Beyond the Baseline

Using Data to Drive Measurable Carbon Reduction

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Introduction to P2zero ®

About Us

- Award-winning sustainability consultancy based in the UK but operating worldwide
- 100% shareholder-owned
- Members of the UK Government Digital Sustainability Alliance (GDSA) and Tech Zero
- Fully independent - no income from product sales or rebates

Customers & Projects

- Our projects have analysed the carbon footprint of over 750,000 individual IT devices in 162 countries
- Multi-year projects and managed services for many customers
- Services range from specialist digital sustainability reports to full organisation carbon footprint analysis (e.g. energy use, waste, commuting, business travel & supply chain)
- We provide a carbon footprint report and data quality statement for every project undertaken

Logos include customers where work was undertaken though partners

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Part 1:
Background &
“Green IT” Issues

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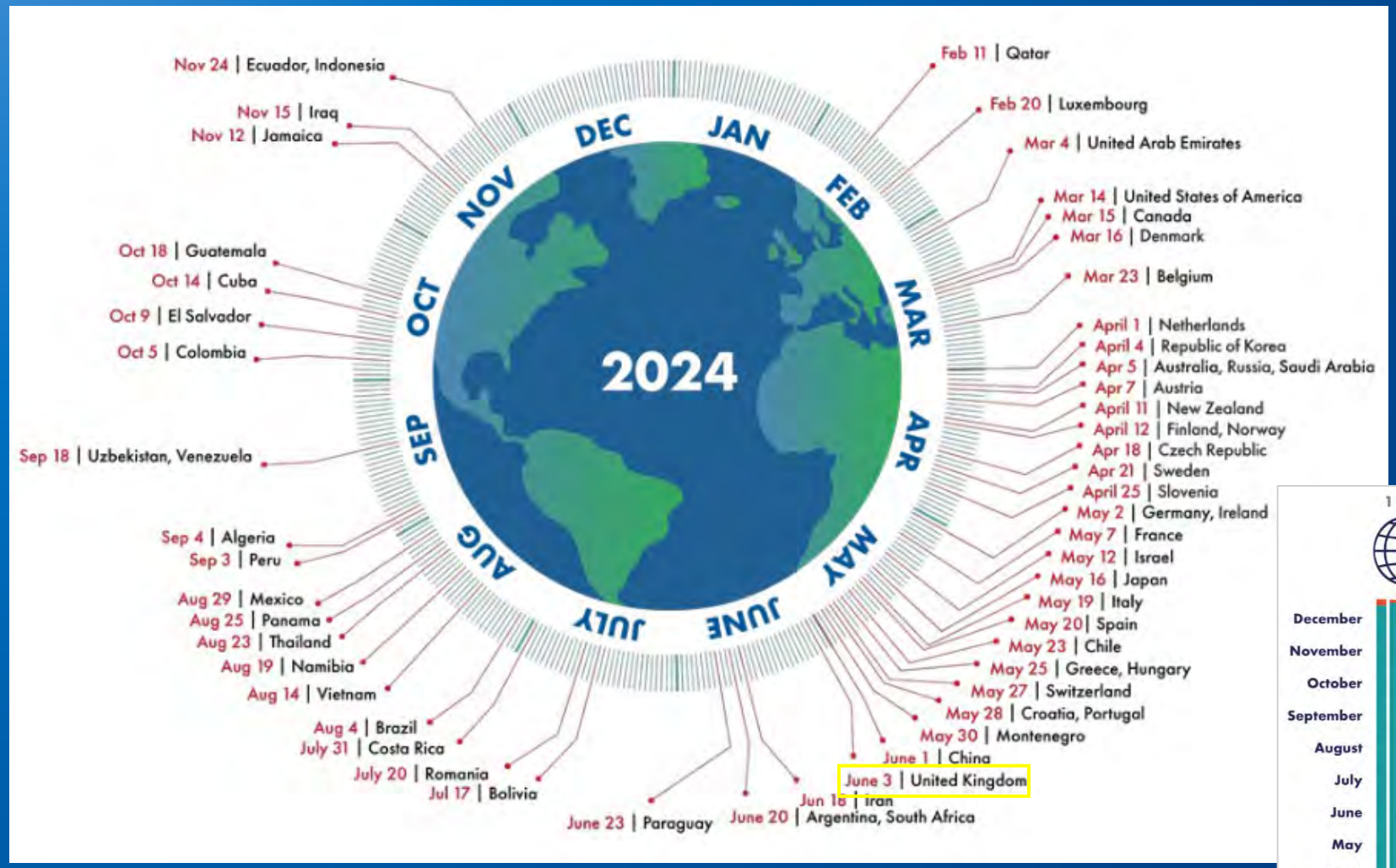
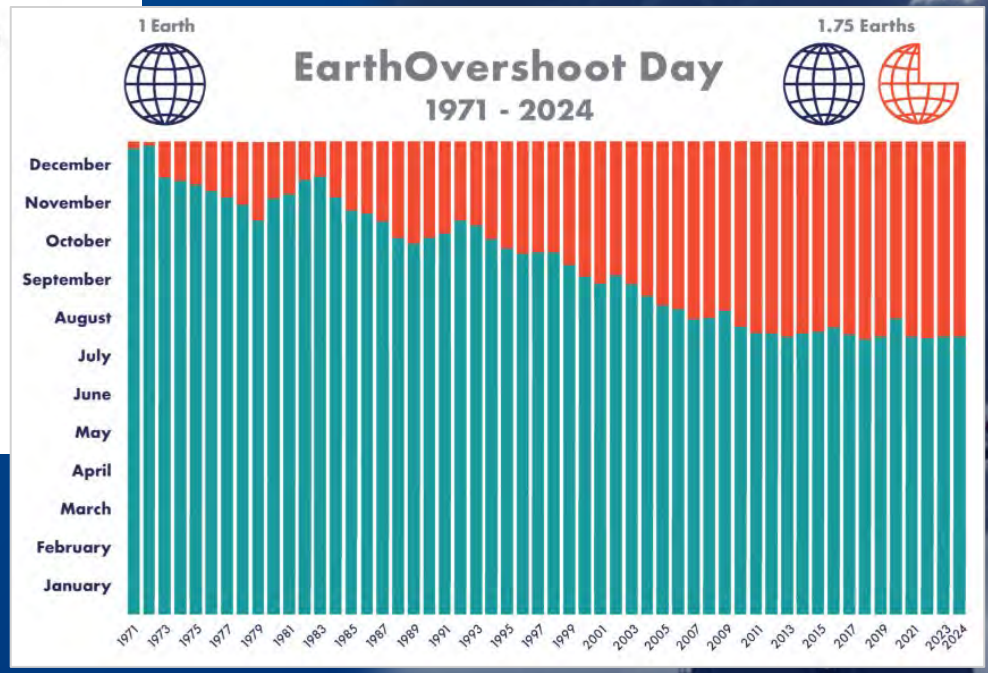
Earth Overshoot Day 2024

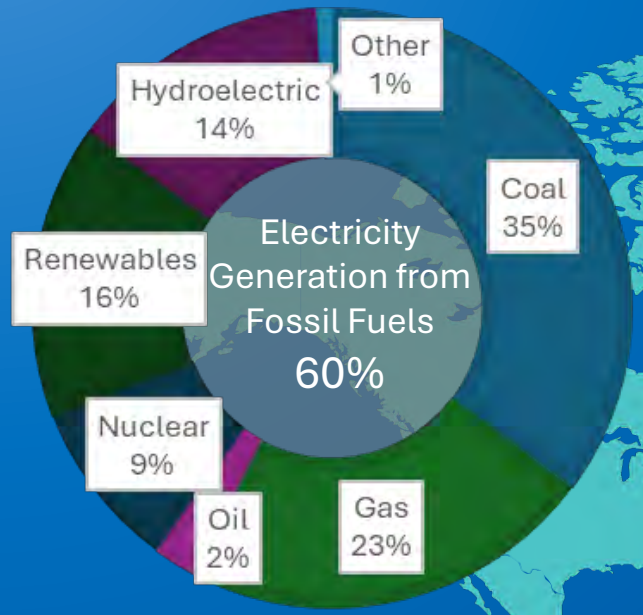


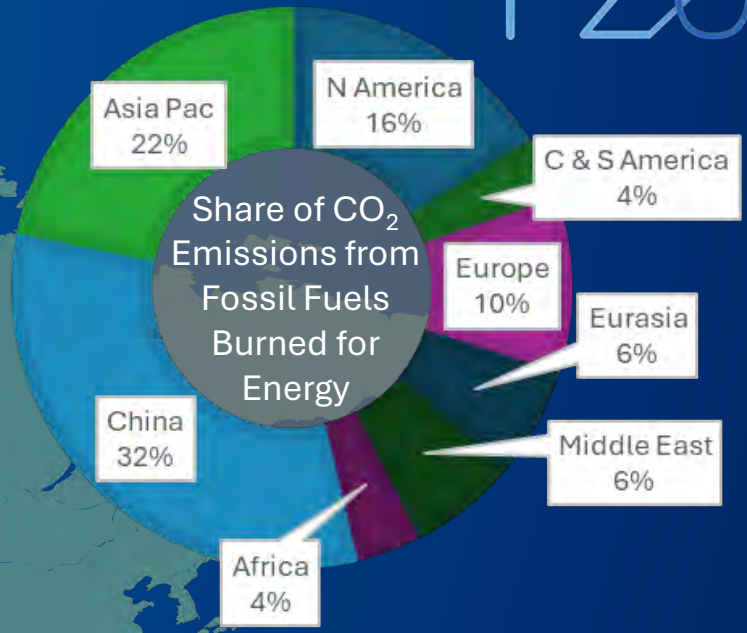


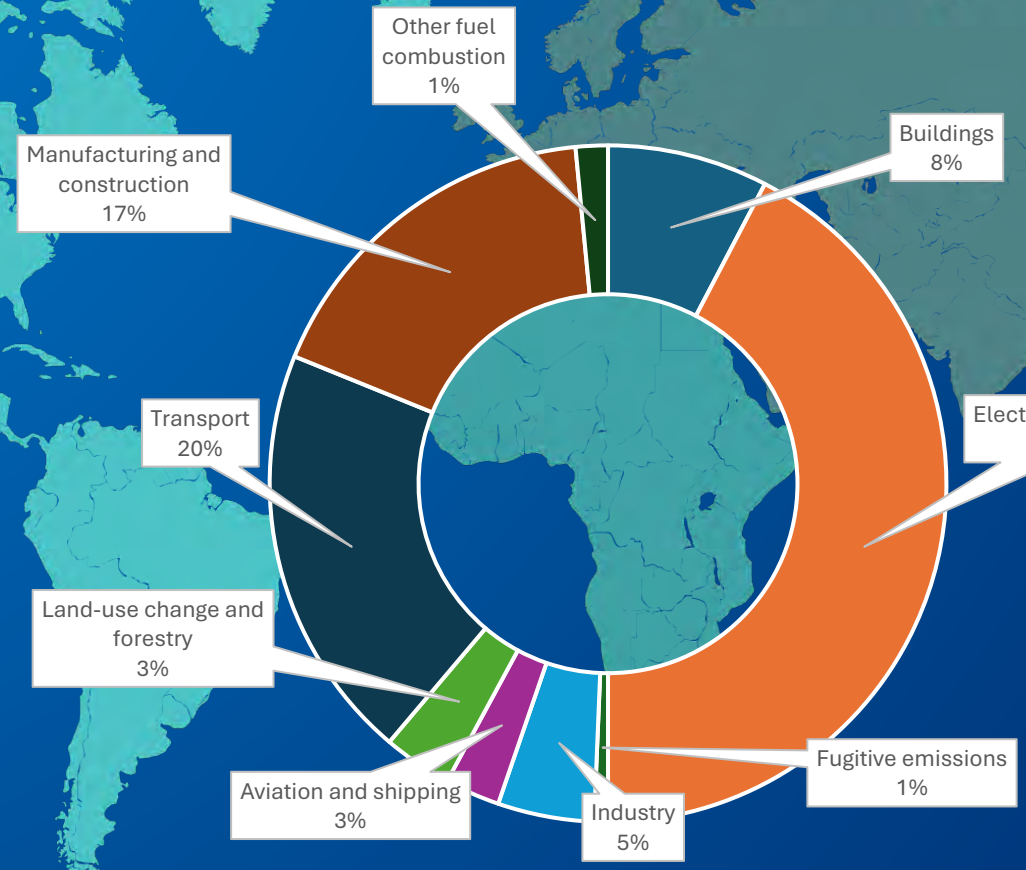
August 1st

https://overshoot.footprintnetwork.org/

Emissions, Worldwide Energy Mix & Consumption

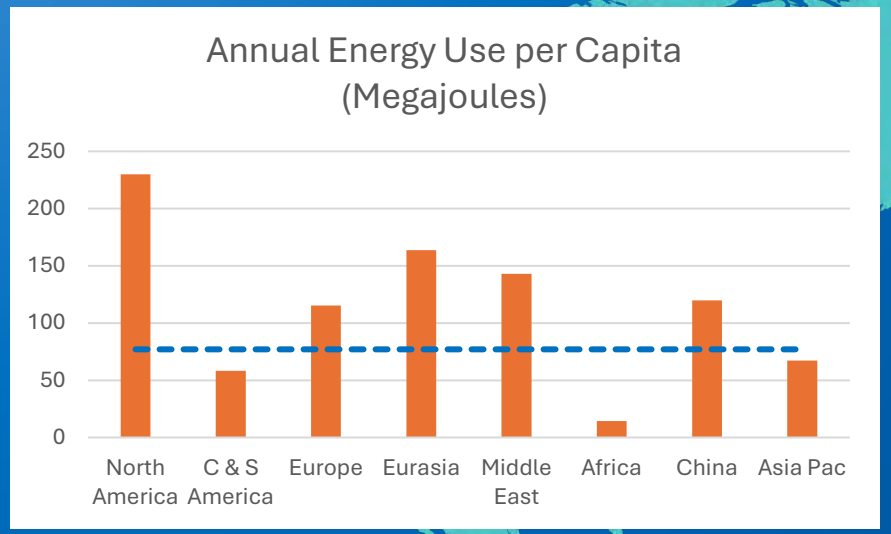


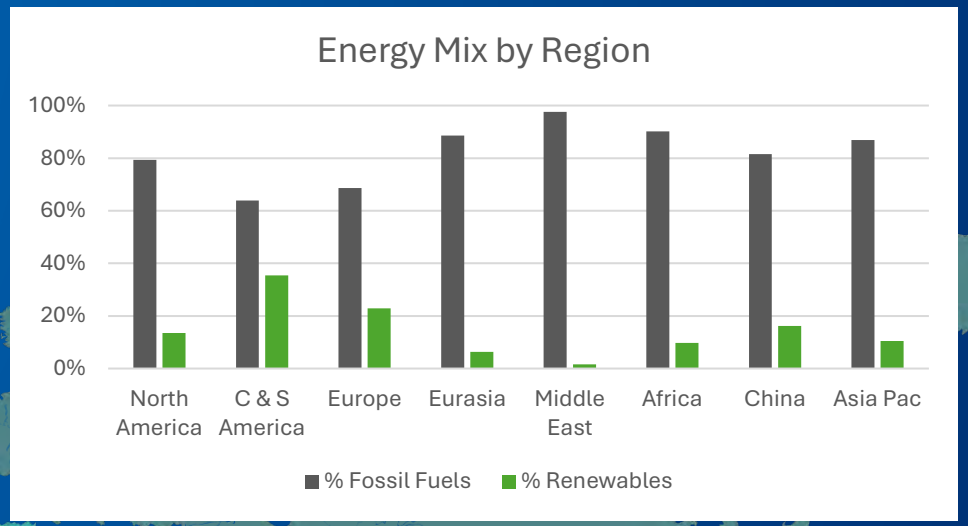


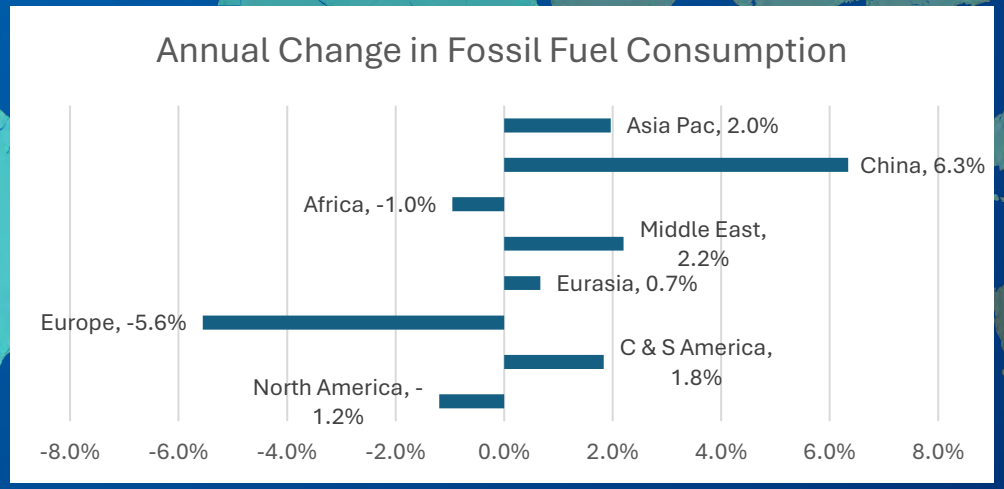


Source: 2024 Statistical Review of World Energy: https://www.energyinst.org/statistical-review

Emissions, Worldwide Energy Mix & Consumption







Global Changes
(2022 vs 2023)
Total Energy Use +2.0%
Per Capita Energy +1.1%
Fossil Fuel Use +1.5%
Coal Production +1.6%

Global coal production reached its highest ever level in 2023

Source: 2024 Statistical Review of World Energy:
https://www.energyinst.org/statistical-review

Our Fossil Fuel Consumption

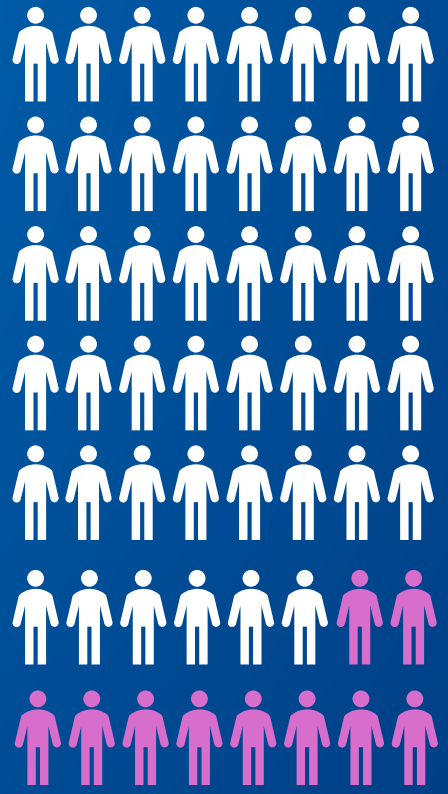
Based on Nate Hagens' "Beyond the Superorganism"[1]

World Population = 8.1 Bn People

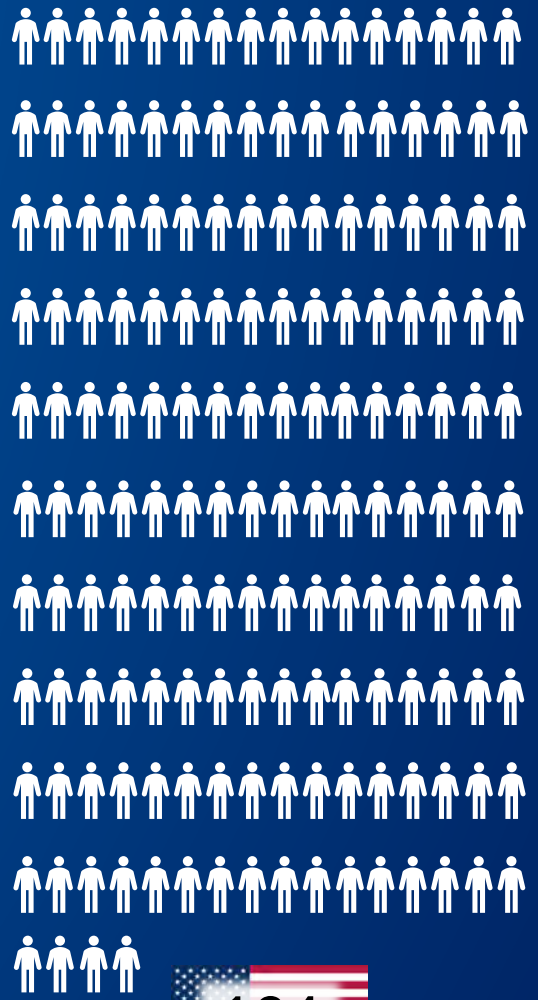
On average we each consumed 10.26 Barrels of Oil Equivalent (BOE) of coal, oil and gas last year [2]

Every BOE = 4.5 Years of Human Effort [3]

Worldwide average of 46 Fossil Fuel "Helpers" Per Person [4]



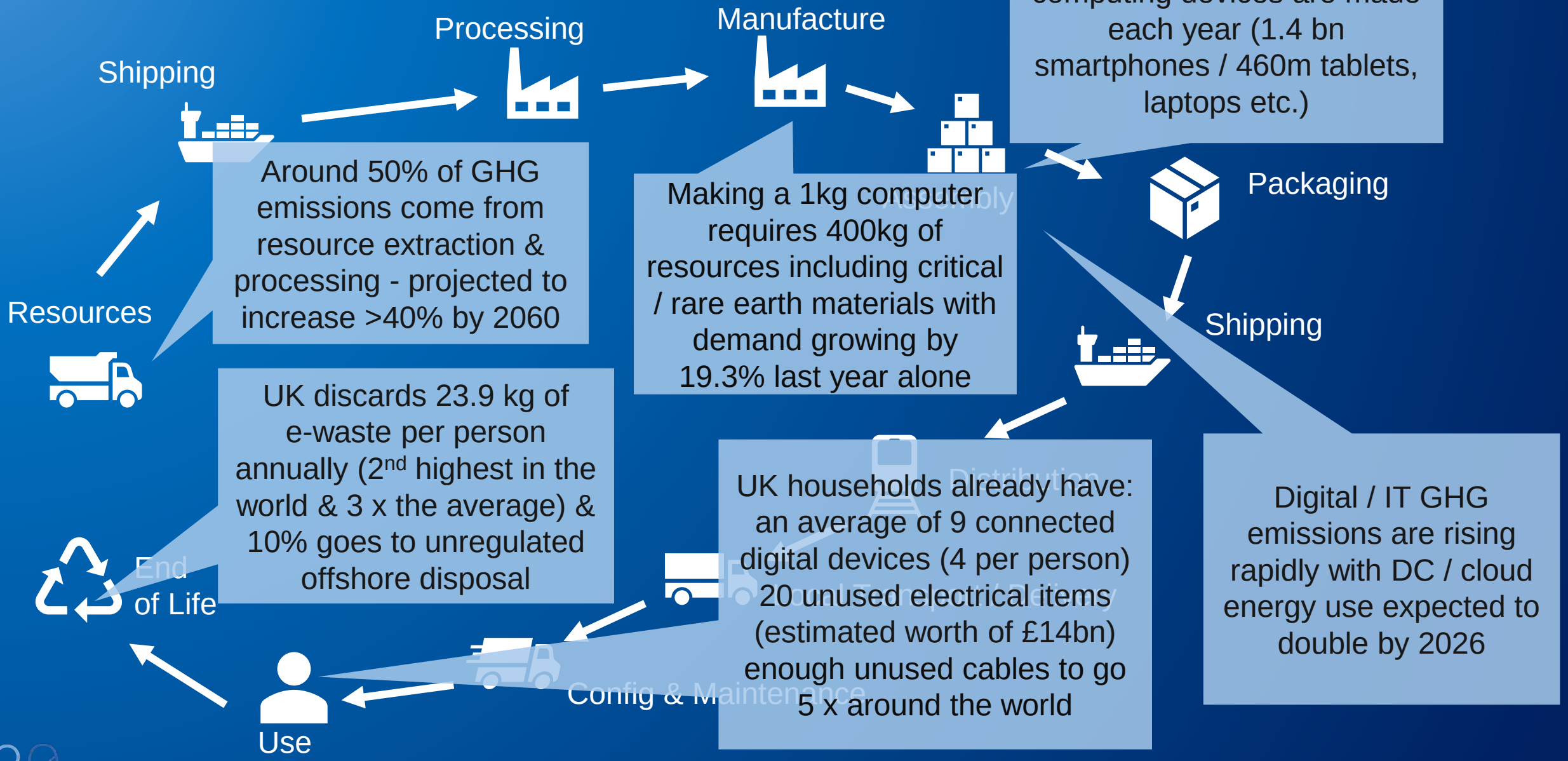
USA = equivalent to a worldwide population of >1.3 Tn People



[1] https://www.sciencedirect.com/science/article/pii/S0921800919310067
[2] 2023 worldwide fossil fuel consumption was a record >140k terawatt-hours
[3] Based BOE @ 1,699 kWh & effective human output (with rest) of 1.04 kWh per day
[4] 10.26 (barrels) x 1,699 (kWh equivalent) / 1.04 (kWh output) x 365 (days)

Remaining Reserves - Gas: 49 Years, Oil: 56 Years, Coal: 139 Years
Consumption of fossil reserves is 10M x faster than replacement

Digital Sustainability Impacts



1.9 billion new personal computing devices are made each year (1.4 bn smartphones / 460m tablets, laptops etc.)

Around 50% of GHG emissions come from resource extraction & processing - projected to increase >40% by 2060

Making a 1kg computer requires 400kg of resources including critical / rare earth materials with demand growing by 19.3% last year alone

UK discards 23.9 kg of e-waste per person annually (2nd highest in the world & 3 x the average) & 10% goes to unregulated offshore disposal

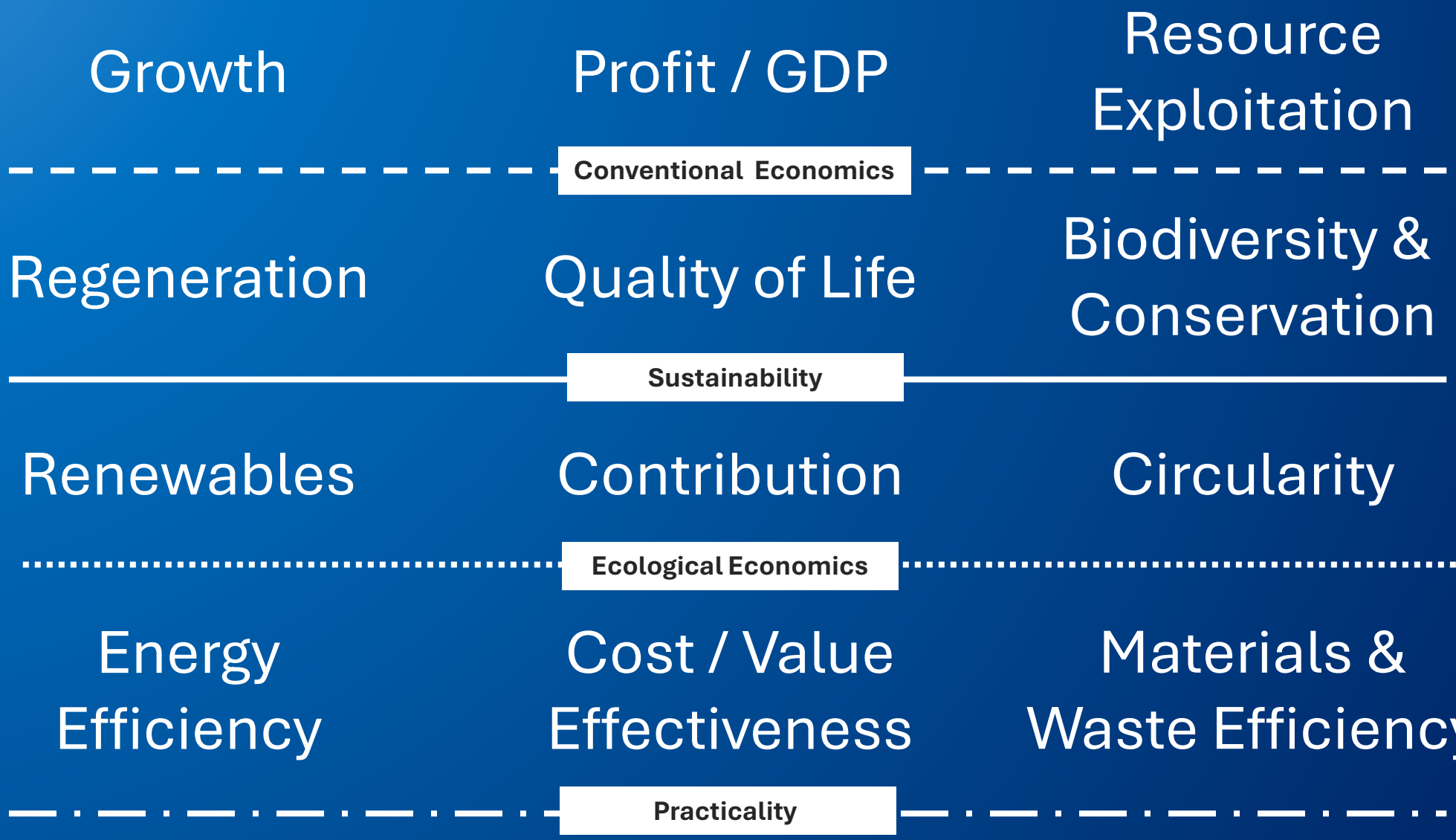
UK households already have: an average of 9 connected digital devices (4 per person) 20 unused electrical items (estimated worth of £14bn) enough unused cables to go 5 x around the world

Digital / IT GHG emissions are rising rapidly with DC / cloud energy use expected to double by 2026

Figures from UN Trade and Development (2024) & the UK House of Commons Environmental Audit Committee “Electronic waste and the Circular Economy” (2020)

The Sustainability Bottom Line

Changing the Mindset to Recognise “Externality” & Practicality



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Part 2:

Carbon Footprint Reporting
& Dashboards

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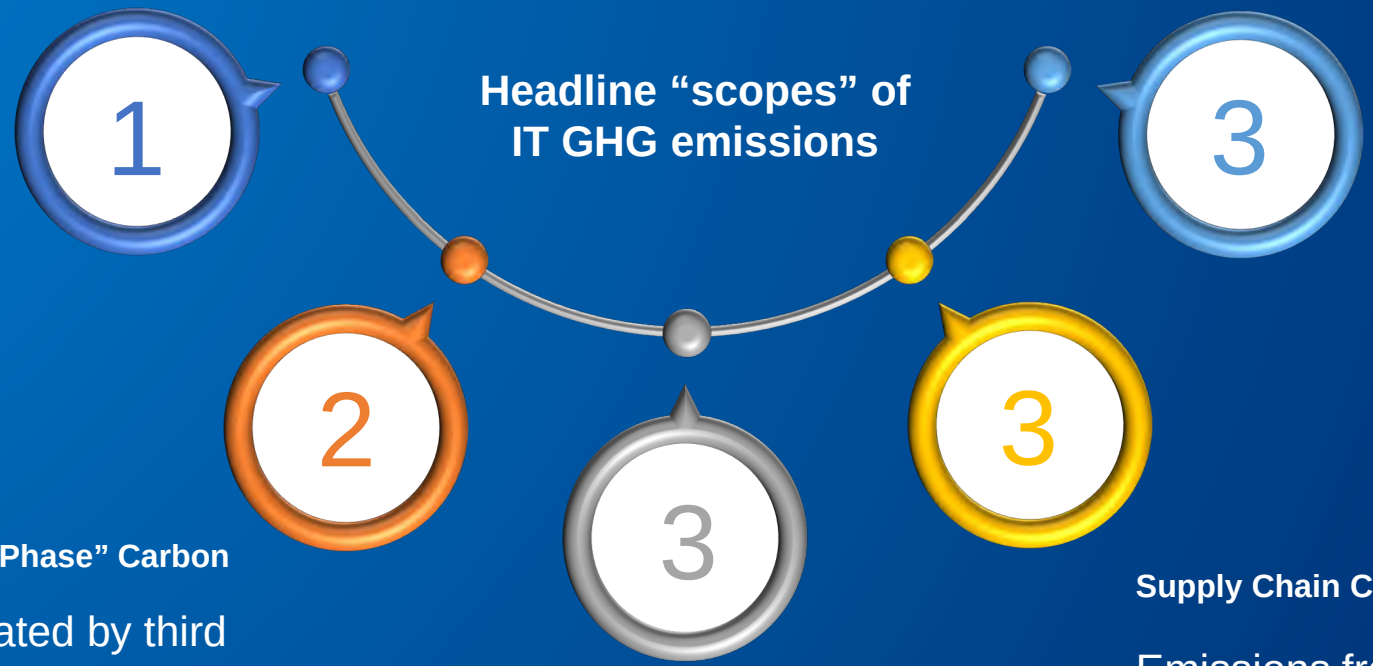
Carbon Footprint Reporting

- Included in ESG metrics, social value & net zero commitments
- “Net zero” means at least 90% emissions reduction (SBTi definition)
- Huge variation in the actual commitment depending on:
  - baseline year and target date
  - which scopes are included
- Many organisations currently only report and set targets on scopes 1 & 2..
- But most emissions (for most organisations) are actually in **scope 3**
- Wider sustainability considerations also include:
  - Resource use
  - Waste
  - People
  - Circular economy

IT Carbon Footprint Reporting: the Relevant “Scopes”

Fugitive Gases & Owned Vehicles

Emissions from fluids used in cooling data centres and from fuel consumption by vehicles (owned / controlled by the organisation)



Headline “scopes” of IT GHG emissions

IT Operations

Indirect emissions from IT operations including waste and employee travel / commute

“Use Phase” Carbon

Emissions created by third parties producing “grid” energy used by devices when in use, standby and switched off

Embodied Carbon

Emissions from resources, energy & waste in manufacturing and production packaging and transportation to country of use and “end of life” treatments

Supply Chain Carbon

Emissions from supply chain services including delivery, management, maintenance, transport, support etc.

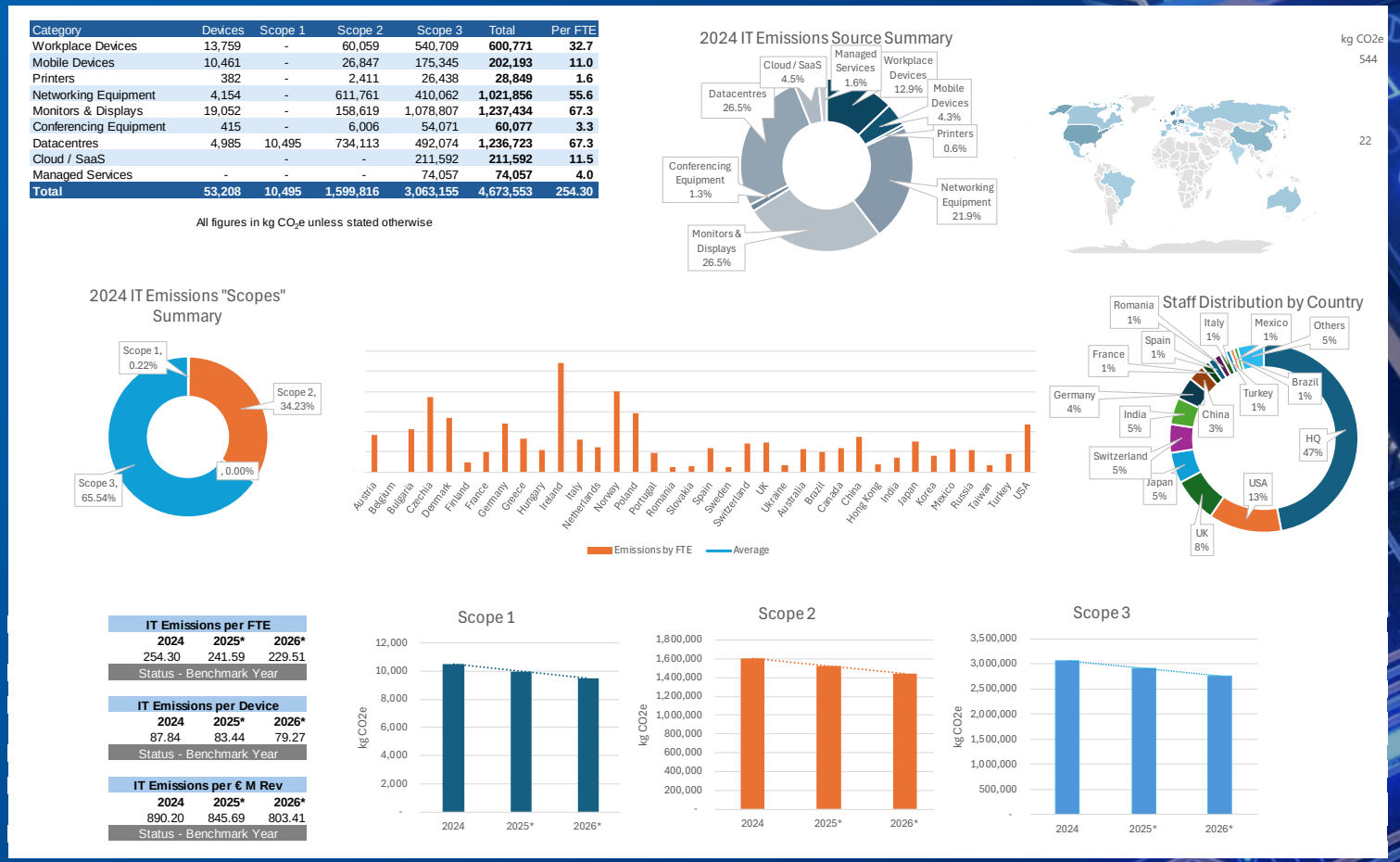
Carbon Footprint Baseline: Metrics & Dashboards

Standard data tables and visualisations:

- Workspace & Mobile Devices, Displays, Printers, DCs, Networking, Cloud & Managed Service
- Scope 1, 2 & 3 emissions by device type & location
- KPIs and trends including emissions per FTE / £ Revenue
- Hotspots & impact tracking for action areas

Optional:

- Customised model for carbon reduction scenarios
- Device model detail & comparison
- Role / profile-based calculations
- Sector & best practice benchmarking



Category	Devices	Scope 1	Scope 2	Scope 3	Total	Per FTE
Workplace Devices	13,759	-	60,059	540,709	**600,771**	**32.7**
Mobile Devices	10,461	-	26,847	175,345	**202,193**	**11.0**
Printers	382	-	2,411	26,438	**28,849**	**1.6**
Networking Equipment	4,154	-	611,761	410,062	**1,021,856**	**55.6**
Monitors & Displays	19,052	-	158,619	1,078,807	**1,237,434**	**67.3**
Conferencing Equipment	415	-	6,006	54,071	**60,077**	**3.3**
Datacentres	4,985	10,495	734,113	492,074	**1,236,723**	**67.3**
Cloud / SaaS		-	-	211,592	**211,592**	**11.5**
Managed Services	-	-	-	74,057	**74,057**	**4.0**
Total	**53,208**	**10,495**	**1,599,816**	**3,063,155**	**4,673,553**	**254.30**

All figures in kg CO_2e unless stated otherwise

IT Emissions per FTE		
2024	**2025***	**2026***
254.30	241.59	229.51
Status - Benchmark Year		

IT Emissions per Device		
2024	**2025***	**2026***
87.84	83.44	79.27
Status - Benchmark Year		

IT Emissions per € M Rev		
2024	**2025***	**2026***
890.20	845.69	803.41
Status - Benchmark Year		

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Part 3:
Challenges
& Obstacles

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Barriers to Reporting & Action

Operational Challenges

- Where do you start?
- Determining what should be measured, how often & how it will be accessed / used
- Getting the time and resources needed for gathering the required data and setting KPIs
- Minimising additional complexity, cost & operational overheads

Data Challenges

- Ensuring your data is accessible, accurate, comprehensive & up to date
- Identifying additional contextual information to make the data “actionable”
- Understanding the data from hardware, software and service providers
- Getting meaningful information from cloud providers

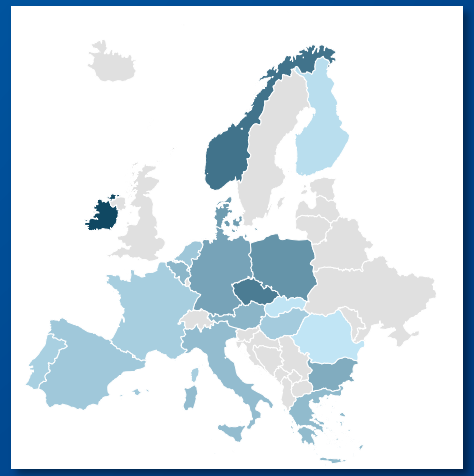
Country Report - all emissions figures are kg CO_2e

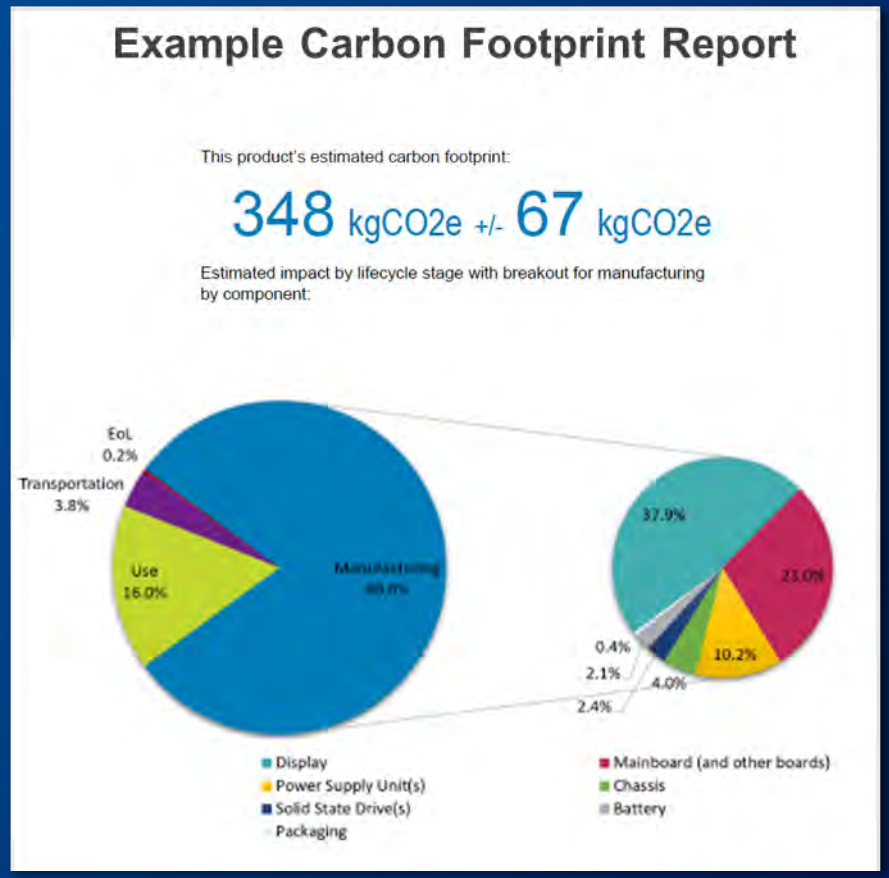
Location: Germany

IT Estate	Devices	Estate Scope 2 (Annual Emissions)	Estate Scope 3 (Annual Emissions)	Estate Annualised Emissions
⊞Display	2,274	38,441	129,429	167,870
⊞Mobile Device	2,546	10,007	52,302	62,310
⊞Networking	424	132,844	45,356	178,200
⊞Printer	21	339	1,489	1,828
⊞Workplace	2,412	15,837	96,569	112,406
Grand Total	7,677	197,468	325,145	522,614

Data Assessment

Metric	Rating
Data Accuracy	B
Data Granularity	A
Methodology	A
Coverage	C
Overall	B





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Part 4:

Accelerating Beyond the Baseline

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Action 1: Get the Whole Picture

Status

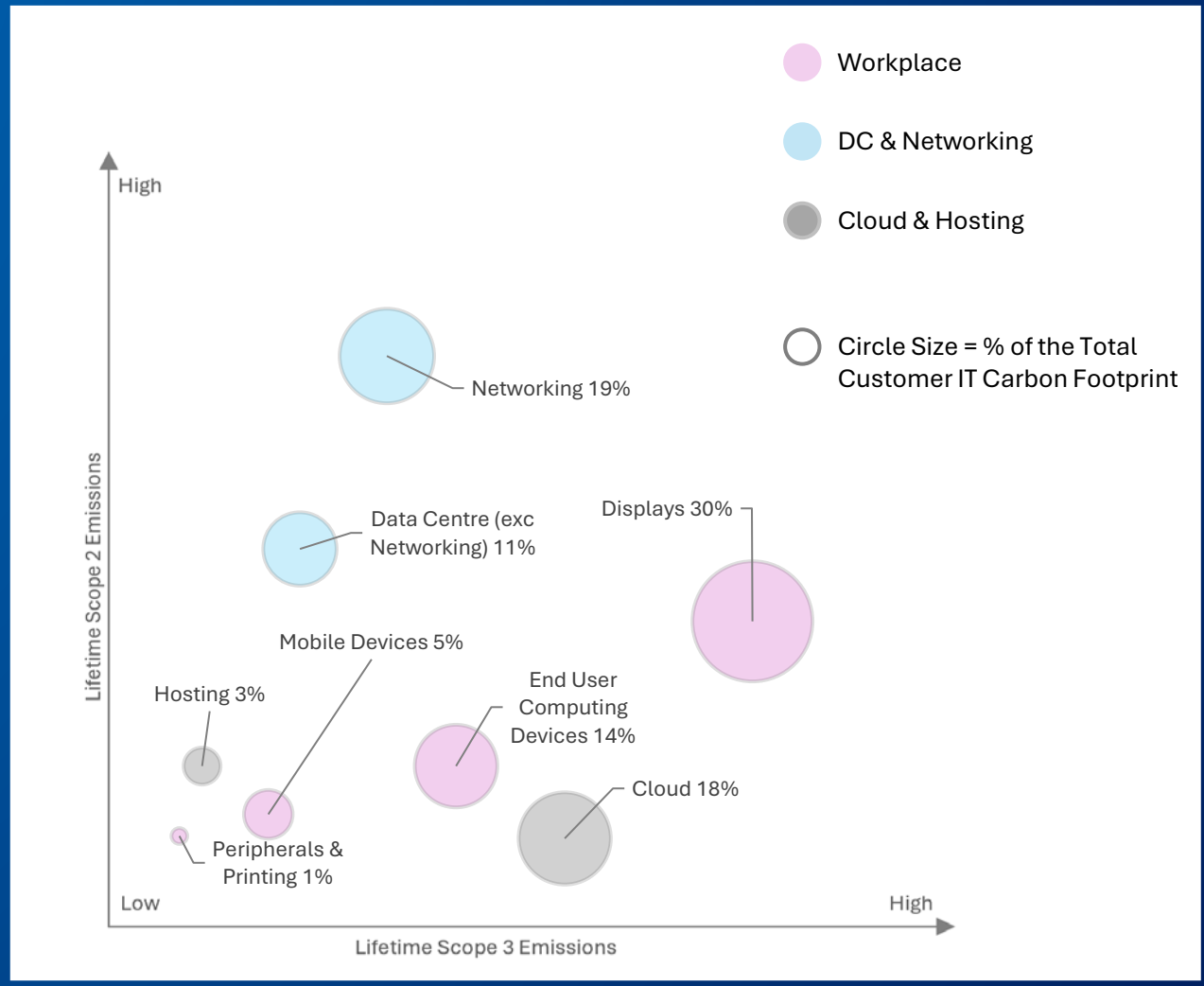
- Get all departments / owners involved
- Establish metrics for all the main elements
- Determine the contribution to the problem
- Establish regular reporting & trends

Diagnostics

- What are the more sustainable options?
- How well “aligned” are our key suppliers?
- What can be changed and by how much?
- When are devices / contracts up for renewal?

Action Plan

- Use visualisation to track potential & actual progress



Action 2: User Engagement Programme

Relevant

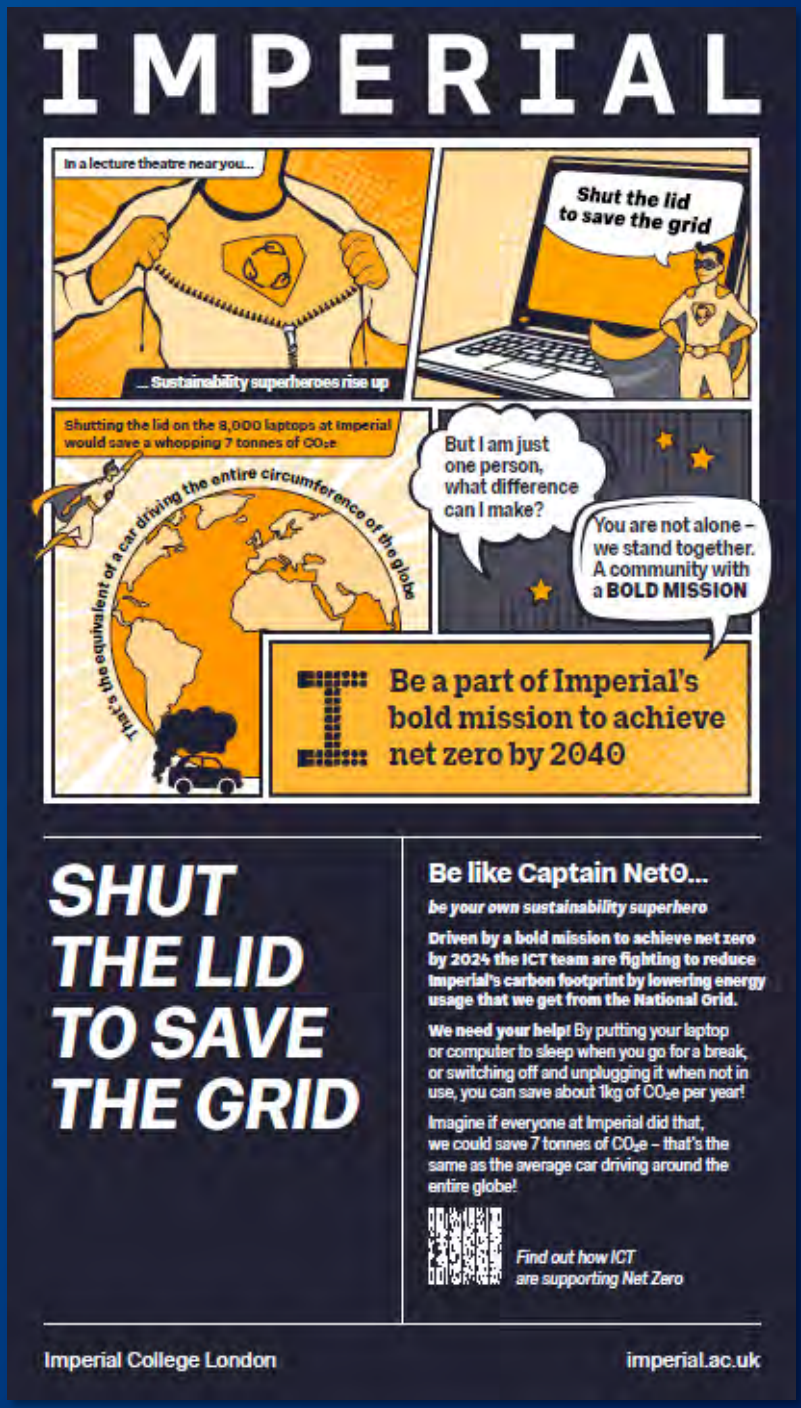
- Identify specific behaviours and actions to target
- Illustrate impacts and benefits of change
- Provide online training & certification

Collaborative

- Encourage team spirit and collaboration
- Promote “champions” network

Focus on Communications

- Ensure messages are clear and supported by a strong identity
- Establish regular “cadence” and structured content
- Celebrate success



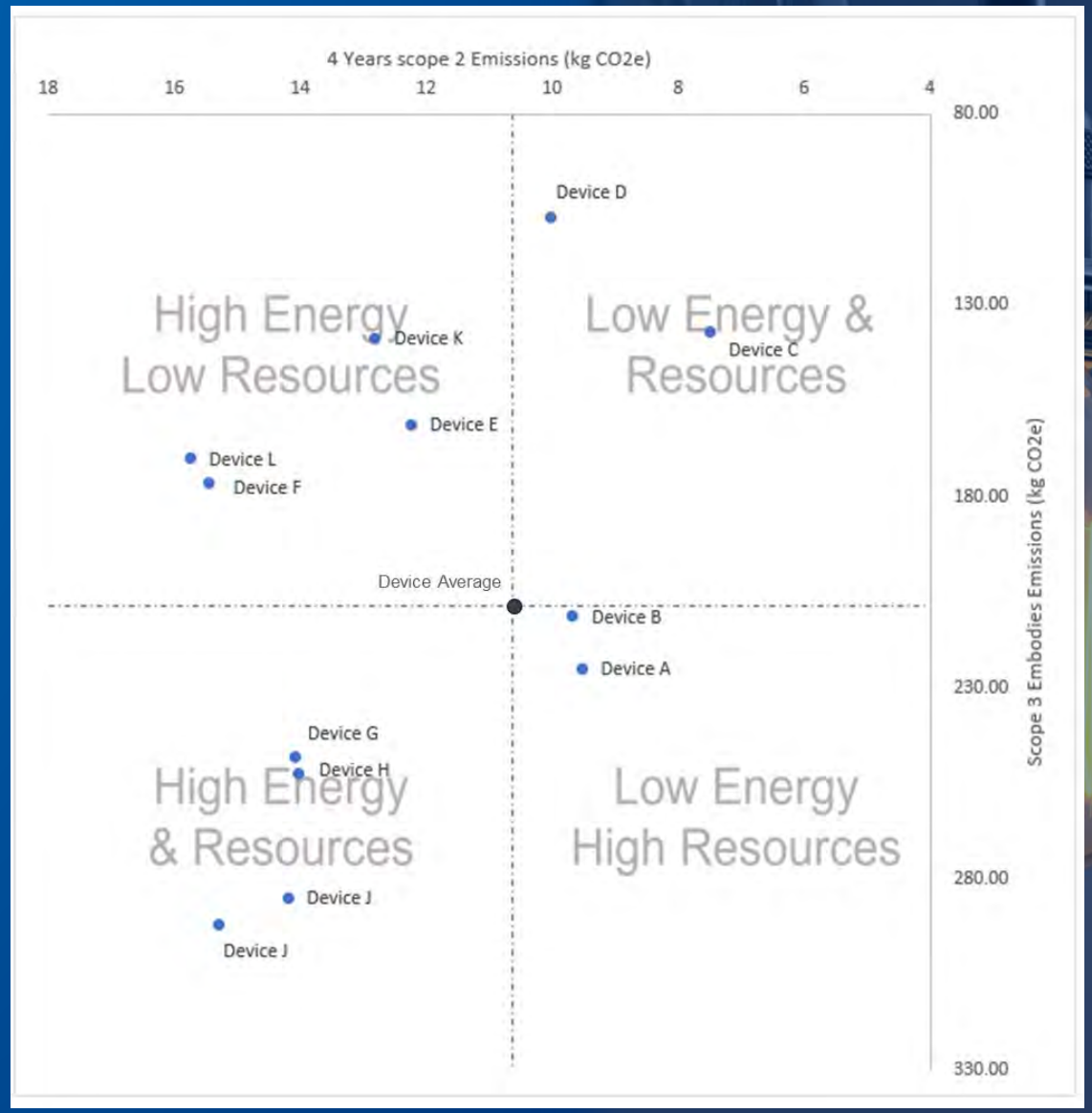
Action 3: Benchmarking

Options

- Scope 2 and 3 emissions of specific devices or device types (e.g. laptops)
- KPIs for whole environments
- Status of strategy, policies and metrics
- Compare with other sectors or national averages

Uses & Benefits

- Assist in sustainable procurement
- Identify opportunities for / benefits of improvement
- Use competition to “Gamify” change



Action 4: Integrate with Wider Sustainability Initiatives

Decrease Planetary Impact

- Consider the bigger picture

Plan for Longer Life

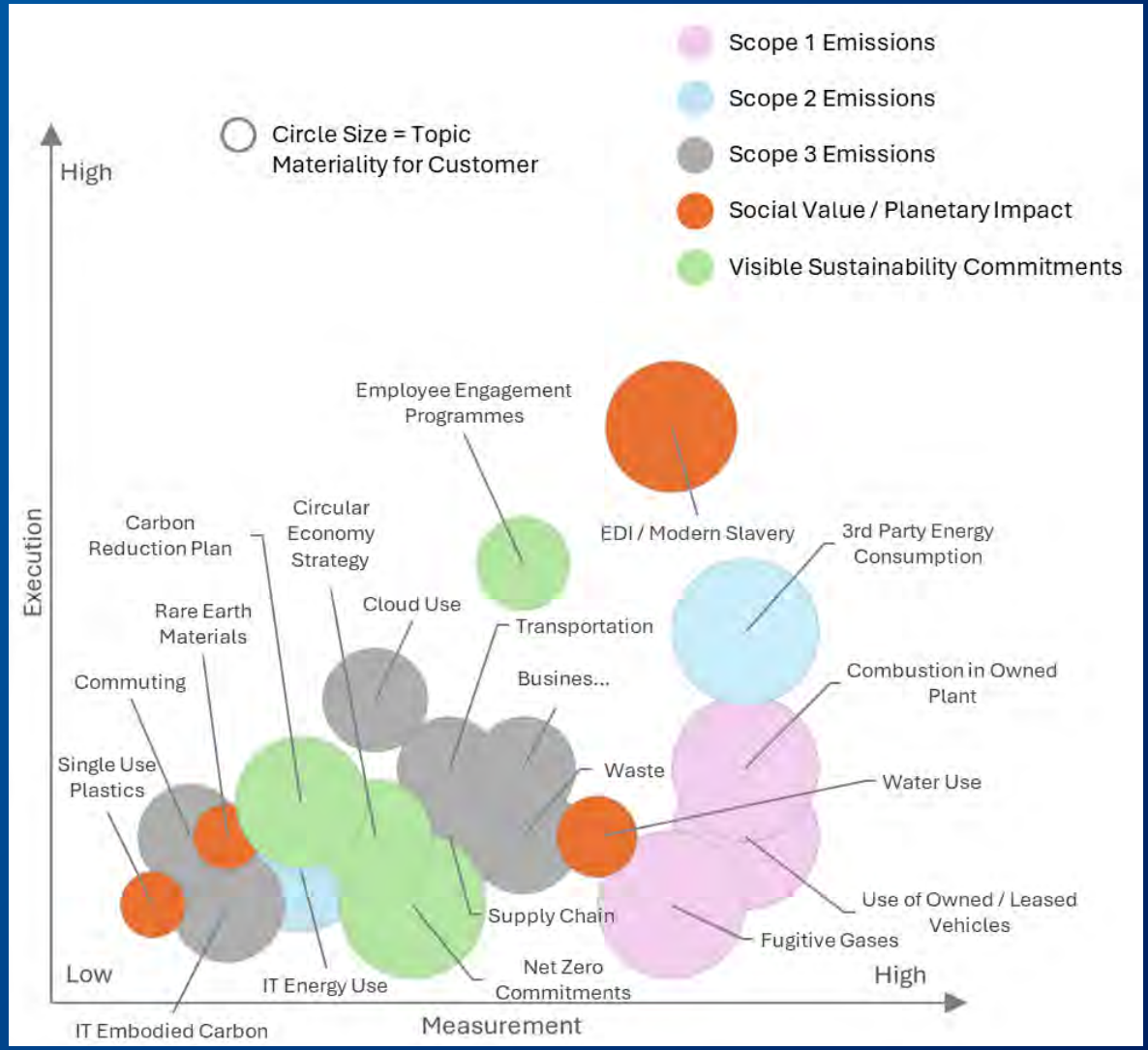
- Repair, reuse, refurbish, repurpose, reallocate, retire & recycle

Reduce Consumption & Waste

- Combine cost & carbon metrics
- Ensure accountability & traceability
- Establish, publicise & reinforce best practice

Use Smarter Sourcing

- Use “gateways” to filter out non-sustainable procurement
- Ensure granular reporting and impact reduction are core service components
- Optimise & improve – complex topic (!) but don’t just shift right and “outsource the issue”



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Part 5:

Impacts & Outcomes

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Impacts & Outcomes

Examples of savings identified through recent P2zero Projects

Physical Devices

32% scope 2: energy savings

40% scope 3: supply chain / embodied carbon savings

and

23% capital cost saving

Cloud Services

78% scope 2: energy savings

25% scope 3: supply chain / embodied carbon savings*

and

28% overall cost saving

* Cloud energy use calculated by P2zero based on workloads and instances using independent tools, modified by actual PUE, with emissions calculated using the location-based method

Questions