ROAD DESIGN FOR NETZERO AND CLIMATE CHANGE

SESSION 5

ROADS BITESIZE TRAINING

2022 PROGRAMME

This session will start at 11:30

8 March 2022

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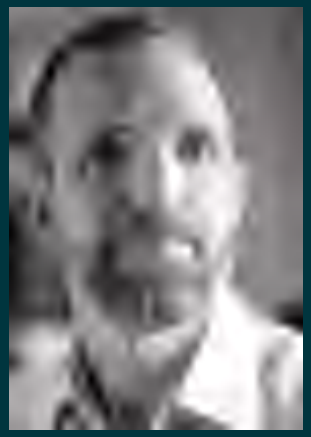
Agenda

01 Introductions
02 Values moment
03 Carbon and the project lifecycle
04 Carbon Management Plans
05 Carbon in use
06 Carbon in design
07 Resilience and climate change
08 Questions

Introductions

Eoin Harris

- Role – Sustainable infrastructure advice and support
- Working with a broad range of clients across the infrastructure lifecycle
- Background in carbon management, circular economy and working with infrastructure delivery.



Peter Wright

- Role – Carbon and Climate Emergency Champion, Planning
- Cross-sector engagement on transport planning and infrastructure projects
- Background in strategic planning, environment and policy development

Values moment

Speed Awareness

C – Concentration
O – Observation
A – Anticipation
S – Space
T – Time

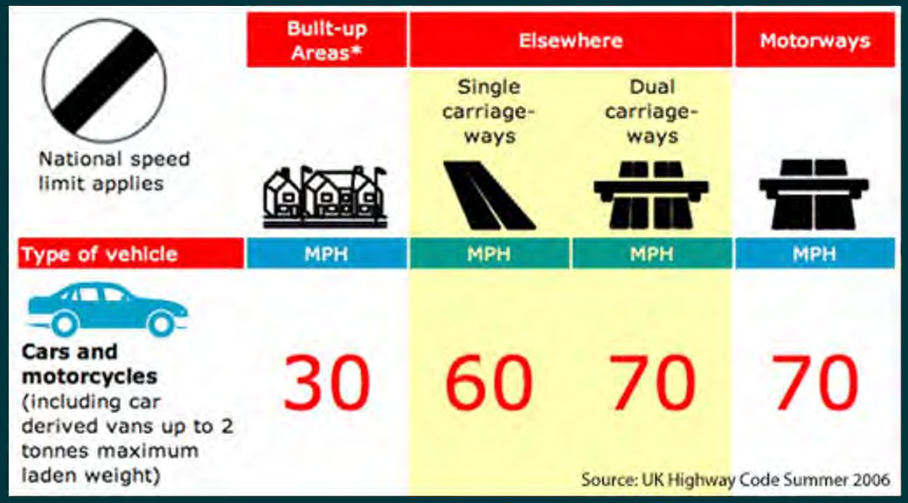
Speed Awareness Course Feedback – Speed limits

A 30 mph speed limit applies to all single carriageway and dual carriageways that have street lighting **unless** there are signs that show otherwise, e.g. 20, 40, 50

Zones apply to whole areas

Mandatory

National Speed Limit = NSL = No Street Lights



National speed limit applies	Built-up Areas*	Elsewhere		Motorways
		Single carriage-ways	Dual carriage-ways	
Type of vehicle	MPH	MPH	MPH	MPH
Cars and motorcycles (including car derived vans up to 2 tonnes maximum laden weight)	30	60	70	70

Source: UK Highway Code Summer 2006

Speed Awareness Course Feedback – Stopping Distances

- Condition are dry
- Visibility is good and no distractions
- Driver knows they will be asked to stop

	Stopping distance (SD)	Speed at SD if speeding
20 mph v 25 mph	12m	15 mph
30 mph v 31 mph	23m	8 mph
50 mph v 55 mph	53m	23 mph
70 mph v 80mph	96m	39 mph

1m 56s

Time saving versus

Action Plan

- Allow time for delays – prepare/pack beforehand
- Notify someone in advance if going to be late
- Use speed limiters/cruise control where appropriate

https://www.youtube.com/watch?v=WjvVbXDy20w

Carbon and the Project Lifecycle

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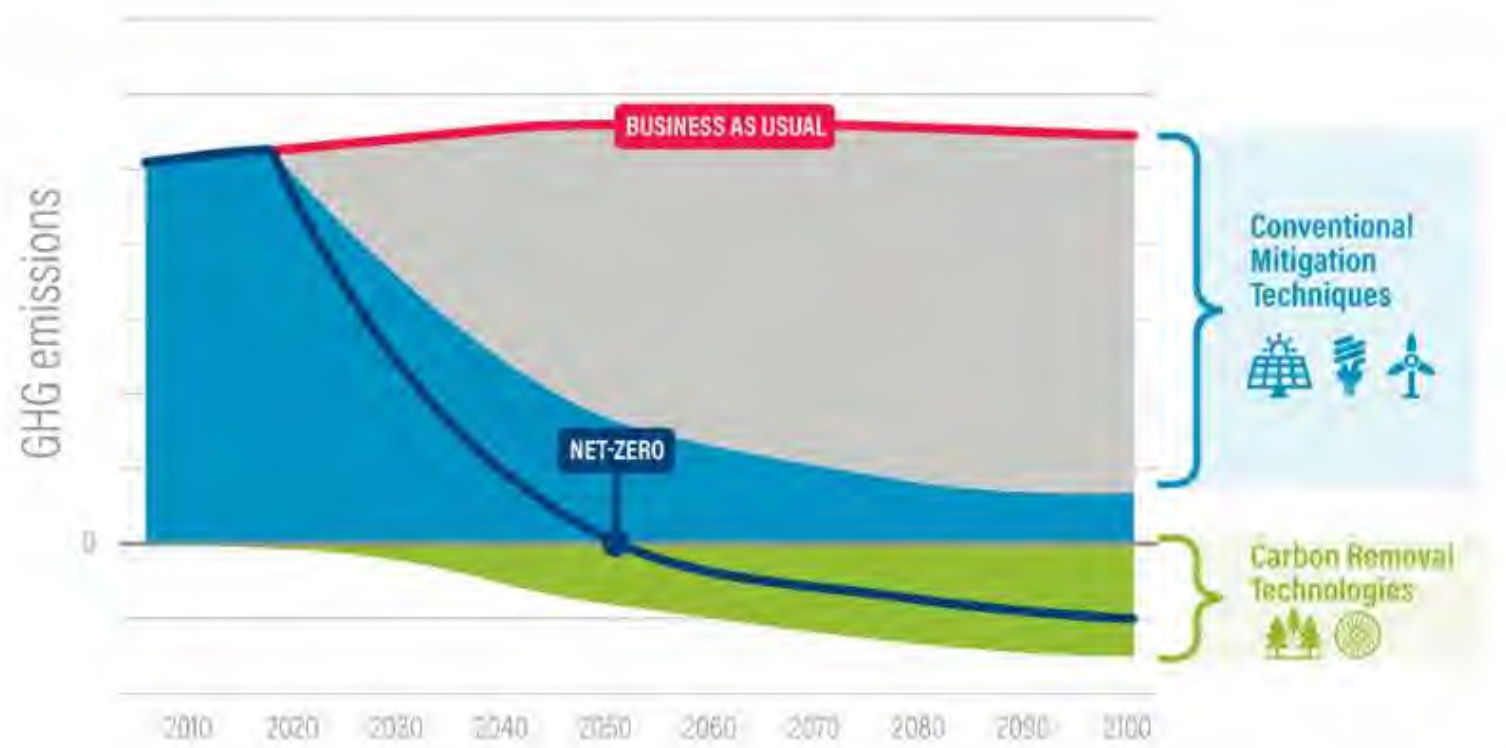
Net Zero is the balance of human generated GHG emissions with GHG removals

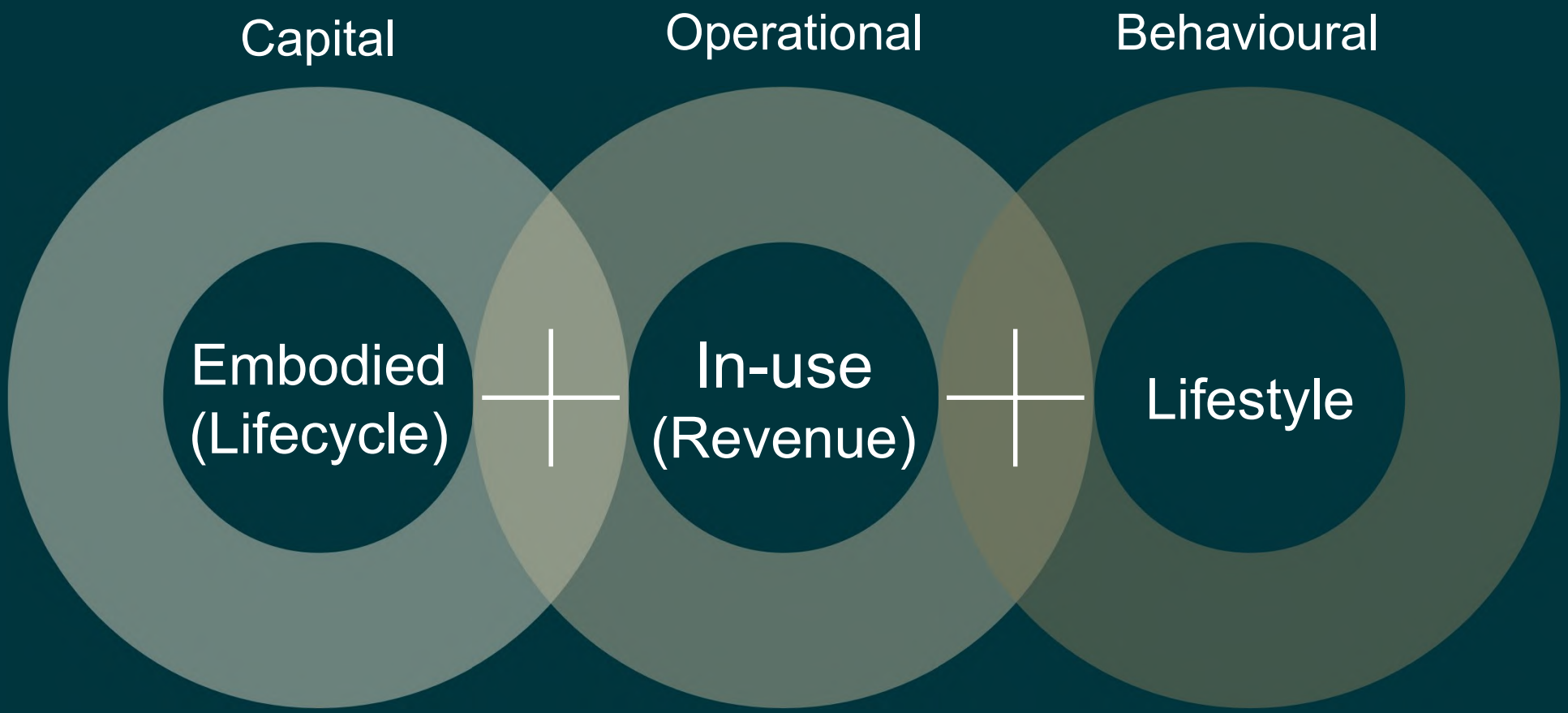


Business needs to be UNUSUAL!

WORLD RESOURCES INSTITUTE

https://www.wri.org/blog/2019/09/what-does-net-zero-emissions-mean-6-common-questions-answered

Carbon emissions come from infrastructure construction and use, but also wider behavioural impacts associated with the infrastructure



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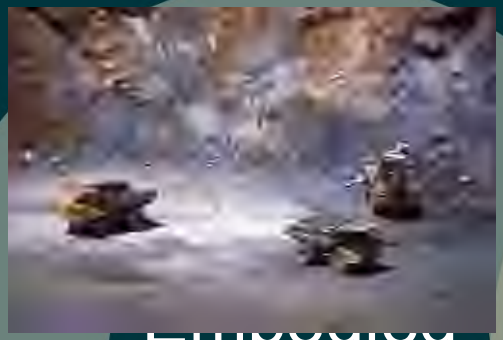
Capital



Embodied

Pre-construction (inc. materials)
Construction
Decommissioning

Operational

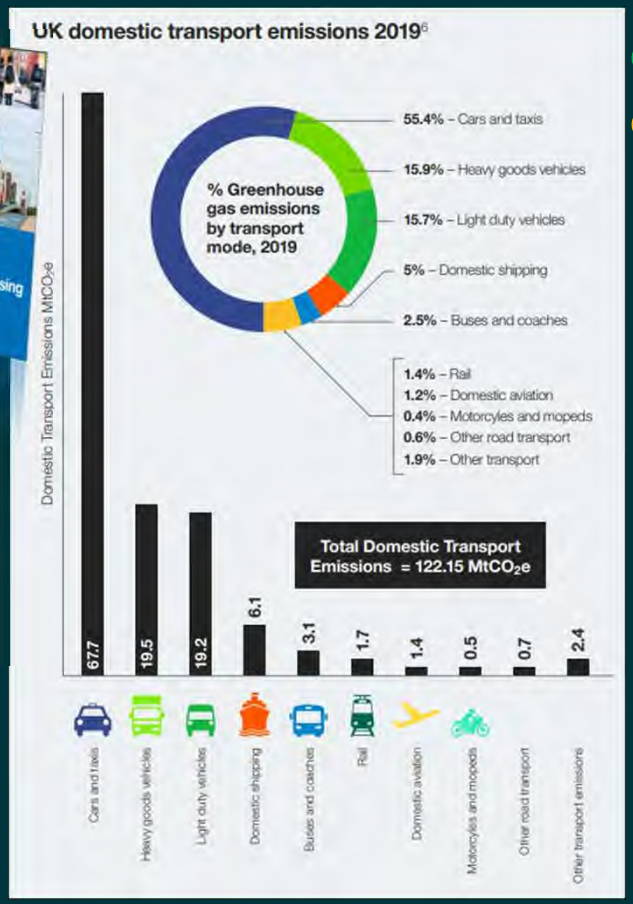
Operating the infrastructure – including maintenance & use

Behavioural

Lifestyle

Changing behaviours associated with land use and design, e.g. modal shift

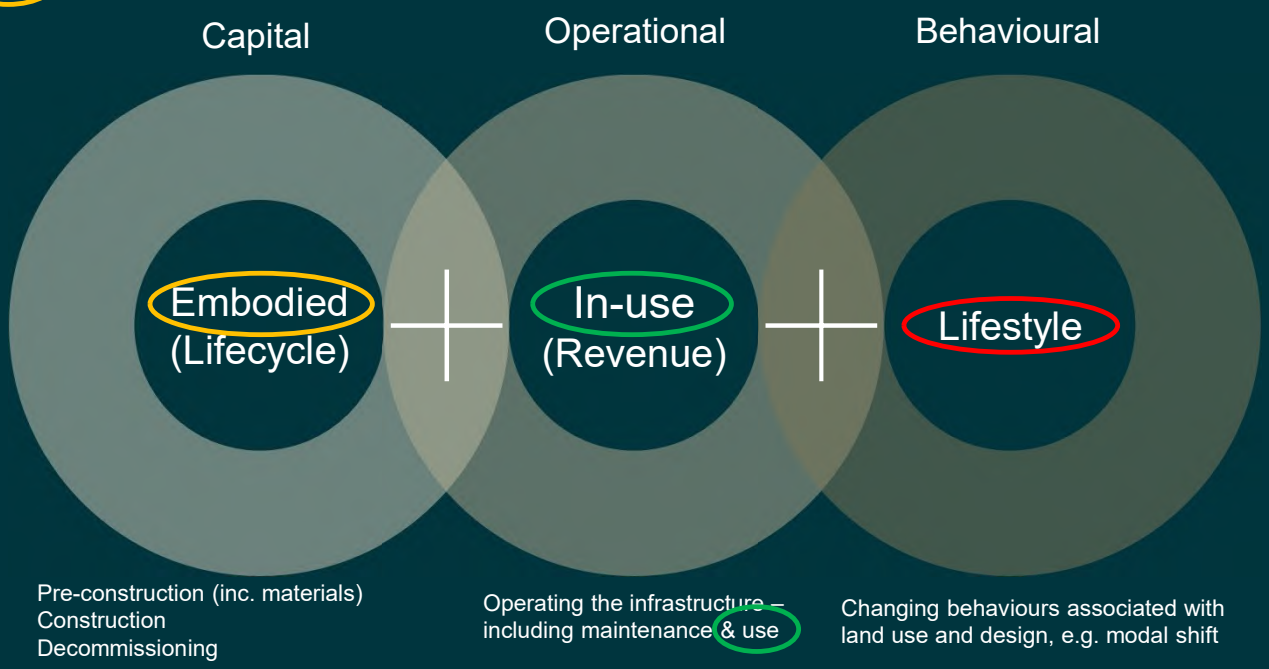
Whilst emissions come from infrastructure construction, transport use and changes in behaviour, the DTP plan only covers “direct” or “tailpipe” emissions*



*In scope of DTP plan

Carbon Management Plans^

Spatial planning



Pre-construction (inc. materials)
Construction
Decommissioning

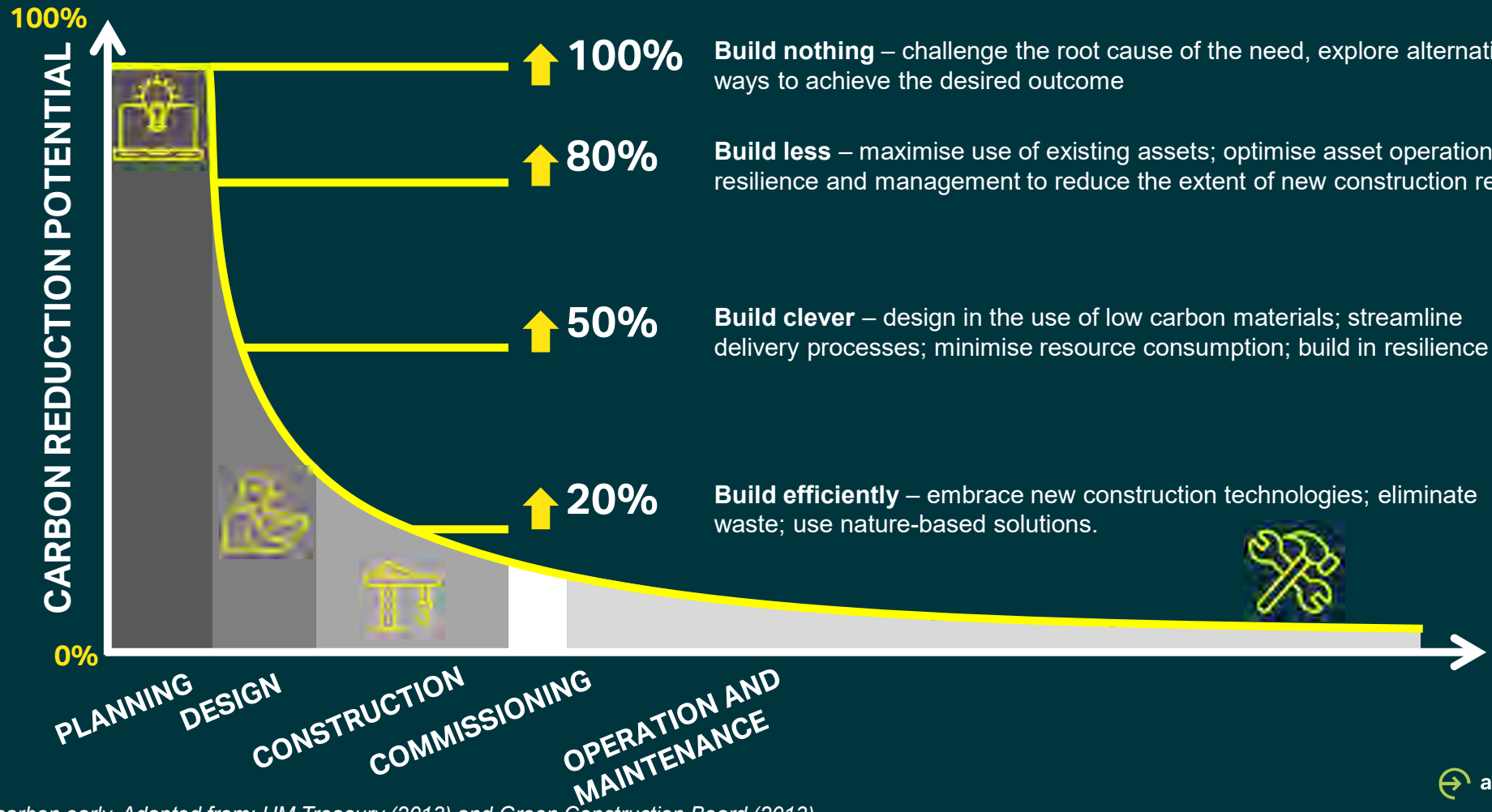
Operating the infrastructure – including maintenance & use

Changing behaviours associated with land use and design, e.g. modal shift

^ DfT programme for whole carbon of infrastructure projects at a portfolio level

NB: GHG emissions associated with power generation are considered in Energy White Paper

The biggest opportunities to reduce carbon and build in resilience are up front – including through links to the planning system



Build nothing – challenge the root cause of the need, explore alternative ways to achieve the desired outcome

Build less – maximise use of existing assets; optimise asset operation, resilience and management to reduce the extent of new construction required

Build clever – design in the use of low carbon materials; streamline delivery processes; minimise resource consumption; build in resilience

Build efficiently – embrace new construction technologies; eliminate waste; use nature-based solutions.

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Tackle carbon early. Adapted from: HM Treasury (2013) and Green Construction Board (2013)

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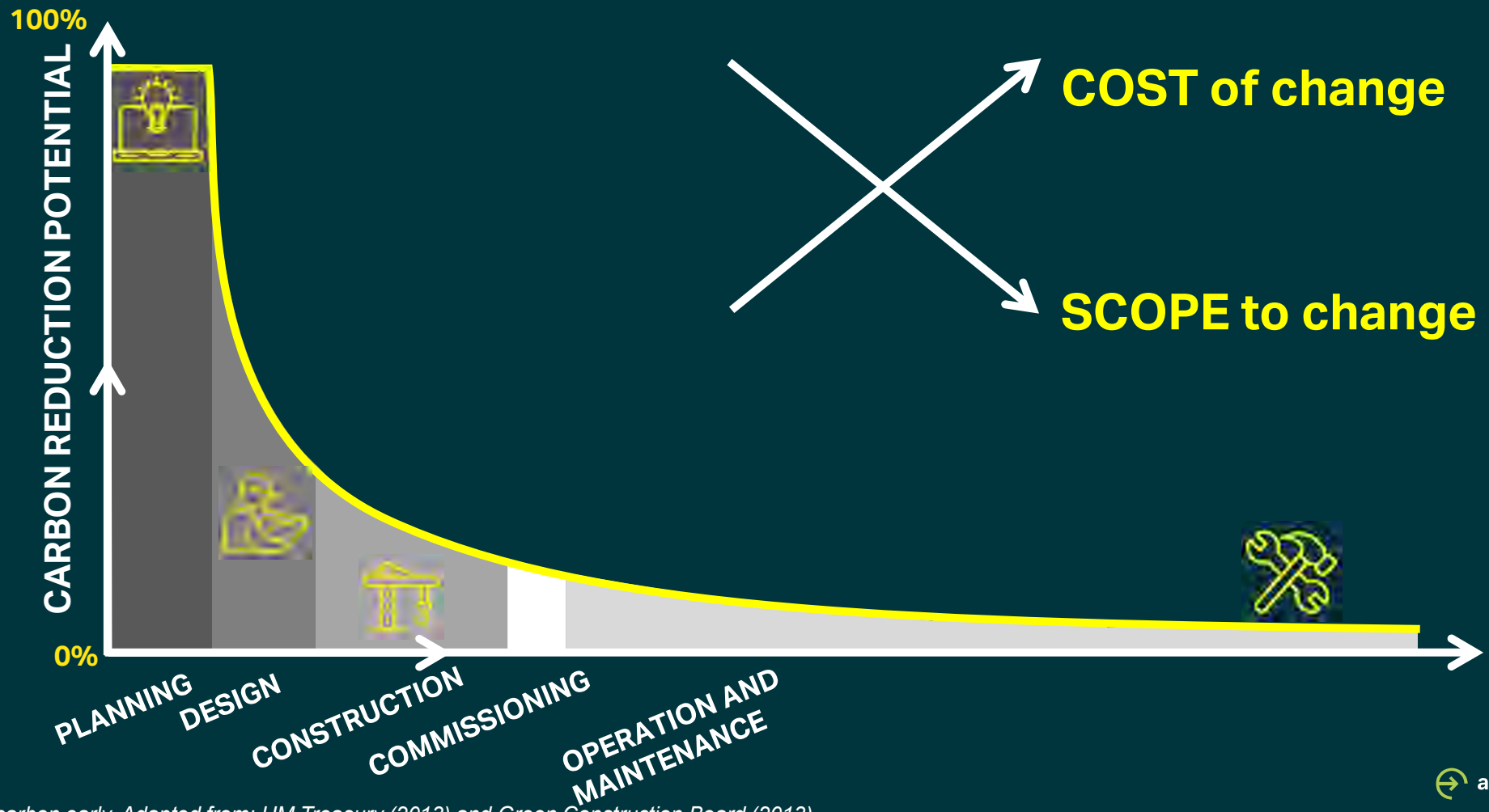

Tackle carbon early. Adapted from: HM Treasury (2013) and Green Construction Board (2013)

Carbon Management Plans

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Carbon Management Plan (CMP)

Why?

- Department for Transport requires a CMP to be included with business case submissions for funding
- National commitment to net zero by 2050
- Early consideration of carbon results in greatest carbon reduction opportunities

What?

- Carbon Management is the "*assessment, removal and reduction of Greenhouse Gas ('carbon') emissions during the delivery of new, or the management of existing, infrastructure assets and programmes*"
- The CMP must indicate how carbon emissions will be managed and reduced across the whole course of the project lifecycle, from project conception to end of life
- Adopt the principles of PAS 2080
- Responsibilities for carbon management at all stages of the project clearly defined

How?

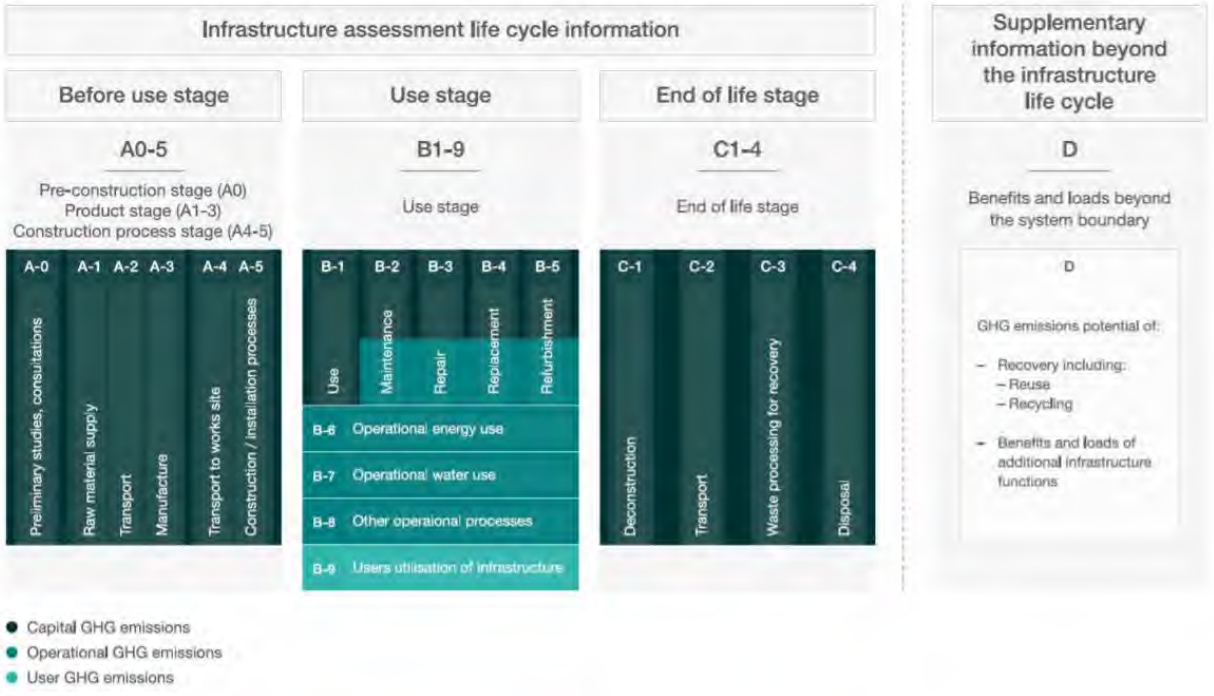
- Collaborative: involving the client, designer, contractor, operator
- Quantify carbon → set targets → identify carbon reduction opportunities → prioritise and implement opportunities
- Document procedural requirements, roles and responsibilities
- Submit CMP to DfT
- Live document: ongoing review and implementation

DfT Carbon Management Guidance

Business Case Stage	Carbon Management Activities
SOBC: Set carbon reduction targets against baseline	Establish the frequency of carbon emissions quantification and reporting during delivery of the project to ensure that quantification sufficiently informs decision-making.
	Calculate a baseline value and set targets relative to the baseline. This can be done at an individual asset and/ or programme level.
	Set carbon reduction targets which are also cost reducing on a whole life basis. Targets can relate to Whole Life Carbon or a breakdown of targets for Capital, Operational or User Carbon can be provided.
	Clarify how carbon reductions will be measured, i.e. as a total reduction figure or as a carbon intensity figure (tCO2e / £'000).
OBC, FBC, in construction and project closure	Assess and report emissions against baseline in order to track progress against the reductions target. Review and amend policies as needed.

Delivering Carbon Reduction – Baseline and Targets

Establish the baseline emissions associated with the activities with each PAS 2080 stage, and the approximate contribution of the activity per stage.



The baseline:

- Helps you understand which activities are major sources of emissions
- Highlights any excess emissions
- Provides a basis for carbon reduction targets and activities
- Provides a basis, against which carbon reduction can be measured, tracked and reported.

Objective Led Carbon Management Process

Pre-baseline steps:

- Describe carbon management governance, roles and responsibilities
- Determine emission sources from activities under the scope of the project at each PAS 2080 lifecycle stage

Reassess carbon footprint at the end of each project stage

Stage 1 Carbon baseline	• **Establish baseline** expected carbon emissions and hotspots associated with the scheme for the identification of carbon reduction opportunities, and targets • **Present carbon reduction targets**
Stage 2: Opportunity identification	• Workshop with client, designer and contractor **to facilitate early identification of opportunities** in Whole Life, Capital, Operational and/ or User Carbon • Update Carbon Opportunities Register
Stage 3: Opportunity prioritisation	• Client and design team to **prioritise carbon reduction** opportunities • Update Carbon Opportunities Register
Stage 4: Further investigation/ feasibility	• Revise GHG calculations • Client and design team assess feasibility of priority carbon opportunities • Update Carbon Opportunities Register
Stage 5: Implementation	• Implement carbon reduction opportunities • Implement carbon targets
Stage 6: Monitoring, reporting and revaluation	• Report revised carbon footprint and assess progress towards targets • Adapt strategy dependent on progress

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Embedding Carbon at a Project Level

Tools for embedding carbon:

Carbon baseline - the expected GHG emissions associated with the lifecycle of the proposed development are calculated. This provides the quantifiable baseline emissions from which targets are set.

Carbon workshop – held in collaboration with design and construction teams, as appropriate, to continually identify, review, assess and prioritise carbon opportunities.

Carbon Management Plan – developed to support the delivery of carbon reduction opportunities across the project lifecycle.

Carbon Opportunities Register – a live register used throughout the project lifecycle by the project team to record carbon reduction opportunities identified during discussions with the project team.

Target Delivery Tracker – a framework mechanism that can be used by the project team to track carbon performance throughout the project lifecycle and evidencing progress to meet targets

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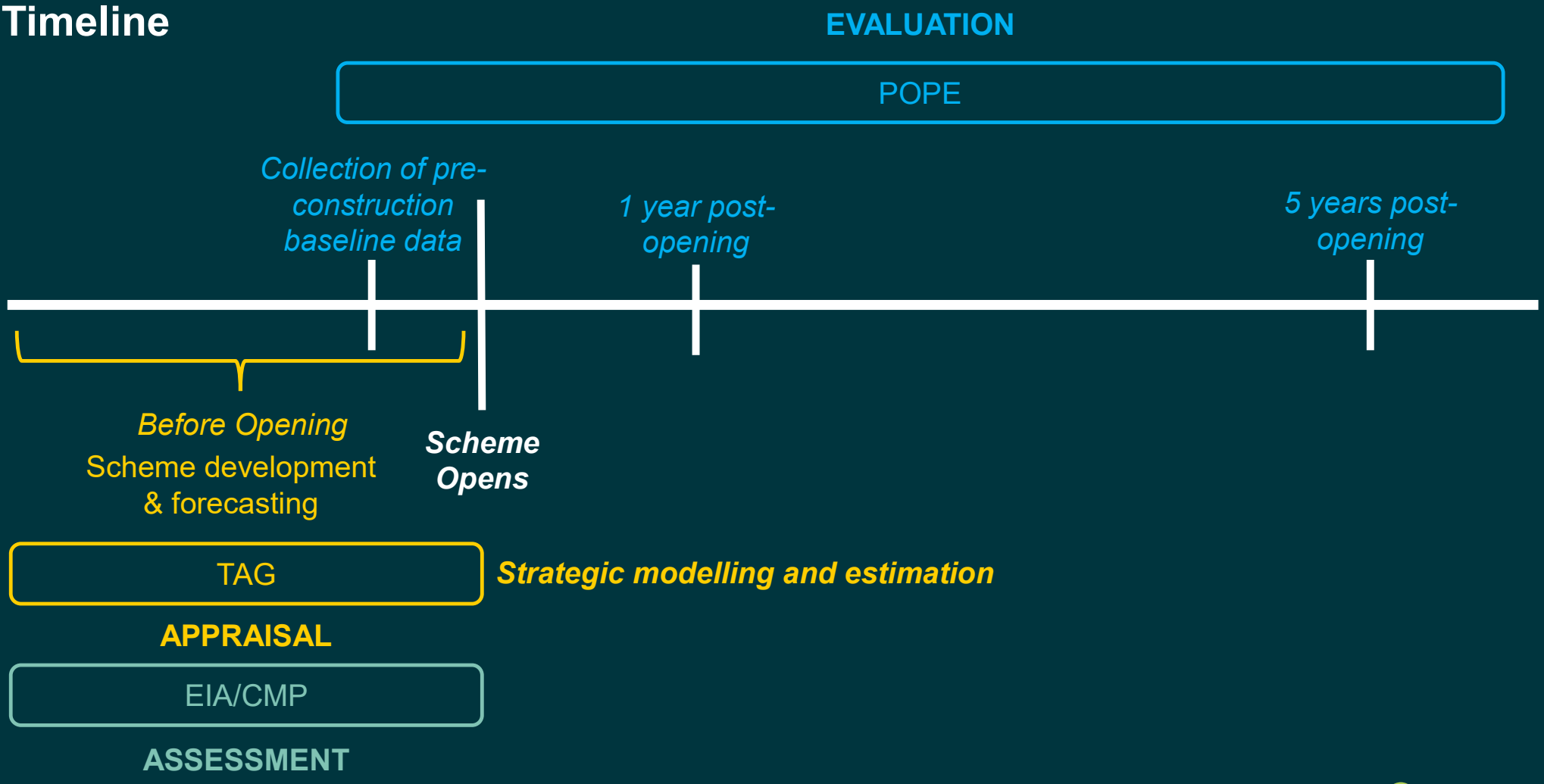
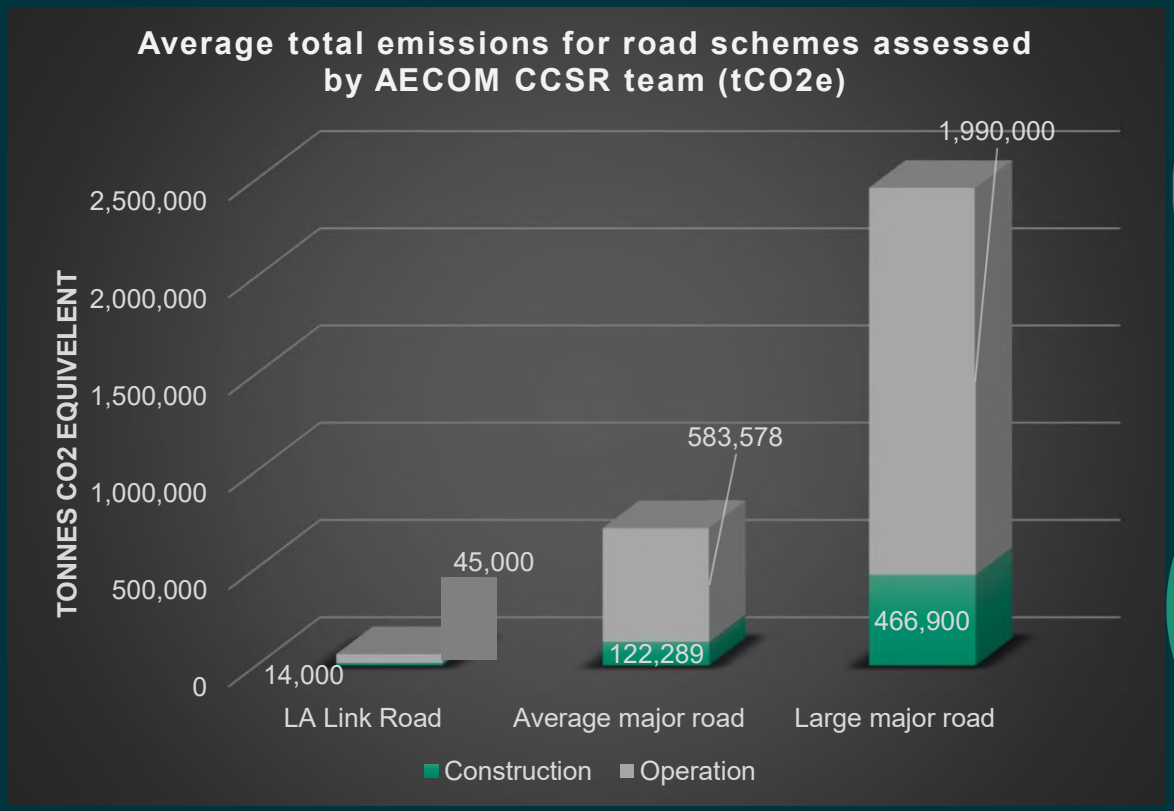
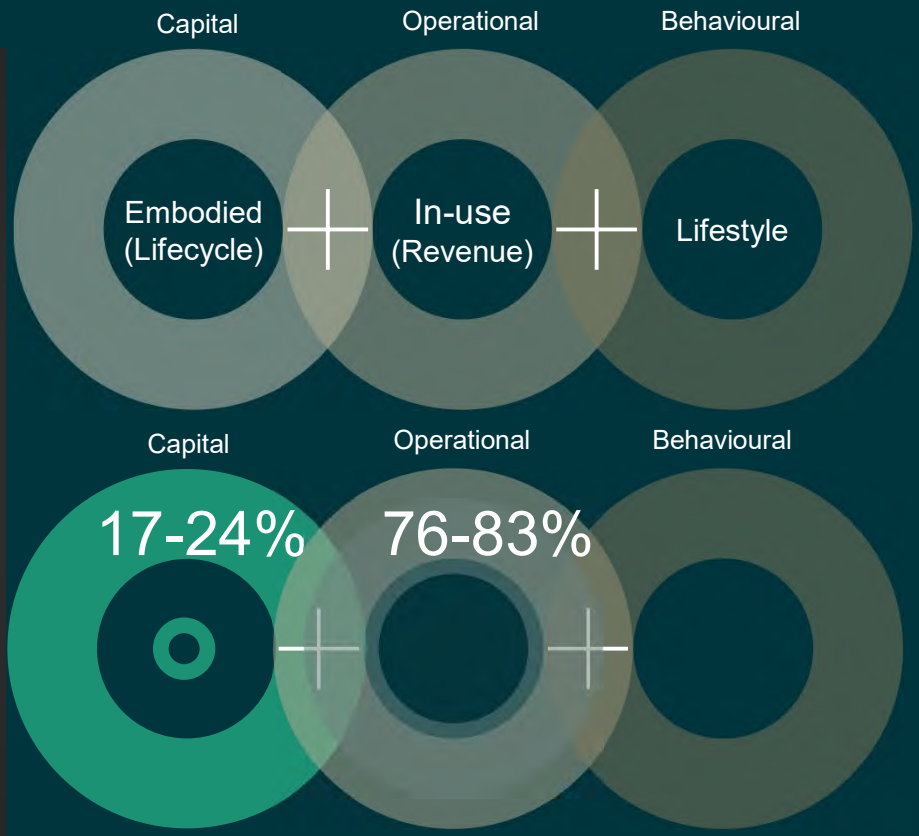
Carbon in use

Timeline


EVALUATION
POPE
Collection of pre-construction baseline data
1 year post-opening
5 years post-opening
Before Opening
Scheme development & forecasting
Scheme Opens
TAG
Strategic modelling and estimation
APPRAISAL
EIA/CMP
ASSESSMENT

Currently, use and maintenance of roads are responsible for c.80% of estimated CO_2e emissions from major road schemes





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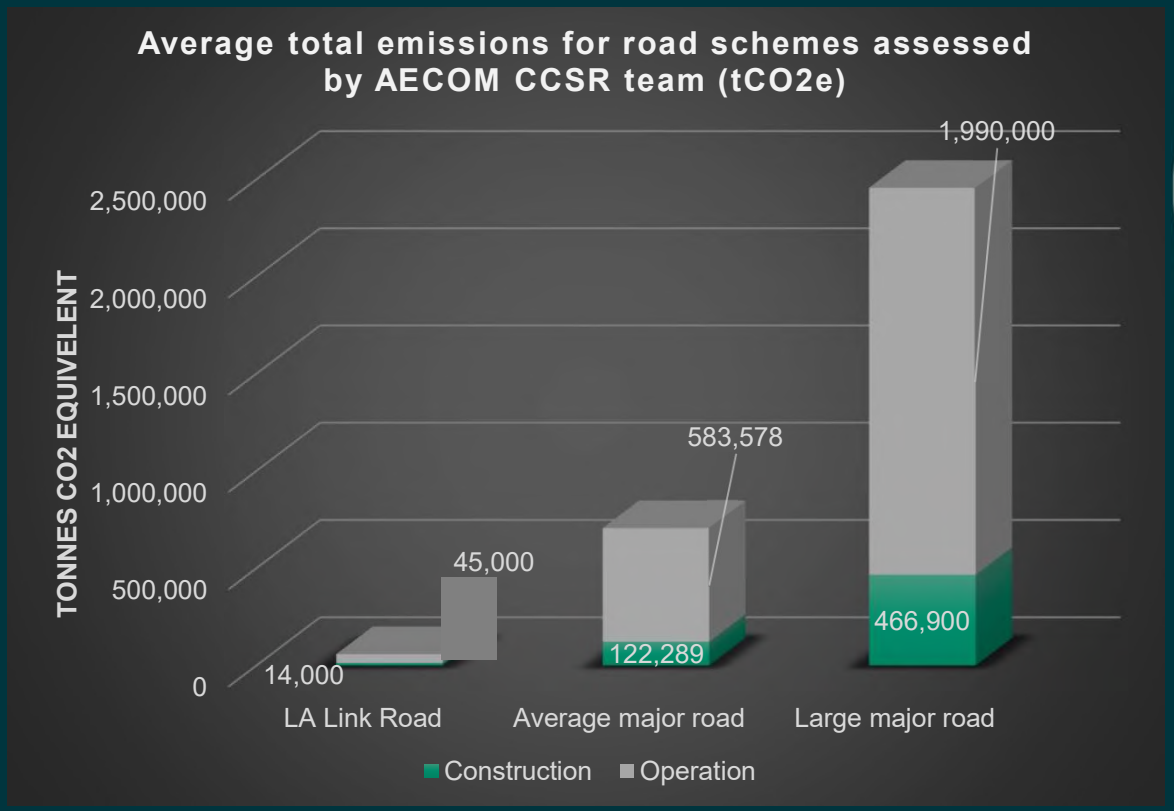

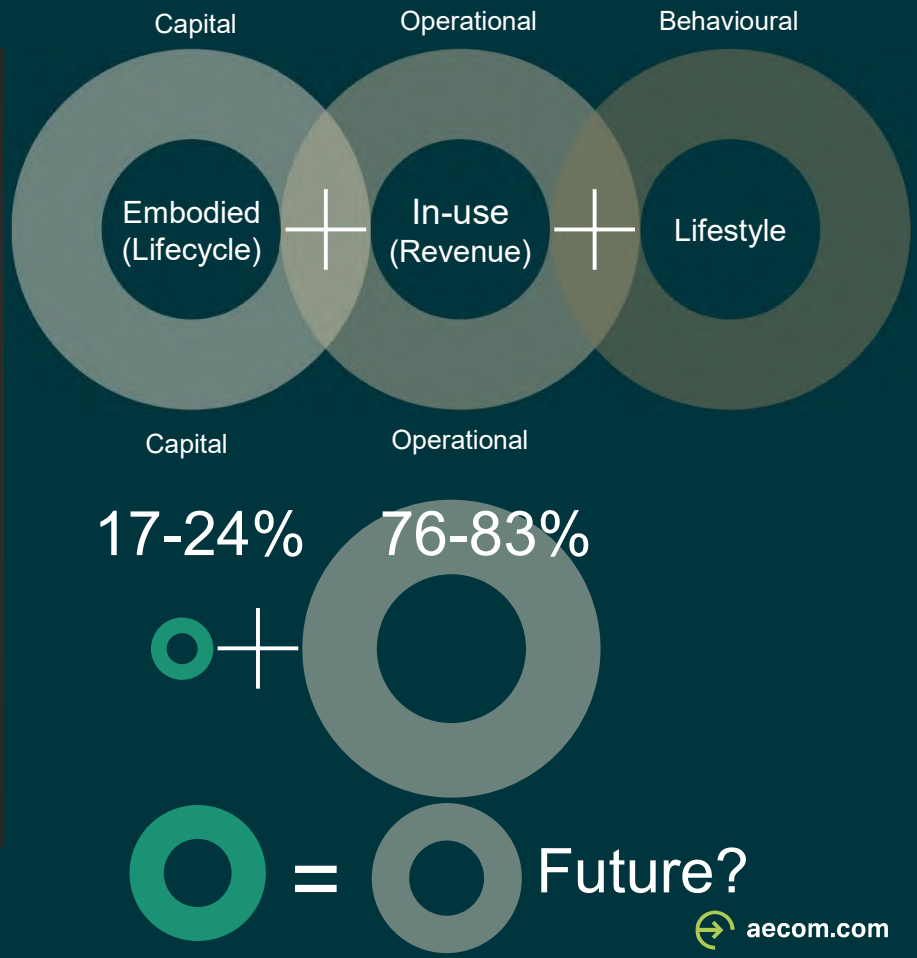

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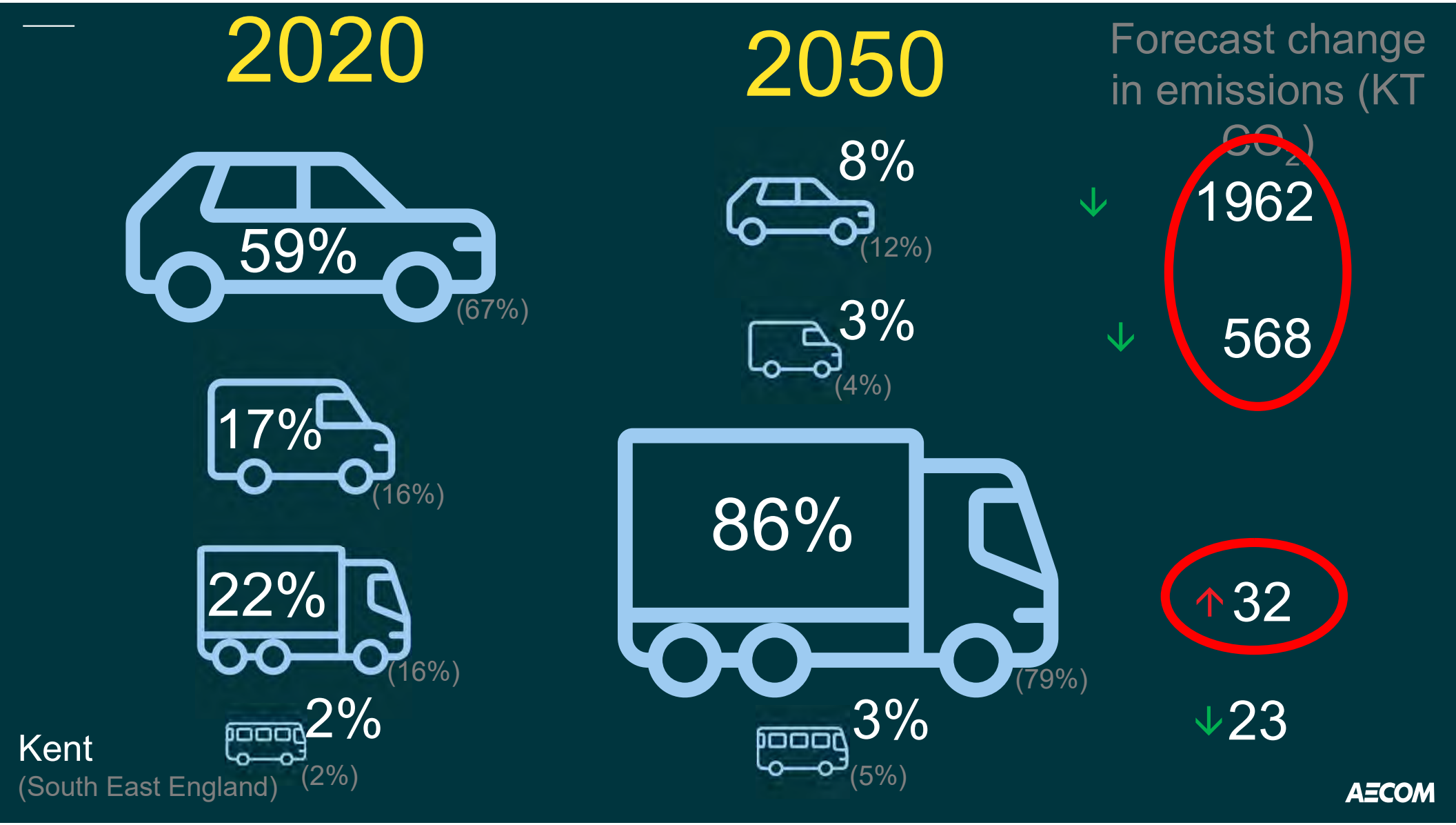
2020
2050
Forecast change in emissions (KT CO_2)
59%
(67%)
8%
(12%)
1962
3%
(4%)
568
17%
(16%)
86%
(79%)
22%
(16%)
↑32
2%
(2%)
3%
(5%)
↓23
Kent
(South East England)
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Carbon in design

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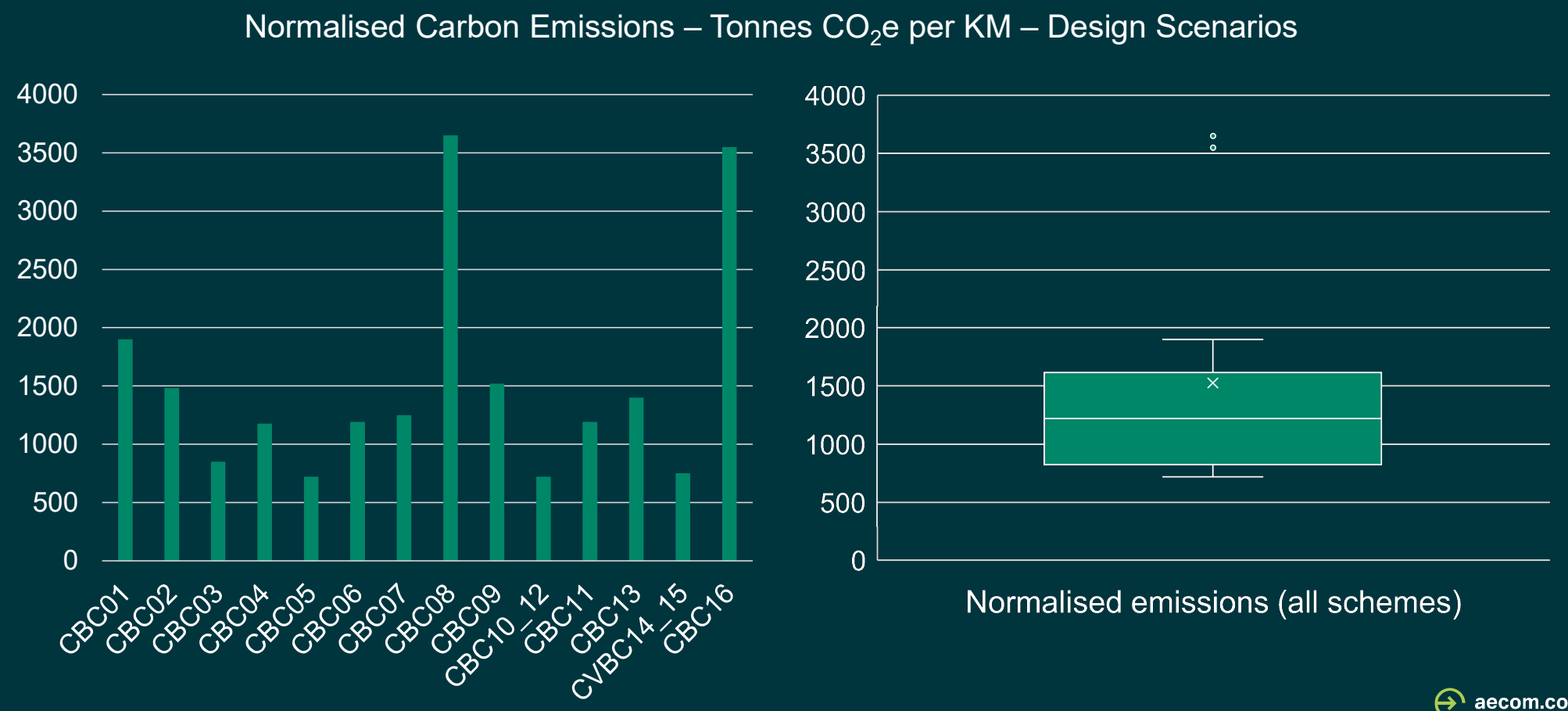
Bus Connects Project, Ireland

- Development and design of 15 routes around Dublin to enable modal shift to reduce emissions
- Introduction of Bus Lanes, dedicated cycle lanes, traffic calming and quiet ways
- Assess Greenhouse Gas (GHG) impacts of different designs
- First route – Core Bus Corridor 9

Scheme Location – Core Bus Corridor 9 Highlighted

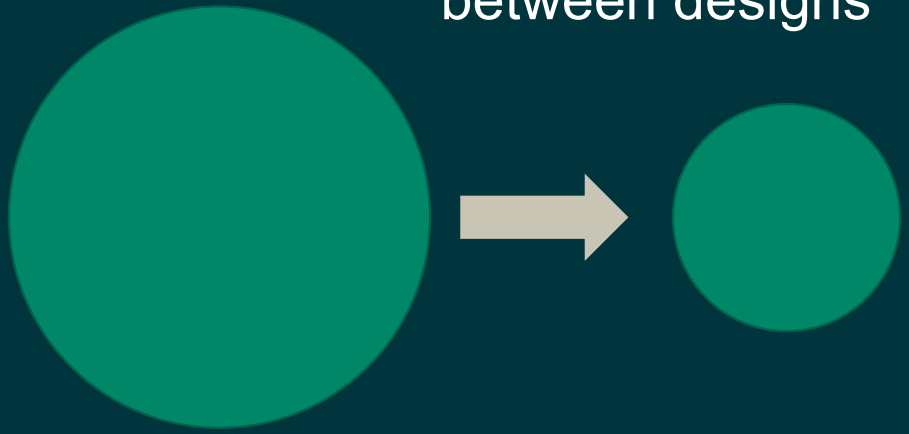
Client: Transport Infrastructure Ireland (TII)

Core Bus Corridors – CO_2e comparison per km



Core Bus Corridors – CO_2e comparison 9 example – previously unquantified

46% reduction in CO2e between designs



Savings achieved through reduction in embodied emissions of materials and reduction in construction waste

Carbon Assessment Tool & Backing Sheet Extract

Resilience and climate change

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A40 Smart Corridor

A40 Smart Corridor provides additional transport capacity to support substantial planned housing growth.

This is achieved through widening to provide Bus Lanes and Active travel provision on both sides of the corridor.

However, this results is significant tree loss and impacts on hedgerows and protected species.

Oxfordshire County Council required 10% Biodiversity Net Gain to mitigate the overall impacts of the scheme.

This is achieved through:

- Maximising habitat creation and replanting on site, including OCC's overcoming maintenance concerns to plant in the central reserve.
- Utilising planted swales for kerbside drainage
- Providing enhancement on linking linear Infrastructure – Oxford Canal through CART
- Providing enhancement to sites within the local parish such as enhancing grasslands and replanting hedgerows.

Specific mitigation examples include

- Redesign of cycle path and use of lightweight material to avoid impacts on a Veteran Tree, including root protection zone.
- Provision of alternative ponds, hedgerows, species rich grasslands and scrub to mitigate the impact on Great Crested Newts.
- Provision of alternative and enhanced forage for Hazel Dormice.
- Avoidance of light impacts due to potential for bat disturbance, by limiting extent of lighting provision in agreement with OCC.

Questions

Thank you

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