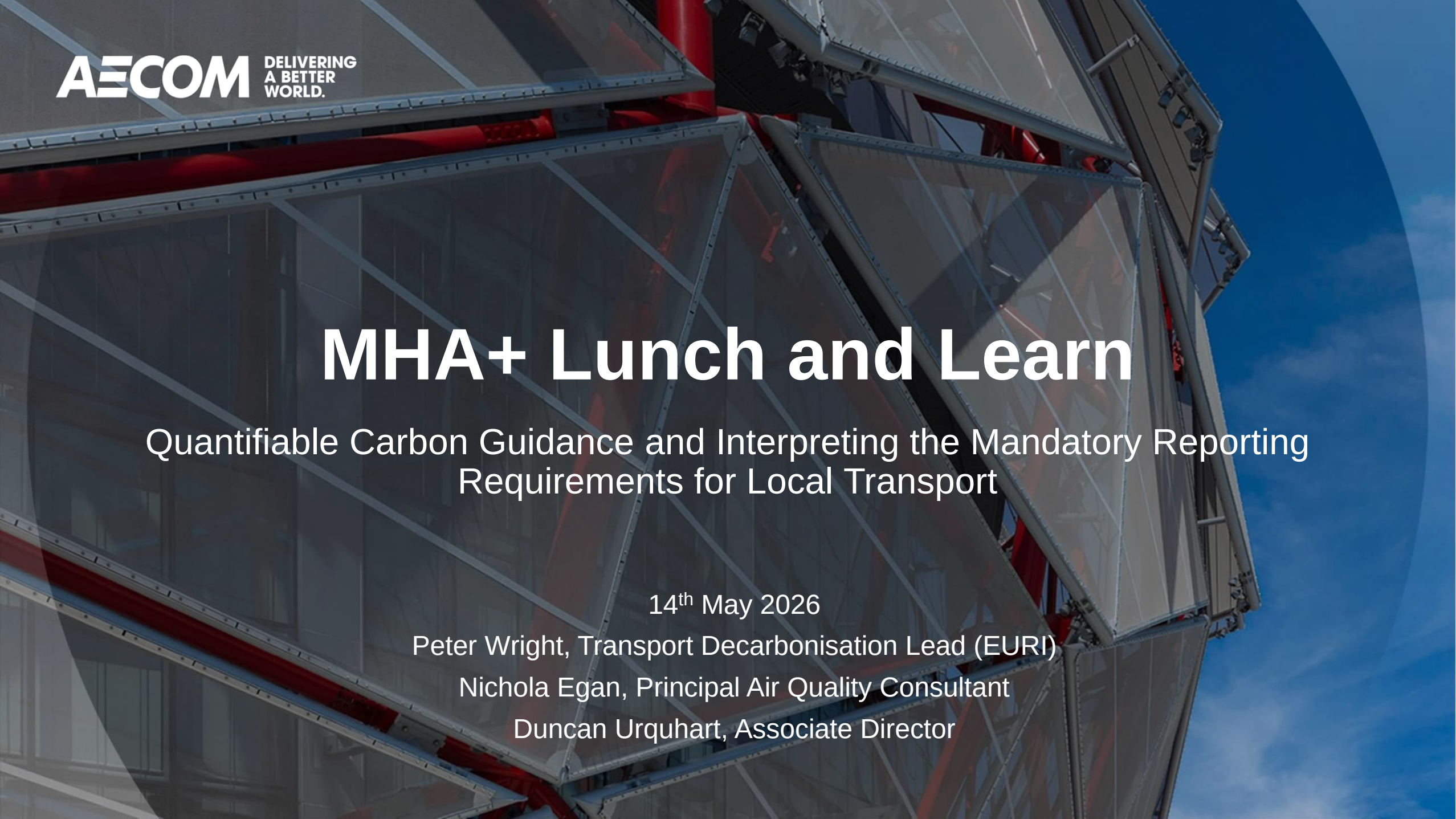


MHA+ Lunch and Learn

Quantifiable Carbon Guidance and Interpreting the Mandatory Reporting Requirements for Local Transport

14th May 2026

Peter Wright, Transport Decarbonisation Lead (EURI)
Nichola Egan, Principal Air Quality Consultant
Duncan Urquhart, Associate Director

Agenda

1. Introductions
2. Safety/Quality Moment
3. Context
4. Emissions modelling using VECAT
5. Summary
6. Q&A

1 Introductions

Introductions

Peter Wright

Transport Decarbonisation Lead (EURI)

Nichola Egan

MIEnvSci MIAQM

Principal Air Quality Consultant

Duncan Urquhart

BSc MSc MIAQM MIEnvSc CSci

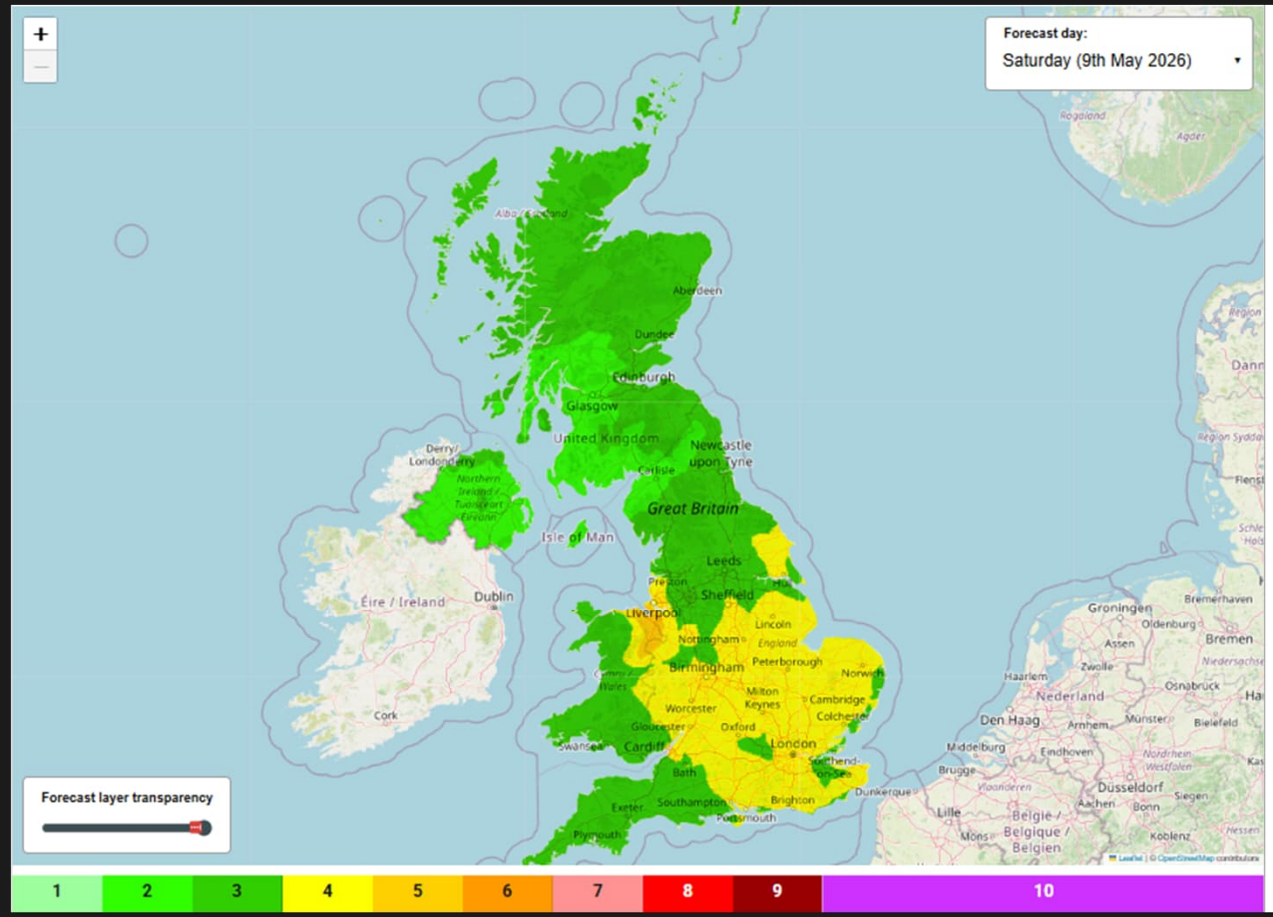
Associate Director Air Quality

AECOM DELIVERING A BETTER WORLD.

2 Quality Moment

Air quality forecasts

- https://uk-air.defra.gov.uk/forecasting/



Recommended Actions and Health Advice

Air Pollution Banding	Value	Accompanying health messages for at-risk individuals*	Accompanying health messages for the general population
Low	1-3	**Enjoy** your usual outdoor activities.	**Enjoy** your usual outdoor activities.
Moderate	4-6	Adults and children with lung problems, and adults with heart problems, **who experience symptoms**, should **consider reducing** strenuous physical activity, particularly outdoors.	**Enjoy** your usual outdoor activities.
High	7-9	Adults and children with lung problems, and adults with heart problems, should **reduce** strenuous physical exertion, particularly outdoors, and particularly if they experience symptoms. People with asthma may find they need to use their reliever inhaler more often. Older people should also **reduce** physical exertion.	Anyone experiencing discomfort such as sore eyes, cough or sore throat should **consider reducing** activity, particularly outdoors.
Very High	10	Adults and children with lung problems, adults with heart problems, and older people, should **avoid** strenuous physical activity. People with asthma may find they need to use their reliever inhaler more often.	**Reduce** physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat.

3 Context

Why reduce carbon?

Reduces whole-life cost (+ carbon)

Improves climate resilience and network reliability

Supports better investment decisions through quantification

Aligns with UK net zero targets and funding

Why reduce carbon?

F UK
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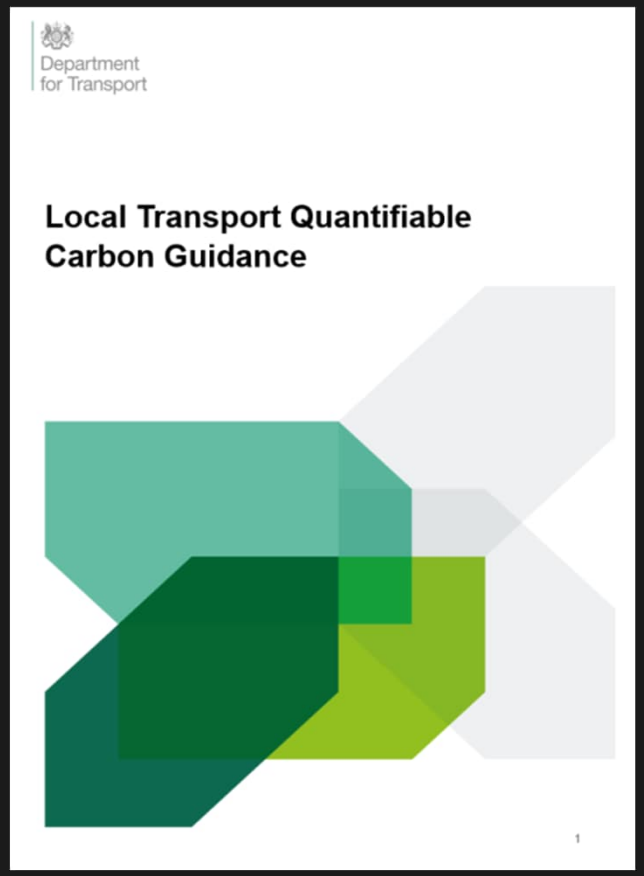
- ng

ecom.com

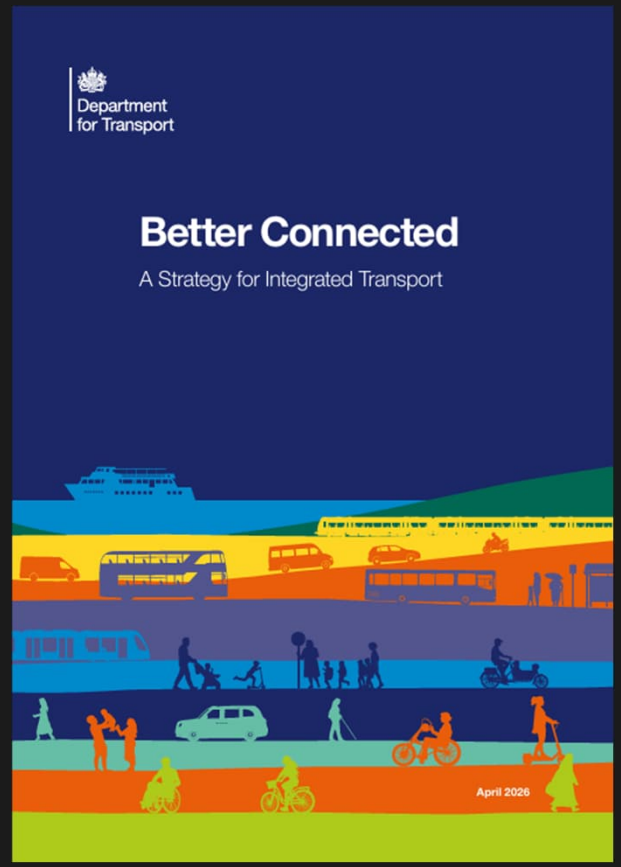
“HOW”
(MEASUREMENT)



28 August 25

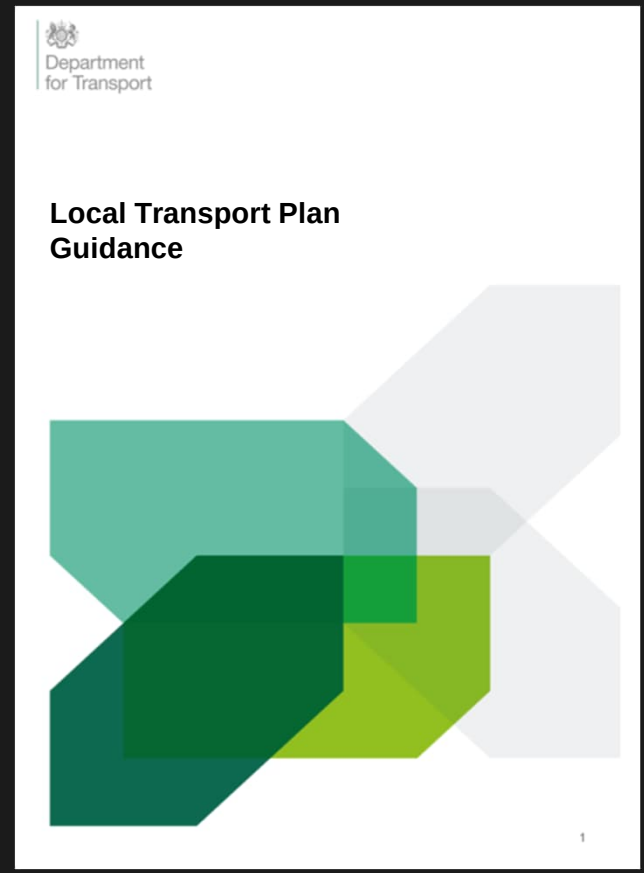
Local Transport Quantifiable Carbon Guidance

“WHAT”
(OUTCOMES/TARGETS)



2 April 26

Better Connected: A Strategy for Integrated Transport

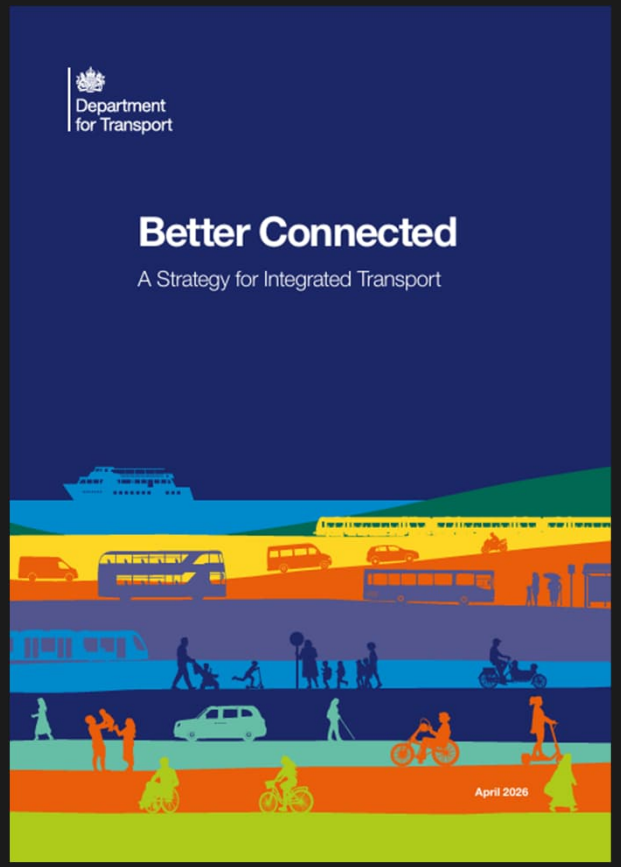


2 April 26

Local transport plans - GOV.UK

“WHAT”
(OUTCOMES/TARGETS)

“HOW”
(MEASUREMENT)



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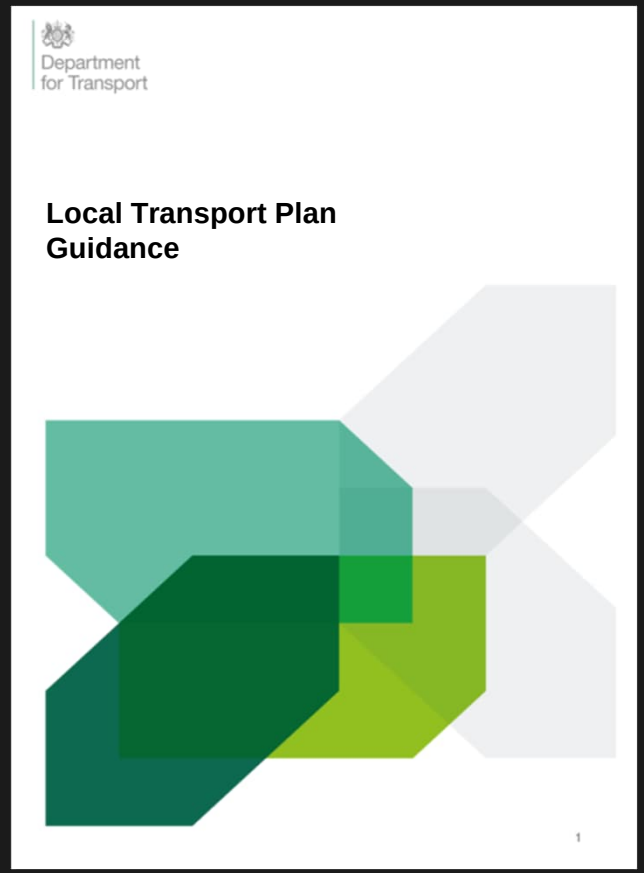

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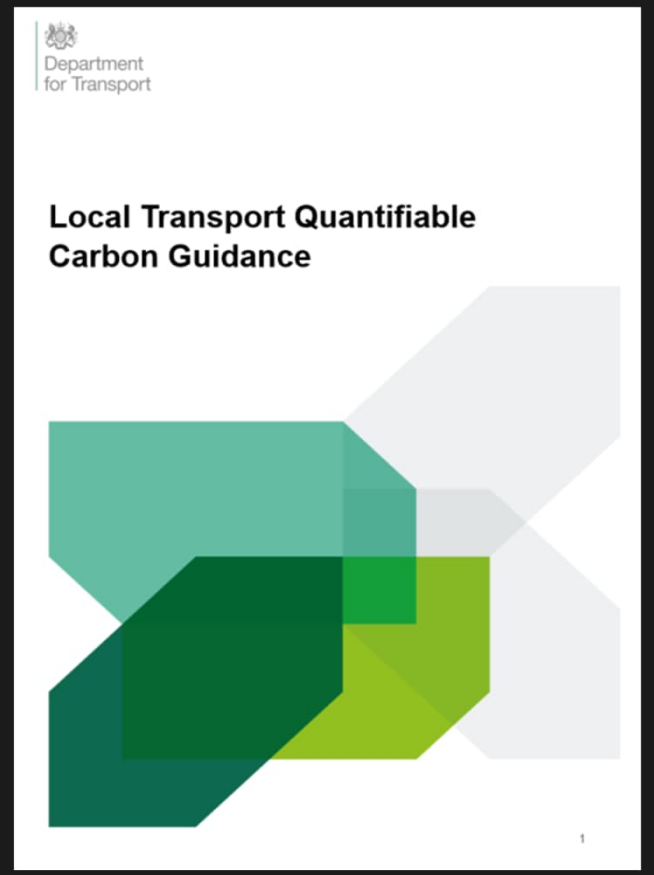
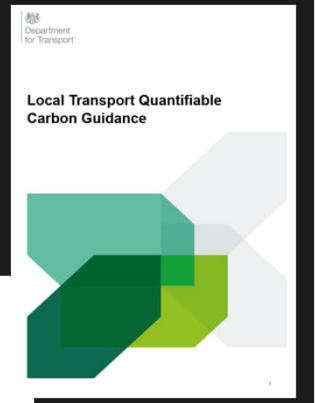


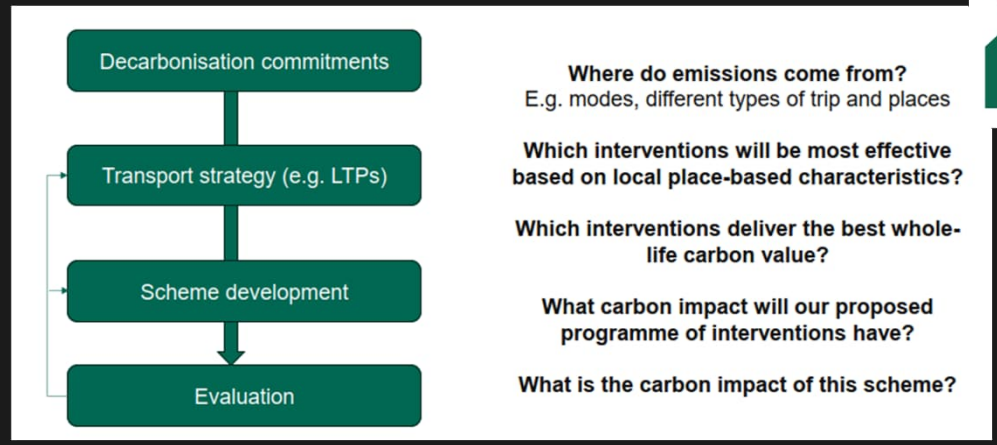
28 August 25

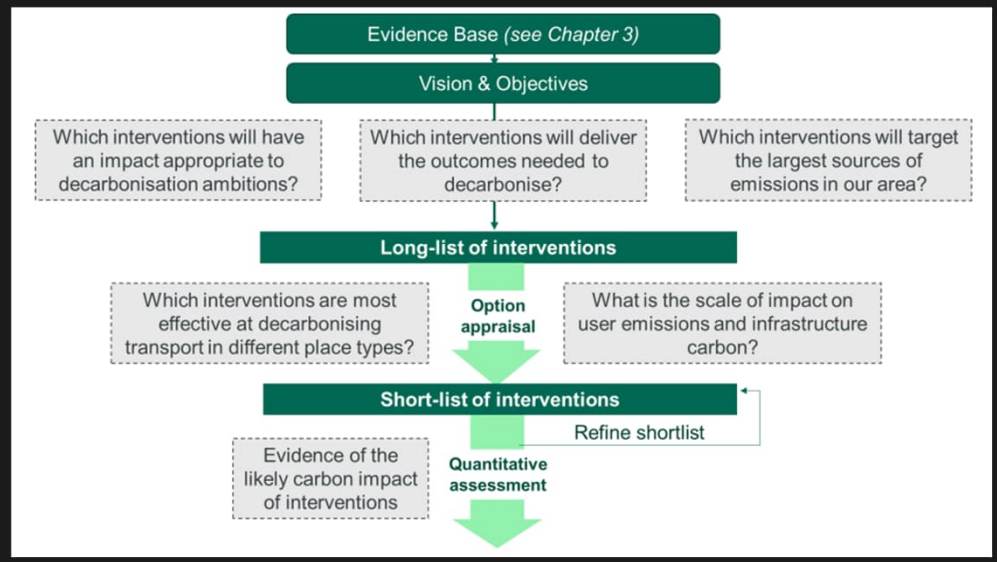
Quantifiable Carbon Guidance (QCG) for local transport planning

- The Quantifiable Carbon Guidance (QCG) was published Aug 25
- Focused on evidence-based approach for quantifying carbon emissions for local transport planning
- Advice on how and when carbon analysis can be integrated into the process of developing transport strategies and schemes
  - Local transport methodologies
  - User carbon methodologies
  - Infrastructure carbon methodologies

  Impact = Do Something – Do Minimum
- Assessment up to 2050, in line with the UK's Net Zero target
- DfT QCG guidance and October 2025 workshop slides provide more detail







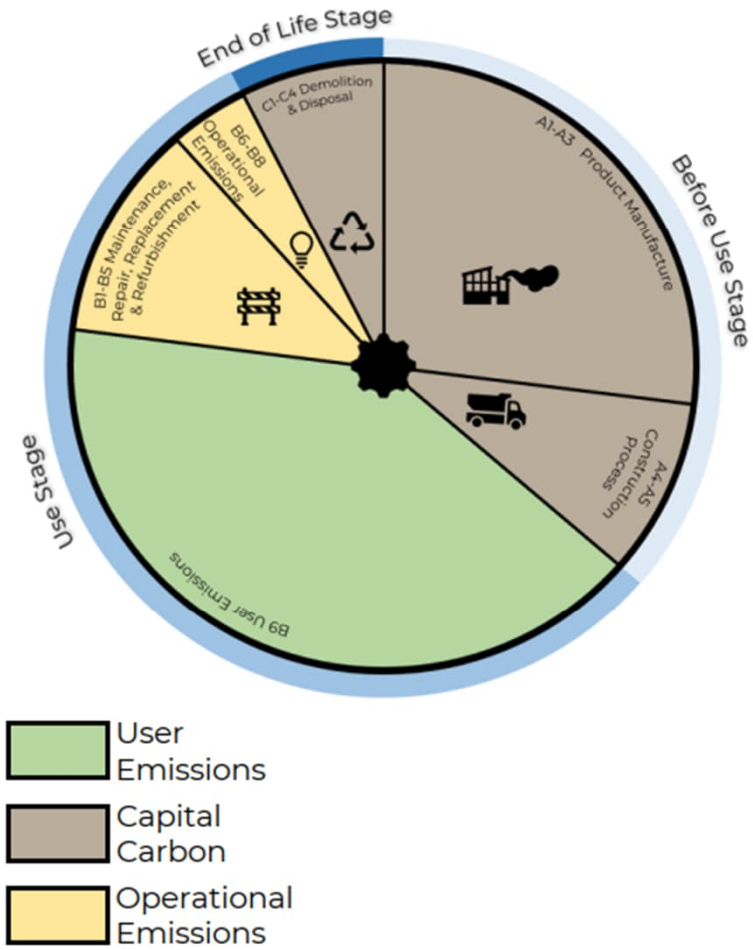
Considering whole life carbon in infrastructure

Carbon tools are often applied to different stages of the whole life carbon lifecycle

'Whole life carbon' (WLC) includes:

- **User carbon emissions** (e.g. tailpipe emissions from burning fuel or energy consumption resulting from EVs)
- **Infrastructure carbon emissions:**
  - Capital carbon – construction and end-of-life, including energy from product manufacture and transporting materials
  - Operational emissions – such as maintenance and energy consumption from lighting

- **Whole life carbon emissions is the sum of user and infrastructure carbon emissions.**



Department for Transport

Considering whole life carbon in infrastructure

What is infrastructure carbon?

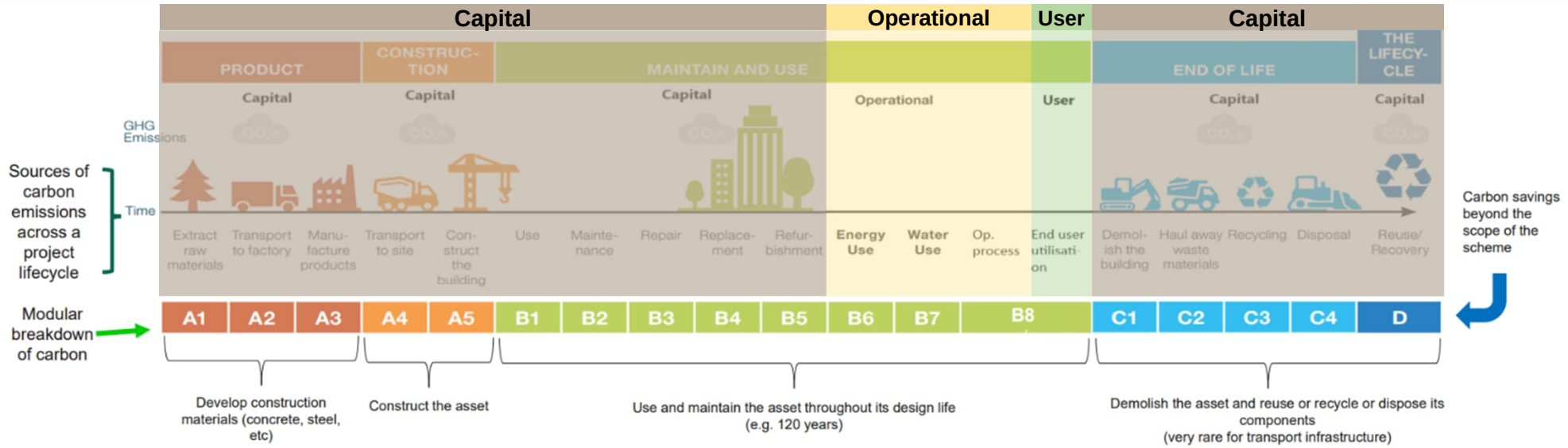
The decisions we are taking today will dictate the carbon we are spending in 2030 and how we are travelling in 2050. Acting now will mean we avoid limiting our ability to respond to future needs.

The term **'carbon'** is often used as shorthand to represent all greenhouse gases (GHG).*

Infrastructure: the basic physical and organizational structures, facilities, equipment and services needed for the operation of a society or organization, or the services and facilities necessary for an economy to function. This includes the development of new local roads and rail assets, as well as enhancements and improvements to existing structures.*

How do infrastructure projects produce emissions?

VECAT



User Emissions

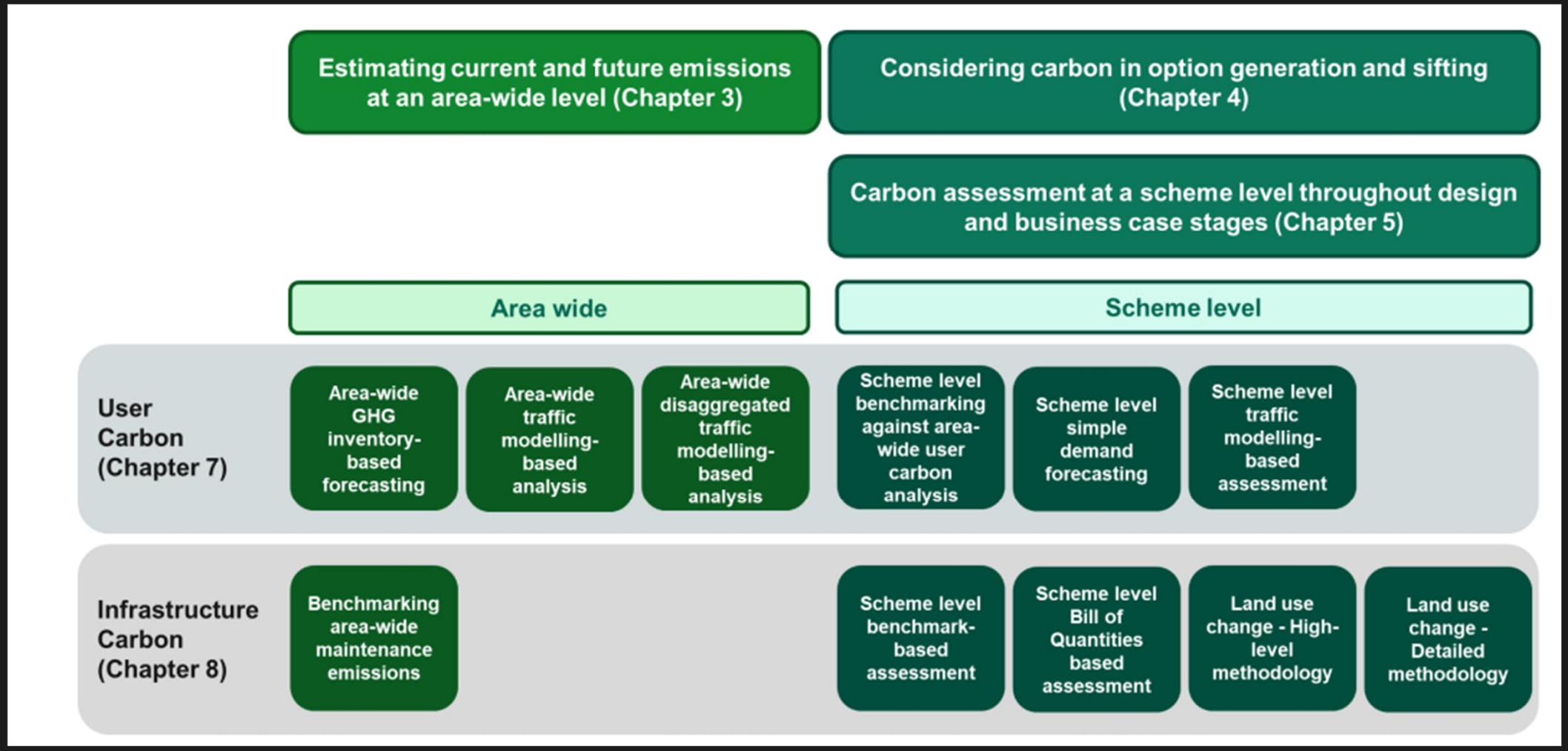
Capital Carbon

Operational Emissions

* As defined in PAS 2080:2023

Official

The QCG covers ‘Area-wide’ and ‘Scheme-level’ carbon assessment



Strategic tools available for area-wide user carbon analysis include:

Carbon Assessment Playbook (CAP)

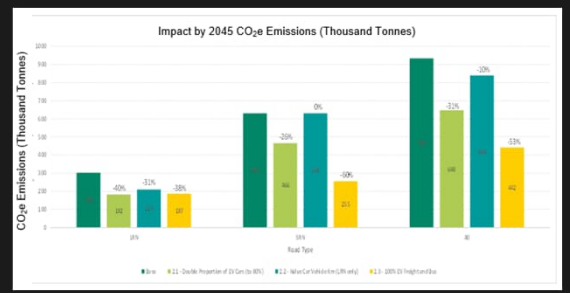
- Developed by Sub-National Transport Bodies (STBs) the CAP offers a place-based carbon baseline and bottom-up policy-builder tool, with 29 intervention cards – generating quantifiable user emissions reduction in local transport plans.

Link: Policy Builder - Carbon Assessment Playbook

Carbon Swift

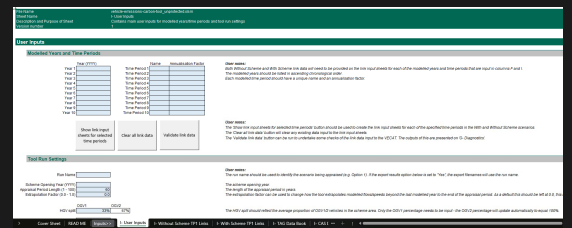
Carbon Swift Assessment Tool for Transport (or *Carbon SAT-T*)

AECOM tool for testing policy levers to forecast and compare strategic transport user emissions – by vehicle and road type – at a top-down / spatial level for different scenarios.



Vehicle Emissions CArbon Tool (VECAT)

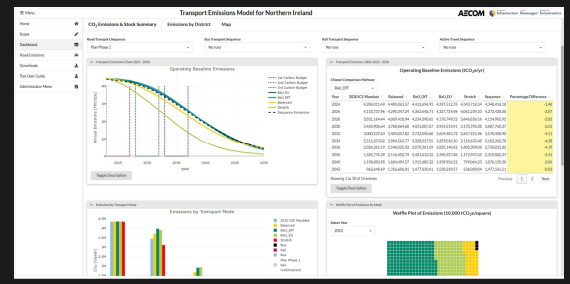
- DfT tool assessing road user carbon emission (with and without scheme). Uses traffic model outputs (flows and speeds) and consistent with TAG Databook. Calculates annual traded and non-traded emissions for every appraisal year and can be copied and pasted into DfT GHG Workbook.



Link: Vehicle emissions carbon tool (VECAT) - GOV.UK

Transport Emissions Model (TEM)

- AECOM transport activity forecasting model using client-bespoke vehicle fleet profiles to calculate network carbon emissions, local air quality and energy pathways for scenario testing



Strategic and detailed tools available for embodied carbon analysis include:

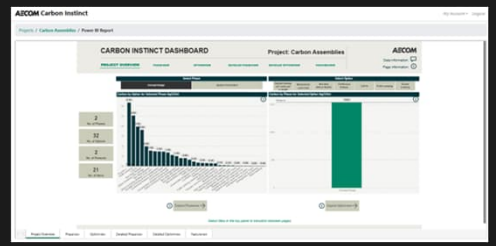
LTICBT
(Local Transport Infrastructure Carbon Benchmarking Tool)

Developed by DfT to generate early-stage, scheme-level benchmark-based estimates of embodied (capital) carbon using standardised reference values for different transportation assets – in line with QCG.

Link: Local transport infrastructure carbon benchmarking tool - GOV.UK

Carbon Instinct

AECOM tool for generating high-level carbon estimates from early designs using custom-built "assemblies" (for Streets) and Bills of Quantity (BoQ) calculations, producing dashboards and comparing between design options – can have bespoke tools, e.g. TII

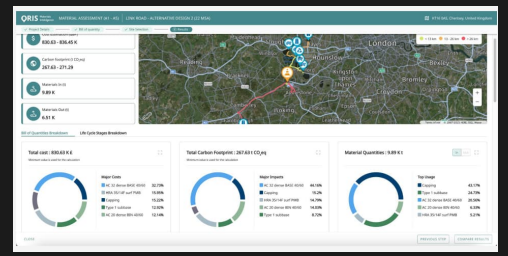


OneClick LCA

Comprehensive Carbon Life Cycle Assessment (LCA) platform mostly used by sustainability or design professionals – integrating with BIM and generates WLC estimates, including for maintenance and renewal. AECOM has an enterprise licence.

ORIS

A powerful carbon tool that integrates with BIM and design workflows (can link to costs), comparing design and material scenarios, with focus on roads and other linear infrastructure.



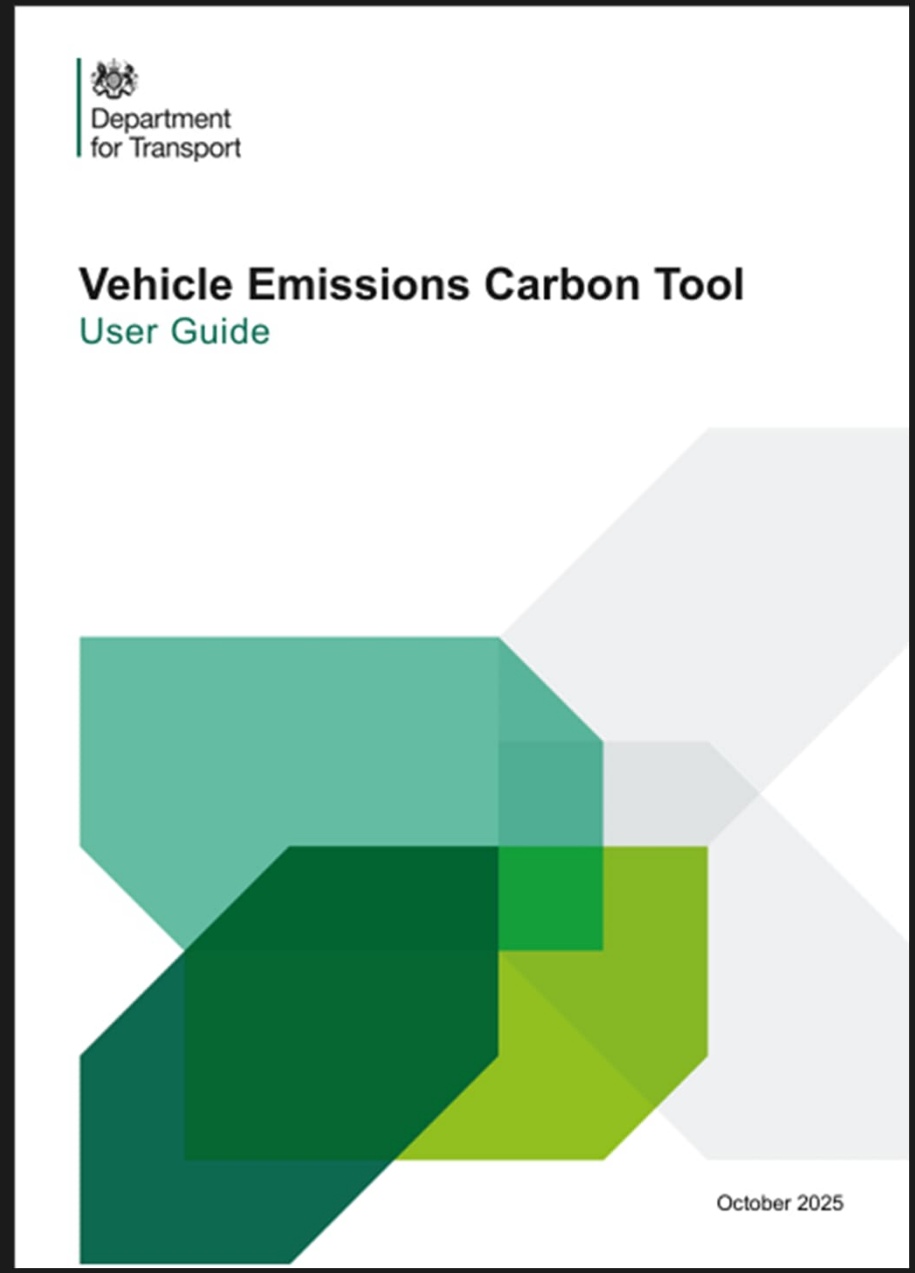
Opportunities to capture decarbonisation benefits in the five dimensions business case model

Case	Influence of Early Carbon Consideration	Capturing Carbon Impacts
Strategic Case	Aligns with national and local net zero goals; strengthens rationale for intervention.	Reference carbon reduction targets, climate strategies, and policy alignment.
Economic Case	Enables monetisation of carbon savings; improves value for money; modal shift.	Use DfT TAG carbon values to monetise emissions; use AMAT; include in cost-benefit analysis and AST.
Commercial Case	Encourages low-carbon procurement and innovation; improves market engagement.	Include carbon performance / KPIs in procurement criteria and risk assessments.
Financial Case	Highlights long-term cost savings from low-carbon options; resilience; BNG; supports funding bids.	Show lifecycle cost benefits of carbon reduction; include resilience and alternative funding opportunities, e.g. health, not just transport.
Management Case	Embeds carbon in delivery plans; supports monitoring and evaluation.	Include carbon KPIs, monitoring frameworks, and governance structures for carbon accountability – feed into future biz cases

4 Emissions modelling using VECAT

VECAT – what does the QCG say?

- VECAT is a DfT tool that can be used to calculate user carbon emissions using inputs derived from a transport model.
- Its use is recommended, but not mandated, at OBC and FBC (cases where a ‘high’ level of detail/complexity is required at the scheme level).
- It is a calculator, taking model outputs (flows, speeds, link lengths, vehicle types), annualising and interpolating these over the assessment period, and applying TAG Data Book fleet and emissions data and projections.
- The output is the with-scheme / without-scheme difference in tCO_2e which can then be monetised.

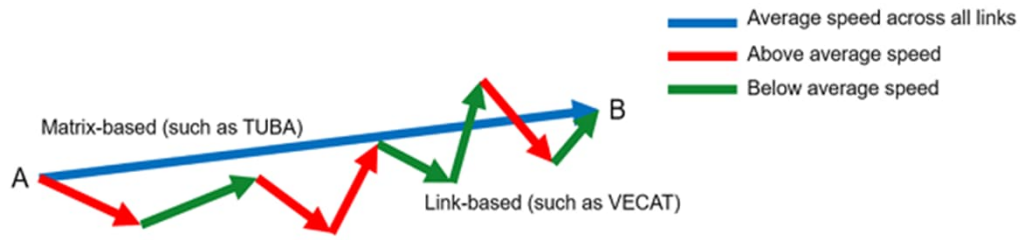


Source: DfT (2025) Local Transport Quantifiable Carbon Guidance

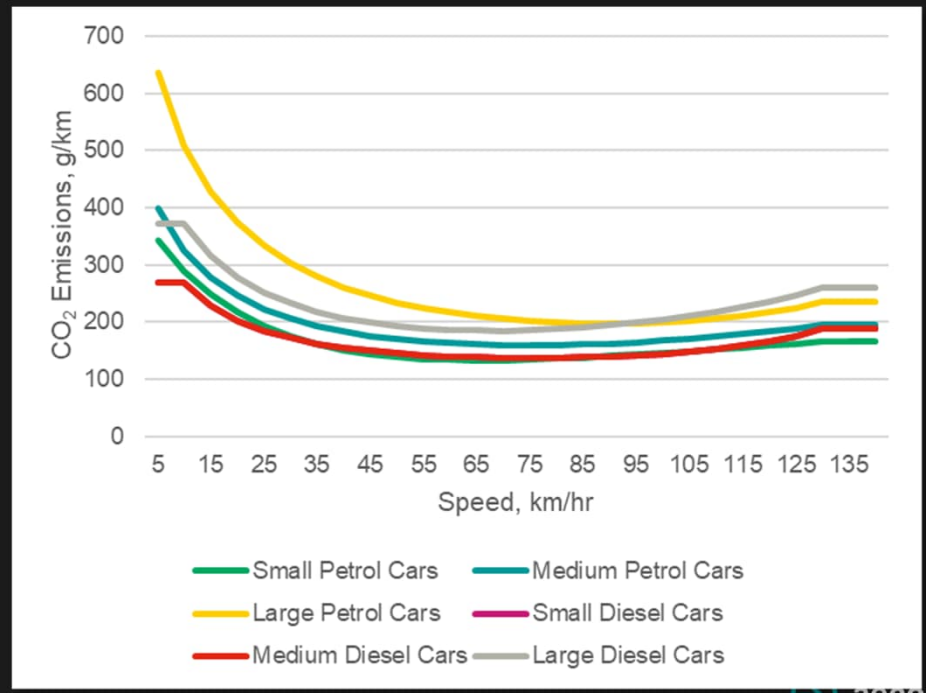
VECAT – a link-based approach

- TUBA is matrix based rather than link based it uses average speed between origin and destination.
- This can result in over- or under-predictions when compared to link-based methods because the speed-emissions relationship is not linear.
- VECAT can be considered to primarily replace TUBA-calculated carbon emissions.
- AM/IP/PM and annualised periods are used for flow and speed.
- Broadly consistent with other tools; e.g. EFT, for detailed emissions studies.

Annex A Figure 1 Illustration of matrix and link-based approaches



Matrix based approaches such as TUBA may therefore over or under-estimate emission rates, while link-based approaches such as TAG-based calculations, e.g. VECAT, are likely to be more accurate and should be used wherever possible.



Source: DfT (2025) Local Transport Quantifiable Carbon Guidance
DEFRA (2025 Emissions Factors Toolkit v13.1

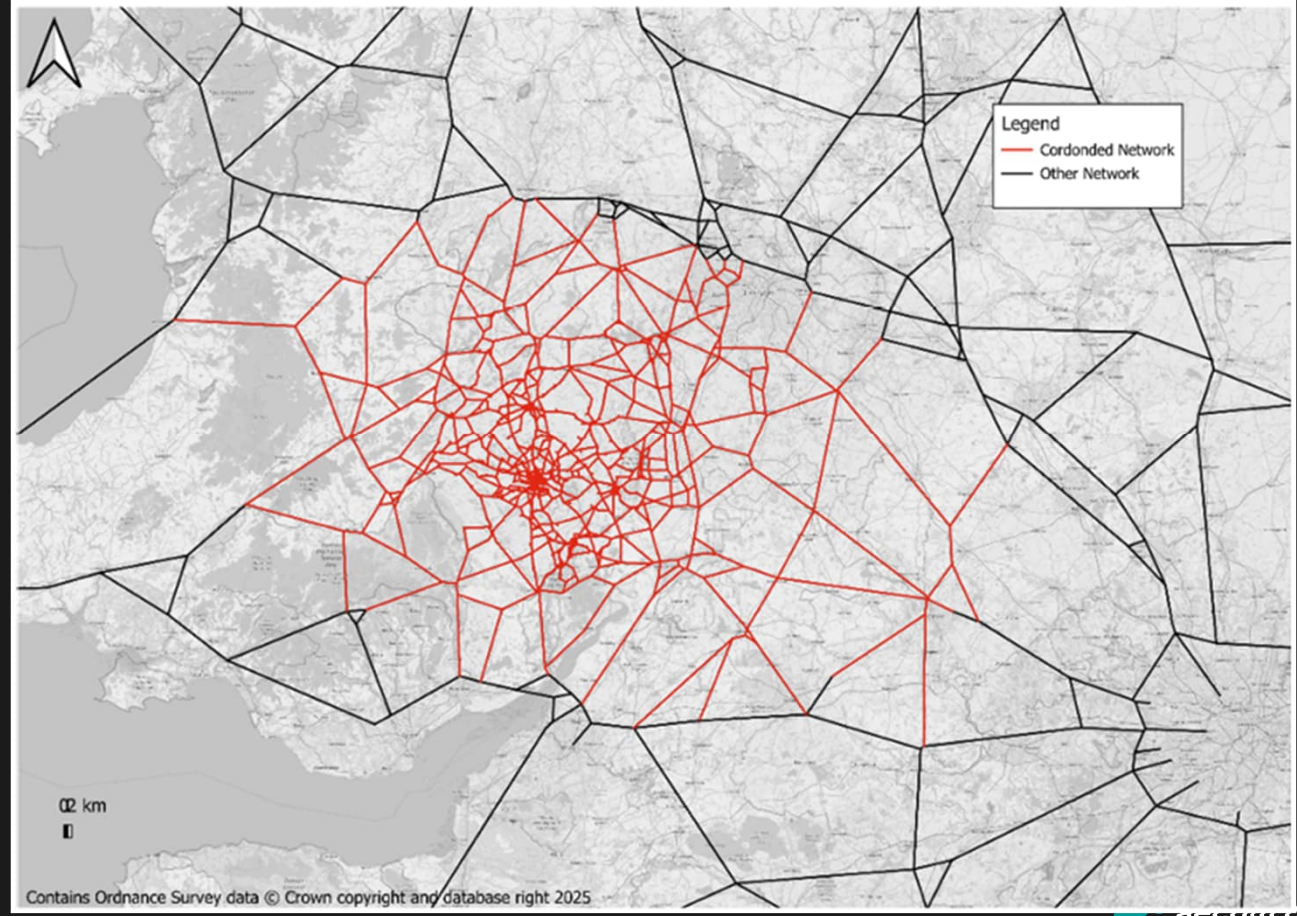
VECAT – things to consider

- The choice of study area can be significant to the outputs.
- It is recommended that the study area is as large as possible to capture cumulative small changes, recognising that it can be hard to differentiate between model noise and real small changes at distance from the scheme.
- Professional judgement of transport modellers and carbon professionals is essential to understand confidence and scope.

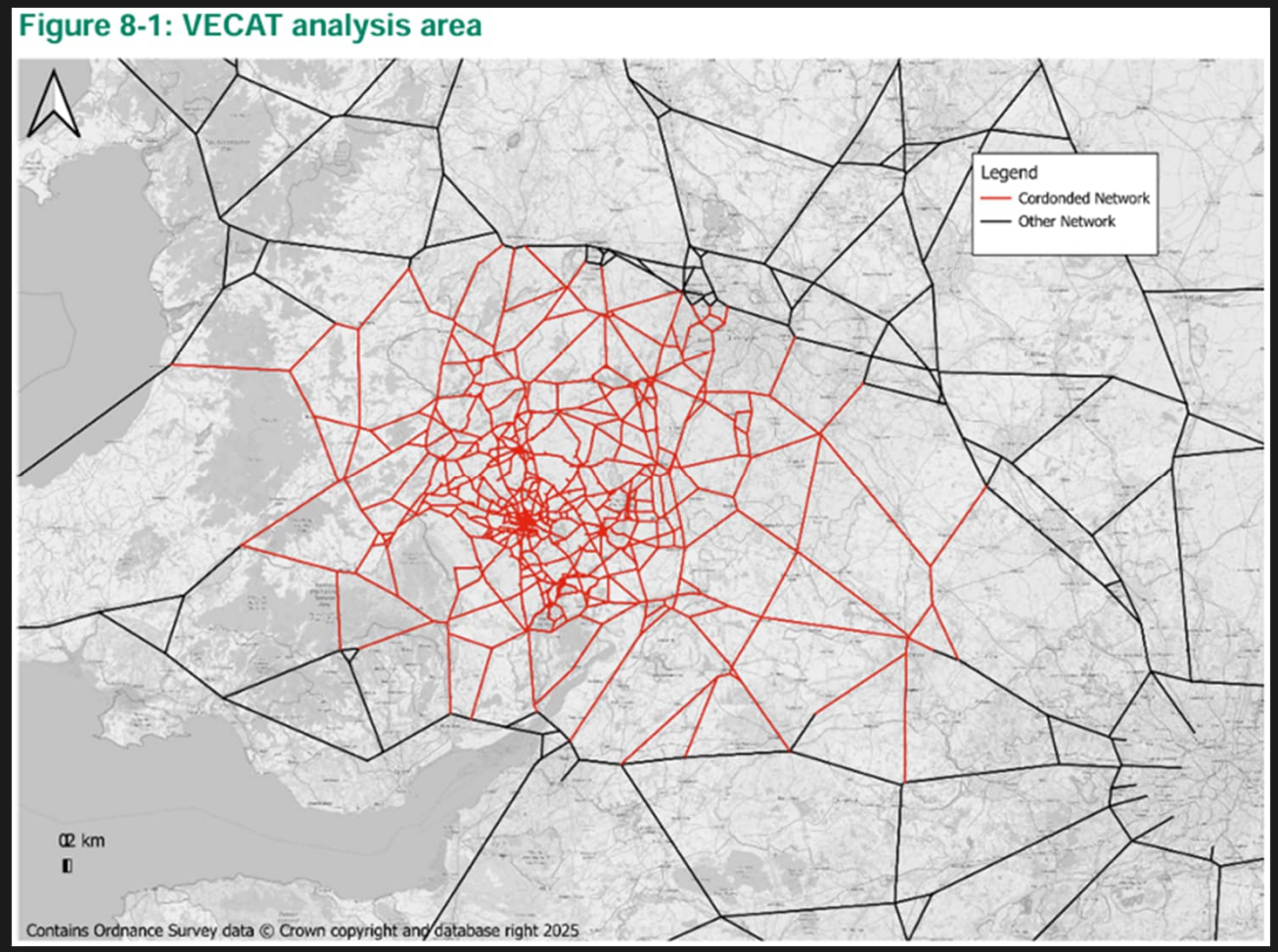
"Promoters should demonstrate that the study area is sufficient to capture the scheme carbon impacts. As minimum, this should cover the Area of Detailed Modelling and Rest of the Fully Modelled Area as defined in Section 2.2.5 of TAG Unit M3.1. While changes may be small on individual links, the cumulative effect of the small changes can be significant."

DfT (2025) VECAT User Guide, Note on Spatial Coverage and Traffic Flow Inputs

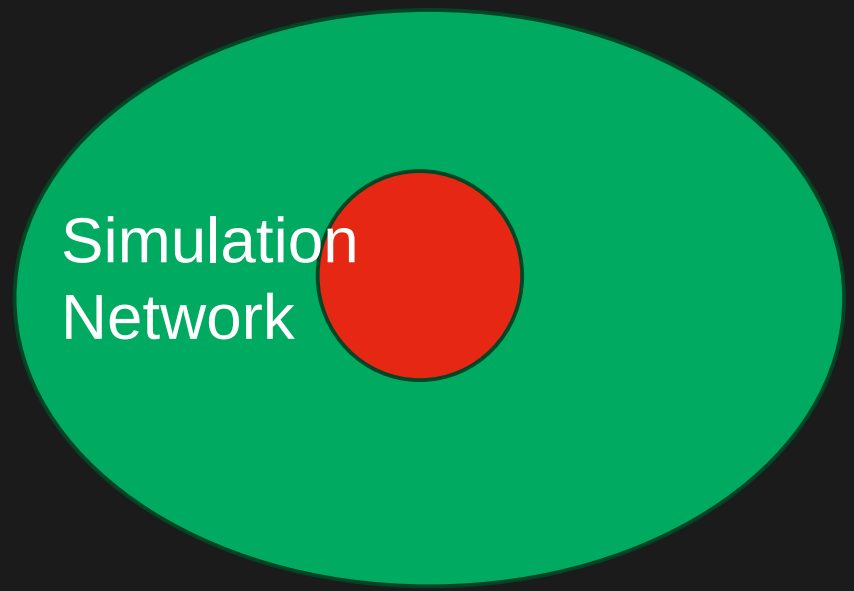
Figure 8-1: VECAT analysis area



VECAT Example – Hereford Bypass Phase One



Full modelled Network (inc. buffer)



[Hereford Bypass Phase One: Scheme Information Report]

VECAT Example – Hereford Bypass Phase One

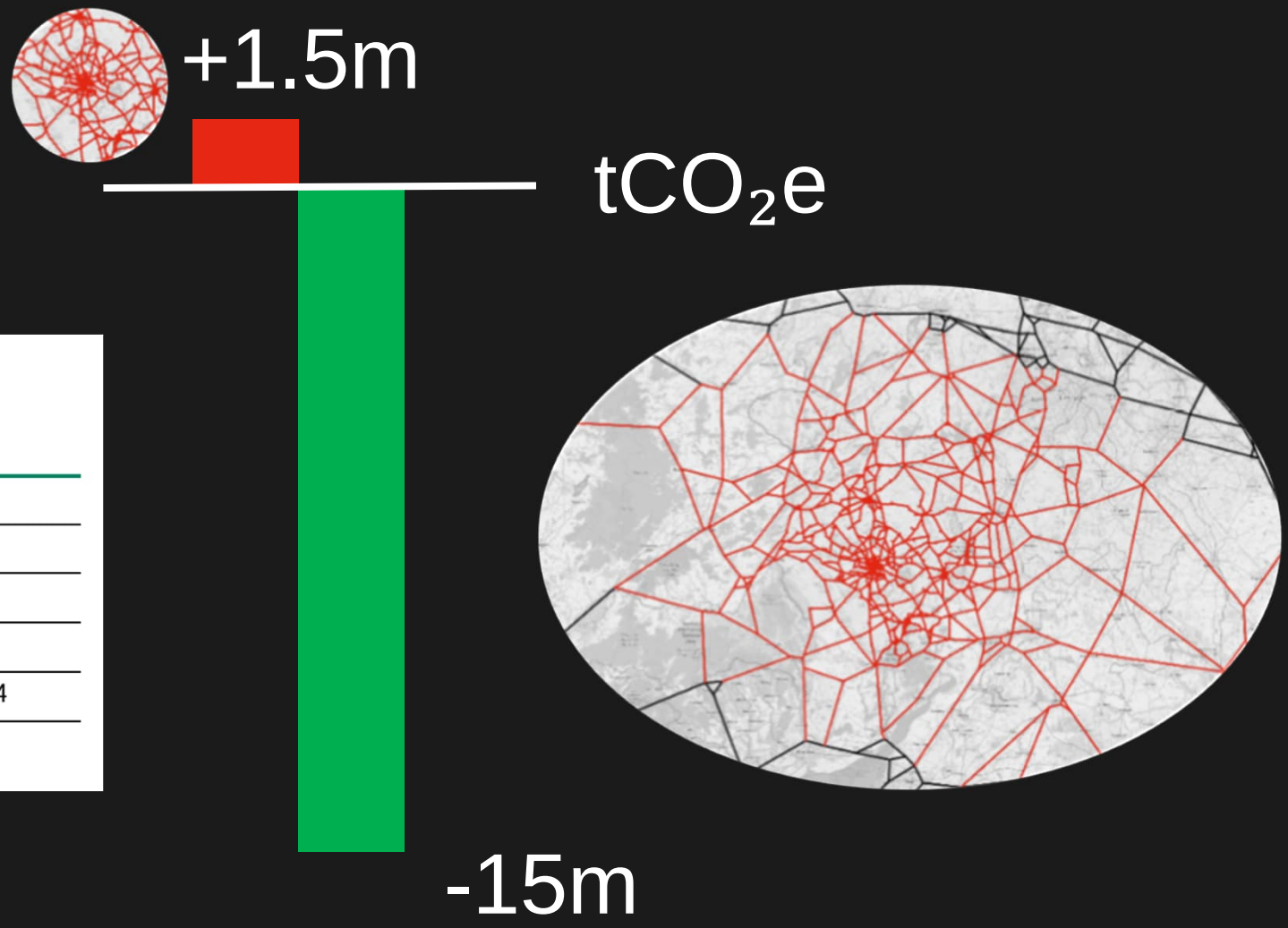
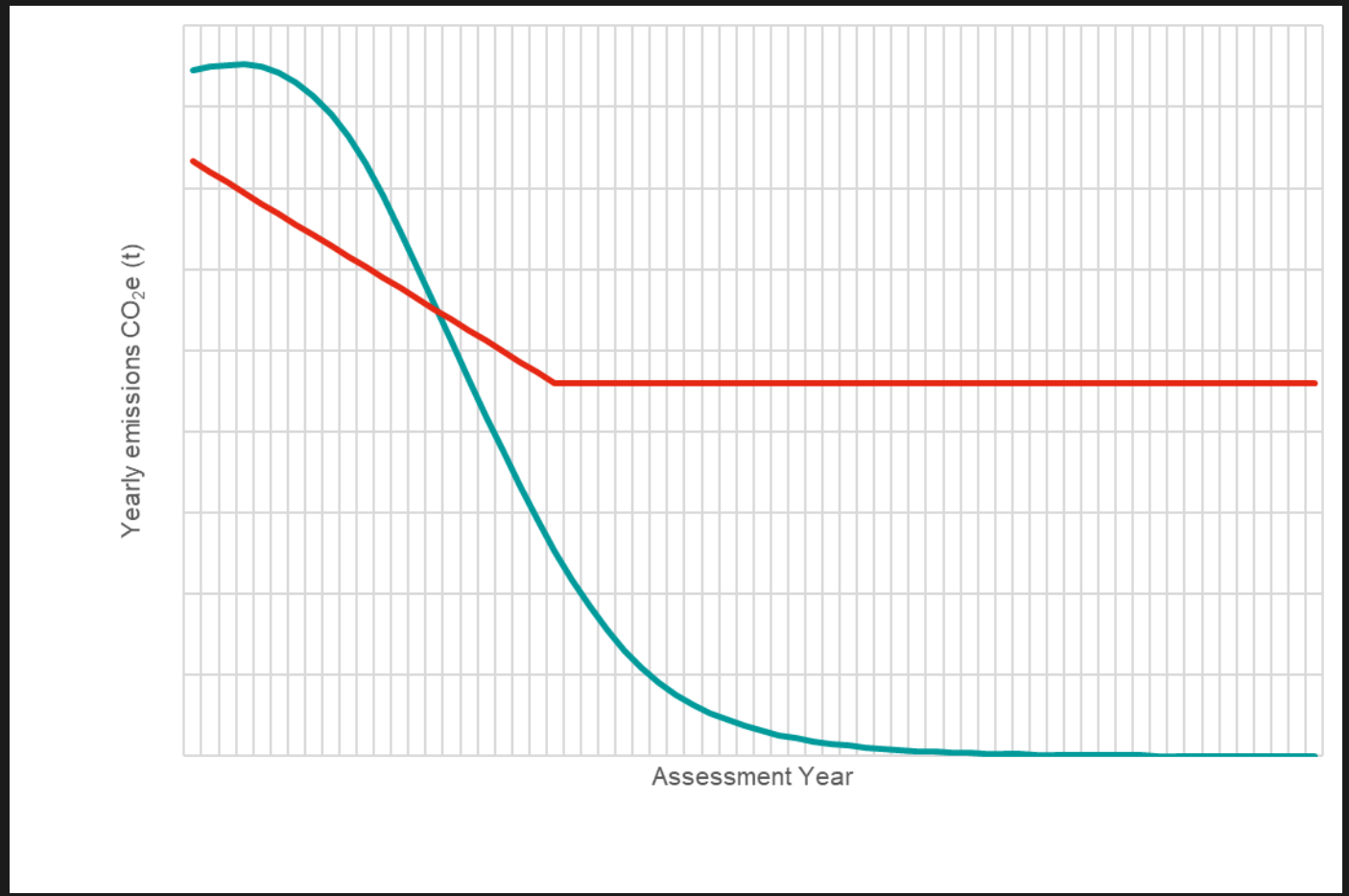


Table 8–1: Summary of Greenhouse Impacts

	Value
Change in CO_2(e) over 60 years (tonnes)	-4,285
Of which traded (tonnes)	-73.5
Change in CO_2(e) in 2028 (tonnes)	-298
NPV of greenhouse gas impact over 60 years	**£947,358**
Upper estimate of NPV	£1,422,284
Lower estimate of NPV	£472,728

Example - Interpolating vs Modelling



- Important to interpolate traffic activity, not emissions.
- The TAG method assumes the same annual emissions from the design year for the remainder of the 60-year appraisal.
- The VECAT method then also applies data for every year up to 2050 for TAG and 2060 for CAS.
- The detailed method more confidently evidences long-term cumulative economic effects.

"Given the UK's commitment to Net Zero by 2050 it is suggested 2050 as a minimum is an appropriate timeframe to quantify future emissions to." DfT (2025)

VECAT – limitations

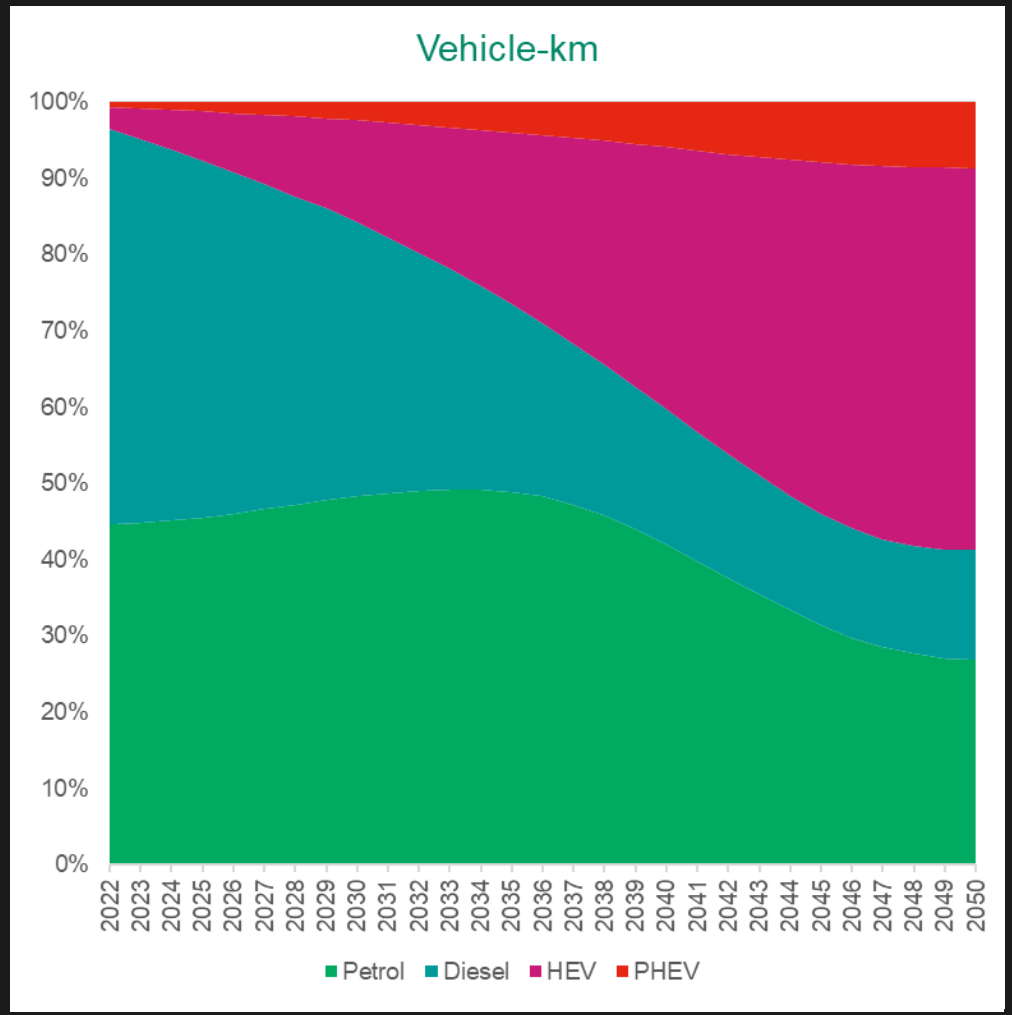
- The TAG data book considers simple fuel type activity.
- It cannot account for intricacies; e.g.
  - Engine size
  - Hybrid utility

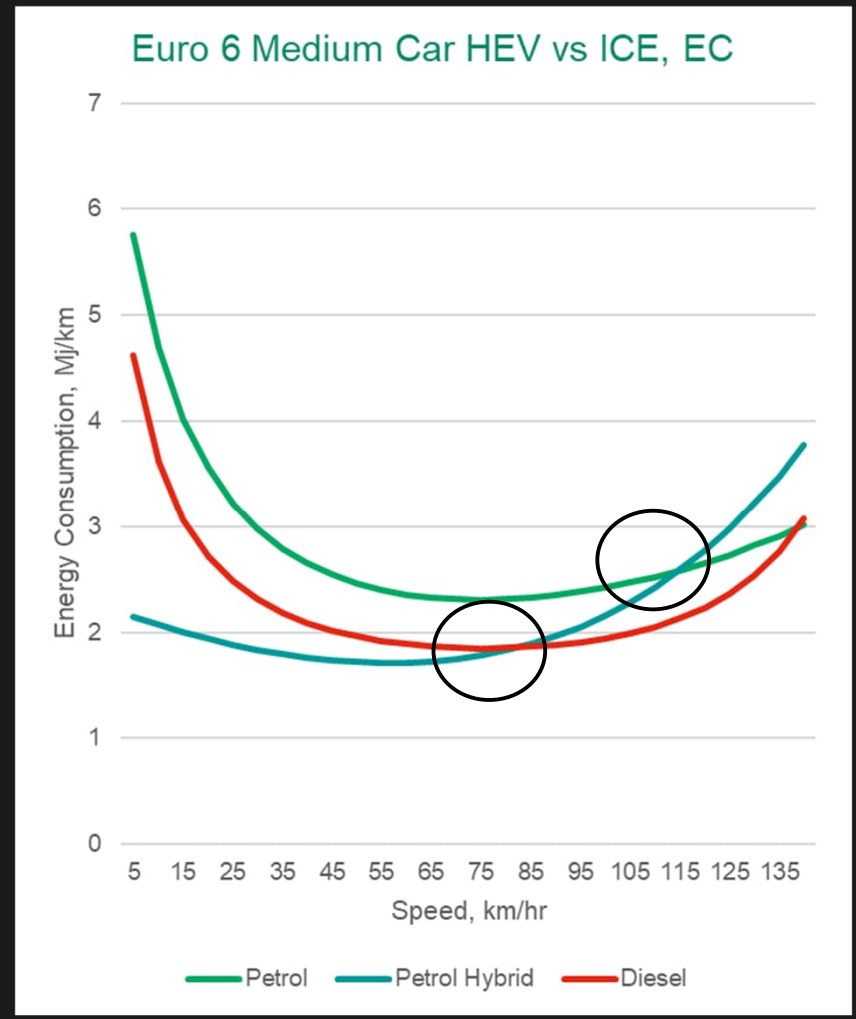
Table A 1.3.9:	Proportion of cars, LGV & other vehicle kilometres using petrol, diesel or electricity											
	Cars			LGV			OGV1		OGV2		PSV	
Year	Petrol	Diesel	Electric	Petrol	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
2024	54%	37%	9%	2%	95%	3%	100%	0%	100%	0%	92%	8%
2025	54%	35%	11%	2%	93%	5%	100%	0%	100%	0%	90%	10%
2026	54%	32%	14%	2%	91%	7%	100%	0%	100%	0%	88%	12%
2027	54%	29%	17%	2%	88%	10%	100%	0%	100%	0%	87%	13%
2028	53%	26%	22%	2%	84%	14%	100%	0%	100%	0%	86%	14%
2029	50%	22%	27%	2%	79%	19%	100%	0%	100%	0%	86%	14%
2030	47%	19%	34%	2%	73%	26%	100%	0%	100%	0%	85%	15%
2031	44%	17%	40%	1%	67%	31%	100%	0%	100%	0%	85%	15%
2032	41%	14%	45%	1%	63%	36%	100%	0%	100%	0%	84%	16%
2033	38%	12%	50%	1%	59%	40%	100%	0%	100%	0%	84%	16%
2034	35%	10%	55%	1%	55%	44%	100%	0%	100%	0%	84%	16%
2035	32%	9%	59%	1%	52%	47%	100%	0%	100%	0%	84%	16%
2036	30%	8%	62%	1%	49%	50%	100%	0%	100%	0%	84%	16%
2037	28%	7%	65%	1%	46%	53%	100%	0%	100%	0%	84%	16%
2038	26%	6%	68%	1%	44%	55%	100%	0%	100%	0%	84%	16%
2039	24%	5%	71%	1%	42%	57%	100%	0%	100%	0%	84%	16%
2040	22%	5%	73%	1%	40%	59%	100%	0%	100%	0%	85%	15%
2041	20%	4%	75%	1%	39%	60%	100%	0%	100%	0%	85%	15%
2042	19%	4%	77%	1%	38%	61%	100%	0%	100%	0%	85%	15%
2043	18%	4%	78%	1%	37%	62%	100%	0%	100%	0%	85%	15%
2044	17%	4%	79%	1%	36%	63%	100%	0%	100%	0%	86%	14%
2045	16%	3%	80%	1%	35%	64%	100%	0%	100%	0%	86%	14%
2046	16%	3%	81%	1%	35%	64%	100%	0%	100%	0%	86%	14%
2047	16%	3%	81%	1%	35%	65%	100%	0%	100%	0%	86%	14%
2048	15%	3%	82%	1%	34%	65%	100%	0%	100%	0%	86%	14%
2049	15%	3%	82%	1%	34%	65%	100%	0%	100%	0%	86%	14%
2050	15%	3%	82%	1%	34%	66%	100%	0%	100%	0%	86%	14%

- TAG data book projections can be considered conservative; e.g. no EV-HGV.
- Decarb-CAS sensitivity tests will likely give substantially reduced carbon outputs and may provide context.
- Some elements of customisation are possible it is a tool generally designed for consistency rather than detailed local understanding.
- Where local fleet and decarb pathway diverge significantly from the national average, consider a more bespoke approach; e.g. rate of EV uptake.

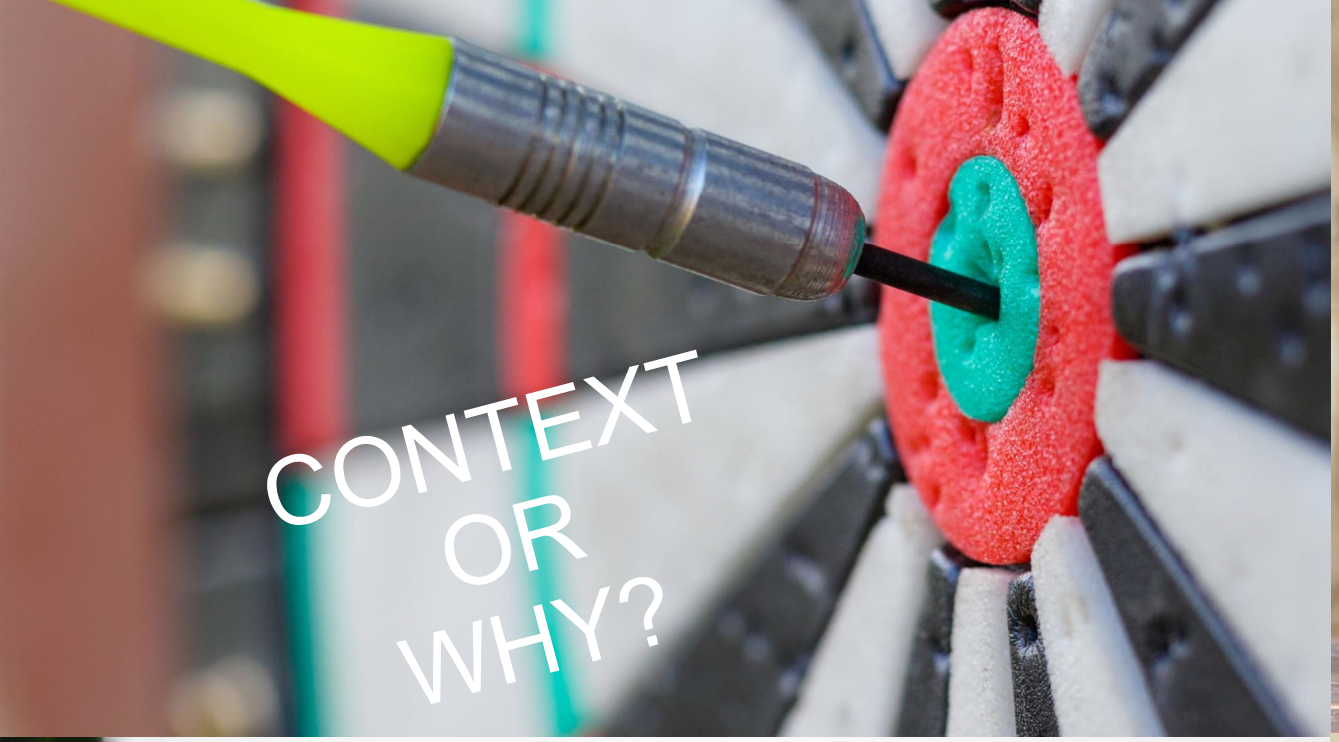
Source: DfT (2025) Vehicle emissions carbon tool (VECAT)

Example – Hybrid Utility Cycles





5 Summary


CONTEXT
OR
WHY?


“WHAT”
v.
“HOW”


GS
TEAM
WORK


GUIDANCE
DIRECTIONS
ADVICE
HELP
aecom.com

Summary

1. Context: Why?
2. LTP / QCG - “What” versus “how”
3. VECAT - Work Together
4. Guidance and Advice

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6 Q&A

Further “Lunch and Learns”

Our next “Lunch and Learn” is scheduled for June and will cover Network Management Plans (Supporting positive change in major urban areas through effective network, kerbside and demand management policies).

Further topics to be announced in due course.

AECOM DELIVERING A BETTER WORLD.

Thank you

Duncan Urquhart - duncan.urquhart@aecom.com

Peter Wright – peter.wright1@aecom.com


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