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proving



Official Research Partner

ADEPT

Association of Directors of
Environment, Economy, Planning & Transport

Future Highways Research Group

Carbon Calculation & Accounting Standard (CCAS)

&

Carbon Analyser Kick-Start Programme

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Introduction

The Future Highways Research Group (FHRG) is a research and innovation group comprising 40 Local Highways Authorities (LHAs), including county councils, unitaries, London boroughs and metropolitan authorities. The FHRG is the official research partner of ADEPT, and our members currently represent over 84% of the UK highways network.

Carbon Calculation & Accounting Standard (CCAS)

A principal research theme of the FHRG is climate change, including the measurement, reporting and reduction of carbon emissions across LHA supply chains. Currently, a lack of standardisation in the UK highways sector has led to highly fragmented approaches to carbon measurement, carbon accounting and carbon reduction. As a response, the FHRG has developed the *Carbon Calculation & Accounting Standard* (CCAS) as guidance for FHRG and ADEPT members.

The CCAS guidance aims include:

- **Comprehensive and consistent standards for carbon accounting for LHAs.**
 - Across GHG scopes 1, 2 & 3.
 - Based on the relevant elements of the GHG protocol, BS EN ISO 14001 (specifically ISO 14064), PAS 2050, PAS 2060 and PAS 2080 standards.
 - Baseline reporting standards for LHAs and their supply chain partners.
- **Repeatable, transparent, and robust processes for undertaking emissions assessments.**
 - Common baseline assumptions and boundaries.
- **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 the development of a low-carbon culture.
 - Avoiding the repeating costs of expensive external consultancy.
- **The assessment of strategic carbon reduction options based on accurate carbon baseline assessments.**
 - Including the assessment of new materials, methods, policies, and partners.

A route map for the CCAS process using Carbon Analyser is included in Appendix A.

Carbon Analyser

Many LHAs do not have the necessary skills or resources to implement and sustain specialist, time consuming and costly carbon accounting processes. To assist LHAs, the CCAS is supported by *Carbon Analyser*; a top-down, inventory-based carbon calculator for LHA services.

1. **The *Carbon Analyser* web application is specifically designed for LHA services.**
 - a. And their supply chain partners.



2. **Fully aligned with the CCAS inventory-based analysis process, assessing:**
 - a. Highways functions and activities, for identifying the reporting boundaries and responsible parties.
 - b. The inventory of premises and sites.
 - c. The inventory of staff and contractors.
 - d. The inventory of vehicles and plant.
 - e. Emissions from purchased products and services (GHG Scope 3).
3. **Strategic analysis of carbon reduction options.**
 - a. Including options analysis scorecards assessing the *attractiveness*, *achievability*, and *stakeholder support* for each option.
4. **A Microsoft Azure, secure, cloud-based *dataverse* web application.**
 - a. Incorporating lookup data from all key published sources (including, *inter alia*, National Highways (NHs), Department for Business, Energy & Industrial Strategy (BEIS), Transport Analysis Guidance (TAG), Inventory of Carbon and Energy (ICE) and Road Surface Treatments Association (RSTA)).

Screenshots of Carbon Analyser are included in Appendix C.

CCAS & Carbon Analyser: Kick-Start Programme

The kick-starter programme includes the following stages and deliverables:

1. **Scoping all highways activities.**
 - a. Including GHG scopes 1, 2 and 3, and identifying the responsibilities for carbon reporting.
 - b. Establishing the reporting cycles, boundaries, assumptions, data sources, and authority-specific defaults required for carbon calculation.
2. **FHRG support in creating the service carbon inventories, including:**
 - a. Proforma workbooks and access to Carbon Analyser for direct data collection, analysis and reporting.
 - b. Comprehensive data collection and carbon conversion support from the FHRG team.
3. **Carbon footprint reports for the service for the selected reporting year.**
 - a. Highlighting the key areas for improvement and areas where further improvements will offer only marginal benefits.
4. **Assist in the development and implementation of permanent, accurate and efficient processes for carbon reporting.**
 - a. Exceeding the standards required by the DfT.
 - b. Identifying and focusing on specific carbon reduction initiatives with supply chain partners.
5. **Assistance in developing an initial, prioritised portfolio of carbon reduction options.**
 - a. With stakeholder workshops to discuss and review the most attractive and achievable options for the authority.
6. **A one-year licence for Carbon Analyser for up to three named users.**
 - a. Includes software maintenance, enhancements and upgrades, and dataverse management.

Authority Preparation

A programme planning meeting will precede each engagement and a copy of the proposed agenda for this meeting is included in Appendix B. In addition, participating authorities are advised to:

1. **Brief supply chain partners regarding the CCAS pioneer programme.**
 - a. This document may be used as a briefing document.



2. **Review current carbon reporting activities undertaken by the authority.**
 - a. Collating any relevant materials.
3. **Assess carbon data availability for key highways processes.**
 - a. To assess the readiness of the authority.
4. **Engage and brief with key internal stakeholders regarding the programme.**
 - a. The executive team, corporate colleagues, and members.

Kick-Starter Programme Costs

The *Kick-Starter Programme* is a fixed cost programme based on a planned number of days. Any work outside of the scope of the *Kick-Starter Programme* will be subject to agreement and will be conducted at our standard day rates.

The programme fees are:

1. **Carbon Analyser Licences..... £ 1,496**
 - a. This license covers Microsoft RDS, SQL Server and Azure licences.
 - b. Includes three users¹.
 - c. Carbon Analyser is free to FHRG members.
2. **Carbon Calculation & Reduction Support Programme..... £ 13,650**
 - a. On-site planning and goals setting workshop.
 - b. Facilitated on-site workshops to complete baseline year data collection, analysis, and reporting.
 - c. Process and toolset embedding planning.
 - d. Review of policy and operational implications².
3. **On-Site Process & Toolset Training & Embedding £ 1,100**
 - a. Up to 8 session participants.

The total fee for the *Kick-Starter Programme* is £ 16,246 + VAT.

An additional optional stage is also available to *Kick-Starter Programme* participants:

4. **Strategic Options Analysis: Carbon Reduction..... £ 4,270**
 - a. Workshops to assist in creating a portfolio of prioritised carbon reduction options within *Carbon Analyser*.
 - b. 45 pre-defined strategic options for carbon reduction will be included within the *Carbon Analyser* toolset for consideration.

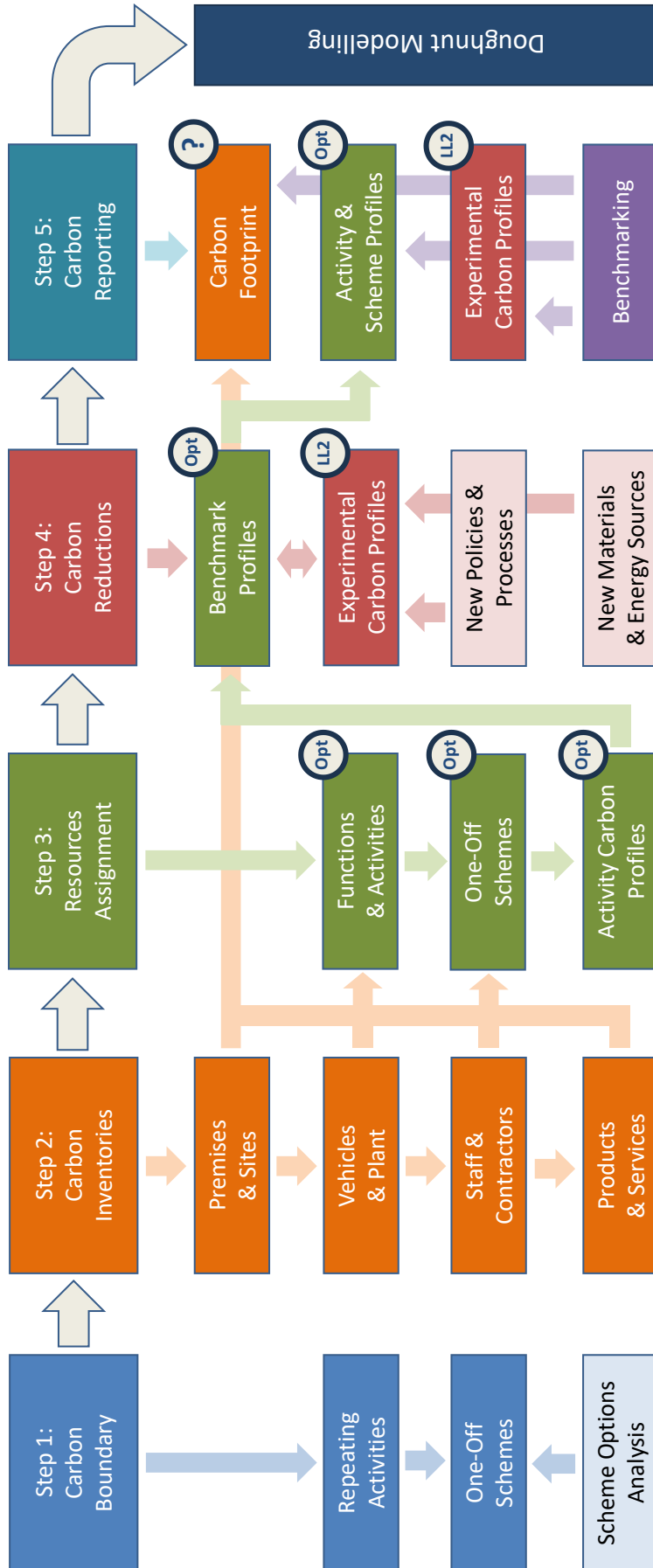
Out of pocket expenses will be charged in addition to the fees quoted above but will be capped at a maximum of 10% of the total fees.

¹ Can be used internally or used by supply chain partners.

² Requires a recent FHRG Value for Money assessment. These are available as separately from the FHRG.



Appendix A: CCAS Process Route Map

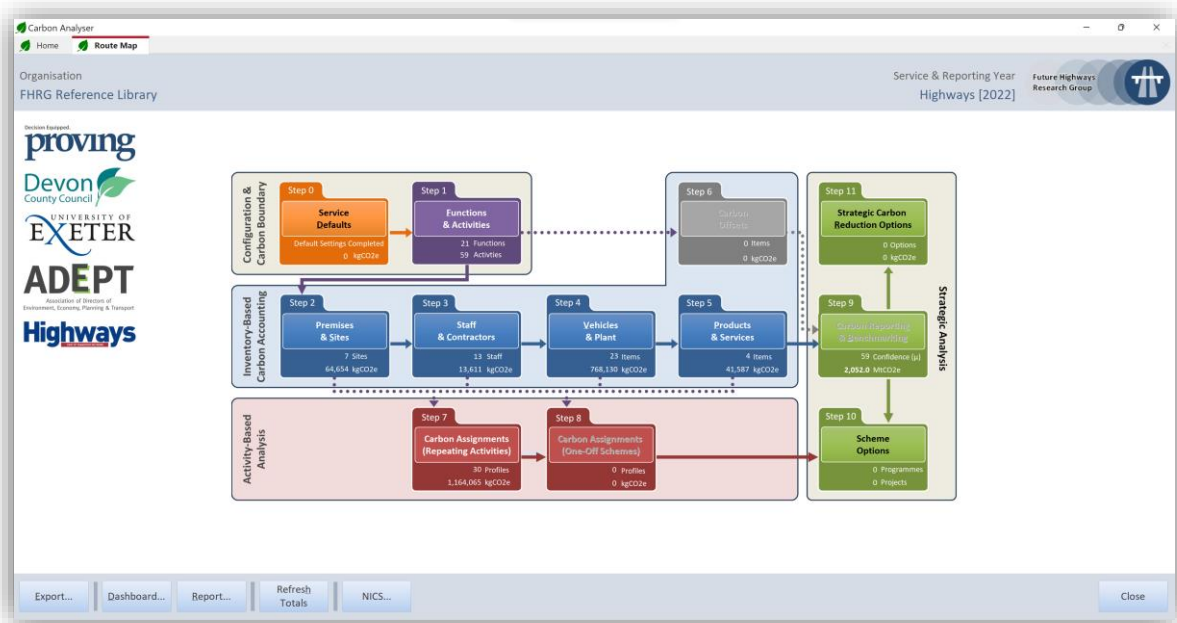


Appendix B: Carbon Analyser: Screenshots

Carbon Analyser is provided to all CCAS Pioneer Programme members.

Analysis Framework: Main Switchboard

Main navigation switchboard for the *Carbon Analyser* application.



Functions & Activities: Reporting Boundaries & Responsible Parties

Define and set the carbon reporting requirements and boundaries for the service.

The screenshot shows the 'Functions & Activities' configuration screen. It contains a table with the following columns: Function or Structure, Activity or Process, Lifecycle Stages, Direct Emissions (Scope 1, 2, 3), Indirect Emissions (Scope 3), Requires Carbon Profiles, Activities, Schemes, and Estimated Scale of Emissions.

Function or Structure	Activity or Process	Lifecycle Stages	Direct Emissions			Indirect Emissions (Scope 3)	Requires Carbon Profiles	Activities	Schemes	Estimated Scale of Emissions
			Scope 1	Scope 2	Scope 3					
Commercial Services	Construction Services & Programme Management	A0	Yes	Yes	Investigate				0	
Commercial Services	Consultancy Services	A0	Yes	Yes	No				0	
Commercial Services	Developer Services	A0	Yes	Yes	No				0	
Commercial Services	Shared Services	B1,B3,B4	No	No	No				0	
Cyclical Maintenance (Excluding Drainage)	Cattle Grid Cleaning	B2	No	No	Yes				25	
Cyclical Maintenance (Excluding Drainage)	Grass Cutting, Verge & Hedge Maintenance	B3,B4	No	No	Yes				50	
Cyclical Maintenance (Excluding Drainage)	Tree Cutting	B3,B4,B5	No	No	Yes				50	
Cyclical Maintenance (Excluding Drainage)	Weed Treatments	B2,B3	No	No	Yes				50	
Drainage & Flood Risk Management	Condition Inspections & Risk Assessments	B2,B3,B4,B5	No	No	Yes				50	
Drainage & Flood Risk Management	Flood Risk Authority (Planning & Management)	B2,B3,B4	Yes	Yes	No				0	
Drainage & Flood Risk Management	Gully Cleansing & Repairs	B2,B3	No	No	Yes				100	
Electrical Assets & Intelligent Transport Systems	Intelligent Transport Systems	B2,B3	Yes	Yes	Yes				0	
Electrical Assets & Intelligent Transport Systems	Signals & Electrical Assets Maintenance	B1,B6	No	No	Yes				25	
Electrical Assets & Intelligent Transport Systems	Street Lighting	B1,B6	No	No	Yes				100	

Comment: Assigned Sites / Assigned Contractors / Assigned Vehicles & Plant / Assigned Staff & Operatives

Navigation buttons at the bottom include: Carbon Profiles..., Copy..., Rename..., Dashboard..., Summary..., Reports..., and Close.

Staff & Contractors Inventory

Carbon Analyser
 Home | Route Map | **Staff & Operatives**

Organisation: FHRG Reference Library
 Staff & Operatives (Employed & Agency) | Future Highways Research Group | Highways [2022]

Name Or Identifier	Employer	Primary Function	Home Working Days	Commuting Days	Typical Transport Mode	Typical Fuel Type	Daily Commuting Miles	Annual Commuting Miles	Annual Business Miles	Total kgCO ₂ e Home Working	Total kgCO ₂ e Business Miles	Total kgCO ₂ e Commuting Miles	Data Confidence Score
Colin Price	Authority	Network Management	90.0	134.0	Motorbike	Petrol	24.3	3,261.3	0	225.3	0.0	596.0	75
Dale Lynch	Tier 1 Partner	Network Management	64.0	177.0	Car	Petrol	28.0	4,956.0	0	163.6	0.0	1,359.7	75
Jason Smith	Tier 1 Partner	Major Schemes & Capital Programmes	60.0	165.0	Car	Petrol	22.0	3,630.0	300	153.3	82.3	995.9	75
Kianna Reilly	Not Specified	Major Schemes & Capital Programmes	64.0	177.0	Car	Hybrid	5.0	885.0	550	163.6	20.3	32.7	75
Leon Davies	Tier 1 Partner	Major Schemes & Capital Programmes	90.0	134.0	Car	Diesel	30.0	4,020.0	650	230.0	215.9	1,335.0	75
Marlee Nelson	Tier 1 Partner	Reactive Maintenance	24.0	210.0	Car	Electric	19.0	3,990.0	300	61.3	29.3	389.4	75
Martin Fisher	Tier 1 Partner	Reactive Maintenance	232.0	18.0	Car	Hybrid	18.0	324.0	250	592.9	9.2	12.0	75
Max Hodge	Tier 1 Partner	Reactive Maintenance	232.0	0.0	Car	Diesel	0.0	0.0	2,800	592.9	929.9	0.0	75
Nancy Greene	Tier 2 Partner	Safety, Risk & Care Inspections	0.0	226.0	Car	Diesel	29.0	6,554.0	1,800	0.0	597.8	2,176.6	75
Rosemary Macias	Tier 1 Partner	Reactive Maintenance	120.0	105.0	Car	Petrol	22.0	2,310.0	0	306.7	0.0	633.8	75
Ruth Jones	Not Specified	Reactive Maintenance	0.0	226.0	Car	Diesel	9.0	2,034.0	0	0.0	0.0	675.5	75
Tanya Keen	Tier 1 Partner	Network Resilience	14.0	209.0	Train	N/A	58.0	12,122.0	0	35.8	0.0	697.5	75
Tim Hines	Tier 2 Partner	Planned Maintenance (Minor Schemes)	77.0	199.0	Car	Plug-In Hybrid	11.0	2,189.0	510	196.8	18.9	81.0	75
*			52.0	200.0	Car		18.0						

Details | Comments | Data Source | Comments

Home Postcode: MK17 8QU | Work Postcode: MK45 4LQ | Home Working Data Source & Item: [BEIS] Home Working, Combined, Per FTE, 7.5 hours (2023) | Home Working Carbon Factor: 2.50336 | Travel Carbon Factor Data Source & Item: [BEIS] Travel, Staff Petrol, Motorbike | Unit Of Measure: kgCO₂e/mile | Travel Carbon Factor: 0.1827

Add Group... | Copy... | Set Carbon Factors... | Dashboard... | Summary... | Reports... | Close

Carbon Profiles: Standard, Benchmark, Programme & Experimental

Create and amend carbon profiles for highways activities.

Carbon Analyser
 Home | Switchboard | **Profile**

Carbon Profile Editor
 FHRG Test Authority | Service & Reporting Year: Highways [2022] | Future Highways Research Group

Function or Process	Profile Name	Type	Measure	Baseline Unit(s)	Cost Per Unit	Units Per Year	Lifetime (Years)	kgCO ₂ e Per Unit	kgCO ₂ e Per Year	Total Cost Per Year	kgCO ₂ e Per £	Unit kgCO ₂ e / Lifetime	Traffic kgCO ₂ e	Data Confidence Score
Reactive Maintenance Teams	Dragon Patcher	LDC	m2	500	£54.00	915.0	3.0	47.8920	29,881.8	£49,410	1.7	9,960.6	-0.1	75.0
Reactive Maintenance Teams	Hand Patching	LDC	m2	500	£39.00	1,020.0	3.0	32.3421	32,989.0	£39,780	1.2	10,996.3	0.0	67.9
Reactive Maintenance Teams	Pothole Repair (Cat 3 to 6 Road)	BMK	Shift	1	£1,009.00	1,900.0	1.5	156.0006	296,401.1	£1,917,100	6.5	197,600.7	0.0	56.3
Reactive Maintenance Teams	Pothole Repair (Cat 7 to 11 Road)	EXP	Shift	1	£1,370.50	1,100.0	1.5	161.5349	177,688.4	£1,507,550	8.5	118,458.9	-0.2	75.0
*				1	£0.00	1.0	5.0	0.0000	0.0	£0	0.0	0.0	0.0	0.0

*Carbon reporting year (April to April): 3 | Avg: 78,7449 | Sum: 359,271.9 | Sum: £2,006,290 | Avg: 3,1091 | Avg: 72,852.6 | Sum: -0.1 | Avg: 66.4

Count Of Profiles (Excludes [EXP])

Comments

Details... | Traffic... | Copy... | Dashboard... | Close



Strategic Options Portfolio

Linked to highways functions and activities, and experimental carbon profiles.

The screenshot displays the 'Carbon Analyser' interface for the 'Options Portfolio' of the 'FHRG Test Authority'. It features a table of strategic options and a detailed dashboard for one of the options.

Reference	Option or Programme Name	In Portfolio	Primary Purpose	Secondary Purpose	Function	Service Alignment Activity	Link To EXP	Whole Life Cost (£)	Annual kgCO2e Reduction	Whole Life Financial Benefit (£)
1050	Ultra-Low Emission Zones	<input type="checkbox"/>	CER	WEL			<input type="checkbox"/>	£3,800,000	16,281.60	£2,690,000
1090	Differential Charging for Car Park Parking (Polluter Pays)	<input type="checkbox"/>	CER	REV.POL			<input type="checkbox"/>	£1,440,000	16,626.80	£1,471,000
1110	Conversion of Fleet to EV / Hydrogen Vehicles	<input checked="" type="checkbox"/>	CER	SRV.POL.DIR	Vehicles, Plant & Equipment (VPE)	Operations Vehicles (Including Elec)	<input type="checkbox"/>	£4,160,000	18,014.60	£553,200
1290	Dim Street Lights	<input checked="" type="checkbox"/>	CRD	SUS.CER.POL.STR	Electrical Assets & Intelligent Trans	Street Lighting	<input type="checkbox"/>	£1,900,000	17,357.20	£432,000
1300	Sensor(s)-Driven Adaptive LED Street Lighting	<input checked="" type="checkbox"/>	CRD	EQY.WEL.POL	Electrical Assets & Intelligent Trans	Street Lighting	<input type="checkbox"/>	£2,250,000	14,451.00	£568,800
1370	Commuted Sum	<input type="checkbox"/>	CRY	SRV.STR			<input type="checkbox"/>	£615,000	18,529.60	£1,008,000
1380	Asset Sponsorship & Street-Side Advertising	<input type="checkbox"/>	REV				<input type="checkbox"/>	£48,000	14,552.60	£69,120
1390	Bus Stop & Bus-Side Advertising	<input type="checkbox"/>	REV				<input type="checkbox"/>	£48,000	17,063.00	£93,520
1400	Road Maintenance & Winter Services on Private Roads & Comm	<input type="checkbox"/>	REV	CRY			<input type="checkbox"/>	£90,000	11,386.80	£12,240
1410	Road Maintenance & Winter Services on Public Sector & Regulat	<input type="checkbox"/>	REV				<input type="checkbox"/>	£90,000	10,565.60	£115,200
1420	Using Highways Estates for Energy Generation (PPA / Private Wi	<input type="checkbox"/>	CRD	REV.CER			<input type="checkbox"/>	£1,600,000	19,295.20	£104,400
Count Of Options								28	3	
In Portfolio								£8,310,000	49,822.8	£447,600
Other								£14,070,000	408,751.4	£13,441,660
Sum										

Option Details Dashboard		Option Source & Comments	
Whole Life Cost (£) (↓)	Whole Life Benefit (£) (↓)	Air Quality	Baseline (↓)
22 Nov 2022	18 May 2023		50
Confidence	Confidence	Outcome (↓)	Social Value
75	50	100	Equality
		Confidence	Wellbeing
		75	100
		Confidence	Stakeholder Support
		50	Members
		50	Executive
		50	-50
		50	Readiness (↓)
		50	75
		50	Complexity (↓)
		50	75
		50	Operational (↓)
		50	50
		50	Commercial (↓)
		50	75
		50	Reputation (↓)
		50	75



Appendix C: Planning Meeting

Title	CCAS & Carbon Analyser: Planning Meeting
Date & Time	<TBD>
Location	On-Site
Objective(s)	<ul style="list-style-type: none"> • Agree assignment goals and timescales. • Review functions and activities. • Launch inventories development: <ul style="list-style-type: none"> ○ Premises and sites. ○ Staff and contractors. ○ Vehicles and plant. ○ Purchased products and services. • Next steps.
Attendees	FHRG, Participating Authority & Supply Chain Partners
Briefing Document(s)	TBA

Proposed

A G E N D A

Open: <TBD>

1. **Programme overview.**
 - a. Assignment goals and deliverables.
 - b. Timescales and resources requirements.
2. **Carbon reporting options.**
 - a. Top-down carbon accounting (inventory-based method).
 - b. Bottom-up carbon analysis (activity-based method).
3. **Current carbon reporting structures.**
 - a. Corporate level.
 - b. Service level (where applicable).
 - c. Supply chain.
4. **Stakeholder(s) map.**
 - a. Stakeholder and supply chain map.
5. **Functions and activities (review).**
 - a. First workshop outputs.
2. **Premises and sites inventory.**
 - a. Identified owned / controlled premises and sites.
 - b. Data hierarchy.
3. **Vehicles and plant inventory.**
 - a. Controlled, dedicated vehicles and plant.
 - b. Data hierarchy.
4. **Staff and contractors inventory.**
 - a. Employed, contracted, and dedicated staff.
 - b. Data hierarchy.
5. **Purchased products and services inventory.**
 - a. For the reporting year.
 - b. Data hierarchy.
6. **A.O.B**

Close by: <TBD>

Minutes recorded by Proving.