

Future Highways Research Group

Carbon Accounting & Carbon Reduction: Tools & Guidance

APSE Conference

ADEPT / Proving Research Partnership



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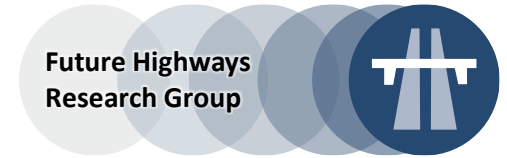
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Future Highways Research Group

Introduction & Membership

Future Highways Research Group Membership

Excludes Applications & Research Associates



- Buckinghamshire Council
- Central Bedfordshire Council
- Cheshire East Council
- **Cheshire West & Chester**
- Cumbria County Council
- Derby City Council
- **Derbyshire County Council**
- **Devon County Council**
- Dorset County Council
- East Sussex County Council
- Essex County Council
- Hampshire County Council
- Herefordshire Council
- **Hertfordshire County Council**
- Kirklees Council
- **Kent County Council**
- Lancashire County Council
- **Leicestershire County Council**
- **Lincolnshire County Council**
- London Borough of Barnet
- London Borough of Newham
- London Borough of Haringey
- **Luton Borough Council**
- Milton Keynes Council
- **Norfolk County Council**
- North Yorkshire County Council
- Northumberland County Council
- Nottinghamshire County Council
- North Somerset Council
- **Oxfordshire County Council**
- Shropshire Council
- **Solihull Metropolitan Borough Council**
- **Somerset County Council**
- South Gloucester Council
- **Staffordshire County Council**
- **Suffolk County Council**
- **Surrey County Council**
- **West Sussex County Council**

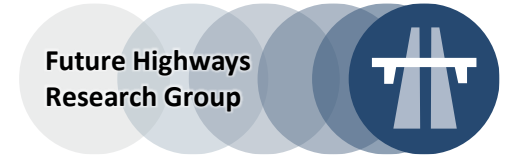
FHRG Board

Simon Wilson (Research Director)
Karen Farquharson (Proving)
Andy Perrin (Proving)
Hannah Bartram (ADEPT)
Dominic Browne (Highways Magazine)

CCAS Programme Engagements

Diversity of Organisations & Services Delivery Models

FHRG Members



- **Mostly county councils and metropolitan authorities.**
 - FHRG members cover nearly 82% of the country (England).
 - Expansion into London Boroughs and West Midlands authorities (Live Labs II).
- **All 98+ ADEPT members are Research Associates.**
 - Under the 5-year exclusive research partnership with ADEPT.
- **Mixture of contracted and in-house delivery organisations.**
 - Mostly contracted services; primary + designer and integrated.
- **Mixture of authority types.**
 - Rural, urban, coastal, and mixed areas.
 - Representing wealthy, deprived and mixed populations.
 - Mixed industrial, commercial and residential network users.
- **All bar four authorities have declared climate emergencies.**



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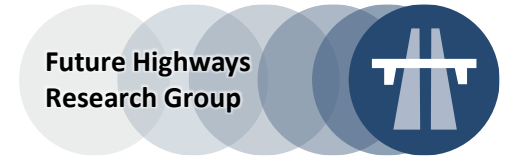
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Carbon Calculation: Challenge & Goals

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Sector Effects & Implications

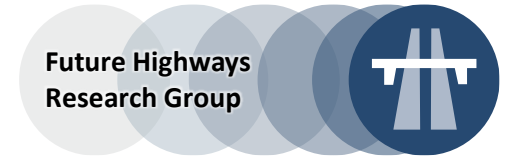
Identified By FHRG Members



- **Fragmented approaches.**
 - Interpretations, reporting cycles, boundaries, assumptions, data sources, calculations.
- **Duplicated effort.**
 - Occurring in each supply chain (multiplied by the number of LHAs).
- **Repeated errors and risks.**
 - As each LHA adopts its own approach.
- **Significant sector costs.**
 - Repeated investments to achieve the same goals... in a different way.
- **Stalled (or worse, “blind”) carbon reduction programmes.**
 - Awaiting standards and unable to identify the best carbon reduction strategies and options.
- **Inability to rapidly identify and dismiss greenwash products and services.**
 - Inability to properly assess vendor claims.
- **No basis for highways sector carbon footprint benchmarking.**
 - Inability to aggregate to provide a sector-wide carbon position.
- **Very high rectification, retreat and replacement costs.**
 - Unpicking wasted investments in systems, people, processes and products and services.

Carbon Calculation & Accounting Standards (CCAS)

Purpose & Goals



- **To provide comprehensive and consistent standards for carbon accounting for LHAs.**
 - Across GHG, scope 1, 2 & 3.
 - Based on the relevant GHG, BS EN ISO 14001, PAS 2050, PAS2060 and PAS 2080 standards.
 - Baseline reporting standards for LHAs and their supply chain partners.
- **A repeatable, transparent and robust process for undertaking emissions assessments.**
 - Common baseline assumptions and boundaries.
- **Enable the assessment of strategic carbon reduction options.**
 - Including the assessment of new materials, methods, policies and partners.
 - Early identification of unsubstantiated initiatives / claims (greenwash).
- **Guidance covering both highways construction and highways maintenance.**
 - Guidance for consistent carbon measurement, conversion, and aggregation.
 - Guidance regarding data sources, data calibration and assessing data sources veracity.
- **Proposed in-house processes for reducing the administrative overheads of carbon accounting.**
 - Enable in-house skills and culture development.
 - Avoiding the repeating costs of expensive external consultancy.
- **Calibrated to encompass 80% of emissions at 80% confidence (scope 3).**
- **Open source (IP/AP free), free to access and use, sector owned and sector curated.**



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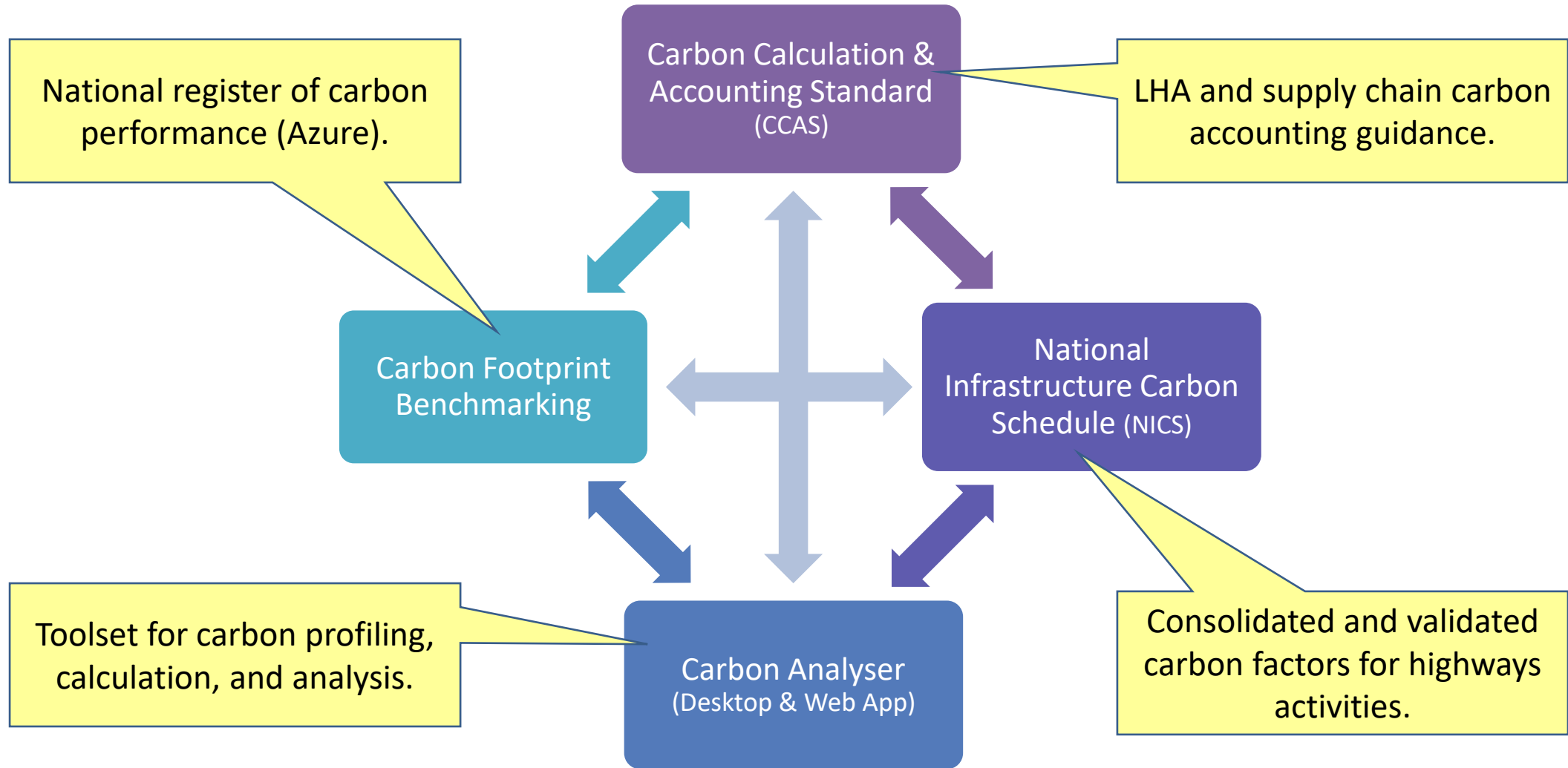
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Carbon Calculation & Accounting Standard (CCAS): Programme Overview

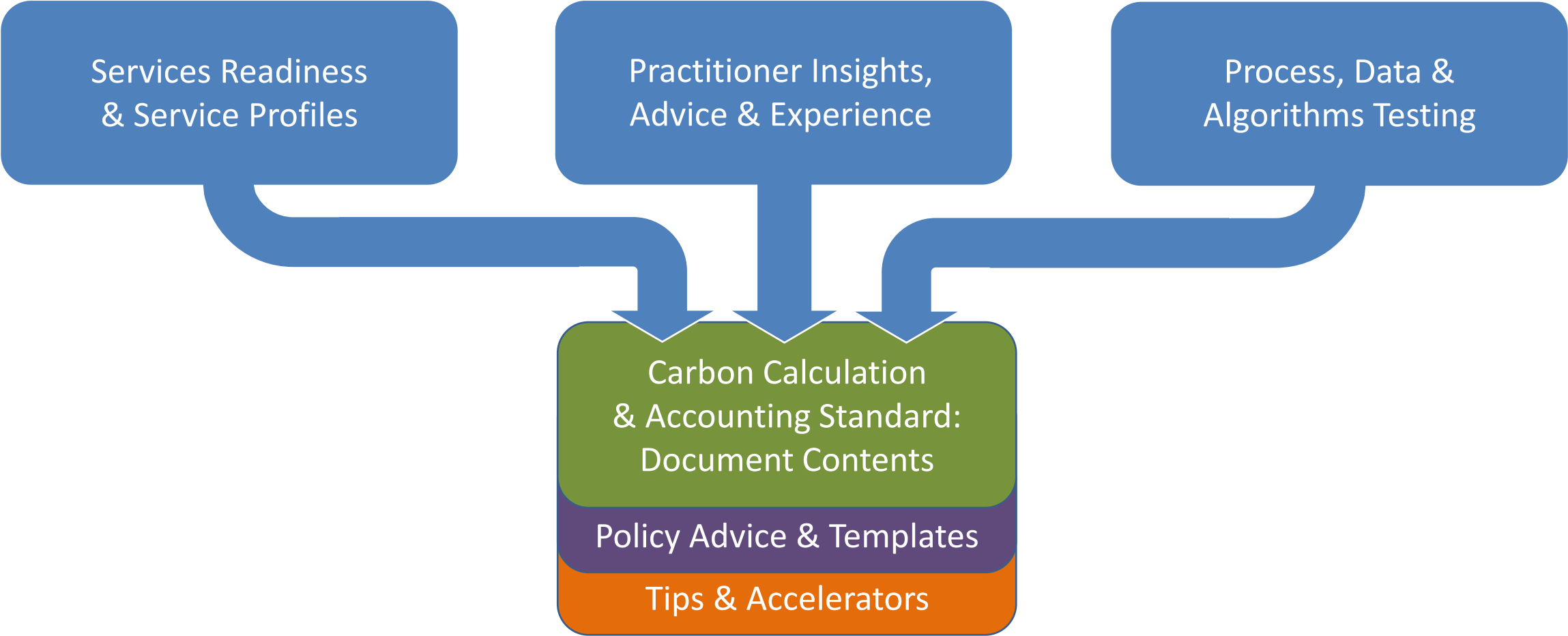
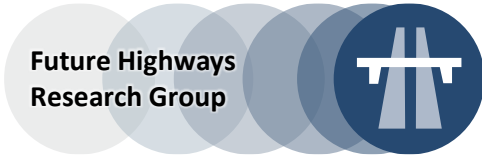
Carbon Calculation & Accounting Standard and Carbon Analyser

Programme Components

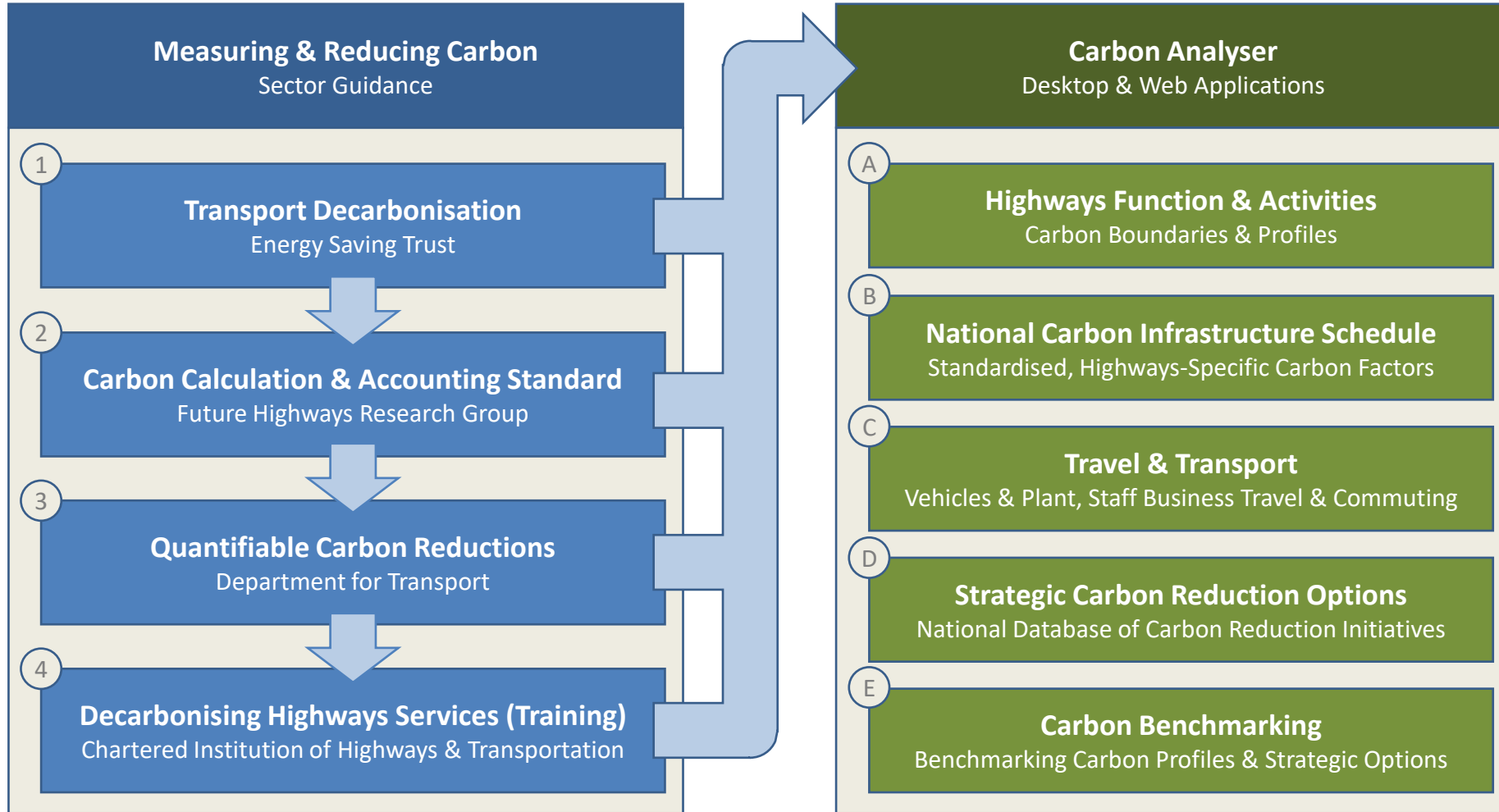


CCAS Guidance Development

Seven-Authority Pioneer Programme



Developing Consistent, Sector-Wide Guidance





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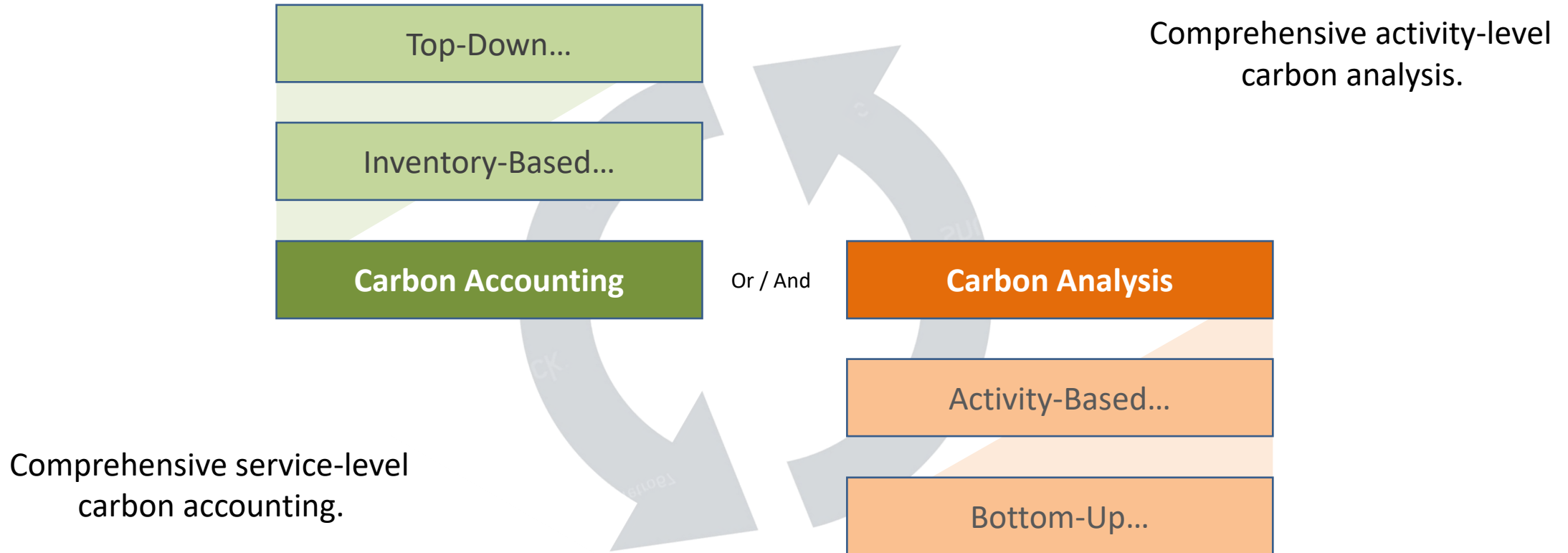
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Carbon Accounting vs Carbon Analysis

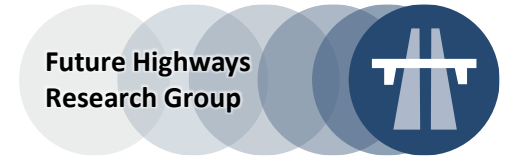
Carbon Calculation & Accounting Standard and Carbon Analyser

Carbon Accounting vs Carbon Analysis



Inventory Based Carbon Accounting

Step 1: Defining the Carbon Boundary



- **Works Management**

- PMO
- Works Scheduling...

- **Planned Maintenance**

- Resurfacing
- Surface Dressing...

- **Network Resilience**

- Winter Maintenance...

- **Reactive Maintenance**

- Find & Fix (Pothole Gangs)...

- **Street Lighting**

- Repairs
- LED Upgrades...

What is in-scope and out-of-scope of our carbon analysis?

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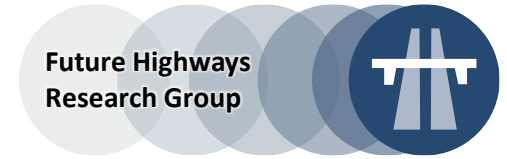
Frame Control Systems...

- **Drainage**

- Gully Emptying...

Inventory Based Carbon Accounting

Step 2: Premises & Sites Inventory



Premises & Sites

Staff & Contractors

Vehicles & Plant

Products & Services

Gas Usage

Electricity Usage

Fugitive Emissions (from A/Cs)

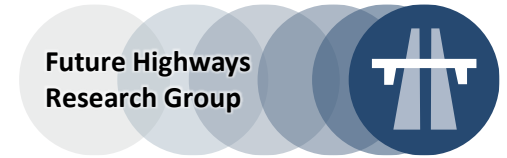
Water & Sewerage

Site Fuel Store Usage

Multiplied By Share Of Site

Inventory Based Carbon Accounting

Step 2: Premises & Sites Inventory



Premises & Sites

Staff & Contractors

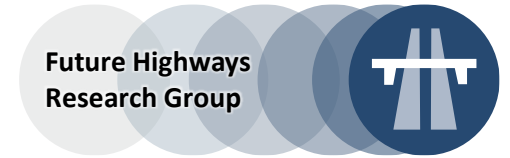
Vehicles & Plant

Products & Services

- Number of Commuting Days
- Number of Home Working Days
- Commute Distance
- Vehicle Type
- Fuel Type
- Business (Grey Fleet) Miles
- Survey or Averages

Inventory Based Carbon Accounting

Step 2: Premises & Sites Inventory



Premises & Sites

Staff & Contractors

Vehicles & Plant

Products & Services

Vehicle / Plant Type

Engine Size

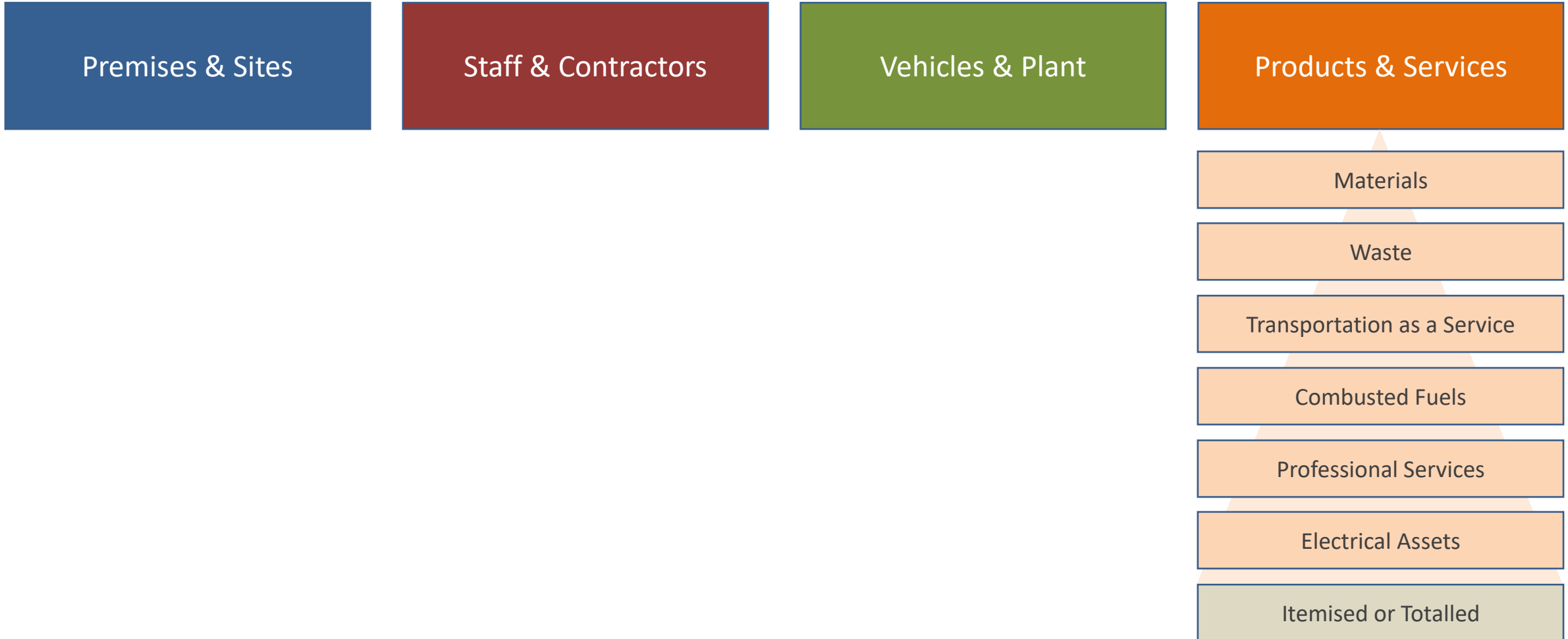
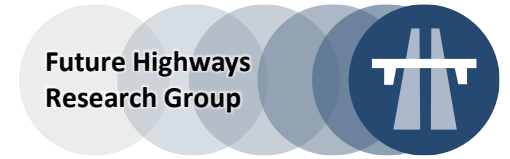
Fuel Type

Litres or Miles

Itemised or Totalled

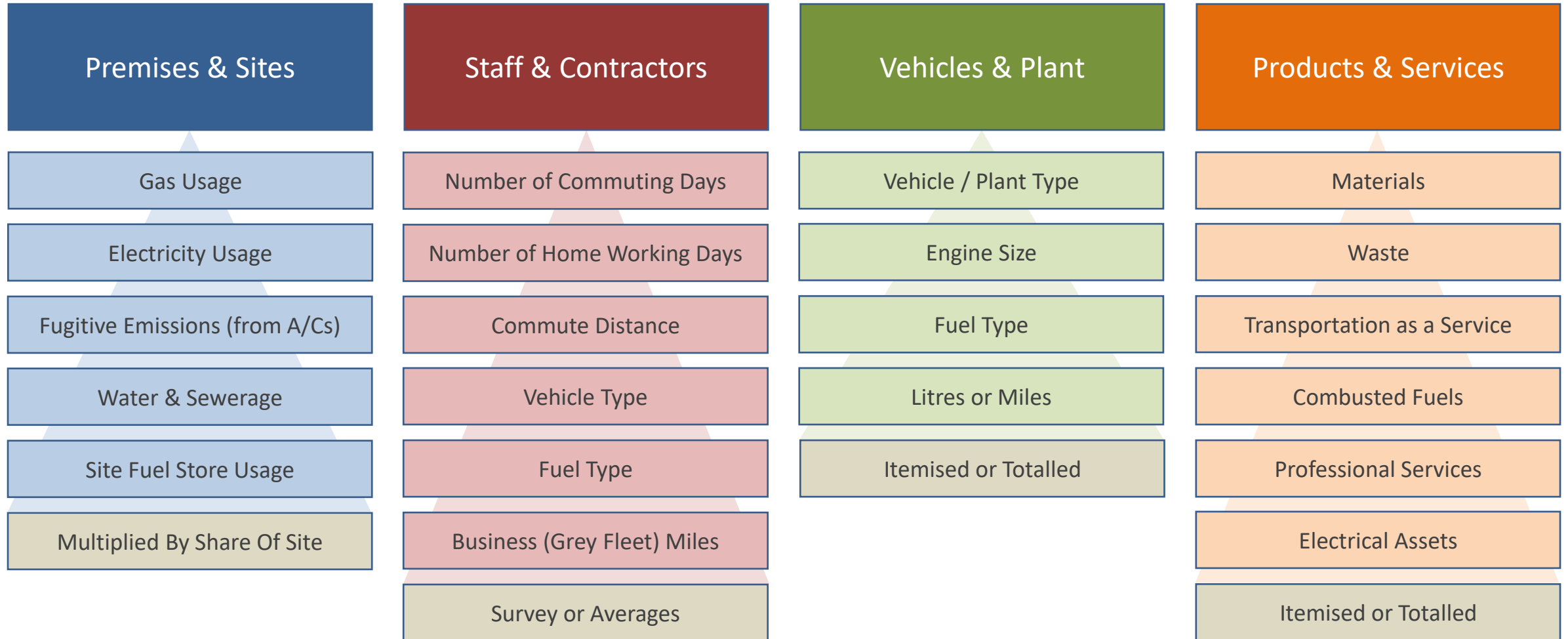
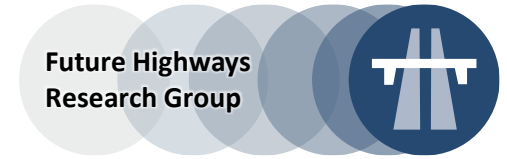
Inventory Based Carbon Accounting

Step 2: Premises & Sites Inventory



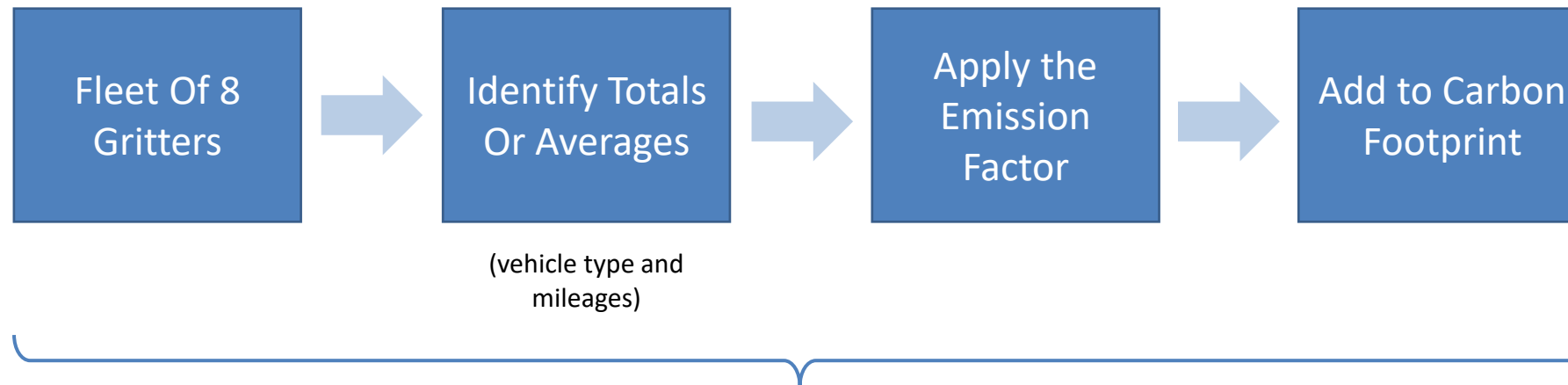
Inventory Based Carbon Accounting

Step 2: Premises & Sites Inventory



Using Summary Data

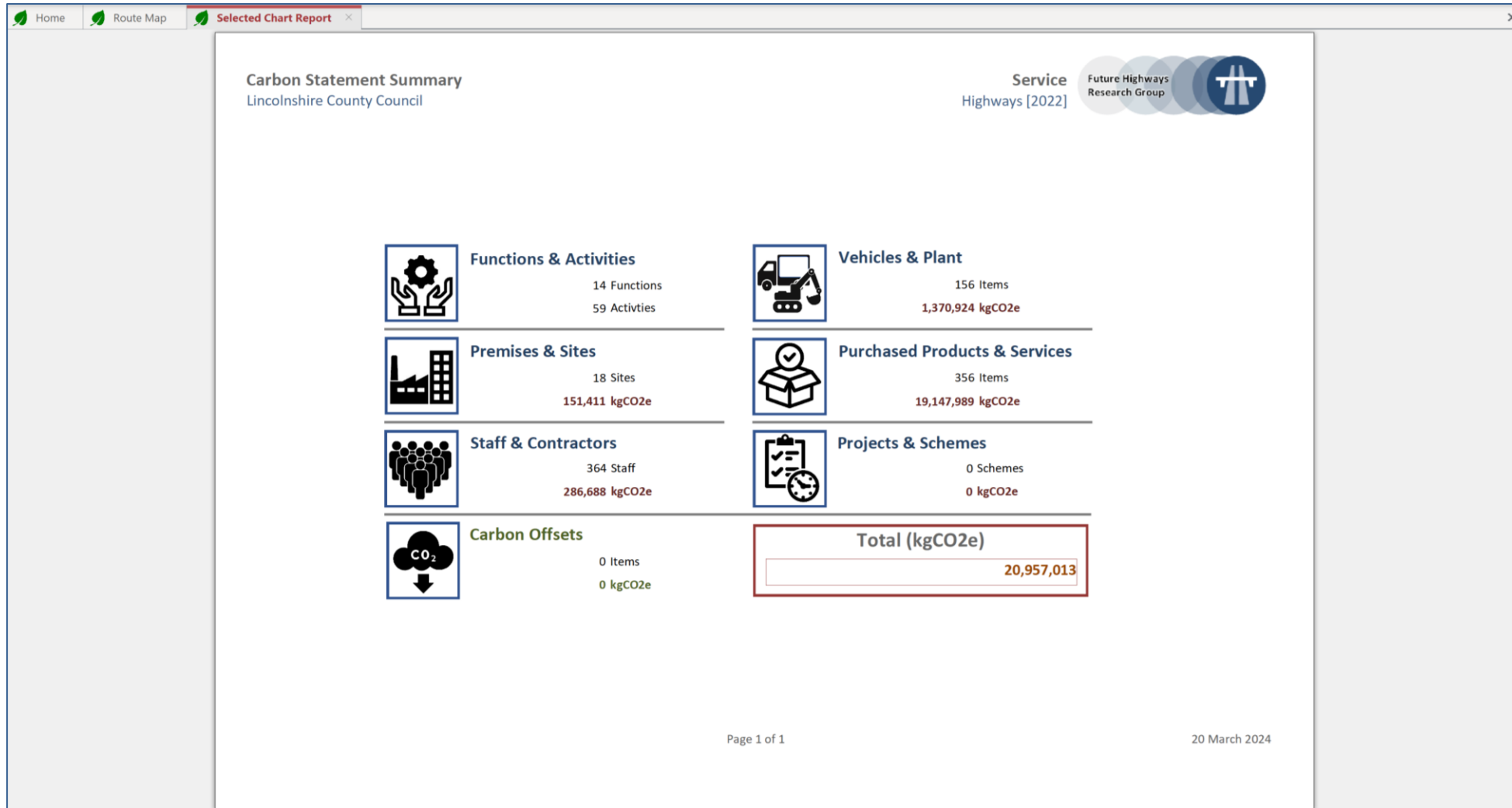
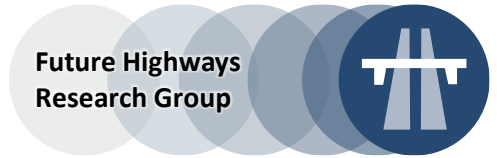
Illustrative Example (Carbon Analyser Accelerators)



Summaries can be used with vehicles and plant, and staff and operatives.

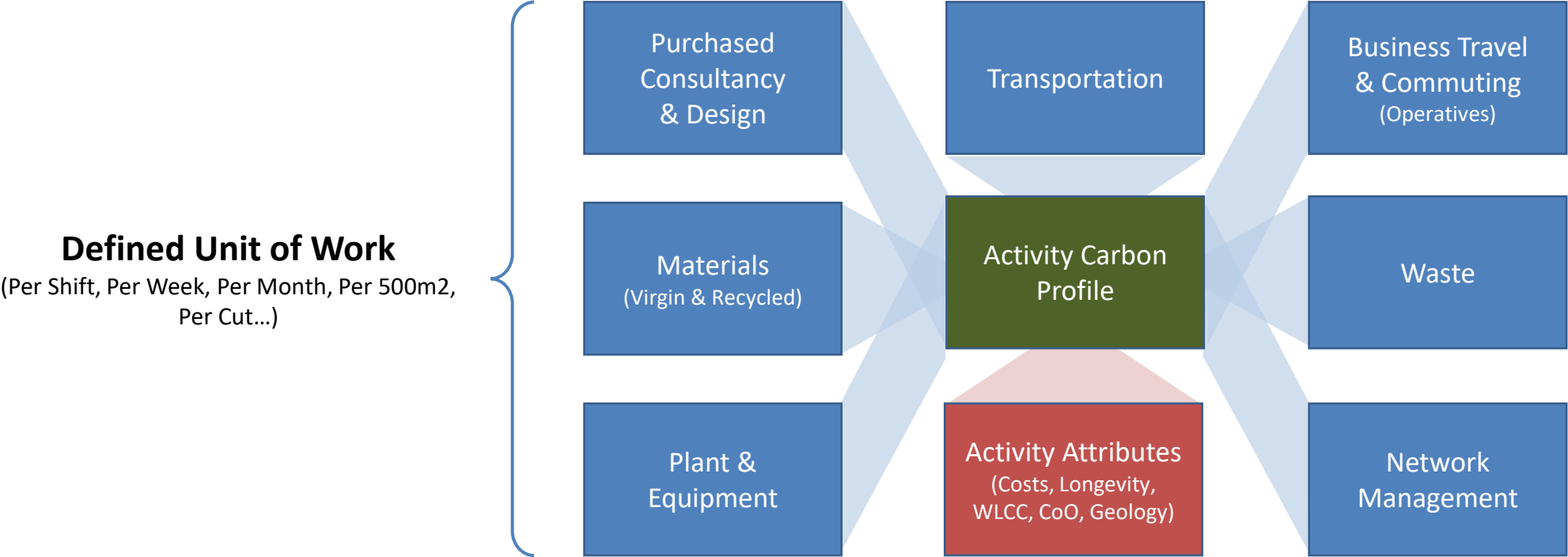
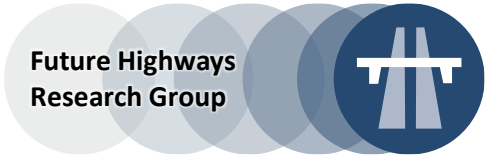
Carbon Footprint Statement

Carbon Analyser



Activity Based Carbon Analysis

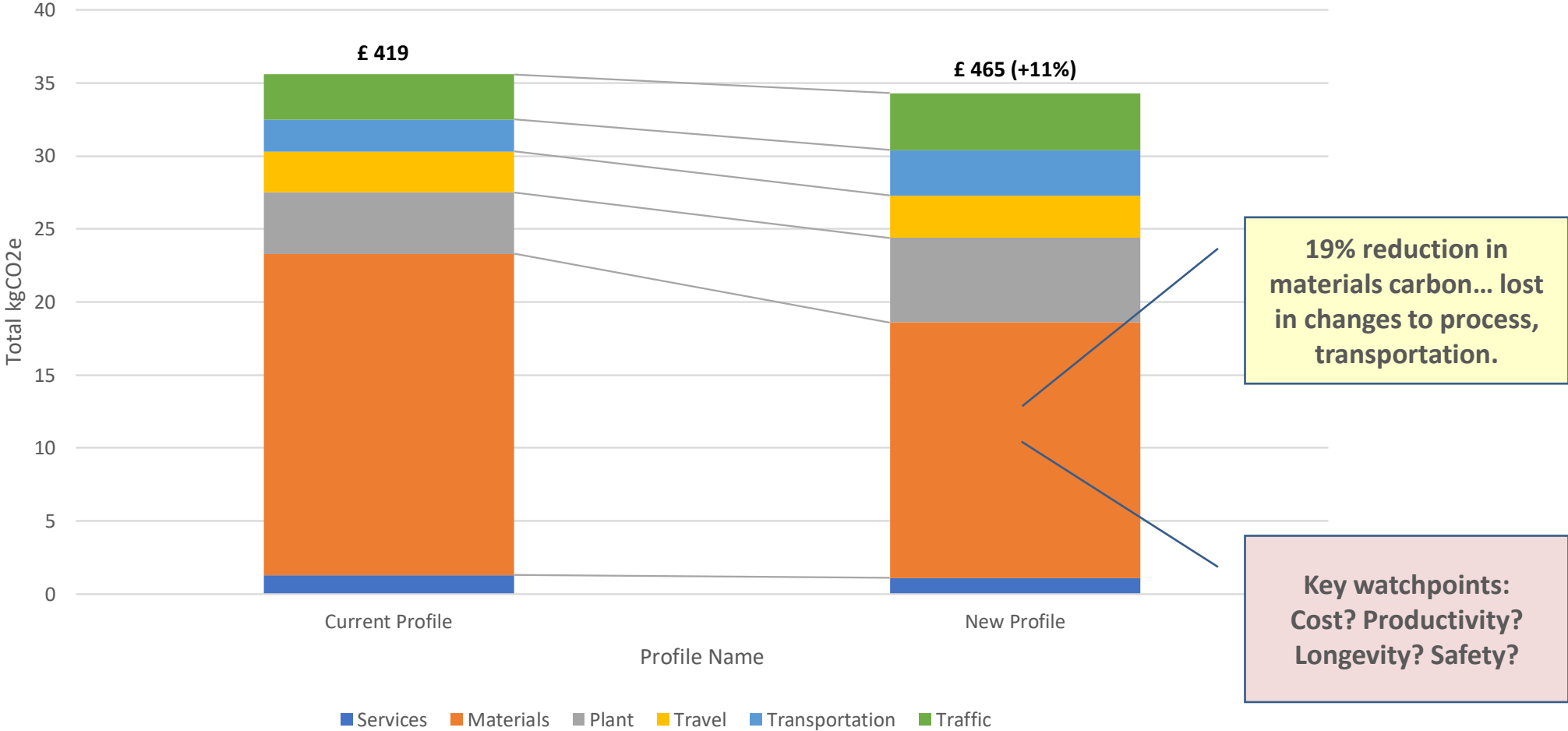
Assessing Carbon & Costs at Activity Level



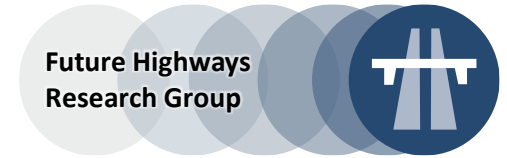
Activity-Level Carbon Assessments & Change Planning



Sample Activity (Per Shift)



What have we learned from the CCAS engagements?



- **High carbon levels are not where we expected to find them.**
 - Fuels, commuting and home working represent significant carbon contributors.
 - Materials always have to be seen in context.
- **Low carbon services correlate with high VfM scores.**
 - FHRG VfM Benchmarking Club.
 - High effectiveness and high efficiency = lower carbon.
- **Carbon measurement and management readiness is highly variable.**
 - Data readiness, culture and teams readiness, reduction initiatives management readiness.
 - We have need to add “accelerators” allowing authorities to work with averages and “big handfuls”.
- **Policies, initiatives and boundaries are highly inconsistent.**
 - Significantly increasing the complexity of benchmarking.
- **LHA’s and their supply chains are solutioneering...**
 - ...ahead of understanding their carbon position: a very risky approach.
 - e.g. understanding carbon efficiency as a KPI.
- **Many solutions are greenwash.**
 - 52% of the 77 assessed options have little or no carbon benefit.
 - Blinding LHAs to better performing options (e.g. fleet SLEP + biofuels?, improved efficiency (high VfM = lower carbon)).



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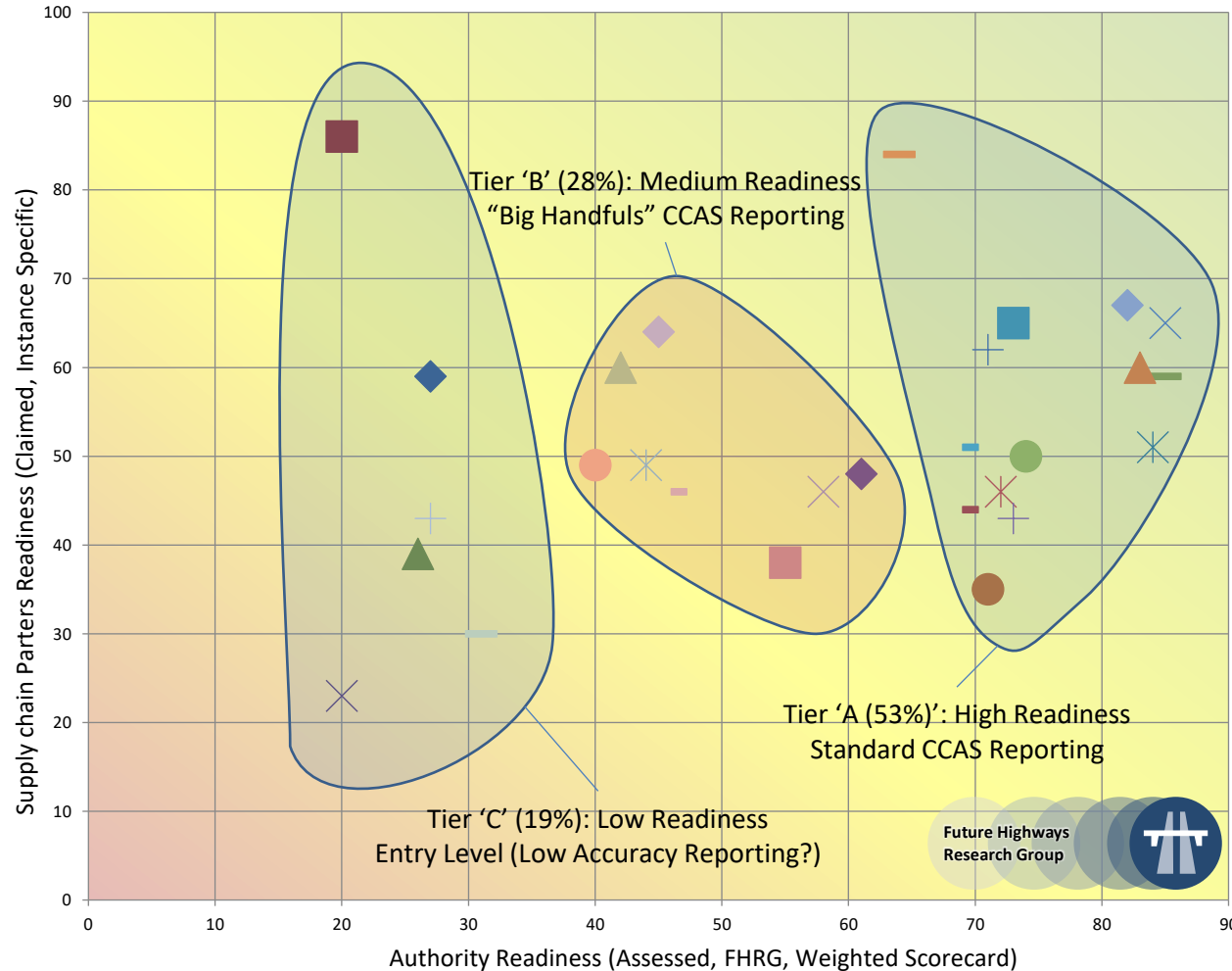
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Readiness Assessment

CCAS & Carbon Analyser:
Kick-Starter Programme

Sector Readiness (Estimates, June 2023)

Carbon Reporting: CCAS Readiness: Anonymised (Weighted Factors Analysis)



...and supply chain partners' readiness?

...not as much as advertised!



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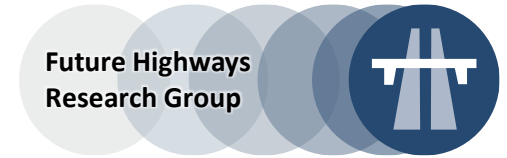
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Political Support

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Political Feedback

Does carbon pass the “so what” test?



- **“How many more potholes will a net zero policy fill?”**
- **“You want to measure carbon during a cost-of-living crisis?”**
- **“What about China?... and India?... and Brazil?”**
- **“Surely, we should invest in climate change resilience... not reduction?”**
- **“We can’t afford electric vehicles, and we don’t believe in the technology.”**
- **“What, realistically, are we going to do with carbon data?”**
- **“This is just another industry for consultants.”**
- **“We want to talk about biodiversity... ponds, ducks, trees... stuff people can see.”**



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Pioneer Programme

Learning From Sector Practitioners