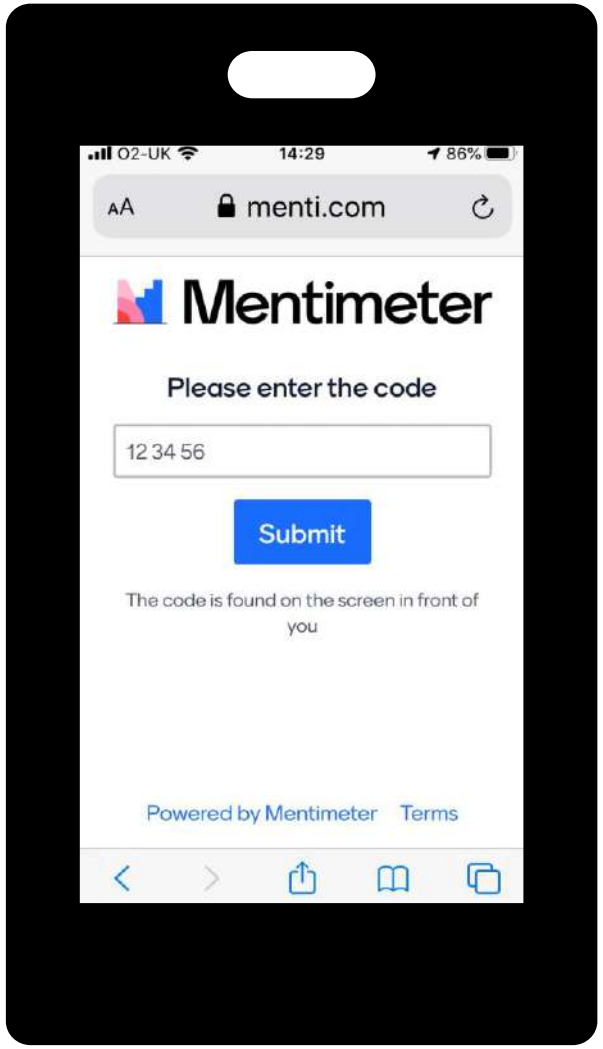
Climate Change, Carbon and Procurement

Hattie Webb

Consultant, Action Sustainability

Mentimeter



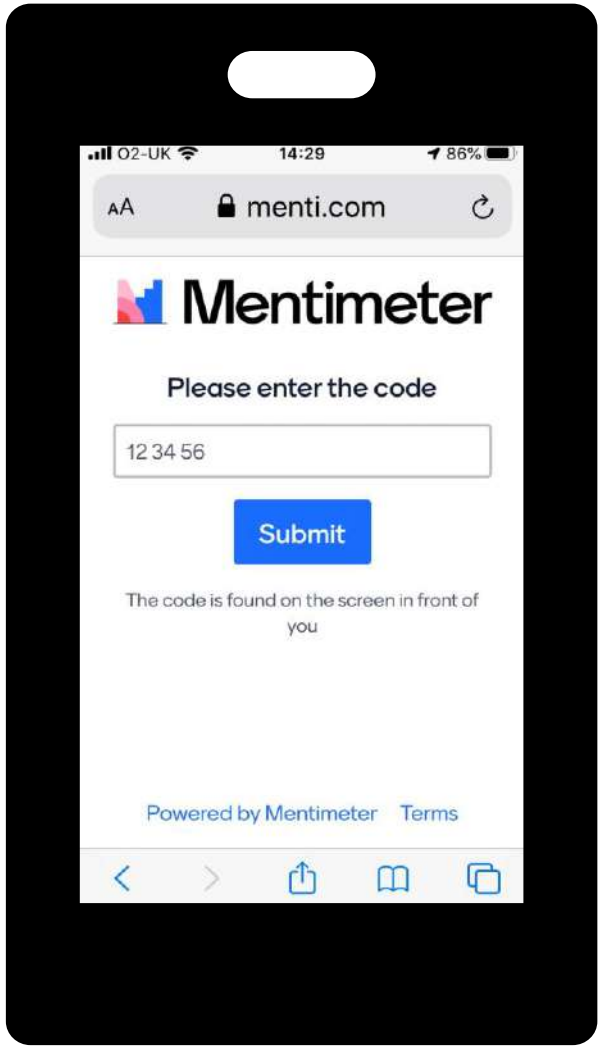
Open Mentimeter

1. Go to www.menti.com in a new browser or tab on your phone or computer, *ideally Chrome or Firefox rather than Edge,* or download the app.
2. Enter the Menti code
3. Don’t disconnect from the webinar, you will still need to hear us

Carbon & Procurement Workshop

1. Carbon and climate change
2. Calculating carbon
3. Sustainable procurement and carbon
4. Risk & opportunity assessment – Heatmapping
5. Exploring RFI/PQQ and RFQ/ITT that address carbon
6. Summary

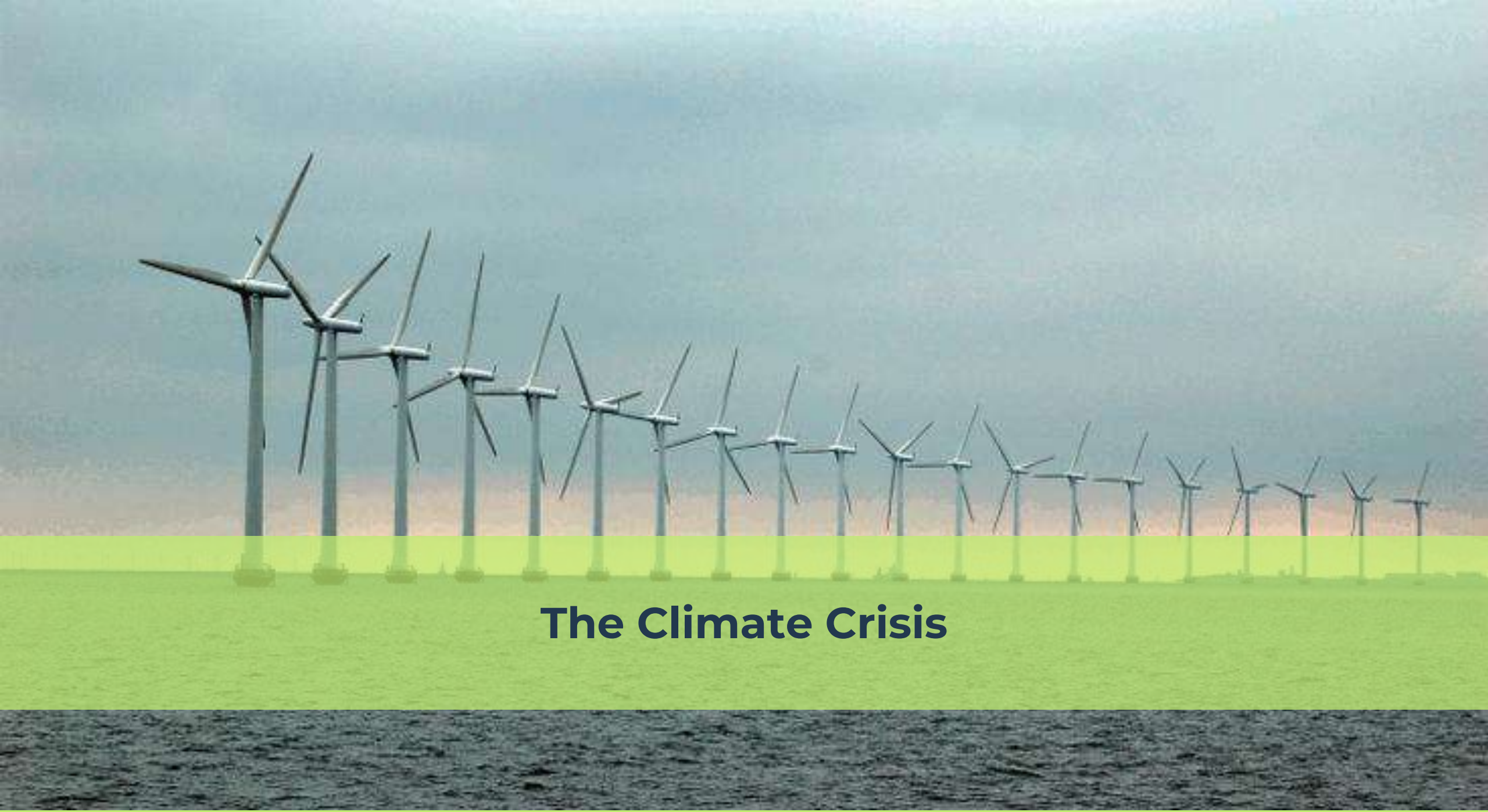
Mentimeter



Open Mentimeter

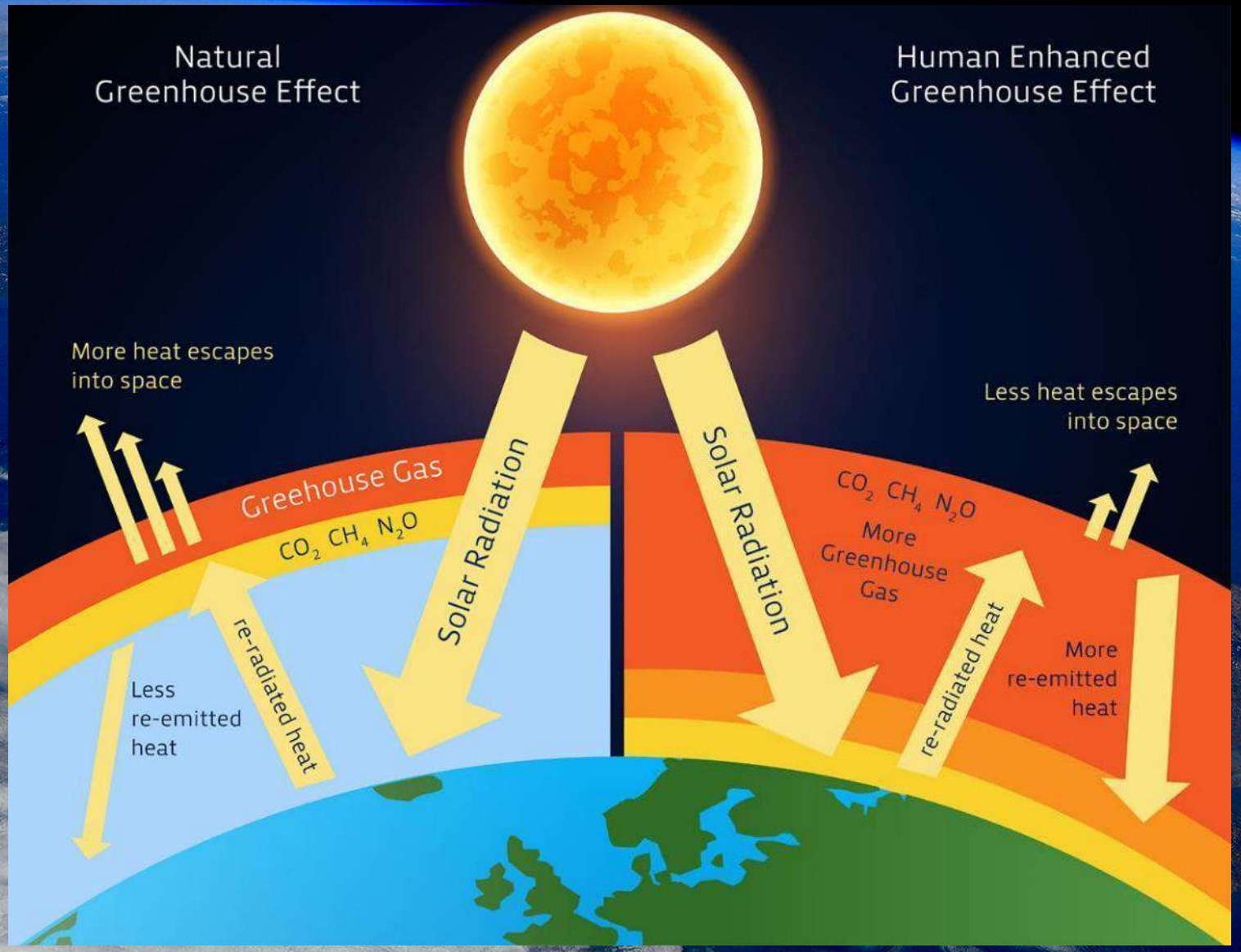
1. Go to www.menti.com in a new browser or tab on your phone or computer, *ideally Chrome or Firefox rather than Edge,* or download the app.
2. Enter the Menti code
3. Don’t disconnect from the webinar, you will still need to hear us
4. **What words come to your mind when you think of sustainable procurement?**

Overview of the situation...



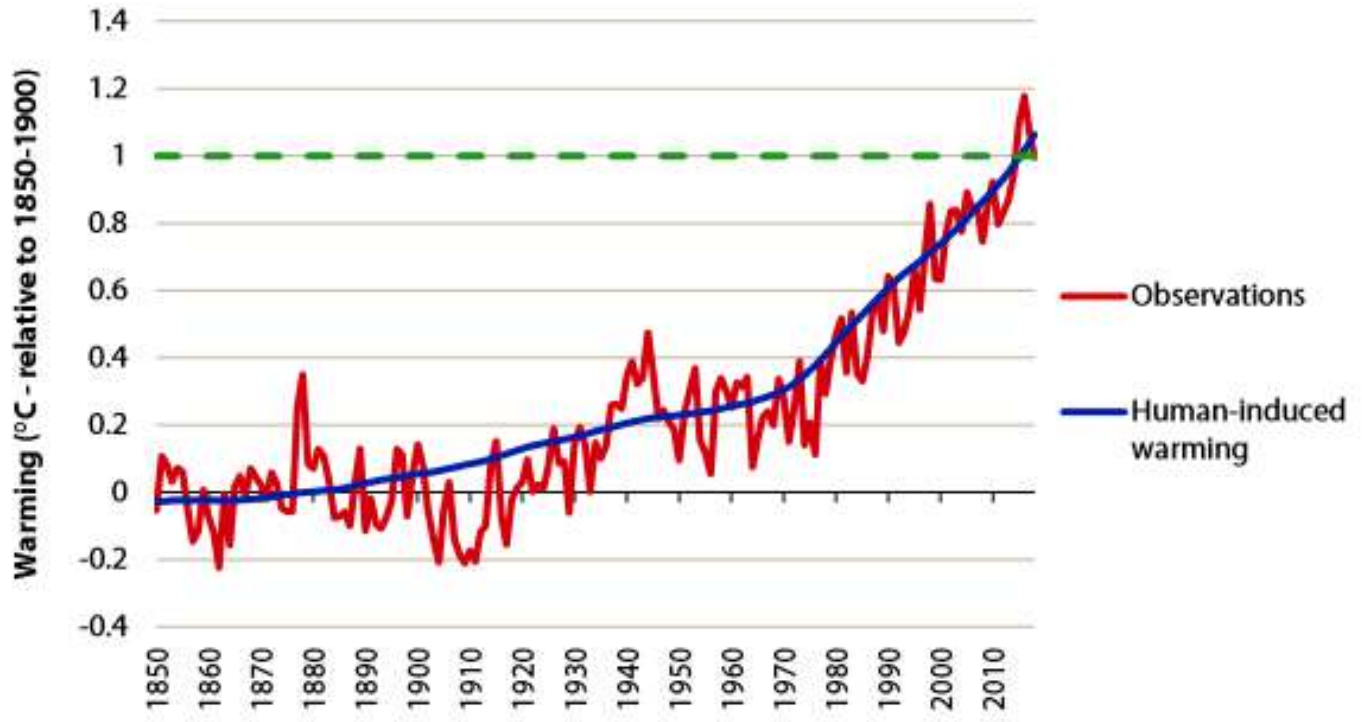
The Climate Crisis

Greenhouse Gas Effect



Scene Setting: The last 200 years

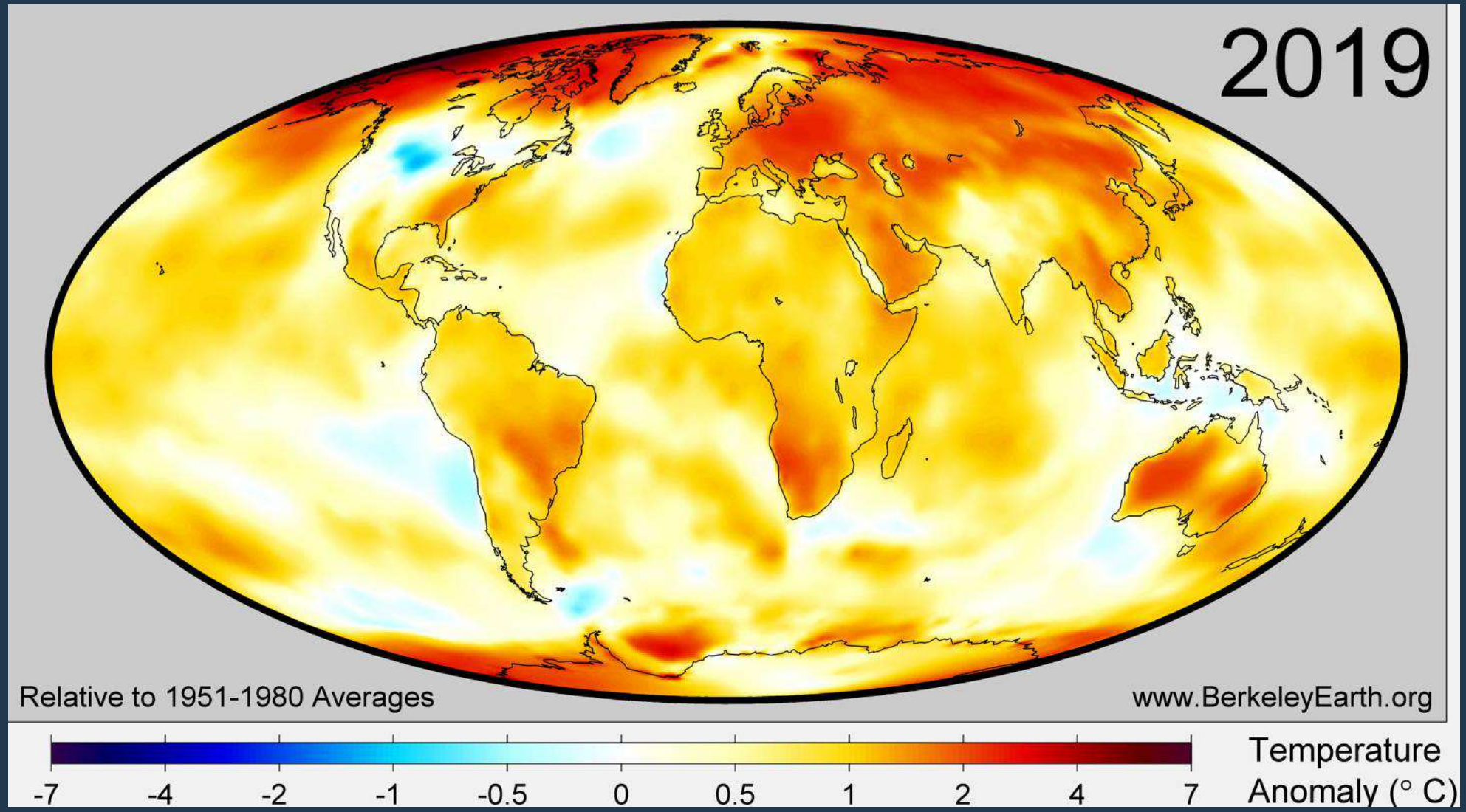
Figure 2.1. Observed and human-induced warming



Source: HadCRUT4, NOAA, NASA and Cowtan & Way datasets; IPCC (2018) *Chapter 1 - Framing and Context.*
Notes: 'Observations' are the average of the four datasets above as in IPCC-SR1.5 including for the full year of data for 2018.

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Global Temperature Anomalies in 2019



SUPPLY CHAIN SUSTAINABILITY SCHOOL

Scene Setting: The last few years

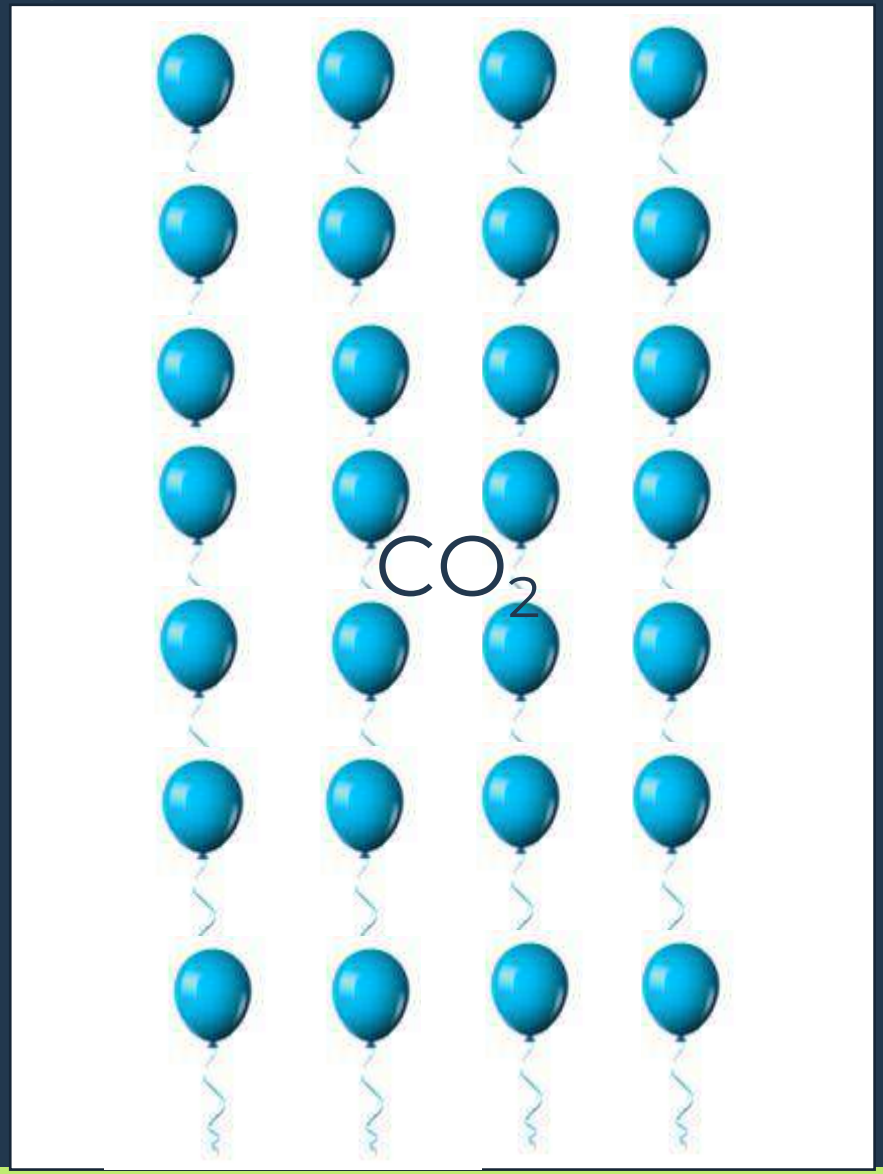
What causes climate change?

- CO_2 (carbon dioxide)
- CH_4 (methane)
- N_2O (nitrous oxide)
- SF_6 (sulphur hexafluoride)
- HFCs (hydrofluorocarbons)
- PFCs (perfluorocarbons)
- (NF_3 nitrogen trifluoride)
- Kyoto Protocol 'Basket' of 6 GHGs
- Limit warming to 1.5°C above pre-industrial levels
- Known as 'carbon' emissions

Some fundamentals – Global Warming Potentials: GWP

- It's all relative…
  - CO_2: 1
  - CH_4: 28
  - N_2O: 265
  - SF_6: 23,500
  - HFCs: 4 – 12,400
  - PFCs: 6,630 – 11,100
  - NF_3: 16,100
  - Expressed as "tonnes of CO_2 equivalent"; tCO_2e

=



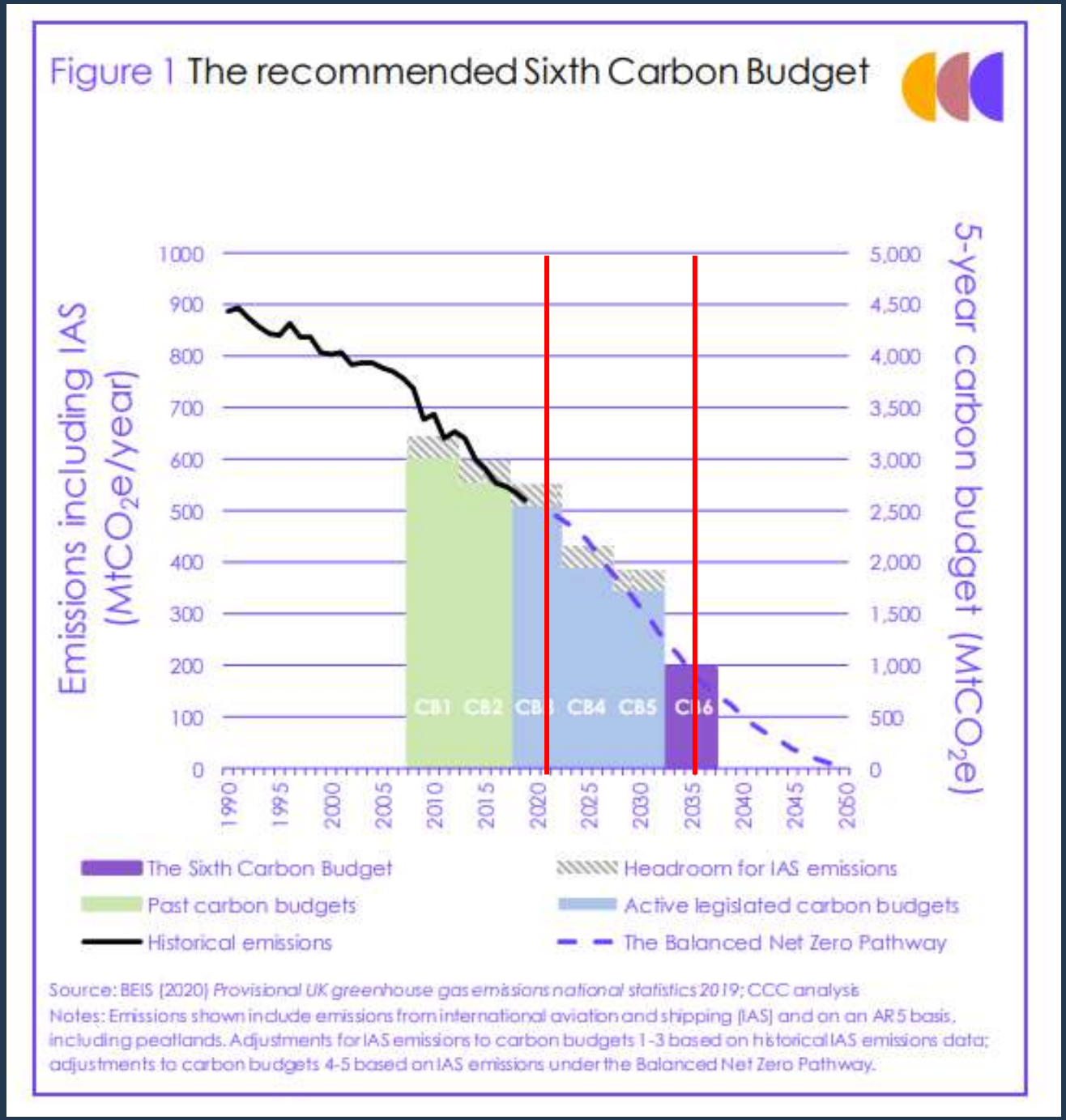
The Paris Climate Change Agreement, COP21, 2015

- Reduce emissions of the “basket of 6” Kyoto Protocol GHGs
- In line with a well-below 2°C or 1.5°C warming scenario
- Each nation to make Nationally Determined Contributions

UNITED NATIONS
PARIS CLIMATE AGREEMENT
SIGNING CEREMONY
22 APRIL 2016

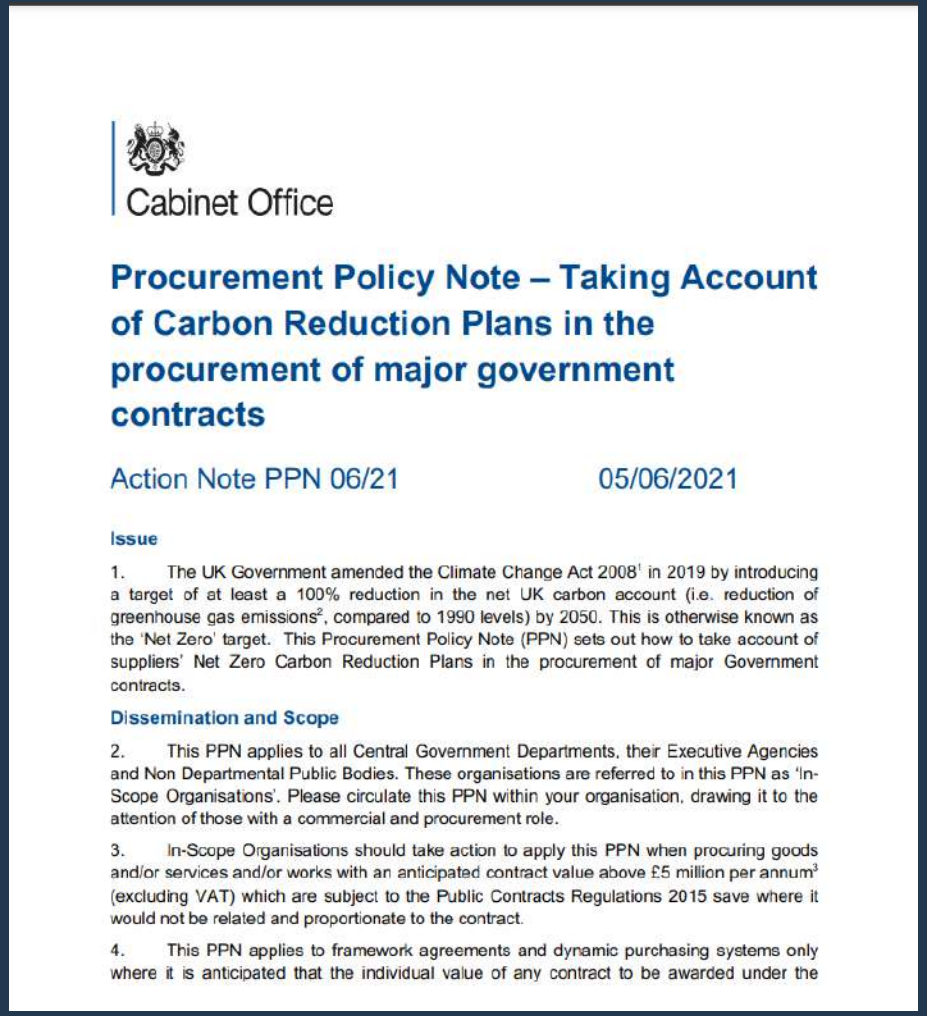
The Law!

- UK Climate Change Act target of 100% reduction by 2050 – 'net zero'
- Scotland has legislated to hit net-zero by 2045
- Wales' target to reduce by 100% by 2050
- Ireland has legislated to hit net-zero by 2050
- The UK's 2035 NDC target, announced by the Prime Minister at COP29 in November 2024, is to **reduce all greenhouse gas emissions by at least 81% on 1990 levels**.



UK Gov't PPN06/21: 5th June 2021 *Carbon Reduction Plans*

- WPPN 06/21 in Wales, SPPN 03/22 in Scotland
- Bidders for any contract over £5m ex VAT per year from Central Government, their Executive Agencies and NDPBs
- Contractors will have to provide a carbon reduction strategy confirming their commitment to achieving Net Zero by 2050 in the UK
- Covers Scope 1, 2 and certain Scope 3 (Upstream transportation & distribution, Waste generated in operations, Business travel, Employee commuting, Downstream transportation & distribution)
- From 30th September 2021
- Plans for an 'embodied carbon law': The Carbon Emissions (Buildings) Bill, and Part Z of Building Regulations



Cabinet Office

Procurement Policy Note – Taking Account of Carbon Reduction Plans in the procurement of major government contracts

Action Note PPN 06/21 05/06/2021

Issue

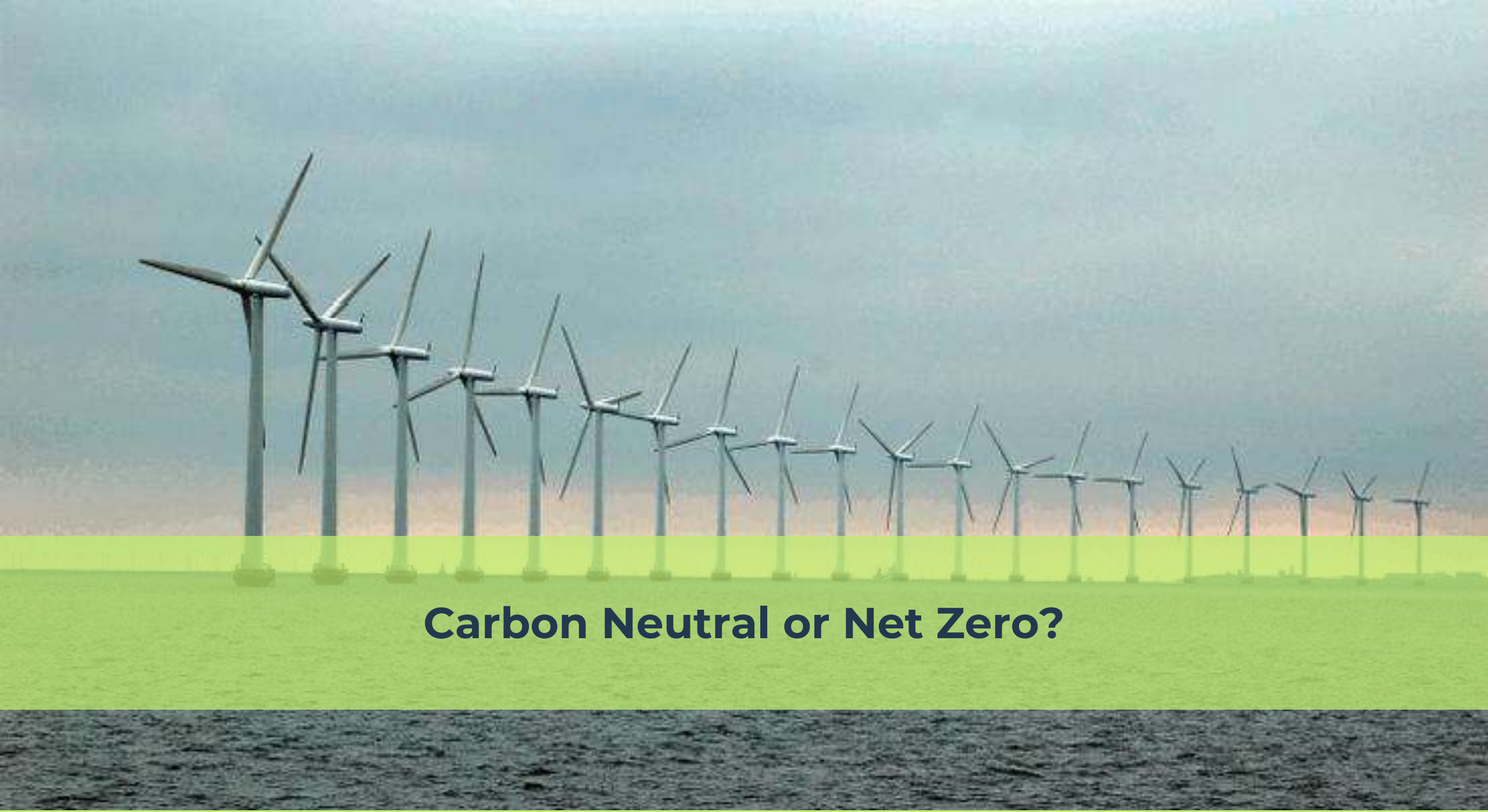
1. The UK Government amended the Climate Change Act 2008[1] in 2019 by introducing a target of at least a 100% reduction in the net UK carbon account (i.e. reduction of greenhouse gas emissions[2], compared to 1990 levels) by 2050. This is otherwise known as the 'Net Zero' target. This Procurement Policy Note (PPN) sets out how to take account of suppliers' Net Zero Carbon Reduction Plans in the procurement of major Government contracts.

Dissemination and Scope

2. This PPN applies to all Central Government Departments, their Executive Agencies and Non Departmental Public Bodies. These organisations are referred to in this PPN as 'In-Scope Organisations'. Please circulate this PPN within your organisation, drawing it to the attention of those with a commercial and procurement role.

3. In-Scope Organisations should take action to apply this PPN when procuring goods and/or services and/or works with an anticipated contract value above £5 million per annum[3] (excluding VAT) which are subject to the Public Contracts Regulations 2015 save where it would not be related and proportionate to the contract.

4. This PPN applies to framework agreements and dynamic purchasing systems only where it is anticipated that the individual value of any contract to be awarded under the



Carbon Neutral or Net Zero?

Net zero carbon

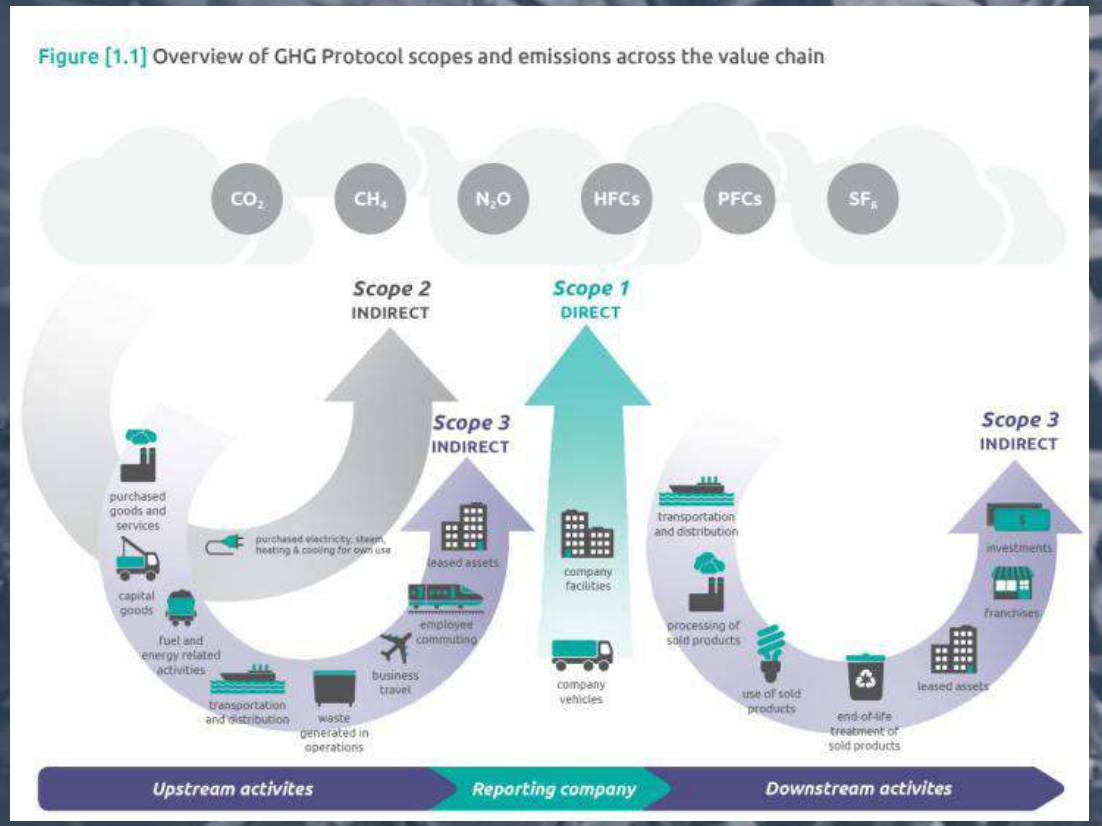
- ‘Net zero’ is about **reducing your GHG emissions as much as possible**, following the carbon hierarchy and in line with IPCC/ Paris
- It covers the **whole value chain** – upstream and downstream – to reduce carbon, not just your organisation, and includes everything you use: transport, products & services, waste, etc
- For many organisations, **80 - 90% of the carbon could be outside the business**, i.e. scope 3!
- Only once emissions have been reduced can you balance any remaining hard-to-decarbonise emissions with **GHG Removals**
- ISO Guidance: https://www.iso.org/netzero

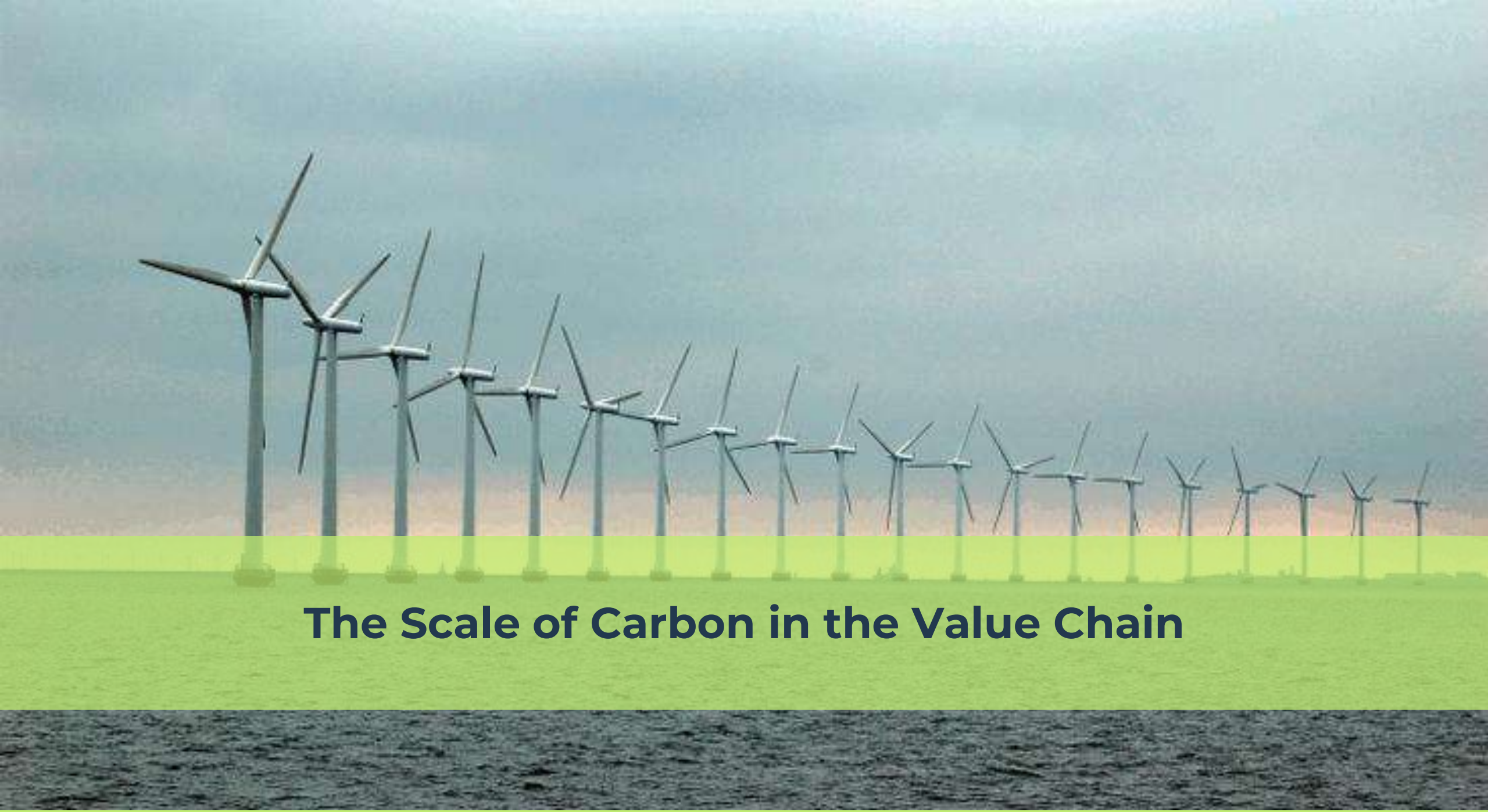
Net zero carbon and Carbon neutral

- **Similar but different!**
- Both are a zero-sum balance between GHG emitted and the same amount offset or sequestered – but different boundaries!
- **‘Carbon Neutrality’** generally focuses on **Scopes 1 and 2**. Scope 3 is optional but encouraged.
- There is **no defined ambition for reduction**.
- It allows **offsetting**.
- **PAS 2060** is the Standard for Carbon Neutrality.

Potential confusion between ‘net zero carbon’ and carbon neutral’

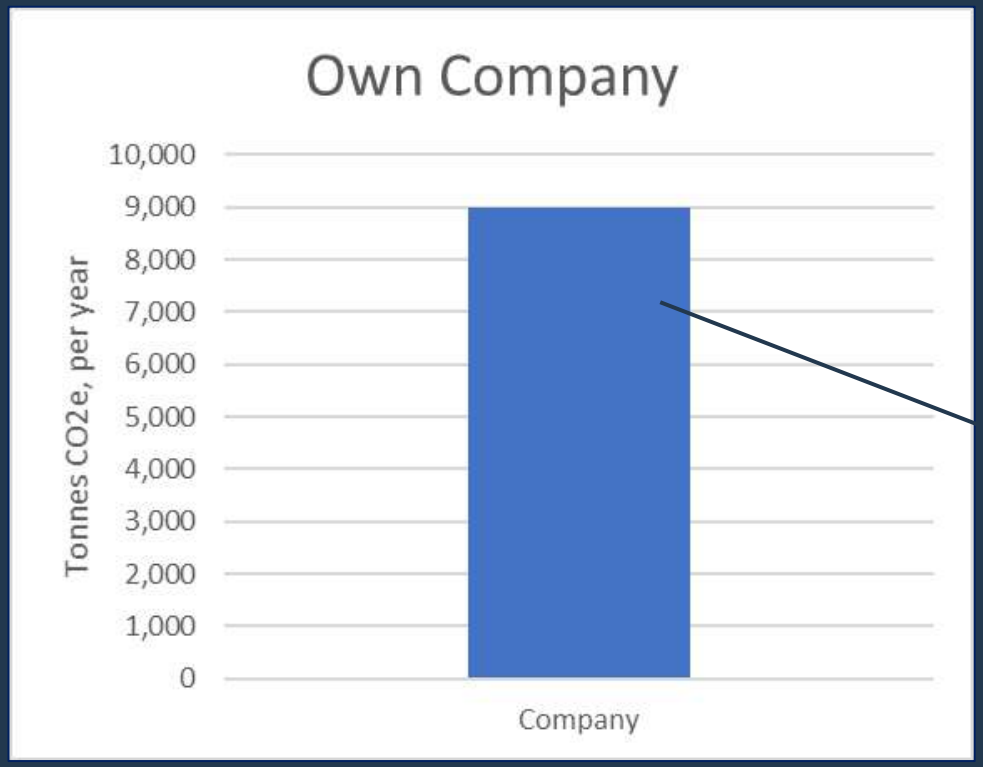
- Take care when organisations say they are ‘carbon neutral’ or ‘net zero’.
- Or even when they ask that you are!
- Are they talking about only their Scope 1 and 2, or is it Scope 3 also?
- Ask the question!

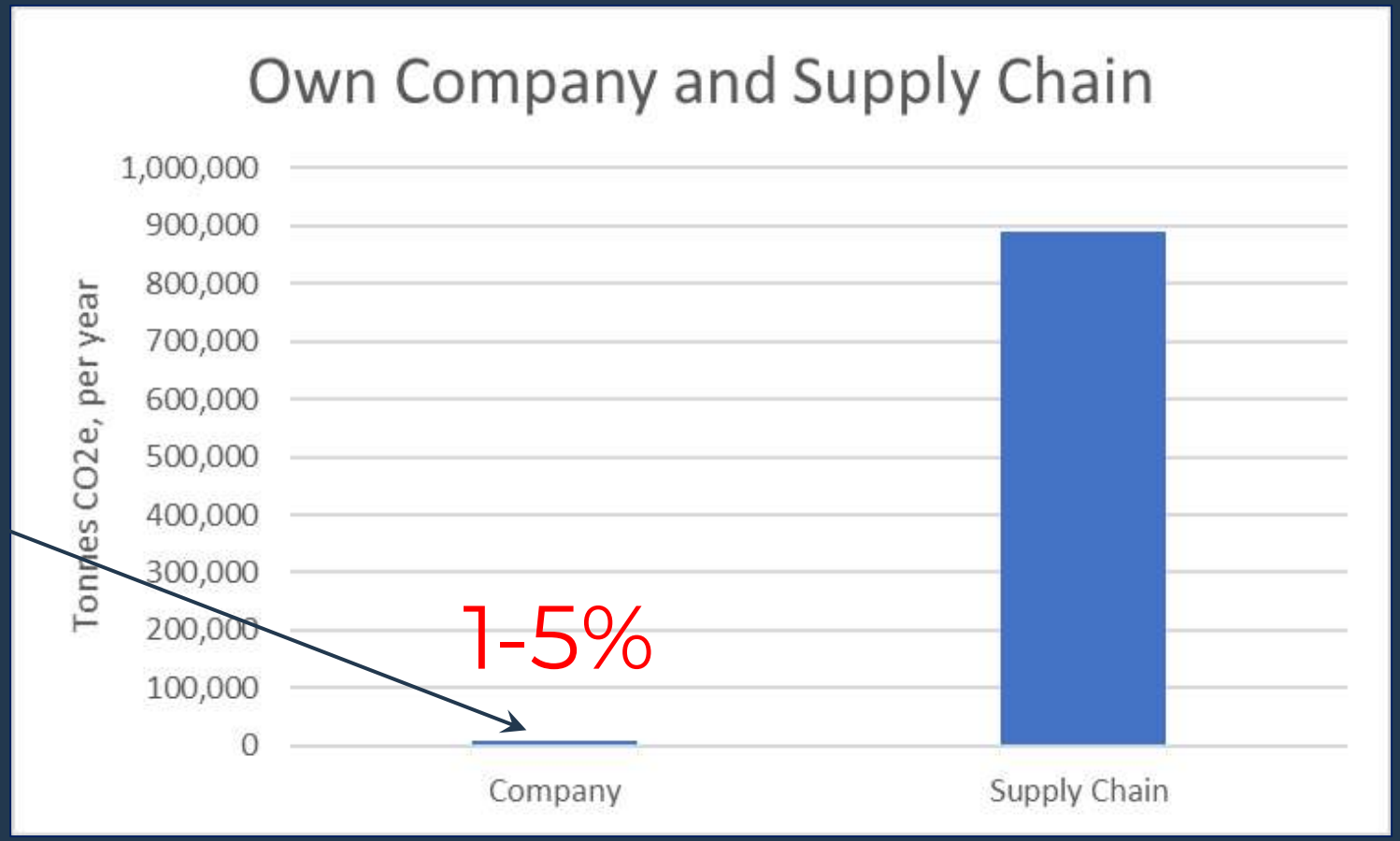




The Scale of Carbon in the Value Chain

Example of Scale: a Tier 1 Contractor





Example of Scale: Housing

1%

Materials and onsite construction
“Embodied” Carbon

The Housing Developer
“Operational” Carbon

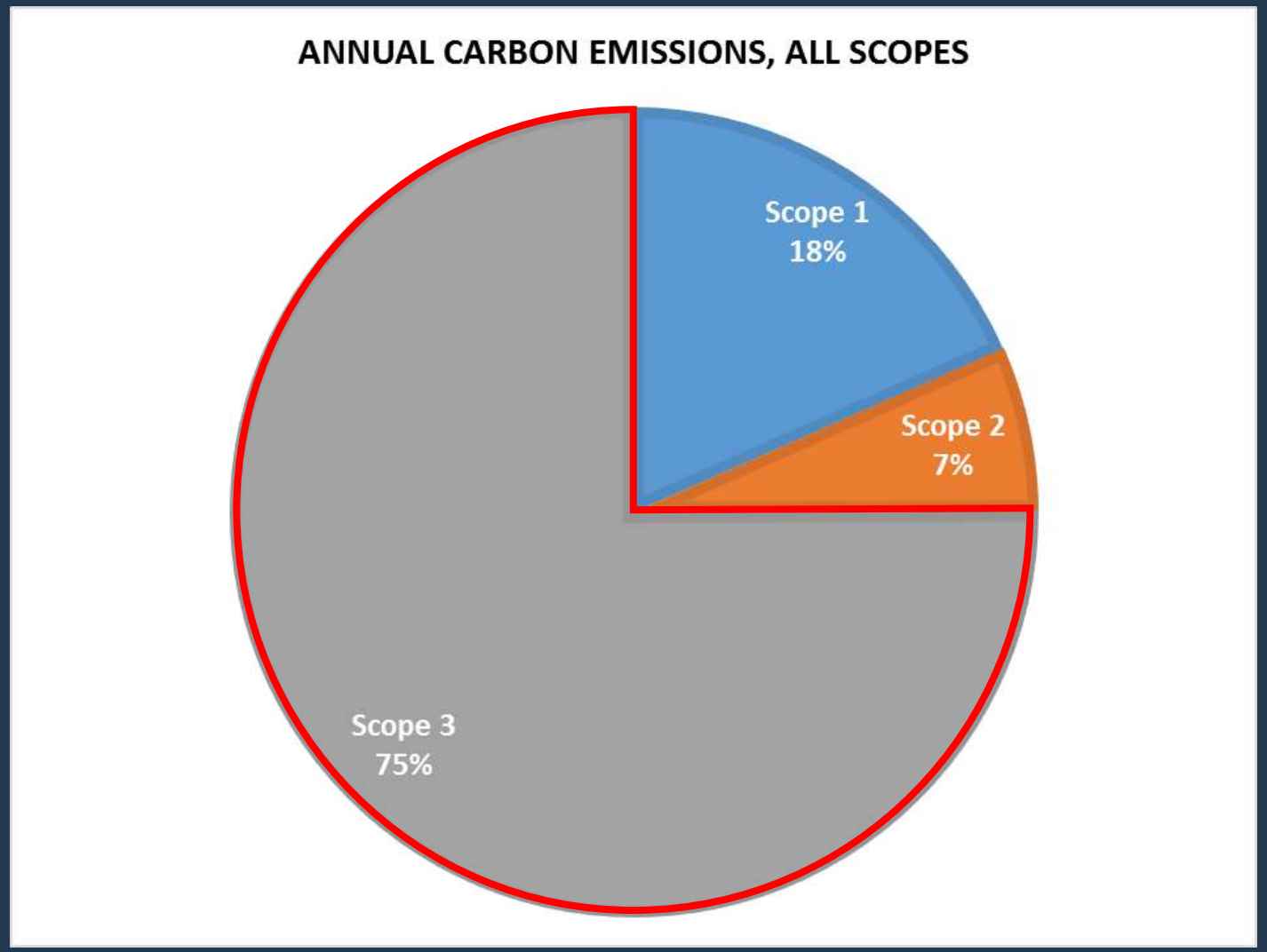
The House Owner “End User”
Carbon

Upstream

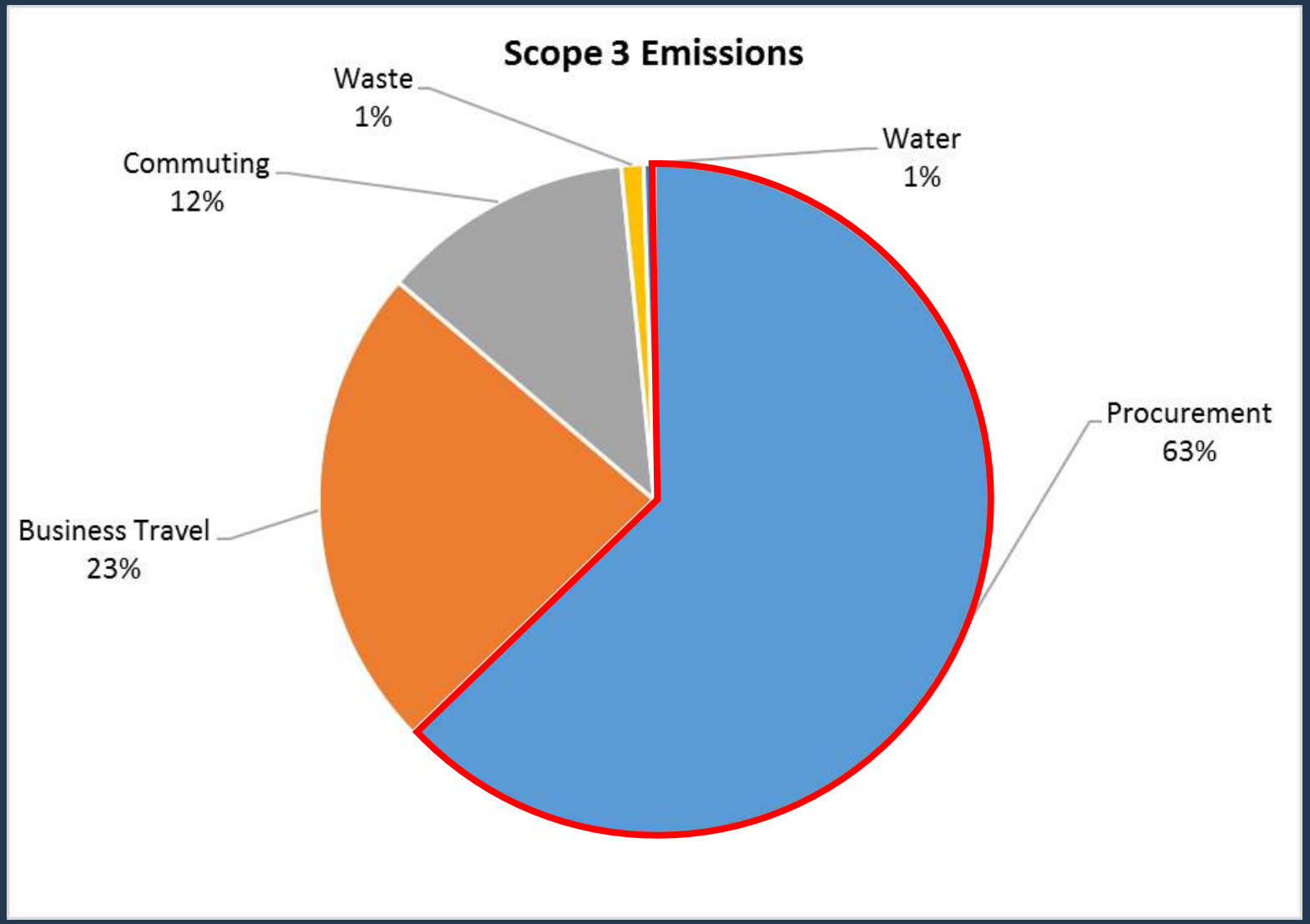
Company

Downstream

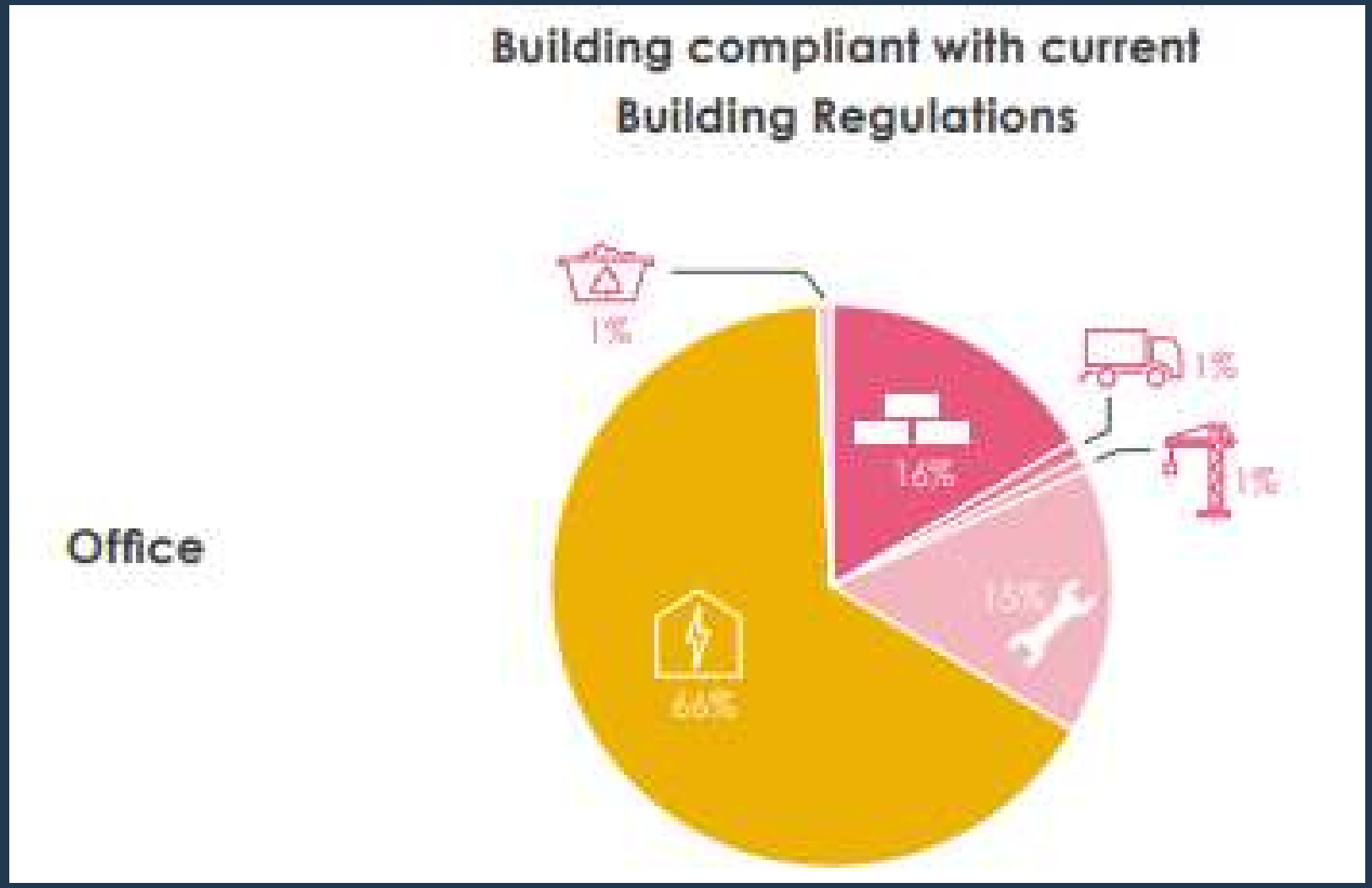
Example of Scale: an Estates Organisation



Example of Scale: an Estates Organisation



Example of Scale: A Finished Building



- Products/materials (A1-A3)
- Transport (A4)
- Construction (A5)
- Maintenance and replacements (B1-B5)
- Operational energy (B6)
- End of life disposal (C1-C4)

Breakdown of whole life carbon for a typical office over 60 years.
LETI Embodied Carbon Primer https://www.leti.uk/ecp

Sectoral Drivers

Sectoral Drivers...

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Approved Document L - Conservation of fuel and power

Volume 1: dwellings

HM Government

TOGETHER FOR OUR PLANET

Net Zero Strategy: Build Back Greener

October 2021

Cabinet Office

Procurement Policy Note – Taking Account of Carbon Reduction Plans in the procurement of major government contracts

Action Note PPN 06/21 05/06/2021

Issue

1. The UK Government amended the Climate Change Act 2008[1] in 2019 by introducing a target of at least a 100% reduction in the net UK carbon account (i.e. reduction of greenhouse gas emissions[2], compared to 1990 levels) by 2050. This is otherwise known as the 'Net Zero' target. This Procurement Policy Note (PPN) sets out how to take account of suppliers' Net Zero Carbon Reduction Plans in the procurement of major Government contracts.

Dissemination and Scope

UK GBC

ADVANCING NET ZERO

Construction Leadership Council

ConstructZERO

Net Zero Carbon Buildings:

A Framework Definition

APRIL 2019

Advancing Net Zero Programme Partners

Lead Partner: REDEVCO

Programme Partners: bam, Berkeley Group, GROSVENOR, HOARE LEA, JLL

Consul

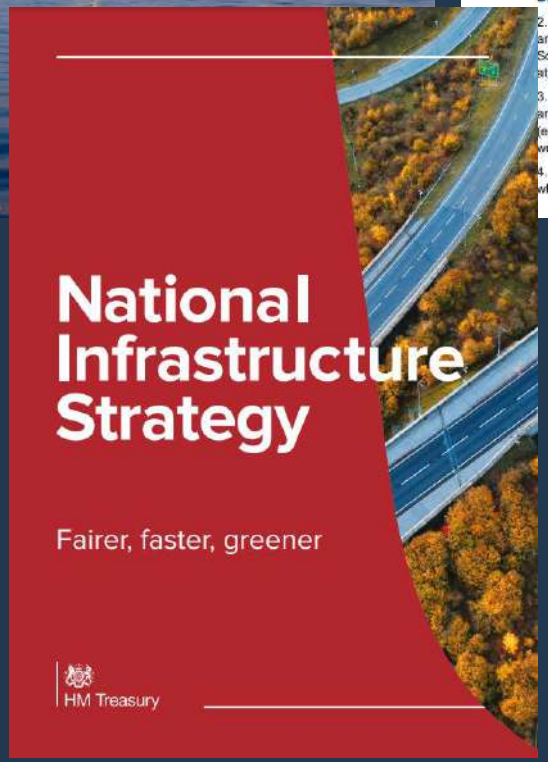
his draft guida
uildings Stand
ower) and Par
nd dwellings;
rimarily seekin
ructure of the

Carbon Reduction Code for the Built Environment

To facilitate the reduction of carbon emissions (CO_2eq) related to design, construction, maintenance, operation and decommissioning of built assets

Issue 2021:2

November 2021



National Infrastructure Strategy

Fairer, faster, greener

HM Treasury

HM Government

THE CONSTRUCTION PLAYBOOK

Government Guidance

on sourcing and contracting public works projects and programmes

Version 1.0

December 2020

SUPPLY C

SCHOOL

But, still, why should we…?

- Reporting for compliance
- Reduced risk of energy security
- Stay ahead of regulation
- Identify hotspots to make carbon reductions and cost savings
- Improve reputation
- Meet stakeholder/client demands
- Win new work
- Become a market leader
- Which all means data accuracy…

Actions we can build into Procurement & Contract Management

Carbon Reduction Actions

Avoid using energy and carbon where possible

materials

Use more

equipmen

behaviours and systems

Measure!

Switch to low carbon forms of transport

Switch to low and zero energy sources

Use the Carbon & Energy Hierarchy

The route to net zero carbon!

AVOID: don't use energy if you can avoid the need

REDUCE: use less by smart design, more efficient equipment, less materials, and better behaviours

SWITCH to low carbon and renewable sources of energy and materials

COMPENSATE/ REMOVE the residual remaining emissions when all other actions have been taken

What can we do about it?

Mitigation

- Sustainable transportation
- Energy conservation
- Thermal mass / sinks for temperature regulation
- Insulation and heat recovery systems
- Renewable energy
- Energy & carbon efficient materials and products
- Improve vehicle fuel efficiency
- Capture and use landfill & digester gas

- Geothermal
- Green roofs
- Solar thermal
- District heating
- Building design for natural light & ventilation
- Tree planting & care
- Water harvesting & conservation
- Local food production

Adaptation

- Infrastructure upgrades: SUDS, sewers & culverts
- Residential programs: sewer backflow & downspout disconnection
- Health programs and help for vulnerable people
- Emergency & business continuity planning
- Coastal and river bank protection and flood plain maintenance

Mitigation: the globally responsible thing to do

Actions that reduce the emissions that contribute to climate change.

Adaptation: the locally responsible thing to do

Actions that minimize or prevent the negative impacts of climate change.

Carbon Reduction Actions

More efficient energy use in equipment and transport

- **Invest in energy-efficient equipment**, e.g. lighting, welfare cabins, plant & equipment, HVAC, IT
- **Upgrade your fleet** to Euro 6 and plant to NRMM Stage V. Go further to electric / hybrid. Knock-on air quality benefits
- **Consider infrastructure needs**: provision of charging points for EV and land for ground-source heat pumps or solar PV
- Think about **alternative transport modes**, e.g. river barges
- **Green travel plans**: public transport, more tele- / video-conferencing than travel for face-to-face meetings: Covid-19

Carbon Reduction Actions

Consider the materials you are using

- **Take an eco-design approach** to enable easier maintenance, repair and upgrade later in the asset's lifetime - 'future proof'
- **Use less material in absolute terms** – work with design and procurement teams
- Switch to alternative **materials with lower carbon impacts** – encourage innovation
- **Increase reuse and the recycled content** of materials – engage suppliers
- **Reduce waste and promote circular economy** – leaner processes
- **Install insulating materials** to reduce in-use energy consumption
- **Pursue offsite production** where possible: lower env'l impacts as well as output efficiency, reduced safety risks

Carbon Reduction Actions

Improve behaviours

- Energy Management Systems and automatic switches & sensors
- Train colleagues and suppliers in how to use equipment efficiently:
  - Choose the right equipment for the job – don't overspec
  - Turn off equipment that's not being used
  - Avoid machine idling
  - Use correct power modes including in low / eco power modes

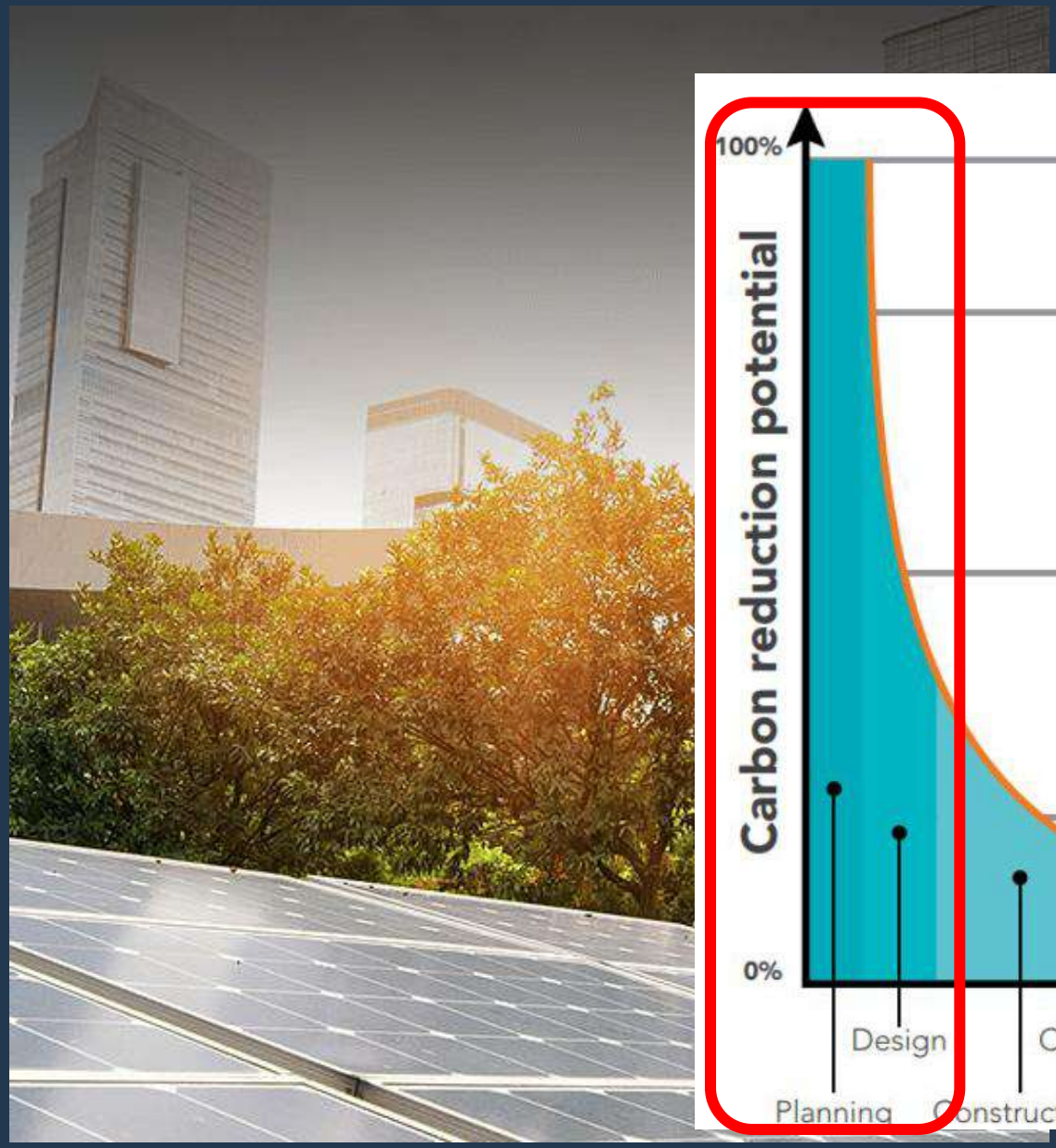
Energy and power sources

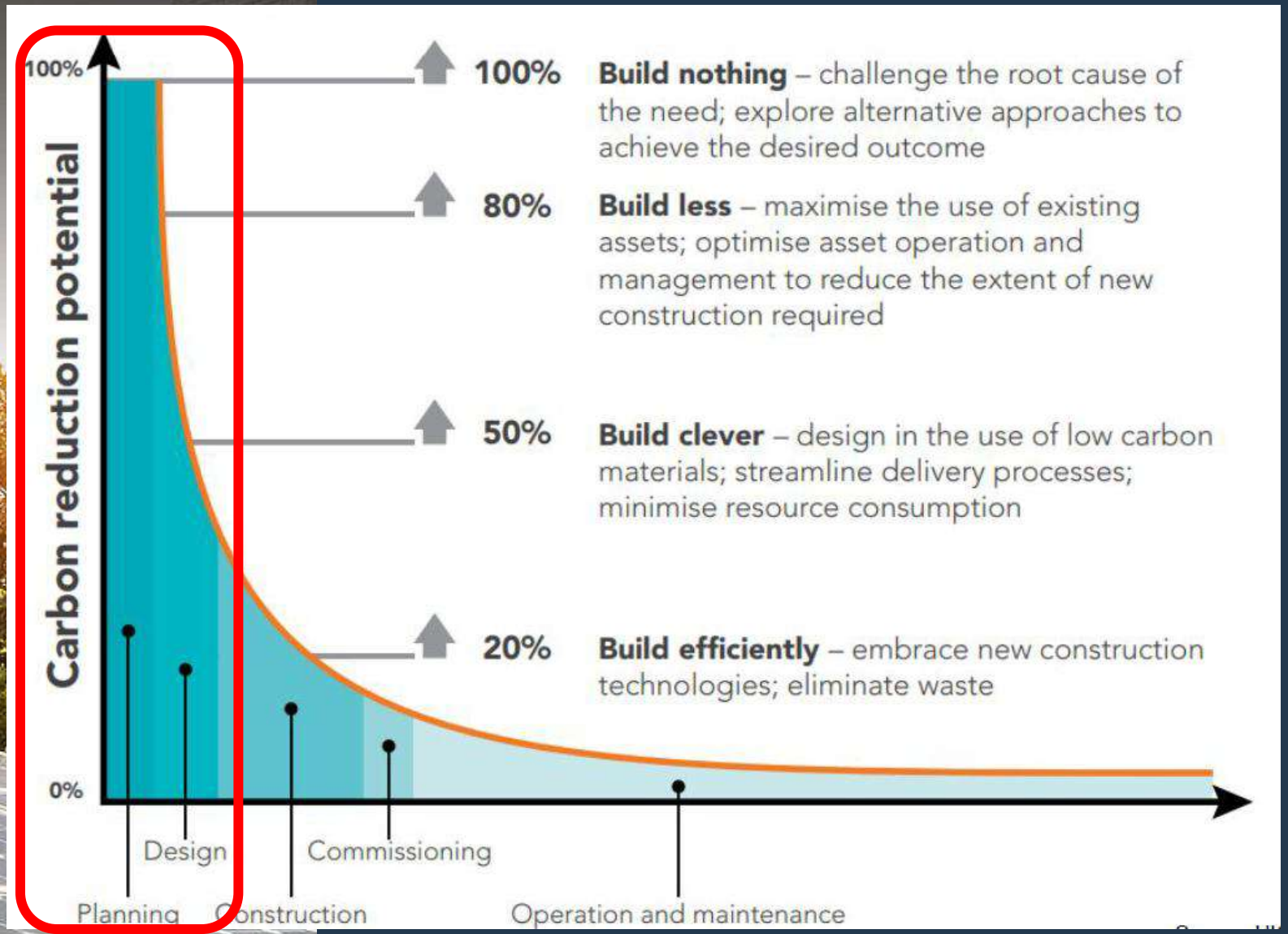
- Increase onsite renewable energy provision in offices and sites, e.g. solar PV, micro CHP
- Battery operated instead of diesel or petrol

Different, lower-carbon business models

- Service / rental rather than ownership
- Remote rather than face-to-face

The opportunity to reduce carbon (UKGBC)





Case Study

Case Study – Cooperative Bank

- The design allows for natural heating, cooling and lighting:
  - Fully-glazed double skin façade curves around the whole building and full-height atrium in its middle
  - Louvres at the top of the façade: open in summer to allow warm air trapped between its inner and outer skins to rise up and out of the building; close in winter so the facade can insulate the building

- Efficient and renewable use of energy and water
  - CHP plant powered by renewable fuel (rapeseed oil) grown on the Co-operative's own farm land
  - Heat recovery from IT systems used to heat the building
  - Energy-efficient LED lighting, IT equipment and lifts
  - Greywater and rainwater recycling for toilet flushing and irrigation

- Predicted 80% less carbon and 50% less energy use than the old head office. Awarded BREEAM "Outstanding" rating.

How do you compare…?

Activity: Better or Worse Bingo!

Which is better for carbon: disposable or reusable cups?

Vs

How many times do you need to use a reusable cup before carbon emissions are lower than using the same number of disposable cups?

24 times. Easy!

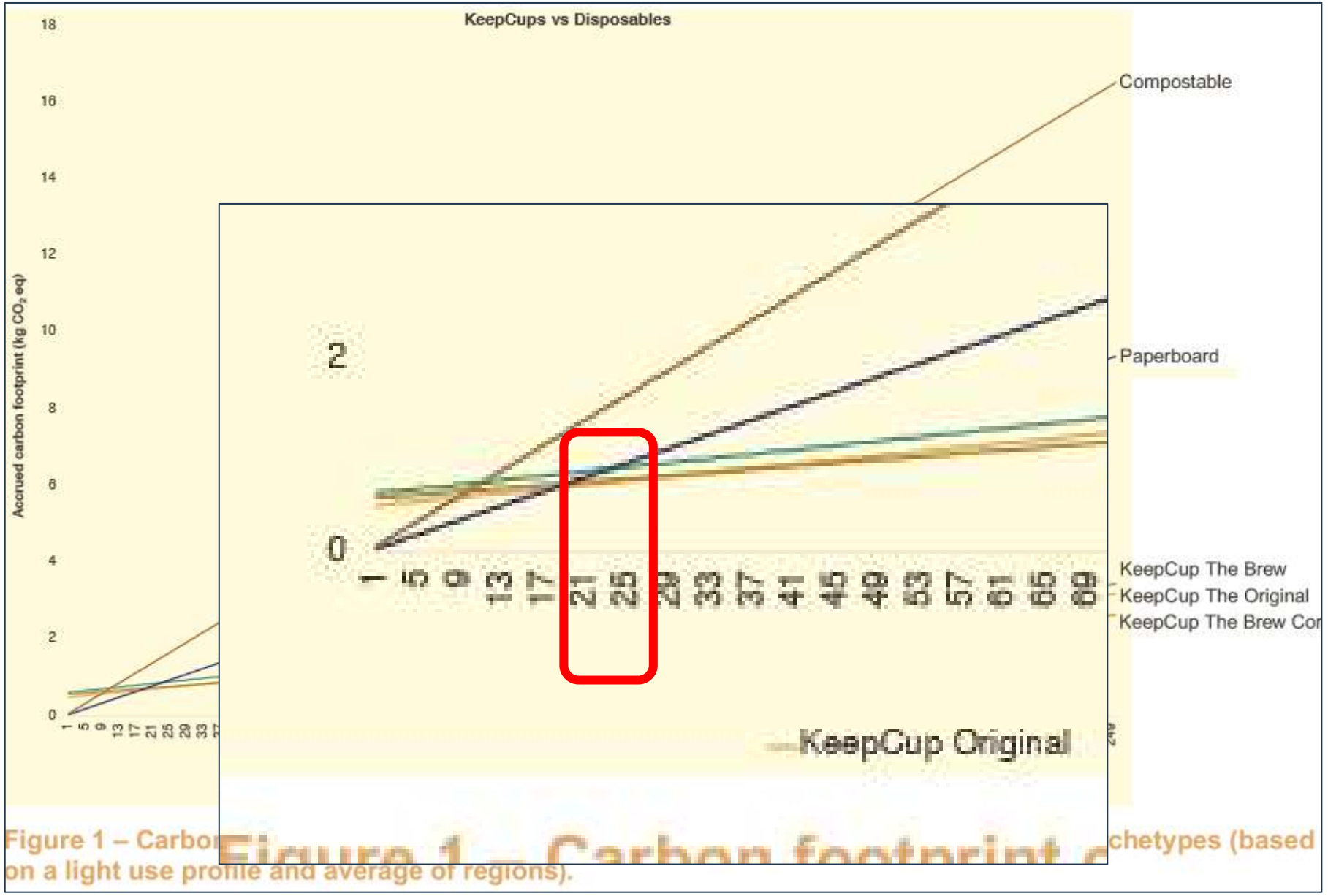


Figure 1 – Carbon footprint chetypes (based on a light use profile and average of regions).

Which is better for carbon: train or plane (for the same distance)?

In % terms, how much better is it for carbon travelling by train vs plane for the same distance?

Train vs Plane

Train lower impact per passenger.km

Comparison	Rail: Oxford to Glasgow 497km	Air: Brum to Glasgow, 418km
Cost for return ticket	£153	£215
Time	5h 30	4h estimated: 1h15 train Oxford to Brum Intl, 1h check in & wait time in airport, 1h15 flight, 0h30 to leave airport
Carbon emitted (per passenger)	**22 kgCO2e** → **80% less than by air**	**125 kgCO2e**
Saving for Rail	103 kgCO2e, or 82% less impact than flying; £60 or 29% cheaper	Approx. 1h30. But, you can work more effectively on a long distance train than in airport and on plane

Which is better for carbon: plastic or cotton (for the same volume)?

Vs.

How often do you need to use the cotton bag for a lower footprint than a plastic bag?

Plastic vs Paper vs Cotton

Type of bag	HDPE bag (No secondary reuse)	HDPE bag (40.3% reused as bin liners)	HDPE bag (100% reused as bin liners	HDPE bag (Used 3 times)
Paper	3	4	7	9
LDPE 'bag for life'	4	5	9	12
Non-woven PP	11	14	26	33
Cotton	131	173	327	393

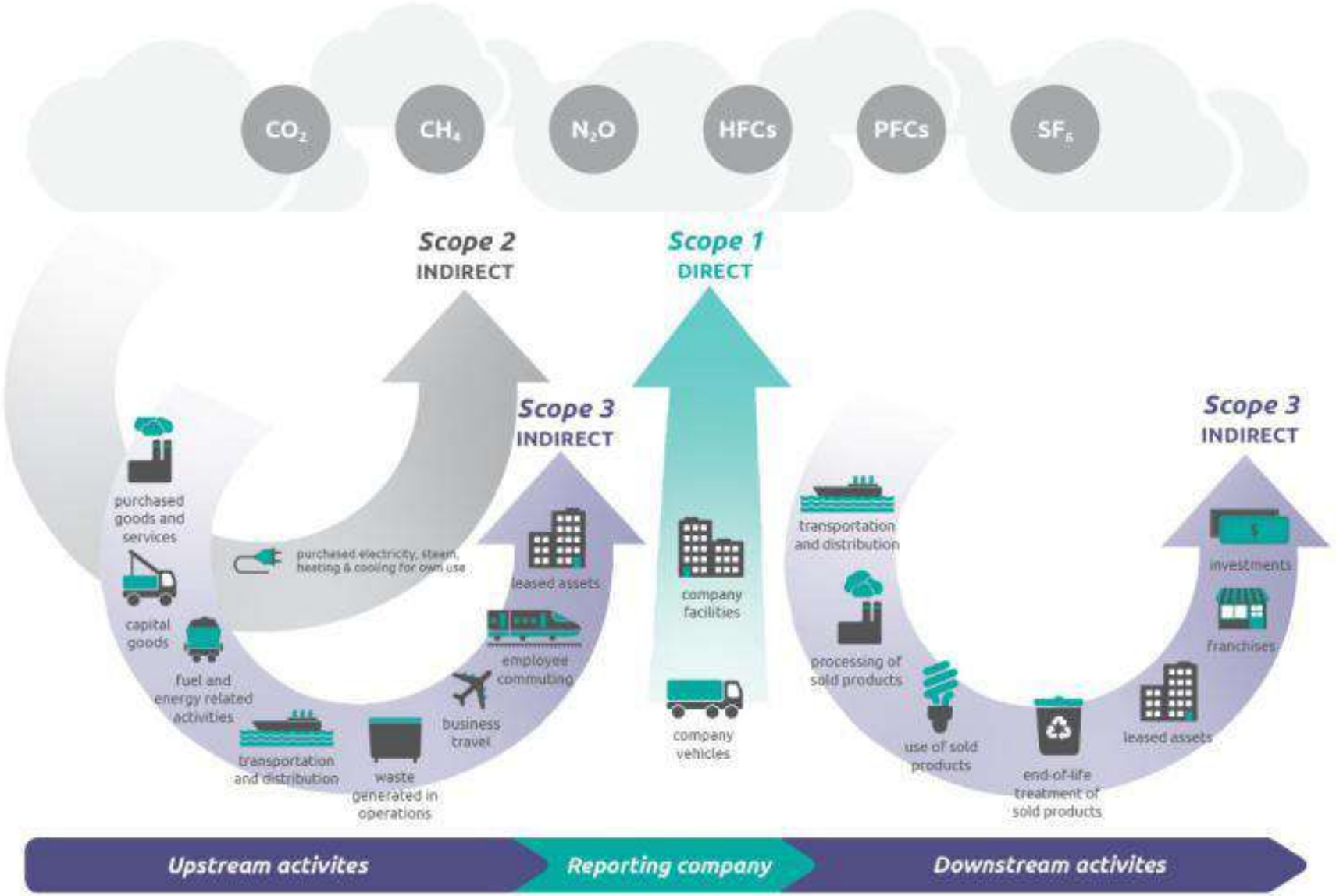
Where to take action

Recap on Carbon Footprinting

"Commonly used to describe the total amount of CO_2 and other greenhouse gas (GHG) emissions attributable to an organisation, project or product."

Operational Boundaries – Scopes

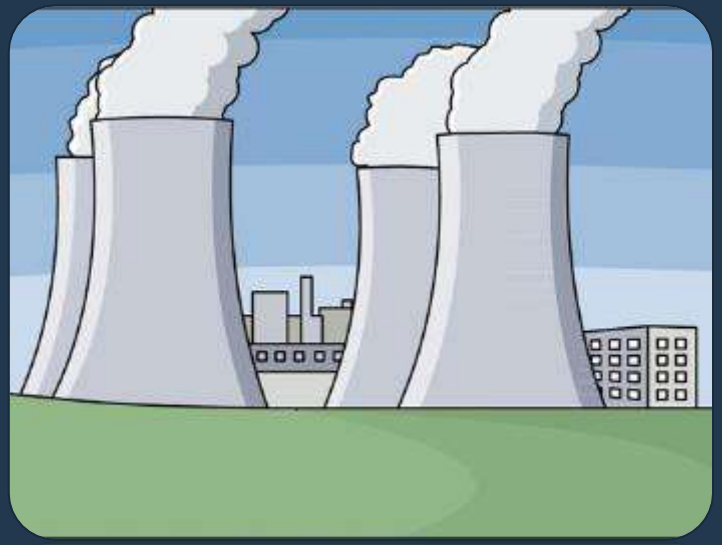
Figure [1.1] Overview of GHG Protocol scopes and emissions across the value chain



- **Direct emissions** are emissions from sources that are owned or controlled by the reporting company

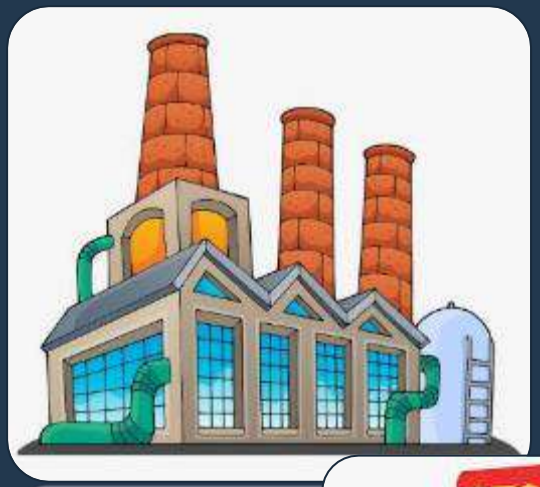
- **Indirect emissions** are emissions that are a consequence of the activities of the company but occur at sources owned or controlled by another company

Who’s responsible for what – electricity



Generating **Electricity** from gas: **Scope 1**

The Householder using their washing machine: **Scope 2**



The Manufacturer & the Retailer: **Scope 3** (use of sold products)

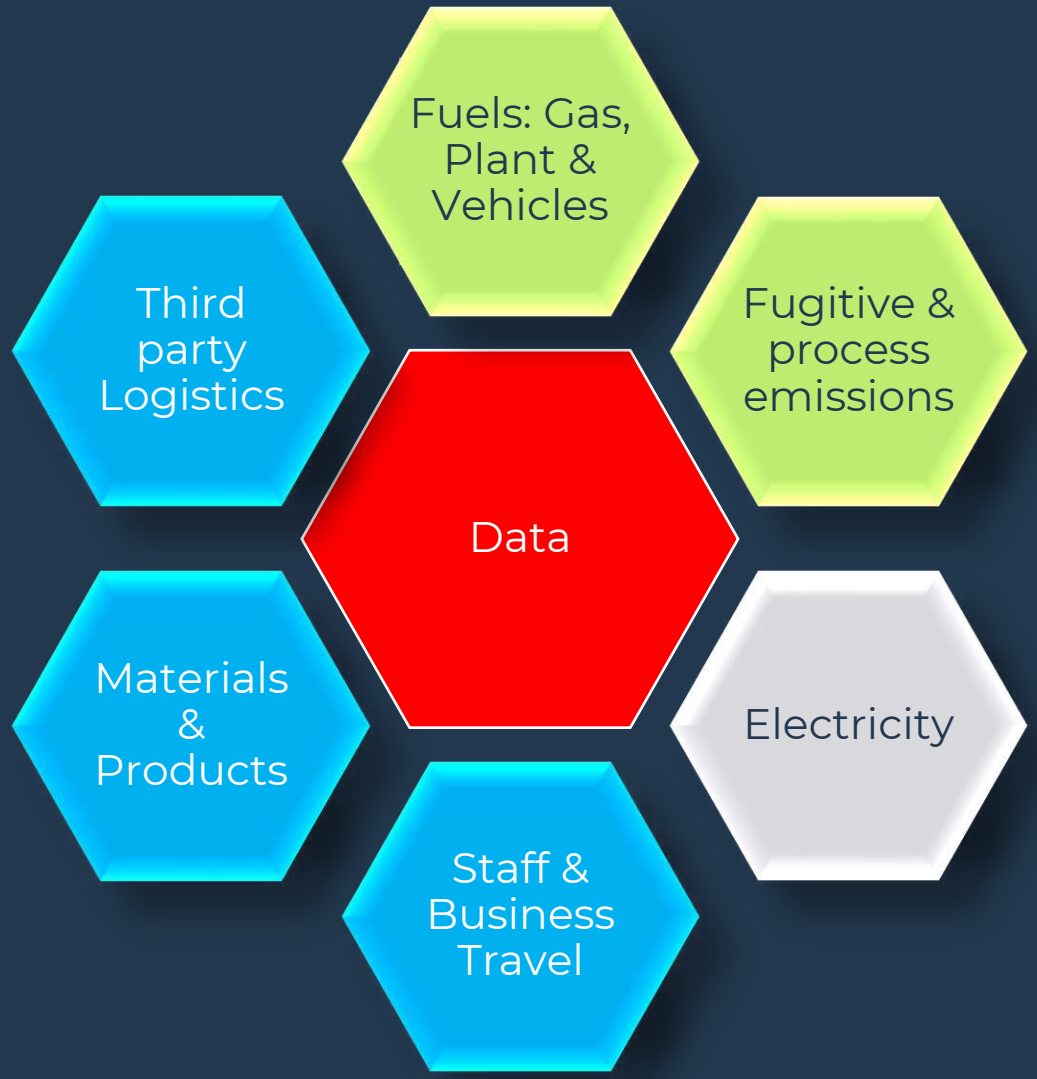
SUPPLY CHAIN SUSTAINABILITY SCHOOL

Activity Data: what it is

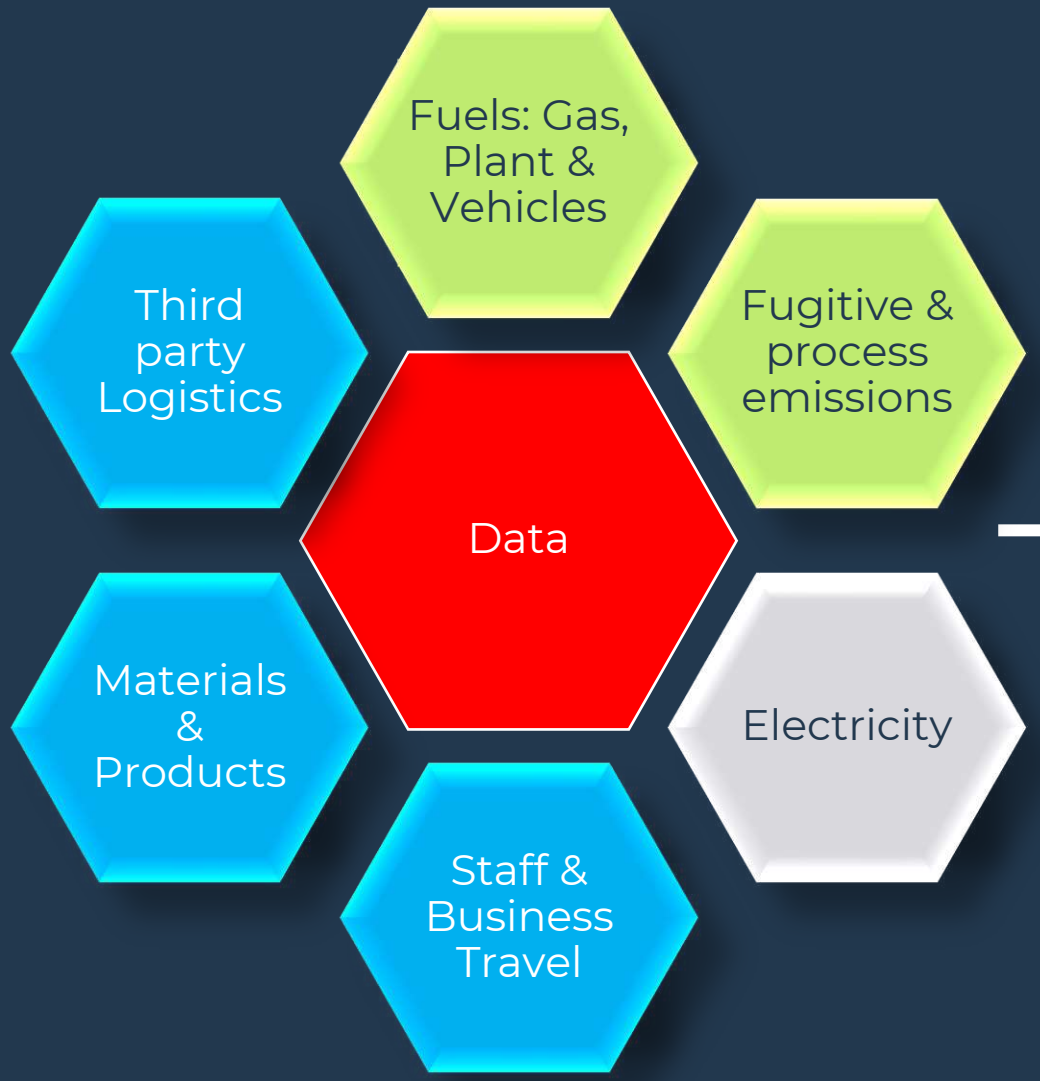
Scope 3

Scope 2

Scope 1



Activity Data: where it comes from



Kinds of Data

- Litres of fuel (diesel, LPG…)
- Litres of refrigerant
- kWh of electricity
- Mileage travelled
- Tonnes, m^3 of materials

Where the Data is

- Fleet
- Estates
- Design / Consultants
- HR / Travel agent
- Procurement
- Suppliers

Some Fundamentals- Emissions Factors Comparing Energy and Transport

1 kWh grid electricity =

0.262 $kgCO_2e$

1 kWh diesel =

0.336 $kgCO_2e$

28% more than grid electric!

One tonne by average container ship =

0.016 $kgCO_2e$ per km

One tonne by average full HGV =

0.074 $kgCO_2e$ per km

4.6 times more than by ship!

One tonne by average flight =

1.019 $kgCO_2e$ per km

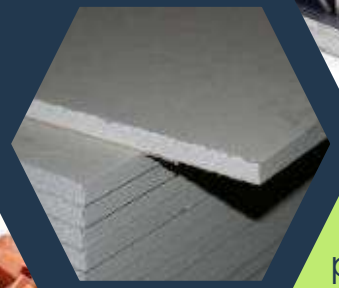
63 times more than by ship!

Some Fundamentals- Emissions Factors
Comparing Materials

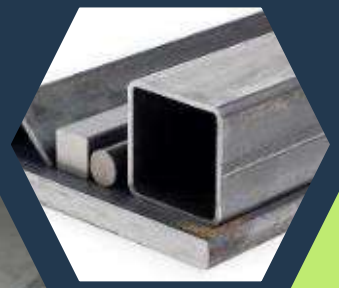
1 tonne of aggregate = 5 kg CO_2e

1 tonne of concrete = 100 kg CO_2e

1 tonne of bricks = 210 kg CO_2e



1 tonne of plasterboard = 390 kg CO_2e



1 tonne of steel = 1550 kg CO_2e

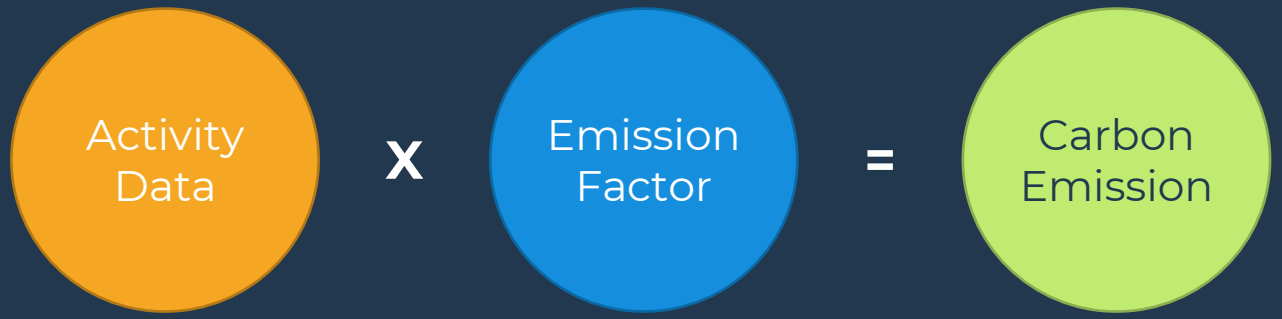
But can vary greatly with

- Raw material source
- Recycled content
- Other additives, e.g., PFA, GGBS
- Manufacturing energy source
- Shipping/transport

Supplier engagement & Environmental Product Declarations (EPDs) !

How to calculate a carbon footprint

- **A carbon footprint is**



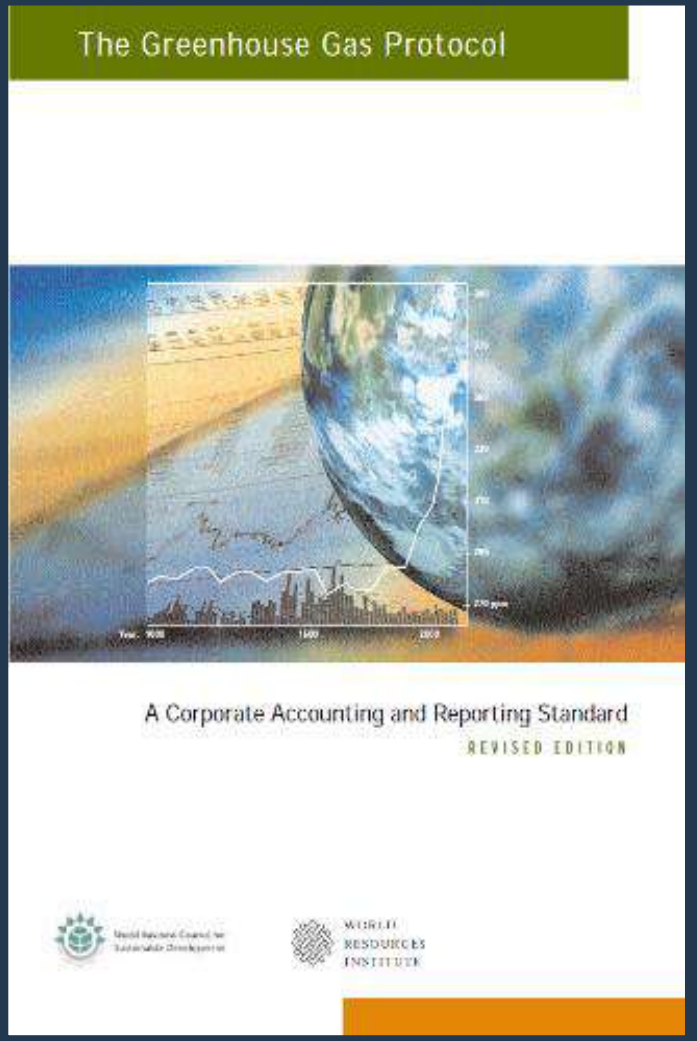
- **For example**

- **KgCO_2e ("equivalent")** takes into account all the main GHGs emitted: CO_2, CH_4 and N_2O, etc.
- Think about **units of measurement** and converting between them: factors of a thousand

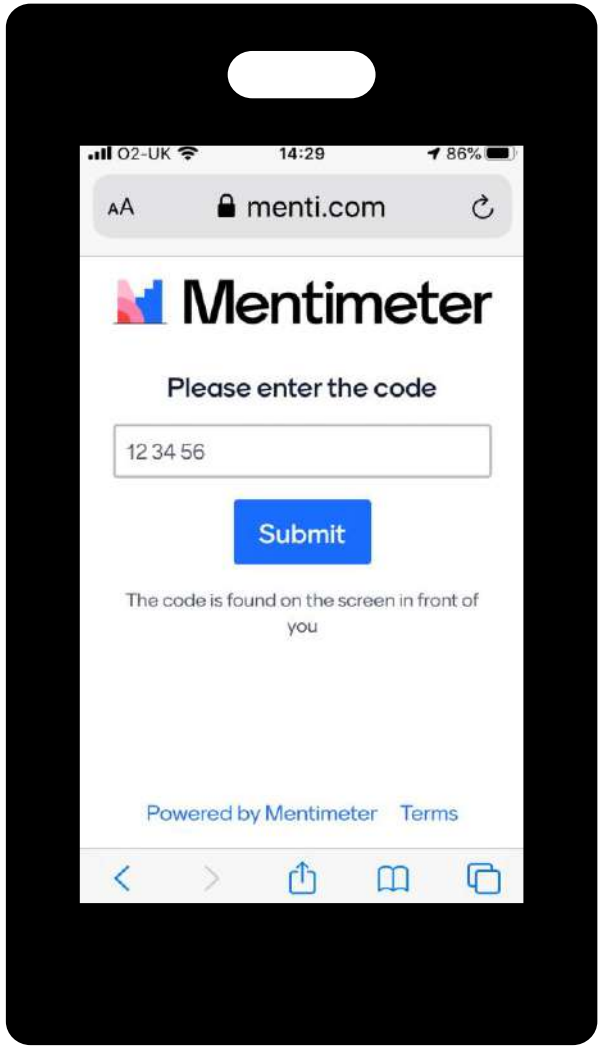
Introduction to relevant standards

GHG Protocol

- Accounting and Reporting of 6 greenhouse gases (Kyoto Protocol)
- GHG inventory using standardised approaches and principles
- Develop an effective strategy to manage and reduce GHG emissions
- Consistency and transparency in GHG Accounting and Reporting
- Construction-specific GHG Protocol - Encord



Mentimeter



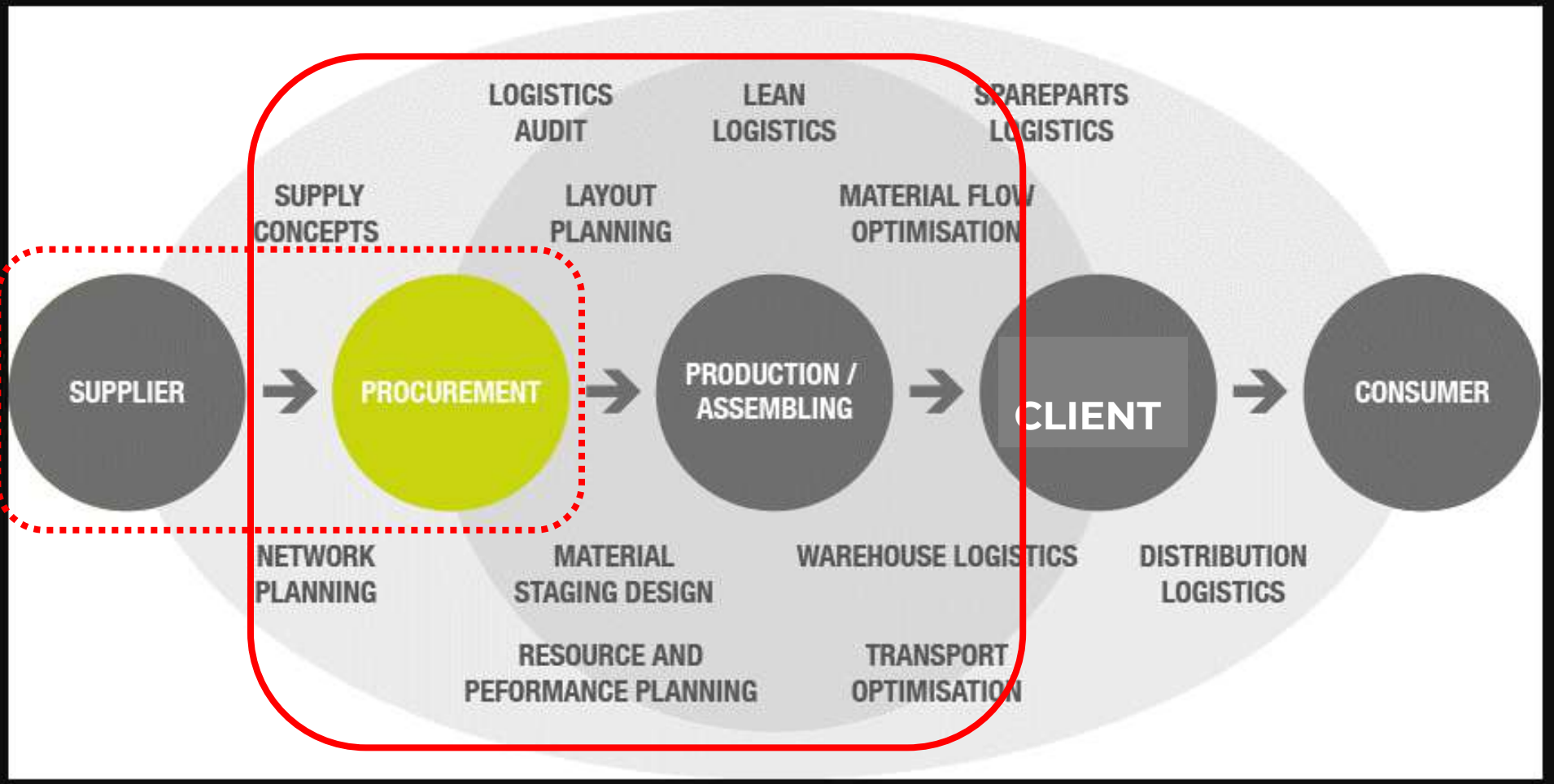
Open Mentimeter

1. Go to www.menti.com in a new browser or tab on your phone or computer, *ideally Chrome or Firefox rather than Edge,* or download the app.
2. Enter the Menti code
3. Don’t disconnect from the webinar, you will still need to hear us
4. **Check your understanding of scopes!**

Break

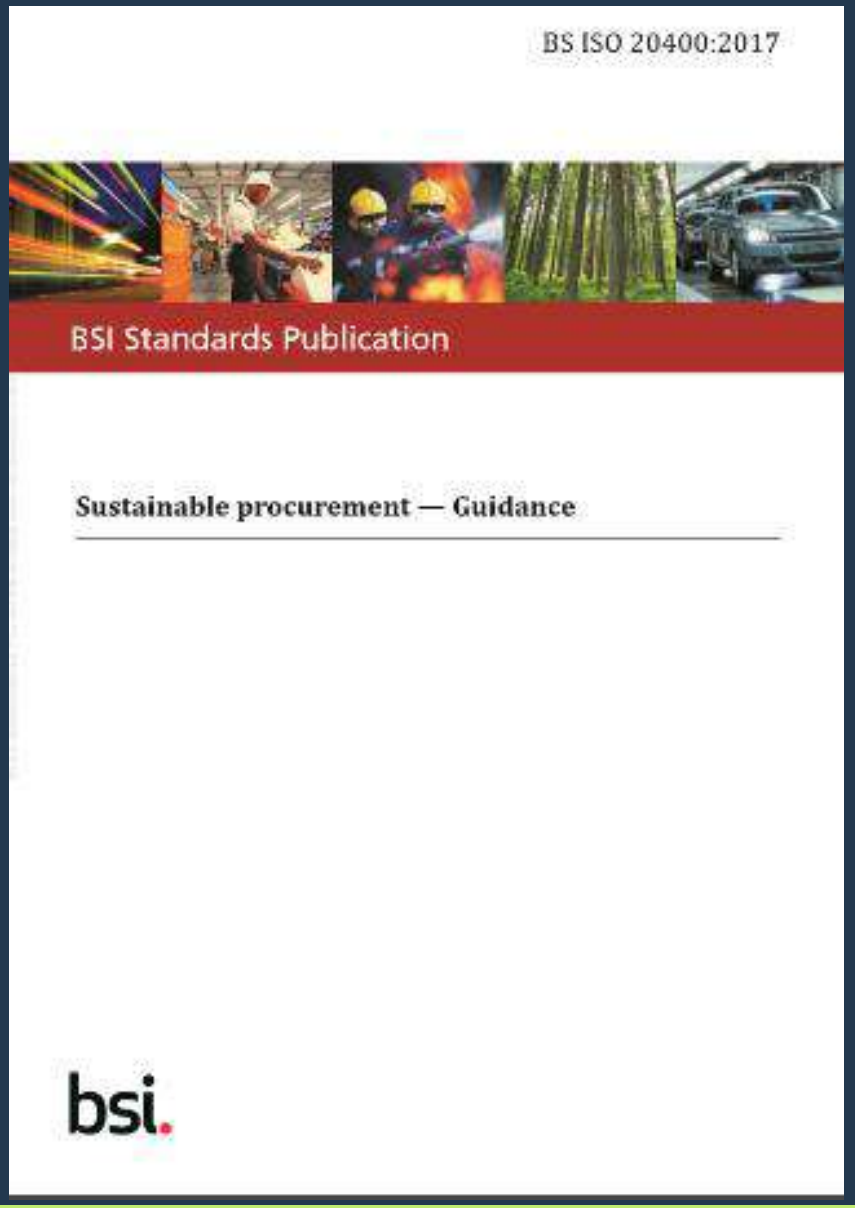
Building Carbon into Procurement

Buying packets of coal from a vending machine in Germany. Literally buying carbon!


LOGISTICS AUDIT
LEAN LOGISTICS
SPAREPARTS LOGISTICS
SUPPLY CONCEPTS
LAYOUT PLANNING
MATERIAL FLOW OPTIMISATION
SUPPLIER
PROCUREMENT
PRODUCTION / ASSEMBLING
CLIENT
CONSUMER
NETWORK PLANNING
MATERIAL STAGING DESIGN
WAREHOUSE LOGISTICS
DISTRIBUTION LOGISTICS
RESOURCE AND PEFORMANCE PLANNING
TRANSPORT OPTIMISATION

Relevant Standards

BS EN ISO 20400:2107



An International Framework Guidance Standard

Applicable to organisations of all sizes, locations and sectors

Embeds sustainability *throughout* the supply chain engagement and mgmt. process

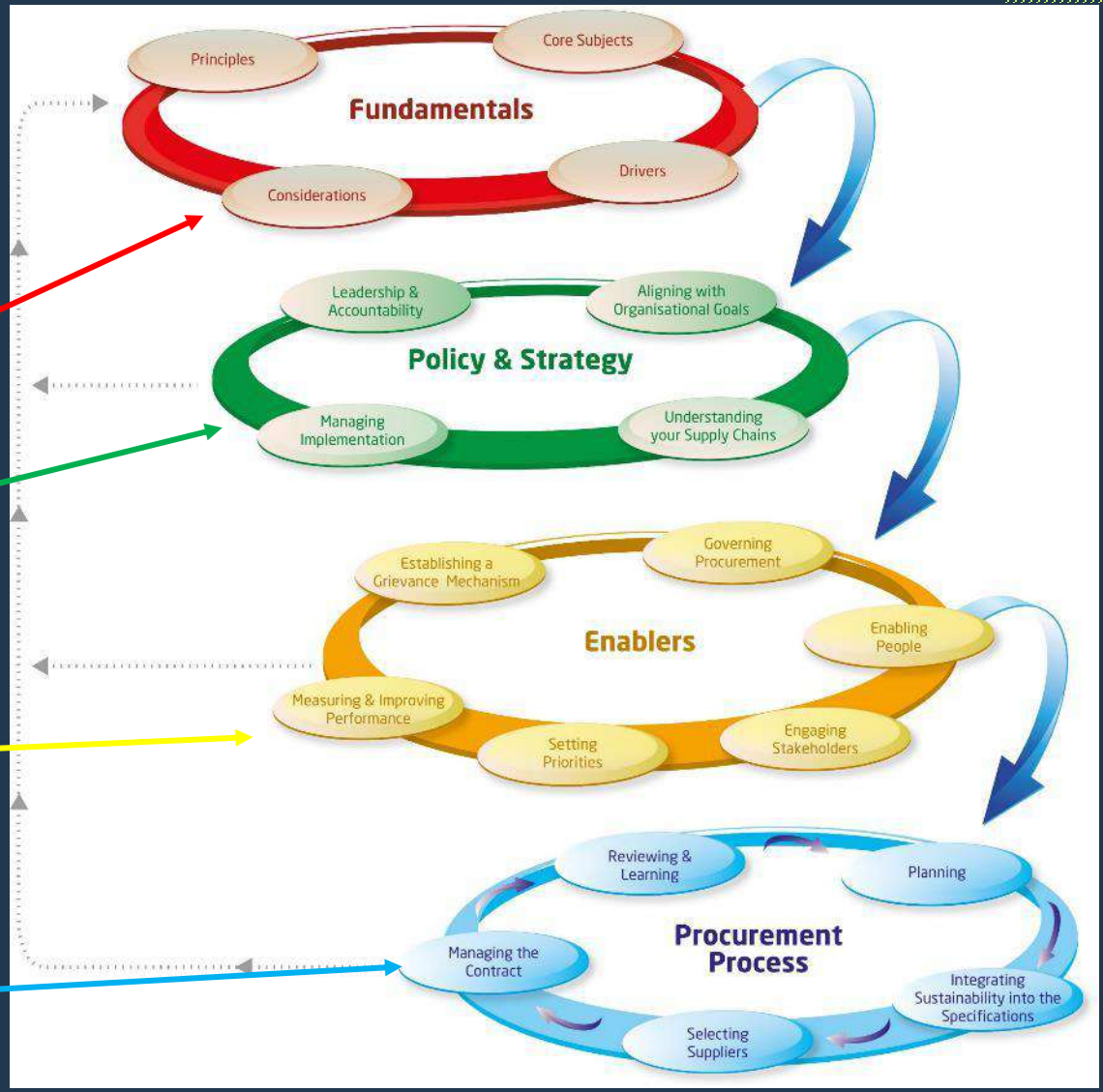
Incorporates strategic drivers, policy, governance, leadership and accountability

Priorities, stakeholder engagement, staff competency and the procurement process

Not accreditable or certifiable but you can get assessment and support on implementation

ISO 20400:2017 for Sustainable Procurement

- Why are you doing sustainable procurement? For what reasons? And what sustainability issues?
- What is your policy? How do you deliver sustainability through procurement?
- How do you support your staff and engage stakeholders? How do you prioritise? What do you measure and how?
- Is sustainability embedded in the procurement process, from SRM through the tender process and out to contract mgmt.?



© Action Sustainability 2017

Introduction to relevant standards

BS EN 15804

BS EN 15804

- Applicable to construction products, services and processes
- Provides a structure to ensure that all EPDs are derived, verified and presented in a harmonized way
- EPDs communicate verifiable, accurate, non-misleading environmental information for products
- Allows for fair comparison and a robust route to reducing environmental impacts
- EPDs = Environmental Product Declarations

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Environmental Product Declarations: EPDs

A summary of the costs and environmental impacts from the manufacture and expected use of a product


ENVIRONMENTAL PRODUCT DECLARATION

CENTRIFUGAL CHILLERS

MAGNITUDE® MAGNETIC BEARING CHILLER MODELS WMC & WME

DAIKIN

Daikin Applied, a member of Daikin Industries, Ltd., designs and manufactures technologically advanced commercial HVAC systems for customers around the world. Customers turn to Daikin with confidence that they will experience outstanding performance, reliability, and energy efficiency.

Magnitude magnetic bearing chillers, manufactured in Staunton, VA, define industry leading sustainable efficiency. Every day throughout the world thousands of customers benefit from the reliable performance and energy savings of Daikin technology.

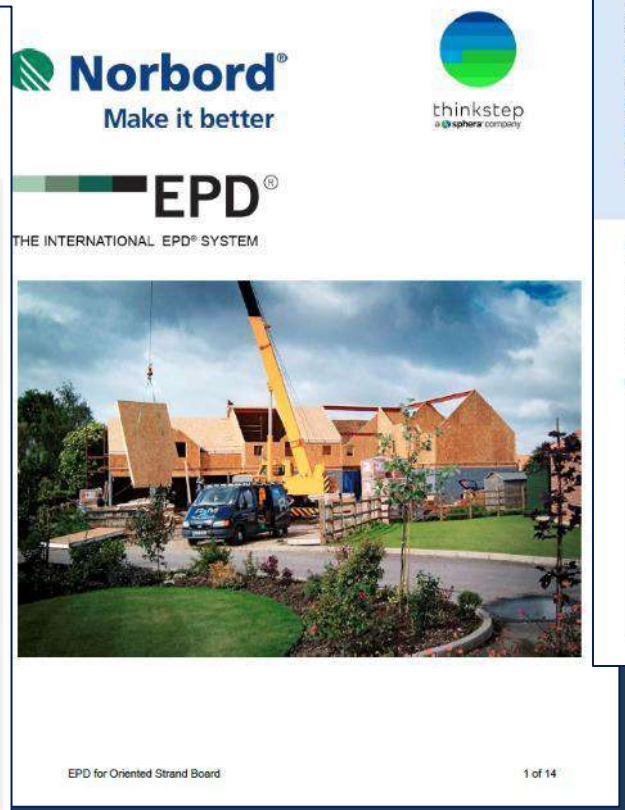
Daikin Applied is committed to sustainable practices as part of our corporate culture. We believe it is the right thing to do for our customers, our community, the environment, and ourselves. As an HVAC company, Daikin Applied has a unique opportunity to make a difference in sustainable initiatives.

For more information visit www.DaikinApplied.com

Magnitude is up to 40% more efficient than standard centrifugal chillers and can save up to $4 million over the life of the chiller. Facility managers can count on their chillers running at peak efficiency year after year with a design that wipes out the risk of contamination from efficiency-robbing oil buildup on to heat-transfer surfaces.

CERTIFIED

ENVIRONMENTAL PRODUCT DECLARATION


Norbord®

Make it better

thinkstep

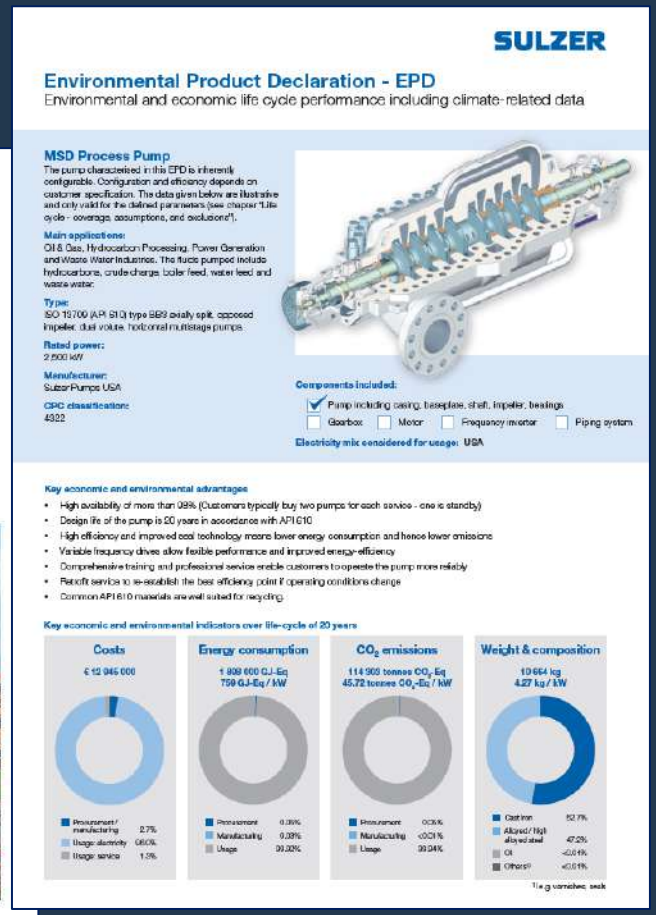
a sphera company

EPD®

THE INTERNATIONAL EPD® SYSTEM

EPD for Oriented Strand Board

1 of 14


SULZER

Environmental Product Declaration - EPD

Environmental and economic life cycle performance including climate-related data

MSD Process Pump

The pump characterised in this EPD is inherently configurable. Configuration and efficiency depends on customer specification. The data given below are illustrative and only valid for the defined parameters (see chapter "Life cycle - coverage, assumptions, and exclusions"!).

Main applications:
Oil & Gas, Hydrocarbon Processing, Power Generation and Waste Water Industries. The fluids pumped include hydrocarbons, crude charge, boiler feed, water feed and waste water.

Type:
ISO 13709 (API 610) type BB3 axially split, opposed impeller, dual volute, horizontal multistage pumps

Rated power:
2 500 kW

Manufacturer:
Sulzer Pumps USA

CPC classification:
4922

Components included:
- [x] Pump including casing, baseplate, shaft, impeller, bearings
- [ ] Gearbox
- [ ] Motor
- [ ] Frequency inverter
- [ ] Piping system

Electricity mix considered for usage: USA

Key economic and environmental advantages
- High availability of more than 99% (Customers typically buy two pumps for each service - one is standby)
- Design life of the pump is 20 years in accordance with API 610
- High efficiency and improved seal technology means lower energy consumption and hence lower emissions
- Variable frequency drives allow flexible performance and improved energy efficiency
- Comprehensive training and professional service enable customers to operate the pump more reliably
- Retrofit service to re-establish the best efficiency point if operating conditions change
- Common API 610 materials are well suited for recycling

Key economic and environmental indicators over life-cycle of 20 years

Costs

€ 12 945 000

Energy consumption

1 938 600 GJ-Eq

759 GJ-Eq / kW

CO_2 emissions

114 900 tonnes CO_2-Eq

45.72 tonnes CO_2-Eq / kW

Weight & composition

10 964 kg

4.27 kg / kW

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Environmental Product Declarations: EPDs

A summary of the costs and environmental impacts from the manufacture and expected use of a product


ENVIRONMENTAL PRODUCT DEC
CENTRIFUGA
MAGNITUDE® MAGNETIC BEARIN

Magnitude is up to 40% more efficient than
and can save up to $4 million over the life o
managers can count on their chillers runnin
after year with a design that wipes out the
efficiency-robbing oil buildup on to heat-tra

bre

LCA Results

The results for the declared unit of 1 tonne of BDA average UK brick can be found below. As the average brick is assumed by the BDA to have a mass of 2.13 kg, results can be calculated per average brick by dividing individual values in results tables by a factor of (1000 / 2.13).

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts

			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	213	1.85e-5	3.49	0.107	0.177	1.24e-4	2370
Construction process stage	Transport	A4	8.026	1.48E-06	0.027	7.08E-03	4.68E-03	2.11E-05	121.2
	Construction	A5	11.466	1.08E-06	0.177	6.07E-03	9.31E-03	8.41E-06	130.9
	Use	B1	MNR	MNR	MNR	MNR	MNR	MNR	MNR
	Maintenance	B2	MNR	MNR	MNR	MNR	MNR	MNR	MNR
	Repair	B3	MNR	MNR	MNR	MNR	MNR	MNR	MNR


SULZER
- EPD
including climate-related data

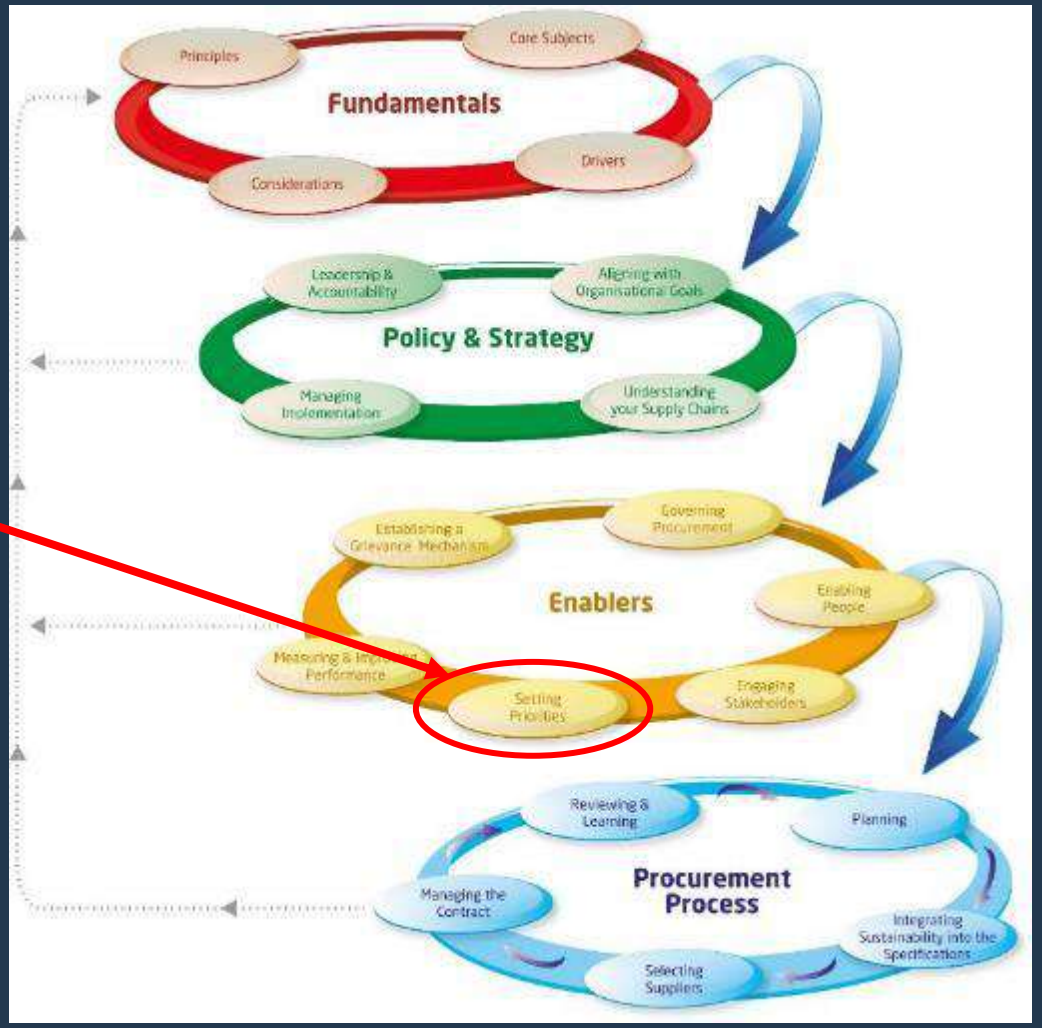
Weight & composition

SUPPLY CHAIN SUSTAINABILITY SCHOOL

Prioritising

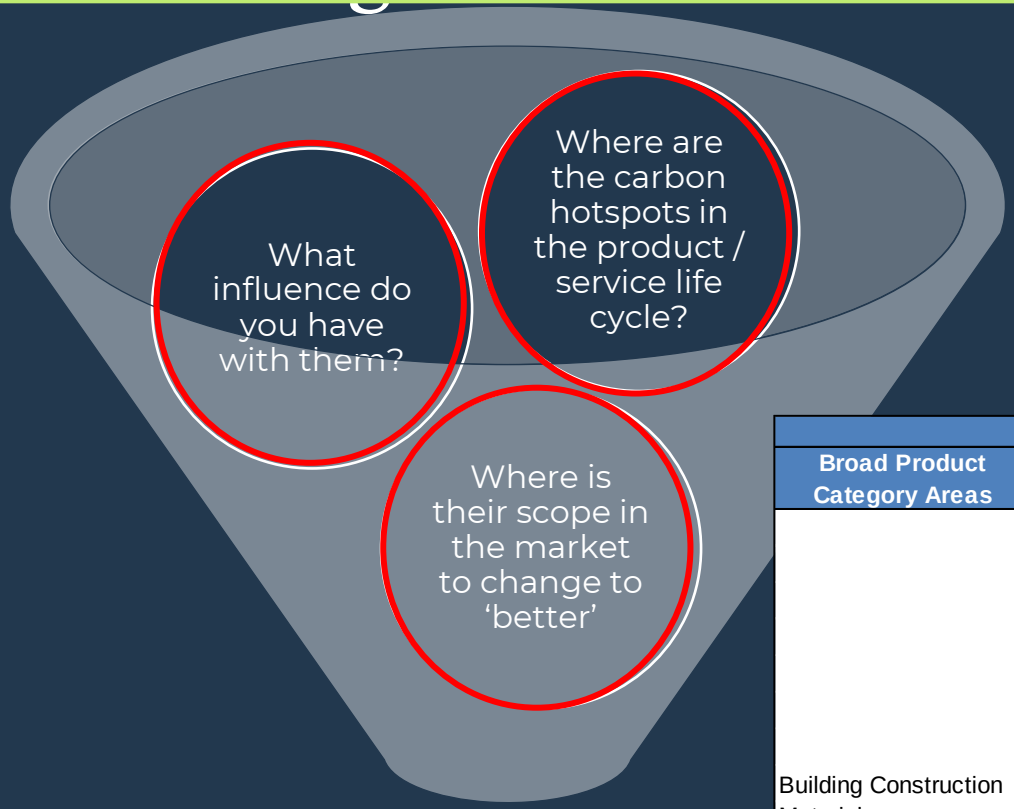
Assessing Products and Services for Carbon

A key step is setting priorities to manage risks and opportunities, also known as heatmapping, for who is engaged, why and on what

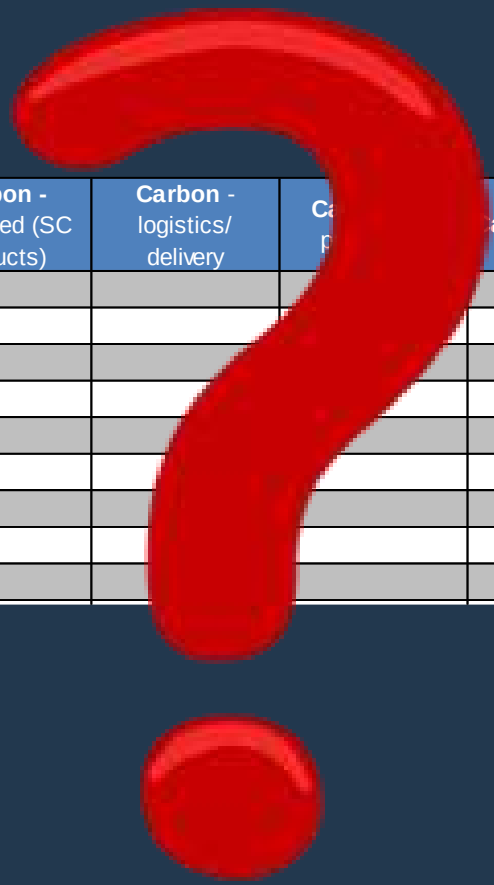


© Action Sustainability 2017

Assessing Products and Service for Carbon



	Sustainability Impact					
Broad Product Category Areas	**Key Product Categories**	**Carbon -** embodied (SC products)	**Carbon** - logistics/ delivery	**Ca** p	**arbon -** in Use	**Carbon** - waste & circular economy
Building Construction Materials	Bathrooms					
	Electrical					
	Fencing					
	Floor Coverings					
	General Materials					
	Glazing					
	Hand Tools					
	Heating & Air Conditioning					
	Kitchens					



Category Strategy and SRM

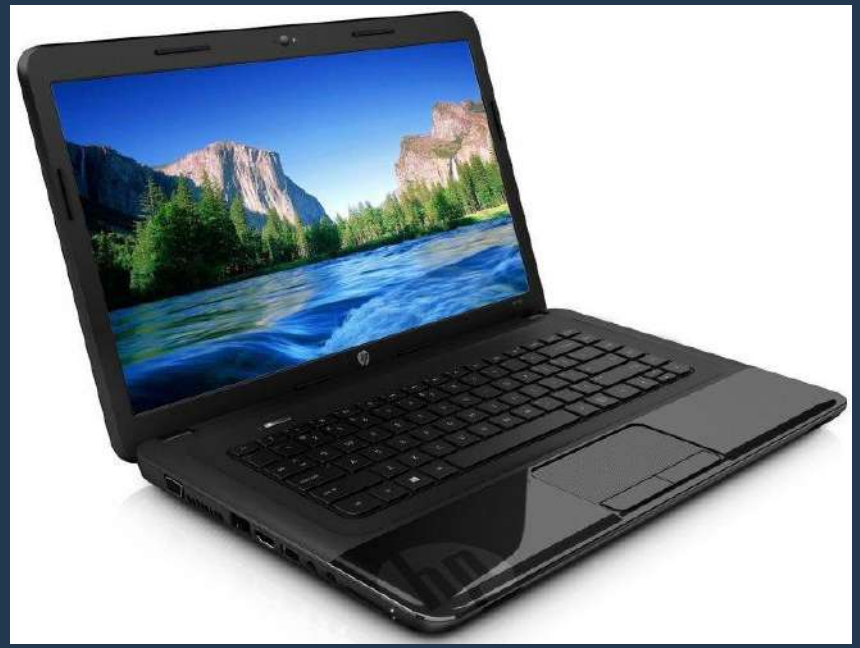
Procurement Process and Questions

Assessing Products and Service for Carbon

- So, how do you know where to focus the line of enquiry about carbon for a product or service?
- You need to know where a product or service uses most carbon in its lifetime
- Use tools such as Life Cycle Assessment (LCA) and carbon footprinting

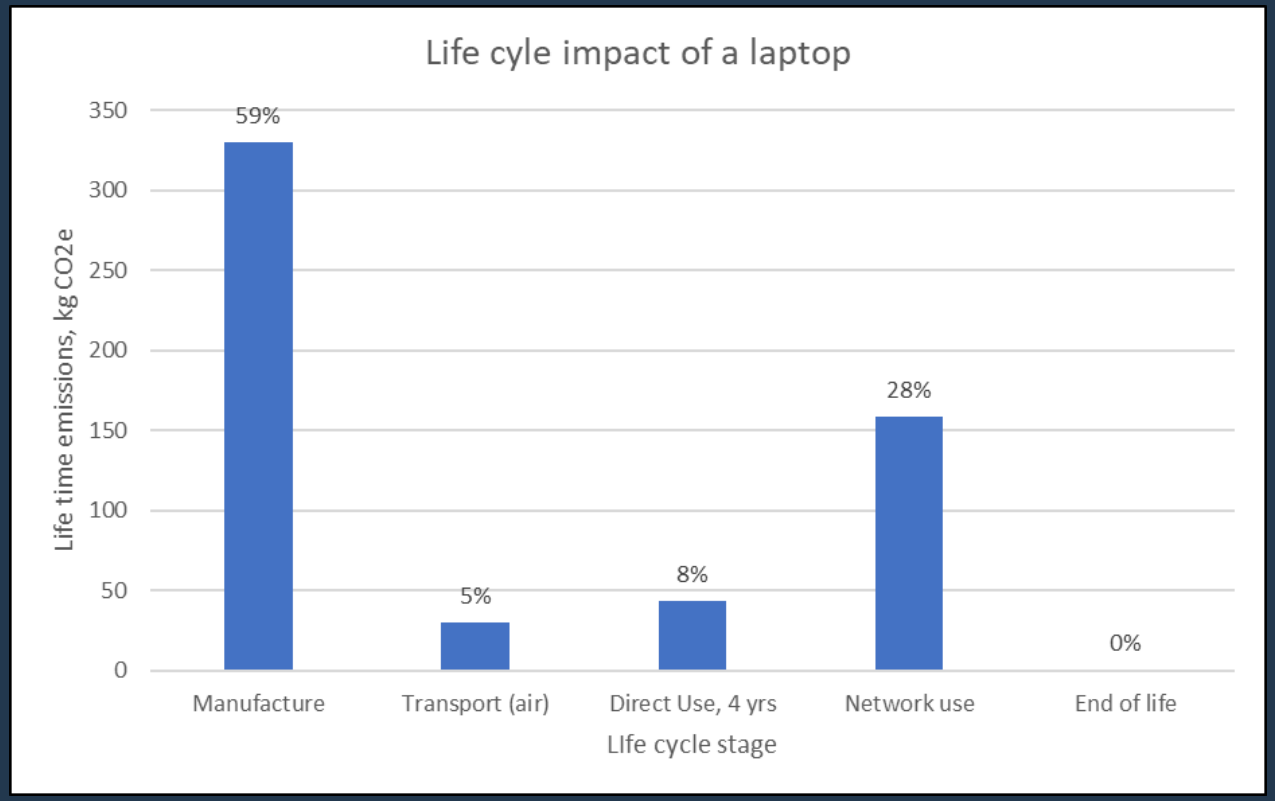
Example: Life cycle impacts of a laptop

- Where are the main areas for carbon emissions in the life cycle of a laptop?
  - Material processing and component manufacture?
  - Product assembly?
  - Use?
  - Disposal?



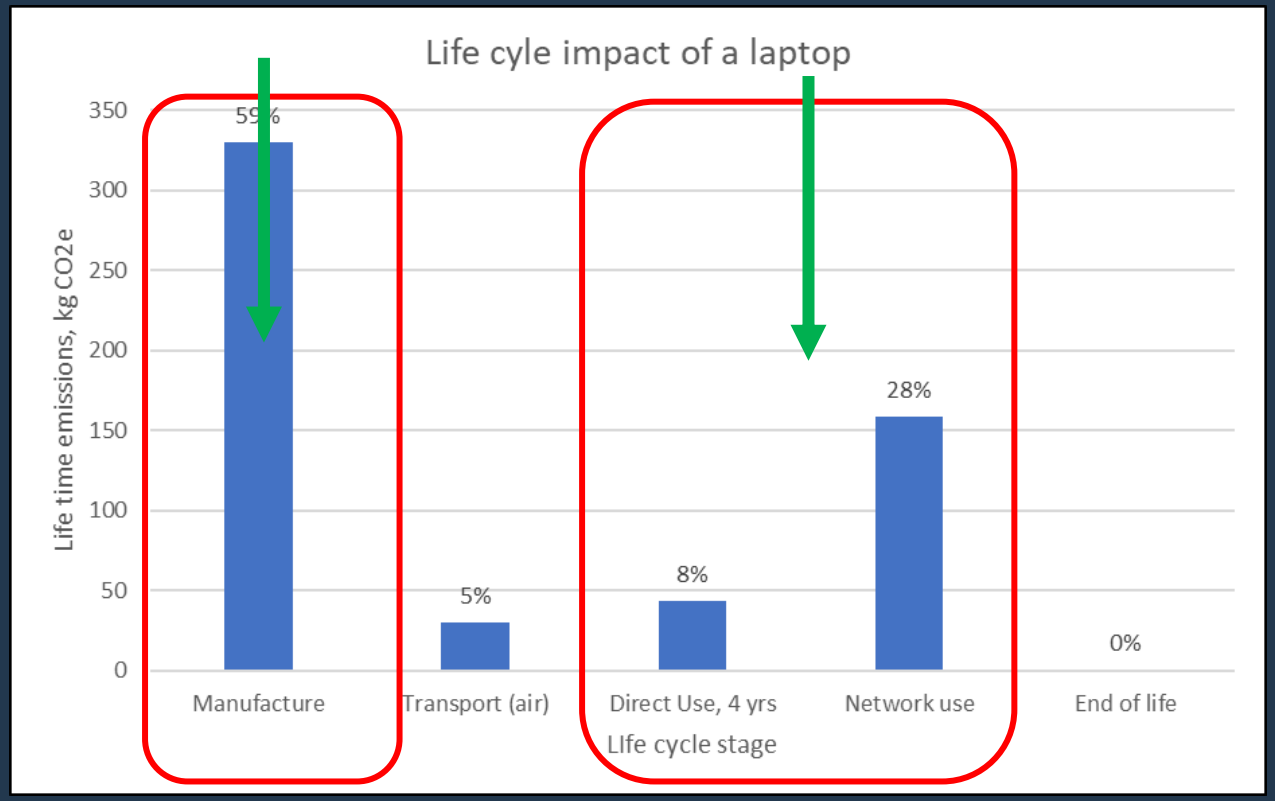
Life cycle impacts of a laptop

- Hotspots for GHG emissions
  - 59% from manufacturing of components: motherboard, hard drive and display
  - 36% from the in-use phase: direct energy and networks



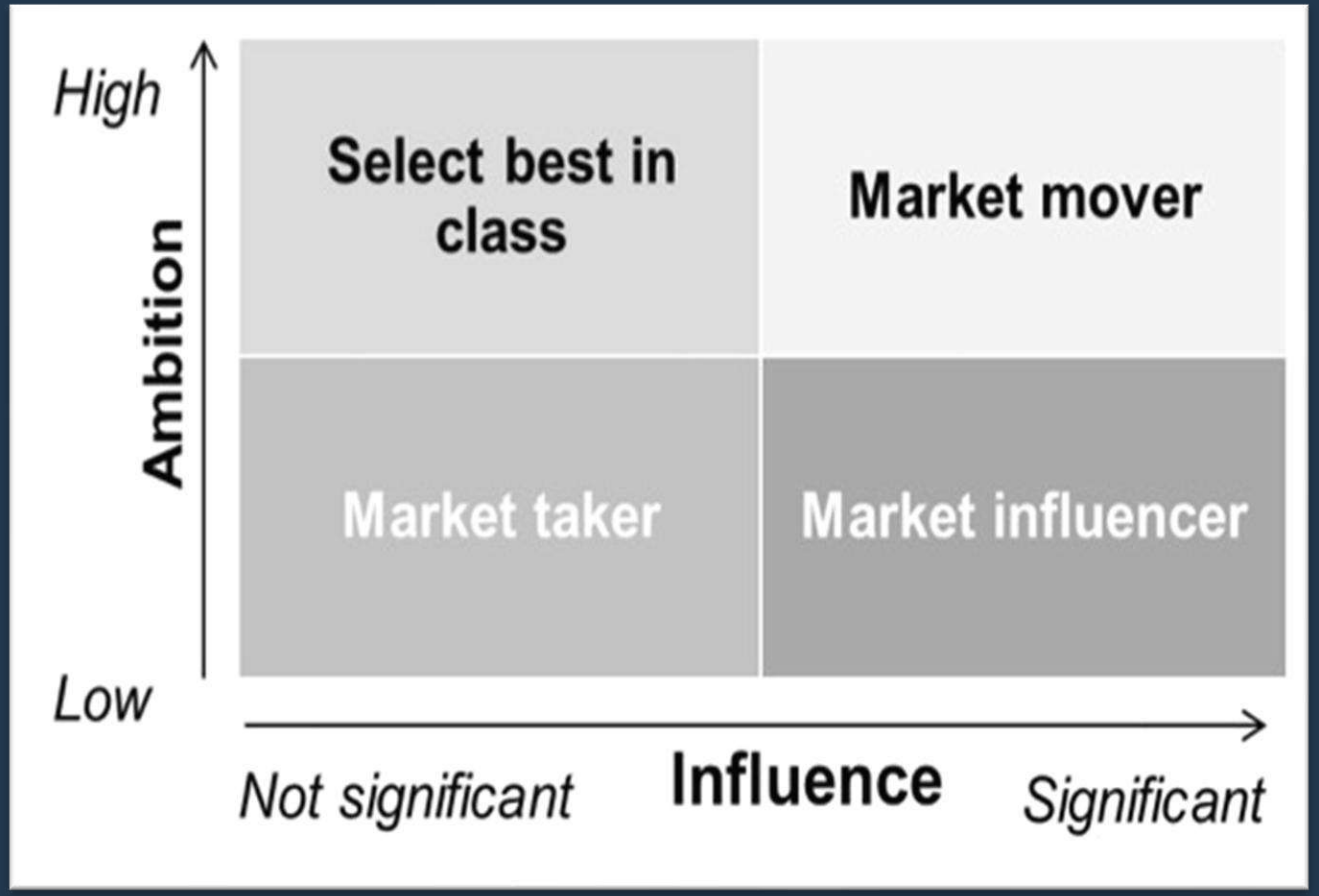
Life cycle impacts of a laptop

- Hotspots for GHG emissions
  - 59% from manufacturing of components: motherboard, hard drive and display
  - 36% from the in-use phase: direct energy and networks
- These are clearly the focus for supplier engagement and carbon reduction, but what do we look for?
  - Embodied energy in manufacture; supplier LCA reports
  - Energy efficient laptops
  - Set to low power mode before delivery, and enable the user to modify
  - Provide clear user guidance
  - Upgrading and repair for extended lifetime
- Which all leads to procurement!



BUT! What's our Influence with the Market?

- How much influence do you have with the manufacturers and distributors of laptops and other ICT?
- Where would you place your organisation on the chart?
- Use this ambition/influence positioning with the life cycle info above in your pre-market engagement and evaluation of capabilities and availabilities



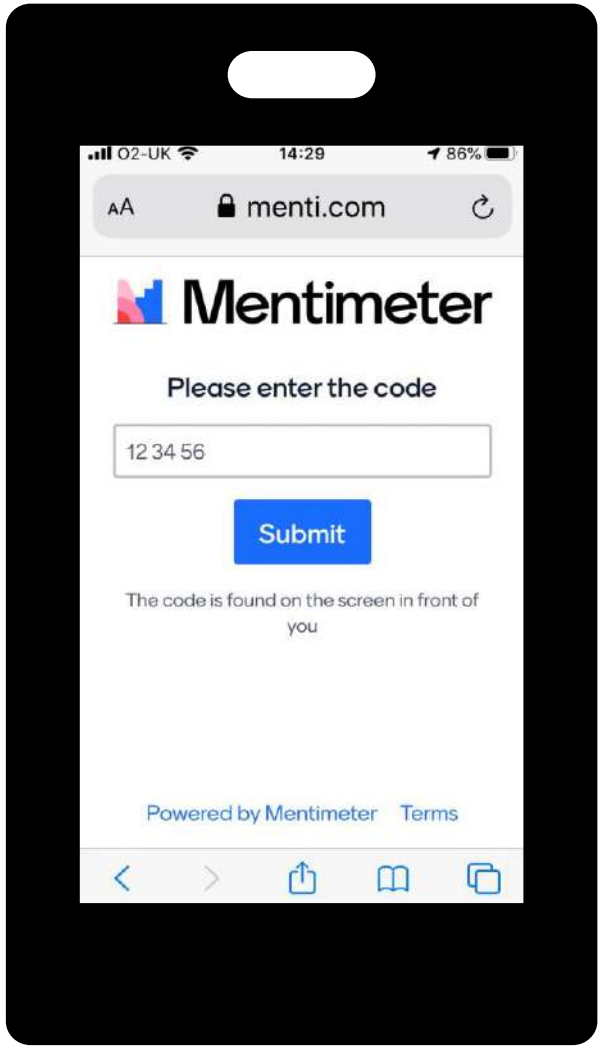
Assessing Products and Service for Carbon

The Heatmap:

- ✓ prioritisation of carbon impacts
- ✓ across the life cycle of products and services
- ✓ accounts for associated air quality emissions
- ✓ a risk or opportunity with respect to carbon
- ✓ leverage and scope to do something about it
- ✓ leads naturally on to the questions on carbon

Sustainability Impact / Broad Product Category Areas	Supply Chain Manufacture - *Embodied Carbon*	Logistics/ delivery - *GHG and AQ emissions*	Packaging - *embodied carbon*	Use phase - *GHG emissions*	Use phase - *Air quality emissions*	End of life, waste & circular economy - *GHG emissions*	Examples
Highways Equipment & Materials							E.g. Aggregates, Bituminous Materials & Surface Dressings, Concrete, Health & Safety (PPE), Paving & Kerbstones, Roads (Design, Drainage, Emergency Guard Rails & Safety Fencing, Proprietary Surfacing, Reconstruction & Resurfacing, Road Markings, Surveys, Construction, Repair & Maintenance), Rock Salt, Signage, Street Furniture & Ironworks, Street Lighting
Building Construction Products							E.g. Bathrooms, Electrical, Fencing, Glazing, Heating , Kitchens, Hand Tools, Floor Coverings, General Materials, Lighting, Machine Tools, Paint & Finishing, Plumbing, Roofing, Signage, Timber,
Transport, vehicles & plant							E.g. Fleet Management, Fuel, Large construction plant and equipment, and Haulage HGV, Smaller plant and equipment, Commercial coaches, Minibuses, Passenger Transport, Taxis and Fleet, including SEN, secure transport, hiring and leasing, Signage & Livery, Maintenance, Repair: Parts, Repair: Tools & Equipment, Vehicle Recovery
Facilities Management							E.g. Cleaning & Janitorial (Laundry equipment and services), Energy Efficiency, Furniture & Soft Furnishings, Health and Safety products and services., Lifts (install and maintain), Portable Building Hire, Property Management, Removals, Room Hire, Security equipment, Storage (Materials and service)
IT							E.g. laptops, screens, peripherals such as keyboards, data servers, and services linked to that
Food							E.g. catering services
Services							E.g. those not picked up elsewhere, above, where there is a clear product at the core of the service (e.g. food and catering, or IT). Examples here include health & adult social care, housing, parking, streets, waste, libraries, leisure, parks, sports

Mentimeter



Open Mentimeter

1. Go to www.menti.com in a new browser or tab on your phone or computer, *ideally Chrome or Firefox rather than Edge,* or download the app.
2. Enter the Menti code
3. Don’t disconnect from the webinar, you will still need to hear us
4. **What can we do to capture the attention of / engage with the supply chain to reduce carbon emissions?**

Building Carbon into Procurement

Your Turn!

Activity 2:
Prioritise Carbon for Procurement
Time: 15 mins

In your Groups decide which categories are priorities for carbon and why

Use the heatmap to RAG rate them.

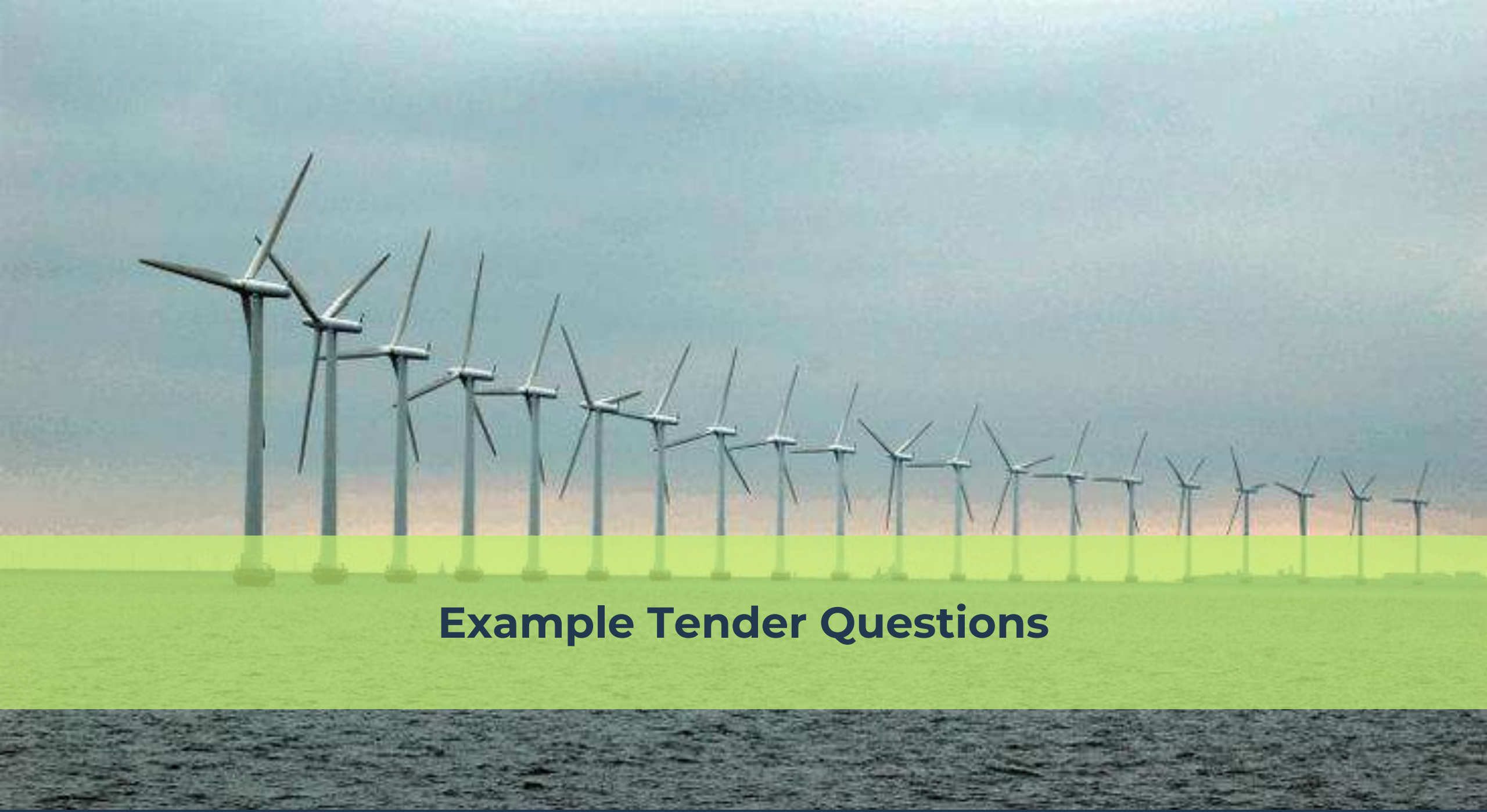
Think about:

- Embodied carbon in manufacture
- Operational energy incl. repairs
- End-of life disposal

		Sustainability Impact		
Spend category	Sub categories	Raw materials /Resource Eff	Waste	Energy& Carbon
Raw Materials	Chemicals, Clays, Solvents etc			
Packaging	Cans, Containers, Metal etc			
Infrastructure	Plant, Machinery and Equipment etc			
Third Party	Brushes, Fillers, Rollers etc			
Commercial	Fleet, Vehicles, Colour Cards etc			
Marketing	Display, Point of Sale stands etc			
Utilities	Gas, Water, Electricity etc			
other...				

Feedback and discussion

5 minutes



Example Tender Questions

Tender Questions for Carbon: Example RFI/PQQ

1. Describe your vision and approach to how you deliver products / services, such that they contribute to the UK's target to be carbon net zero by 2050 and our target to be carbon neutral by 2030.

Expected response to contain issues such as:

i. **Their own policy and targets** for reaching net zero in the coming years, and what actions they are taking
ii. **References to standards** such as ISO 20400, ISO 14001, ISO 14090 and initiatives such as Science Based Targets
iii. The **design process** they have to their products/ services to minimise carbon
iv. How they **engage their clients** to understand their ambitions and where you jointly see the main opportunities lie for reducing carbon;
v. How they **engage their suppliers and contractors** to get them to contribute and buy in to working towards net zero, through education, support and their own procurement selection;
vi. How they **engage the ultimate user**, such that they understand how they product has been designed to be as low C as possible and therefore their role in using it as energy efficiently as possible both in operation and end of life;

Tender Questions for Carbon: Example RFP/ITT

2. Describe how you will evaluate and reduce the carbon impact (embodied carbon /CapCarb / Scope 3) of your design for this project / product, and how you will communicate and report that to us.

Expected response to contain issues such as:

i. **References to relevant life cycle assessment standards**, e.g. EN 15978 Sustainability of Construction works calculation methods, and EN 15804 on EPDs; and BES 6001 for construction materials in general; PAS 2050 or ISO 14044 for products; links to standards such as FSC

ii. How they will look at the **design through the lens of carbon** to reduce impacts through using
    i. less material / smarter design
    ii. using different materials with lower C impacts (including embodied C of manufacture, recycled-content, and the shipping transport required to get it to site)
    iii. using offsite manufacture
    iv. extending the lifetime of components, circular economy, DfMA, etc;

iii. **Good procurement**: from buying the right amount, to working with suppliers to provide the right specification so it doesn't need cutting to size, etc;

iv. Consideration of **climate adaptation** through the use of elements such as SUDS, green roofs.

Tender Questions for Carbon: Example RFP/ITT

3. Describe how you will reduce carbon emissions during the construction / installation phase of the works for this project.

Expected response to contain issues such as:

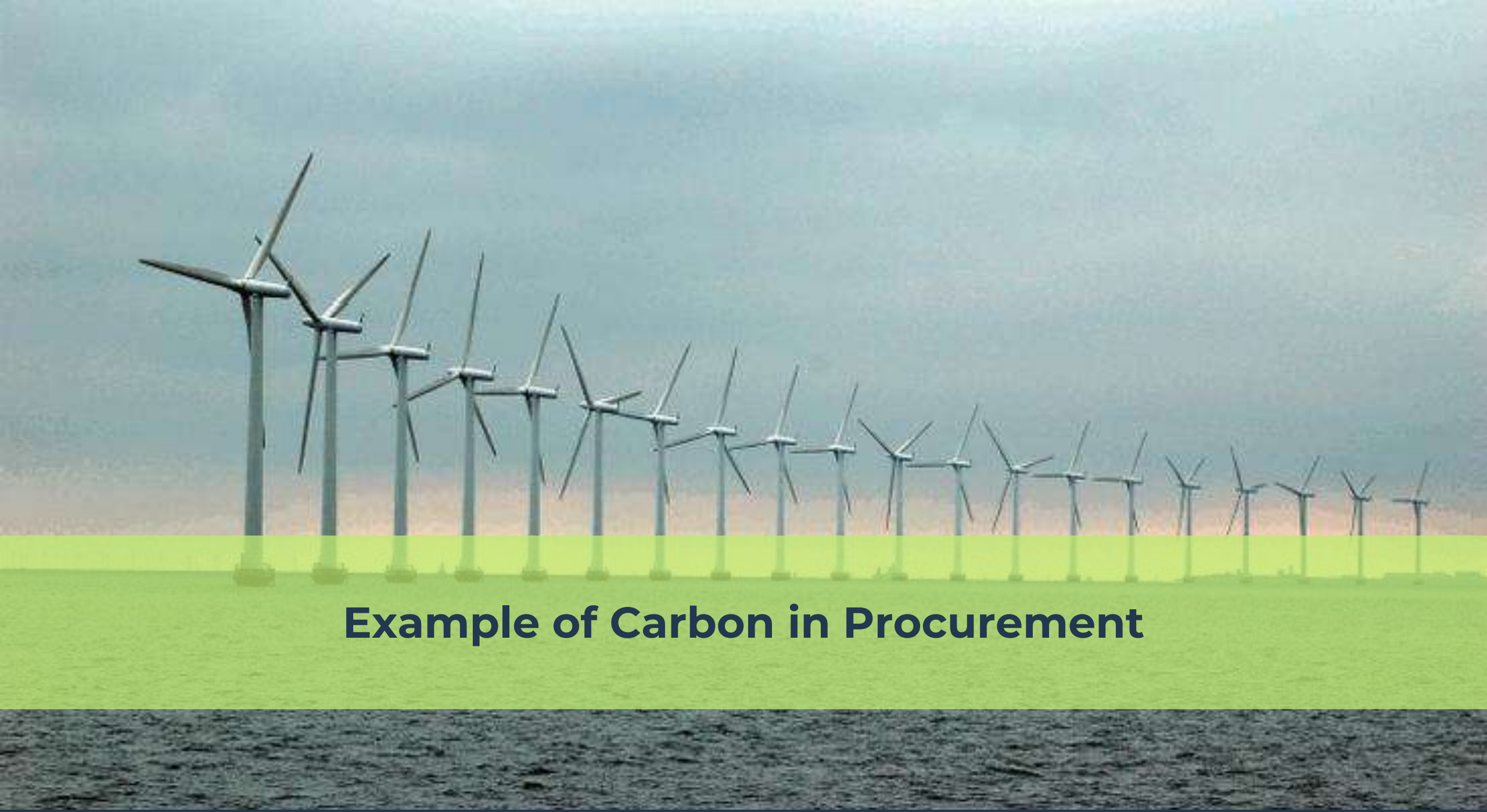
i. Using **efficient plant and equipment**, alternative fuel sources instead of diesel such as EV, battery powered plant, hybrid plant, etc.;
ii. **Optimised logistics** so you don't get excessive lorry movements and idling (also benefits reduced air quality emissions and reduced congestion on local roads);
iii. **Standards** such as FORS for driving and training included in that;
iv. **On-site management of materials** such that waste (and the inherent unnecessary embodied carbon) is minimised as much as possible;
v. **Reduced packaging** associated with the product or service, such as simply using less, using reusable packaging, and packaging that has recycled content
vi. **Lean construction** for more efficient processes

Tender Questions for Carbon: Example RFP

4. Describe how you will provide and/or operate a product/service that will have minimal carbon impact in its use/operation, with as long a lifetime as possible, and how you will you communicate this to us.

Expected response to contain issues such as :

i. **Recognised ecolabels** that cover carbon, e.g. Energy Star, EPEAT, EU Energy and Ecolabels, or Standards such as BREEAM (*these could be in tech specs*); or energy use scenarios;
ii. Explicit **explanation of how the use of any necessary consumables is reduced** and optimised;
iii. **Minimised operational energy use**, through eco-modes, optimised load and running, natural lighting, heating and passive ventilation techniques in buildings, and use of renewables;
iv. **Using energy-efficient products**, e.g. LED lights, low GWP HVAC etc, and that products have accessible controls to set temperature, on and off timing, motion sensors, etc
iv. The ability to **easily maintain the product/asset taking a circular economy approach** to maintenance, repair, refurbishment and upgrading to extend its lifetime as new and/ or improved technologies become available
v. Information on **how to train the user/ operator** with respect to carbon and energy efficiency
vi. How **measurement and reporting** will be undertaken



Example of Carbon in Procurement

Business Reality

National Grid

“One idea that’s really worked is the start of a 5% carbon weighting on our new construction projects.

We’re saying to our suppliers that if you can design a lower-carbon solution you stand a better chance of winning our business.”

National Grid Example

- New electricity substation at Wimbledon
- Smarter thinking on design and use of materials
- Calculated carbon savings of 20% across the asset's life, equivalent to about 39,000 tCO2
- Saved £3 million in costs compared with the original design

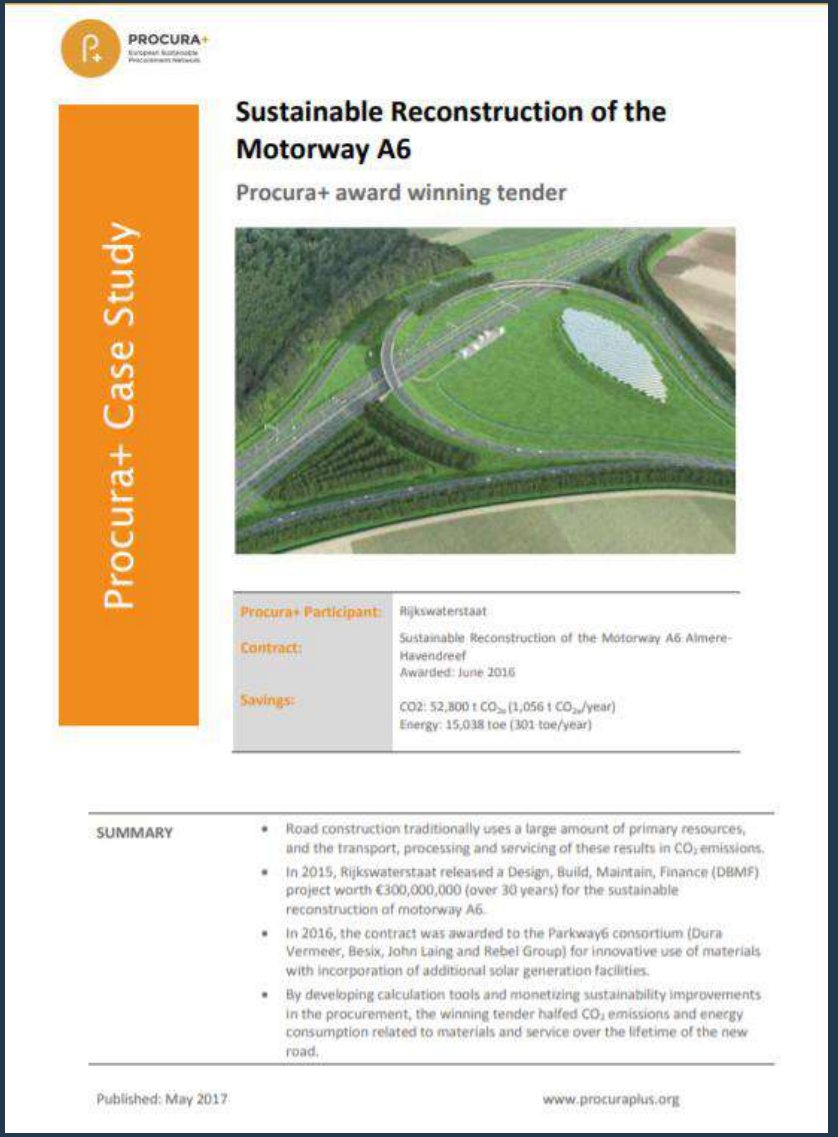
"By having clear data on carbon emissions, we can use energy and resources more efficiently. We've been able to prove the business case that lower carbon can equal lower cost"

Case Studies

Case Study 1
Construction

Public Procurement of Construction – Case Study

- Sustainable Reconstruction of the A6 Motorway, Netherlands
- Rijkswaterstaat released a Design, Build, Maintain, Finance (DBMF) project worth €300m (over 30 years) for the sustainable reconstruction of a stretch of the A6 motorway.
- Context: the Netherlands aims to achieve a 20% reduction in CO_2 emissions by 2020, compared to 1990 levels.
- What did the winning consortium do?
  - A design with innovative use of materials, halving CO_2 emissions and energy consumption over the lifetime of the new motorway
  - Incorporation of additional solar generation facilities
  - Development of calculation tools and monetisation of sustainability improvements
- **Award criteria: reduced CO_2 emissions, LCA on design options and Environmental Cost Indicator (ECI)**
- **Contact clauses: assessment of actual LCA and ECI during and after contract**
- **Outcome: saved 52,800 tCO_2e over 50 year lifetime through smarter transport and material use: more efficient and higher recycled content**



PROCURA+

Procura+ Case Study

Sustainable Reconstruction of the Motorway A6

Procura+ award winning tender

Procura+ Participant:	Rijkswaterstaat
Contract:	Sustainable Reconstruction of the Motorway A6 Almere-Havendreef Awarded: June 2016
Savings:	CO2: 52,800 t CO_{2e} (1,056 t CO_{2e}/year) Energy: 15,038 toe (301 toe/year)

SUMMARY

- Road construction traditionally uses a large amount of primary resources, and the transport, processing and servicing of these results in CO_2 emissions.
- In 2015, Rijkswaterstaat released a Design, Build, Maintain, Finance (DBMF) project worth €300,000,000 (over 30 years) for the sustainable reconstruction of motorway A6.
- In 2016, the contract was awarded to the Parkway6 consortium (Dura Vermeer, Besix, John Laing and Rebel Group) for innovative use of materials with incorporation of additional solar generation facilities.
- By developing calculation tools and monetizing sustainability improvements in the procurement, the winning tender halfed CO_2 emissions and energy consumption related to materials and service over the lifetime of the new road.

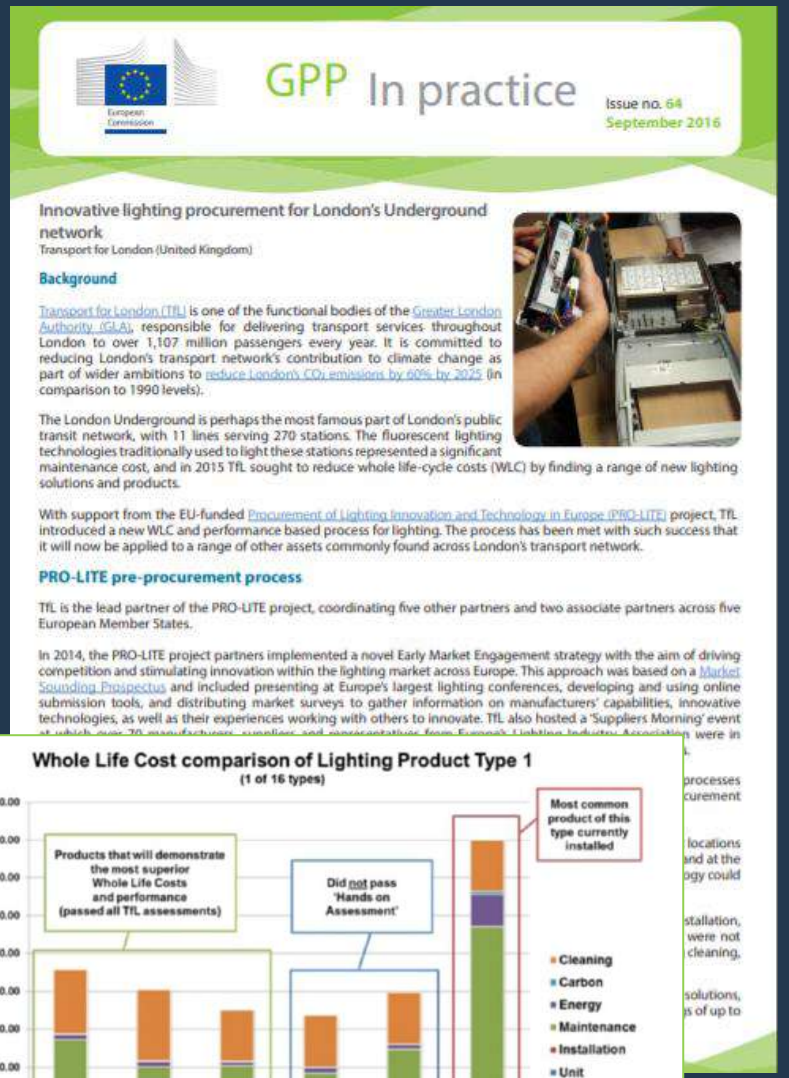
Published: May 2017

www.procuraplus.org

Case Study 2
Lighting

Public Procurement of Lighting – Case Study

- Procurement of lighting by TfL for the Underground
- Aim to reduce WLC of lighting across the network to support target of reducing GHG emissions by 60% by 2025 vs 1990
- Extensive pre-tender early market engagement used to drive competition and innovation and develop perf-based tech specs
  - Presenting at conferences and meet-the-buyer events
  - Gathering market intel from surveys on innovation and capabilities
- Allowed for costs beyond unit price: installation, maintenance, cleaning, running costs and carbon
- After the Pre-qual, Tech Spec ITT: min' lifetime in hours and lumen output, designed for EE, modular for easy repair and recycling, safe & suitable for visually & sensory impaired, and enable the effective performance of all necessary tasks by both passengers and staff;
- "Hands on" test for Award: durability, ease of repair and cleaning
- **Contract clauses: manufacturers incentivised to keep innovating their products that will continue to reduce TfL's WLC and env'l impact**
- **Outcome: biggest savings were from reduced maintenance (replacement) costs, and energy use - up to 50% over life cycle.**



GPP In practice

Issue no. 64
September 2016

Innovative lighting procurement for London's Underground network

Transport for London (United Kingdom)

Background

Transport for London (TfL) is one of the functional bodies of the Greater London Authority (GLA), responsible for delivering transport services throughout London to over 1,107 million passengers every year. It is committed to reducing London's transport network's contribution to climate change as part of wider ambitions to reduce London's CO_2 emissions by 60% by 2025 (in comparison to 1990 levels).

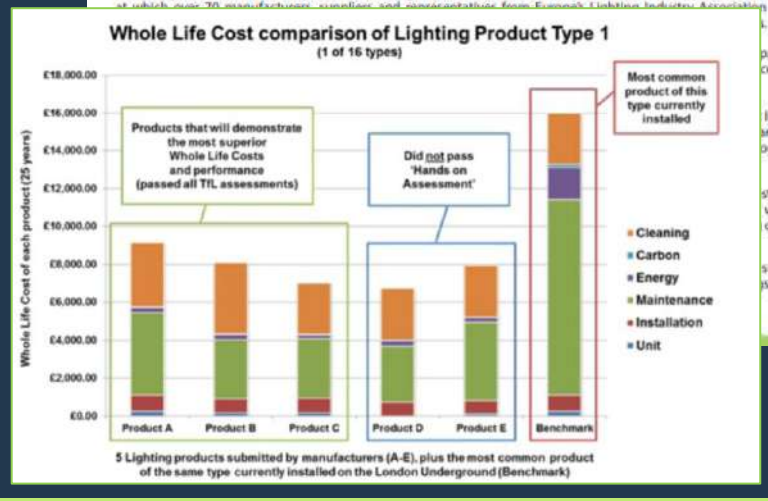
The London Underground is perhaps the most famous part of London's public transit network, with 11 lines serving 270 stations. The fluorescent lighting technologies traditionally used to light these stations represented a significant maintenance cost, and in 2015 TfL sought to reduce whole life-cycle costs (WLC) by finding a range of new lighting solutions and products.

With support from the EU-funded Procurement of Lighting Innovation and Technology in Europe (PRO-LITE) project, TfL introduced a new WLC and performance based process for lighting. The process has been met with such success that it will now be applied to a range of other assets commonly found across London's transport network.

PRO-LITE pre-procurement process

TfL is the lead partner of the PRO-LITE project, coordinating five other partners and two associate partners across five European Member States.

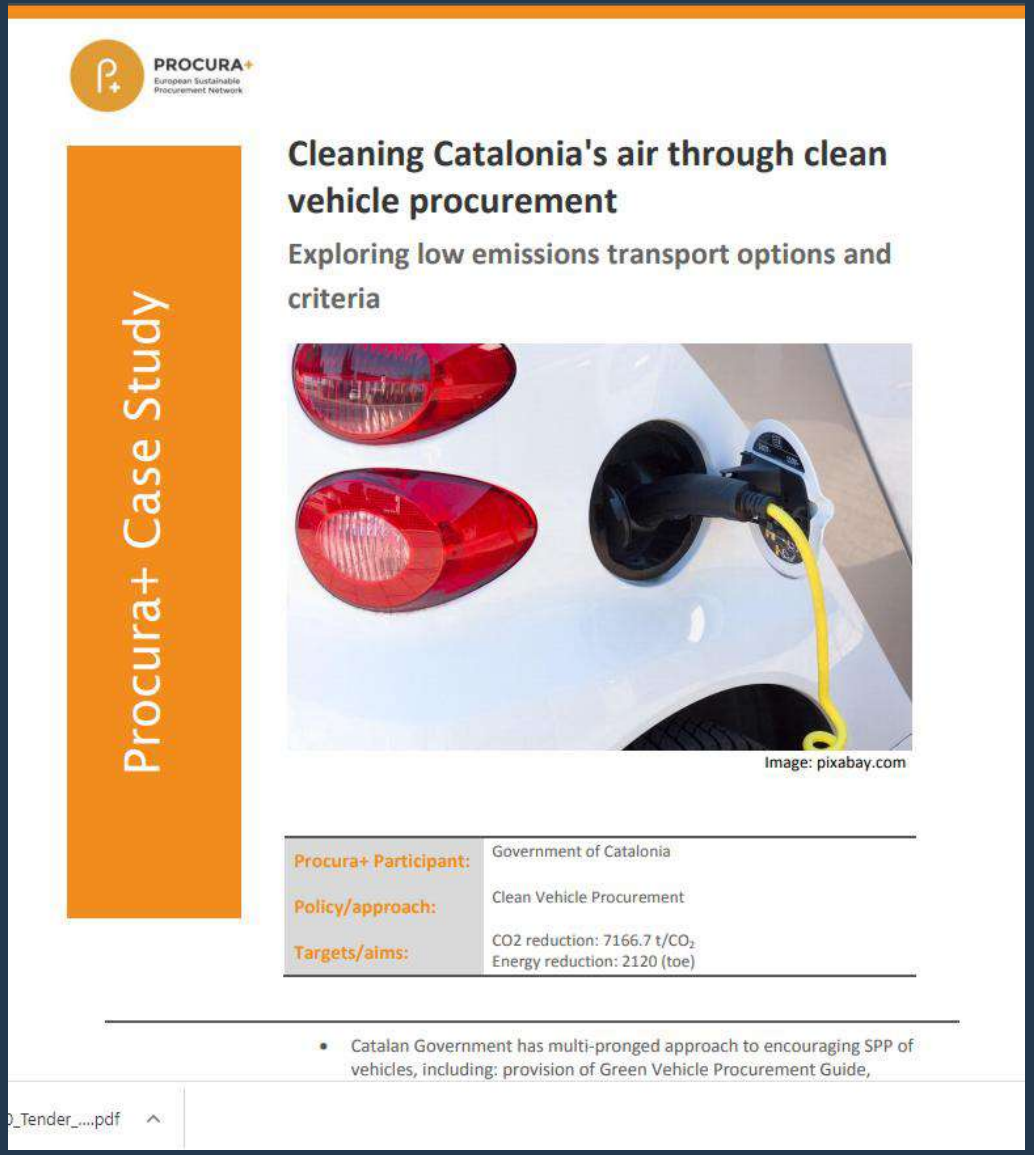
In 2014, the PRO-LITE project partners implemented a novel Early Market Engagement strategy with the aim of driving competition and stimulating innovation within the lighting market across Europe. This approach was based on a Market Sounding Prospectus and included presenting at Europe's largest lighting conferences, developing and using online submission tools, and distributing market surveys to gather information on manufacturers' capabilities, innovative technologies, as well as their experiences working with others to innovate. TfL also hosted a 'Suppliers Morning' event



Case Study 3
Vehicles

Public Procurement of Vehicles – Case Study

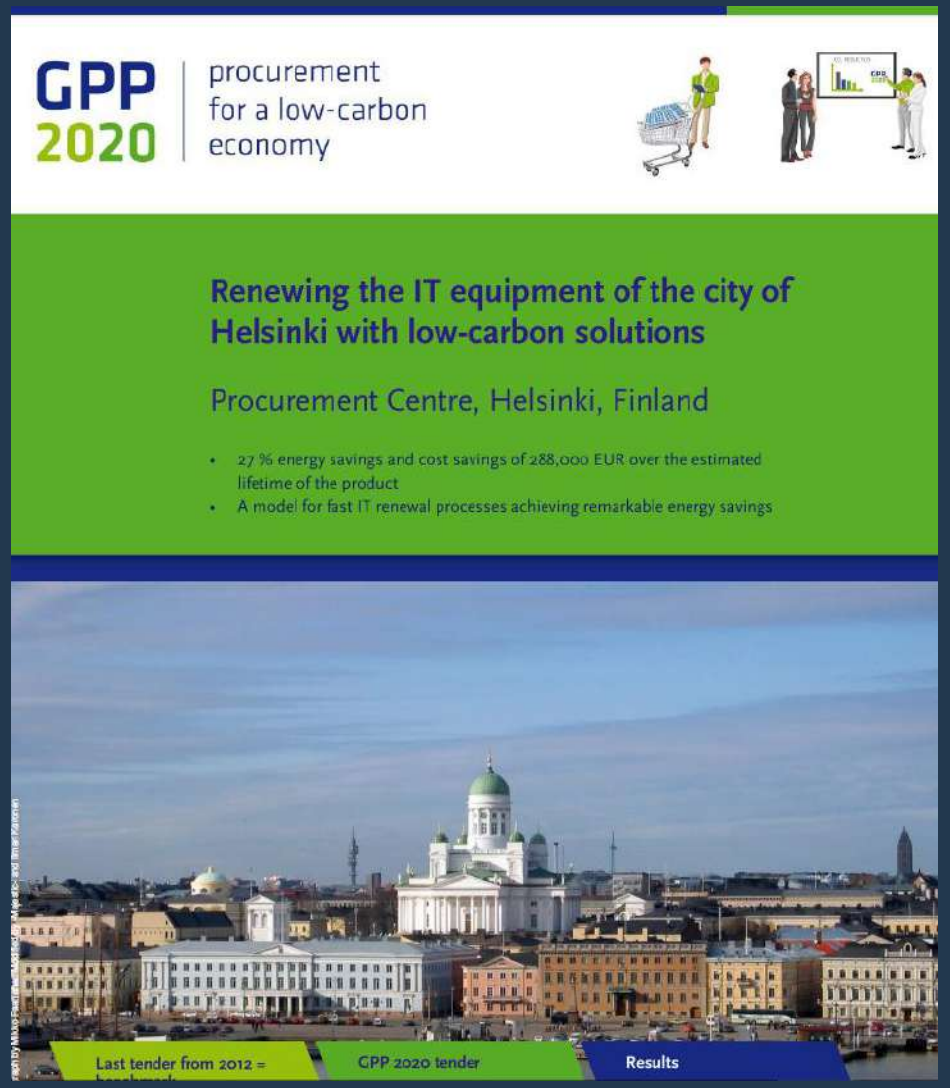
- Procurement of vehicles in Catalonia for emergency services(medical, police and fire) and non-emergency ‘estates’ vehicles
- Explicit link between carbon / GHG emissions and reduced air quality pollutants – NO_2 & PM_{10}
- Aligned to policies for pedestrianisation, lower speed limits, encouraging walking and cycling
- **Use of a guide and ecolabels to identify low GHG & low AQ vehicles**
- **Tech specs:**
  - **EURO Standards, g CO_2/km, prioritisation of zero and low C power trains (electric, hybrid, hydrogen and LPG)**
- **Headline savings over the lifetime of the products compared to baseline**
  - **7167 tCO_2e avoided**



Case Study 4
Computers

Public Procurement of Computers – Case Study

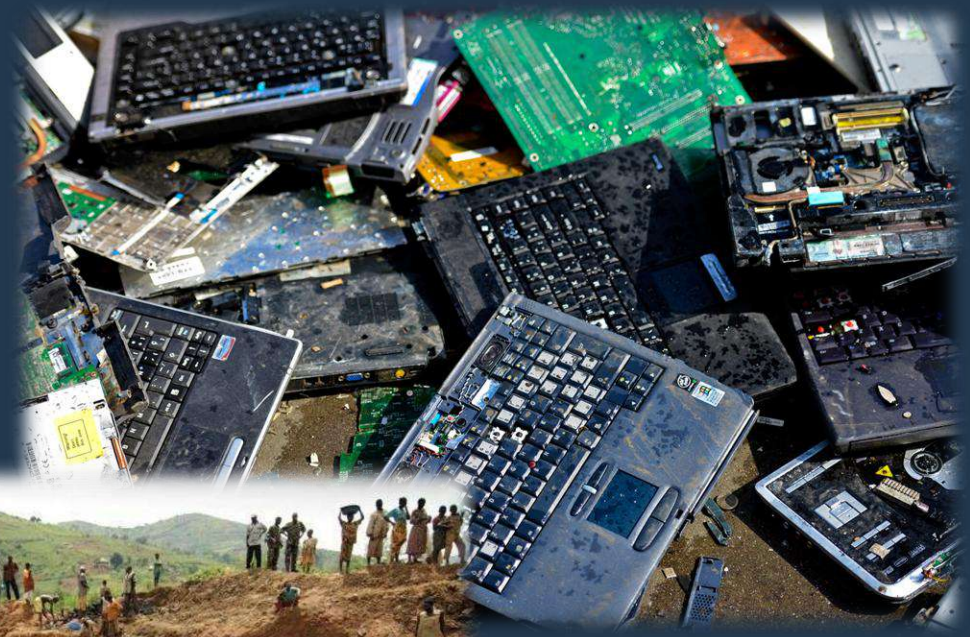
- Estimated that 7,000 PCs, 2,000 monitors and 2,000 laptops are purchased each year in Helsinki Govt
- Tech specs:
  - Comply with WEEE and RoHS, Energy Star Performance
  - Lifetime >1 year
- Award criteria:
  - 3 year onsite warranty;
  - Improved power usage (lower) vs Energy Star;
  - Recycling process and guidance
- Contract clauses to work on better environmental outcomes
- Headline savings over the lifetime of the products (CV = €50 million) compared to 2012 baseline
  - 27% less energy used and 693 tCO_2e avoided
  - €288,000 saved

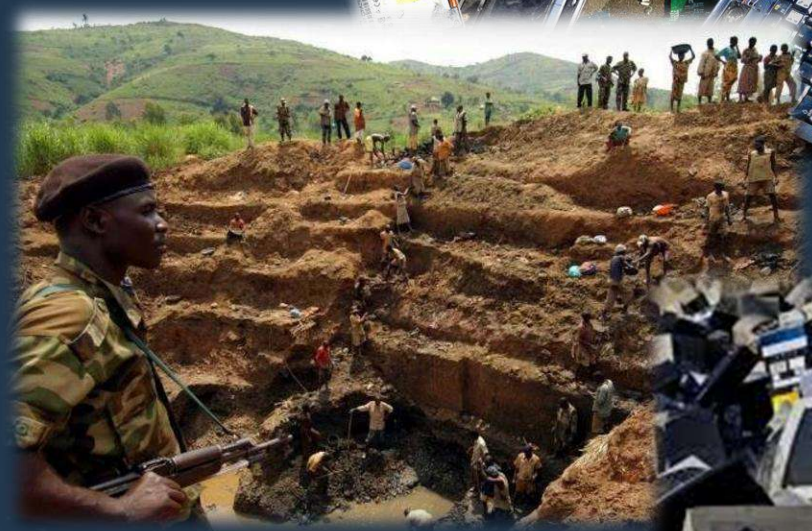


https://sustainable-procurement.org/case-studies/

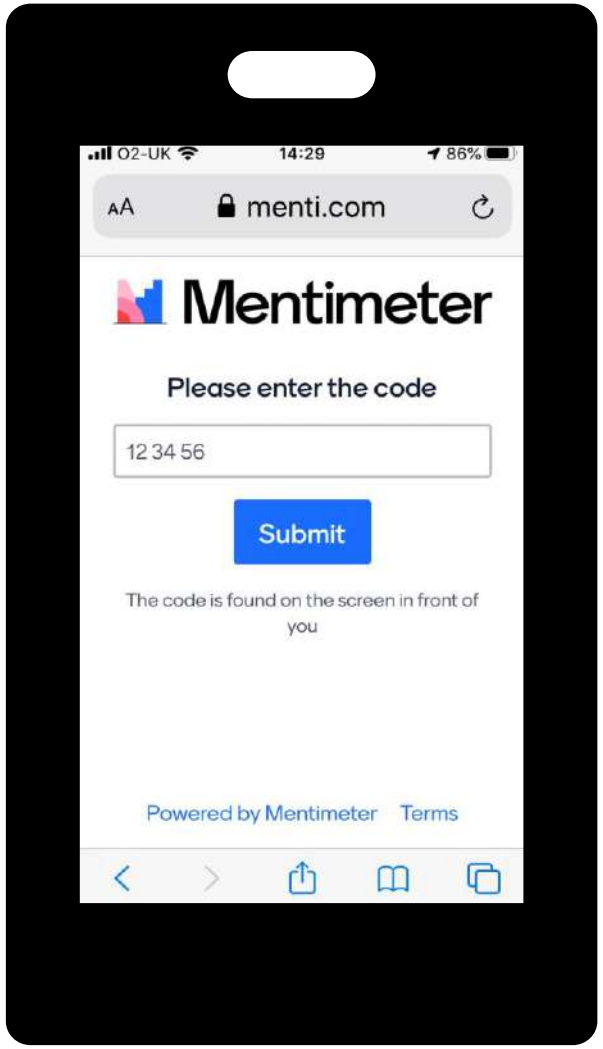
WAIT! There are other impacts!

- But don’t ignore other impacts:
  - Ethical labour standards, modern slavery, rare earth and conflict metals, haz. chemicals, water, air quality
- Production of lots of wastes
  - solid and liquid wastes, as well as emissions to air
- Moreover, EoL disposal often prevents the reuse and recycling of high value components like semi-conductors.
- Use circular economy thinking!





Mentimeter



Open Mentimeter

1. Go to www.menti.com in a new browser or tab on your phone or computer, *ideally Chrome or Firefox rather than Edge,* or download the app.
2. Enter the Menti code
3. Don’t disconnect from the webinar, you will still need to hear us
4. **What amendments could be made to your procurement process to drive carbon reductions within the supply chain?**

Sustainable Procurement Resources

Resources Guidance – Free Carbon Data and Tools

- **Defra/BEIS 2022 Greenhouse gas reporting conversion factors :** the UK Government's database of carbon factors for fuel, energy, transport, and materials, updated annually. https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022
- **Bath Inventory of Carbon and Energy (ICE)** database: a well-established database of embodied carbon factors for a variety of materials, updated periodically. http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html
- **Supply Chain School Carbon Calculator:** a free tool from the School to measure scope 1, 2 and 3 emissions in your supply chain. https://carbon.sustainabilitytool.com/
- **The Embodied Carbon in Construction Calculator (EC3) Tool:** a database of EPDs for construction products https://buildingtransparency.org/ec3
- **Carbon Trust Carbon Calculator** for SMEs: The Carbon Footprint Calculator has been designed to help UK based SMEs measure their corporate emission footprint following GHG Protocol Guidance, including direct emissions from fuel and processes (Scope 1 emissions) and those emissions from purchased electricity (or Scope 2 emissions) for the assets they operate https://www.carbontrust.com/resources/tools/carbon-footprint-calculator
- **Highways England Carbon Tool:** a free-to-download Excel tool to calculate carbon emissions for operational, construction and maintenance activities undertaken on behalf of Highways England that draws on Defra and Bath ICE datasets www.gov.uk/government/publications/carbon-tool
- **The RSSB Rail Carbon Tool** is a web-based tool that allows you to calculate, assess, analyse, report and reduce your rail project carbon footprint by evaluating low-carbon options using verified, centrally-available carbon factor data that draws on Defra and Bath ICE datasets https://www.railindustrycarbon.com/
- **Environment Agency Carbon Calculator:** a free-to-download tool to calculate the carbon impact of different material and transport options in your project www.ice.org.uk/knowledge-and-resources/best-practice/environment-agency-carbon-calculator-tool
- **Hawkins\Brown: Emission Reduction Tool \.** An open source Revit-based tool that enables design teams to quickly analyse and clearly visualise the embodied carbon emissions of different building components and construction material options at any time during the design process. https://www.hawkinsbrown.com/services/hbert

That's the end of training for now...

But your carbon reduction journey is just beginning!

Thank you

Hattie Webb

Consultant, Action Sustainability

www.supplychainschool.co.uk | @SupplyCSSchool

www.actionsustainability | @action_sustain