Carbon Reduction Plan
Zoological Society of London (ZSL)
Publication date: 5th June 2023

Commitment to achieving Net Zero:

ZSL is committed to reducing absolute greenhouse gas emissions in line with limiting global average temperature increase to 1.5^0c, and to achieving net zero for all residual GHG emissions by 2035.

Declaration and Sign Off:

This Carbon Reduction Plan has been completed in accordance with PPN 06/21 and associated guidance and reporting standard for Carbon Reduction Plans.

Emissions have been reported and recorded in accordance with the published reporting standard for Carbon Reduction Plans and the GHG Reporting Protocol corporate standard, and the appropriate Government emission conversion factors for greenhouse gas company reporting.

Scope 1 and Scope 2 emissions have been reported in accordance with the latest Government environmental reporting guidance, and the required subset of Scope 3 emissions (wherever data is practicably available) have been reported in accordance with the published reporting standard for Carbon Reduction Plans and the Corporate Value Chain (Scope 3) Standard.

Data has not been subject to external verification, audit or assurance, however has been compiled using the most accurate and latest data available. Where assumptions or estimations have been used, these are noted.

This Carbon Reduction Plan has been reviewed and signed off by ZSL's Executive Committee, date of approval: 25th May 2023.

Signed on behalf of ZSL:

Matthew Gould

Chief Executive

25th May 2023

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Revision record				
	Author	Amendment	Date	Approved by
0.1	Olivia Preston	DRAFT	23/02/23	
0.2	Olivia Preston	DRAFT – amend as per JK comments. Simplified 1.5 degree target chart. Glossary added. Changed some masterplan refs.	27/03/23	
1	Olivia Preston	Approved in full with no amendments	25/05/23	ExCo

1. Introduction and context for carbon management

Climate breakdown is recognised as one of the most urgent environmental threats facing the world, and a key driver of biodiversity loss across the globe. It is now widely understood that the climate and biodiversity crises are inextricably linked and cannot be addressed independently.

ZSL's vision is a world where wildlife thrives, and our purpose is to inspire, inform and empower people to stop wild animals going extinct. To achieve this vision, we must respond to the critical global challenges of climate breakdown, habitat loss, unsustainable exploitation of species, increasing diseases and pollution impacts.

ZSL uses energy most significantly for heating and powering its two UK sites at Regents Park in London and Whipsnade in Dunstable, as well as for travel, and consequently is responsible for the associated carbon emissions. ZSL has an Environmental Policy and operates an Environmental Management System (EMS) accredited to ISO 14001, focussed on continued improvement in environmental performance. In order to engage our staff, volunteers and visitors to help improve performance, we recognise we must improve transparency of the measures we are implementing to address our own carbon footprint.

Our priority is reducing emissions as low as we can, as quickly as we can, through the actions outlined in this plan and associated policies.

ZSL has grown and developed new exhibits at its two zoos over the years, however the majority of the buildings were built many years ago and are very inefficient. There are a number of listed buildings at both sites. To secure our long-term future as a conservation organisation, we are in the process of developing a new Strategic Framework for both our zoos. This will involve significant redevelopment and new construction, which will be designed and built to the highest sustainability standards. The impact of additions to the estate and improvements to site infrastructure, and its anticipated effect on our greenhouse gas emissions (GHG), is discussed in Section 5.

This new document, the ZSL Carbon Reduction Plan (CRP), sets out the strategy for reducing energy use and associated carbon emissions in line with limiting global average temperature increase to a 1.5^0c warming scenario, on the path to our goal of achieving net zero carbon by 2035. This is in support of our overall ZSL200 Strategy, which recognises the need to adapt to a rapidly changing word. The plan includes:

- an updated footprint baseline, including scope 1, 2 and core scope 3 emissions
- prioritises energy efficiency and optimisation to achieve a more cost effective and low-carbon estate, in line with the GHG Management Hierarchy
- a range of measures and actions to reduce emissions across ZSL, which fall into two main groups:
    - technical measures which require capital investment to achieve a direct reduction in emissions; and
    - enabling behaviour change measures and policies which help embed carbon reduction and management in the zoos' operational processes

Our carbon footprint for the ZSL financial year 2019/20 (the baseline) has been calculated, and a summary is included later in Section 2. We will continue to improve how we quantify, monitor and seek ways to reduce our scope 3 emissions, since this forms the most significant proportion of our overall footprint, yet is the most difficult to measure accurately and address.

The Carbon Reduction Plan provides a summary of ZSL's baseline carbon position and the SBTi reductions needed on our pathway to net zero carbon. It is a living document and will change over time as new opportunities are identified. This will allow the plan to reflect the ever-changing environmental and economic climate but also allow us to keep abreast of advances in technology to deliver more energy reduction projects as new initiatives emerge.

A **Carbon Management Project Register** has been developed as a rolling list of energy efficiency opportunities, which will be regularly reviewed and updated with input from specialist engineering staff and advisors.

The initial list of potential projects has been identified from a number of sources:

- Obvious energy losses identified by ZSL Estates team e.g. a lack of pipe and loft insulation and draughty single-glazed windows etc.
- More technical saving methods e.g. BMS optimisation and upgrades, adjusting ventilation control settings
- Review with Pareto FM maintenance team of easy wins
- Detailed energy studies carried out by Atelier Ten (specialist consultancy) in 2022 alongside the development of our new Strategic Framework (masterplan)
- Energy surveys carried out by Passingham Associates in 2019 (a specialist consultancy) to comply with ESOS Phase 2
- Surveys carried out by Inenco Energy Consultancy in 2012

As many of the opportunities for energy reduction were identified a number of years ago, and before sub-metering was installed at Regents Park, re-validation of the savings is required to calculate payback. It is expected that the detail of the planned opportunities will evolve and change as new opportunities present themselves, but this plan offers an initial opportunities list.

Context and drivers for carbon management

Global, National and Local carbon reduction targets:

International:

- The Kyoto Protocol was adopted on 11 December 1997 and entered into force in February 2005. It operationalises the United Nations Framework Convention on Climate Change by committing industrialised countries and economies to transition to limit and reduce greenhouse gas (GHG) emissions in accordance with agreed individual targets.
- The United Nations Framework on Climate Change (COP21) – the Paris Agreement – is a legally binding international treaty on climate change which entered into force on 4 November 2016. Its goal is to limit global warming to well below 2^0C, preferably to limit the increase to 1.5^0C, compared to pre-industrial levels.

- In 2018, a special report by the Intergovernmental Panel on Climate Change (IPCC) warned that urgent action was needed to cut GHG emissions and limit global warming to 1.5^0C. The report confirmed that without rapid and large-scale reductions in emissions, limiting warming to 1.5^0C or even 2^0C will be beyond reach.

European:

- At the European level, relevant legislation includes the European Union Emissions Trading Scheme (EUETS), and the EU Energy Performance of Buildings Directive (EPBD). The EPBD requires ZSL to provide an energy performance certificate (EPC) for any buildings we sell, rent, or at the time of new construction, although we are not currently required to produce display energy certificates (DECs) for our premises.

National:

- The Climate Change bill introduced in 2007 by the UK Government, and the subsequent 2008 Climate Change Act established a framework for the UK to achieve its long-term goals of reducing greenhouse gas emissions and to make sure steps are taken towards adapting to the impacts of climate change. It set out a commitment to GHG reduction target of 80% by 2050 against 1990 levels, making the UK the first country in the world to set legally binding targets.
- In 2019 this commitment was increased, requiring the UK to bring all greenhouse gas emissions to net zero by 2050.
- ZSL participated in the Carbon Reduction Commitment Energy Efficiency Scheme, from 2008 to 2019.
- The Energy Savings Opportunity Scheme (ESOS) is a mandatory energy assessment scheme for large organisations which either employs 250 or more people, and has an annual turnover in excess of £44 million, and an annual balance sheet total in excess of £38 million. ZSL has participated in Phase 1 and 2 of the scheme.
- The UK Net Zero Strategy 2021 sets out policies and proposals for decarbonising all sectors of the UK economy to meet the net zero target by 2050. Related to this is the Heat and Buildings Strategy, setting out the UK Government's plan for significantly cutting GHG emissions arising from heating, cooling and energy use in buildings.

Local:

- Westminster City Council declared a climate emergency in September 2019, and has set an emissions target to reach net zero by 2040. This is to be achieved though the Climate Emergency Action Plan setting out comprehensive actions for reducing emissions across the City, working in partnership with businesses, communities and residents.
- Central Bedfordshire Council developed a Sustainability Plan in 2020, and has set a target to become carbon neutral by 2030.

2. Measure: Establishing a new carbon emissions baseline

An important first step in planning how to reduce an organisation's carbon emissions is accurately measuring and disclosing the emissions from various sources. This establishes the footprint, highlights any gaps, identifies hot spots and enables reduction projects to be prioritised. In calculating ZSL's carbon emission footprint, the following best practice standards and guidance were followed:

The Greenhouse Gas Protocol (GHG) Corporate Accounting Standard is the most recognised guide for calculating a carbon footprint. The GHG Protocol sets out five reporting principles as the basis for data collection, reporting and managing emissions over time, which have all been considered for ZSL as far as practicable.

- **Relevance** – ensure the GHG inventory appropriately reflects the GHG emission of the company and serves the decision-making needs of users, both internal and external
- **Completeness** – account for and report on all GHG emissions sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions
- **Consistency** – use consistent methodologies to allow for meaningful comparisons of emission over time
- **Transparency** – address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used
- **Accuracy** – ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and seek to reduce uncertainties in reported figures as far as practicable

Any organisation is responsible for two different types of emissions:

- Direct emissions that are produced as a direct result from our activities.
- Indirect emissions are those emitted by others as a consequence of our actions.

There is further categorisation of emissions into three 'scopes':

Scope 1 – direct emissions from owned or controlled sources of fuel sources used in the organisation's buildings or vehicles.

- ZSL uses natural gas for heating at Regents Park, and kerosene and LPG for heating at Whipsnade.
- Vehicles use either DERV (diesel for road vehicles) or red diesel oil for industrial applications, and pool car data is recorded via fuel cards.
- The steam train at Whipsnade uses coal.
- Fugitive emissions (f-gas) from refrigeration and air-conditioning equipment are included in scope 1, and this data is recorded as part of planned programmed maintenance inspections.

Scope 2 – indirect emissions from the generation of purchased electricity, steam, heat or cooling.

- Electricity is used across ZSL for electric heating, lighting, ITC, pumps, air handling / cooling, electric vehicles, tools and equipment. It is estimated that approximately 50% of the total electricity and heating consumption is used for animal husbandry, providing comfort conditions for the animals across both sites. As such, this consumption greatly increases in winter although a relatively high baseload remains throughout the year.

Scope 3 – all other indirect emissions that relate to activities occurring in our value chain, either upstream or downstream, e.g.

- water supply and disposal, waste disposal, business travel in vehicles not owned by ZSL, construction and capital spend, purchased goods and services, and emissions associated with energy losses during electricity transmission and distribution or Well-to-tank emissions.

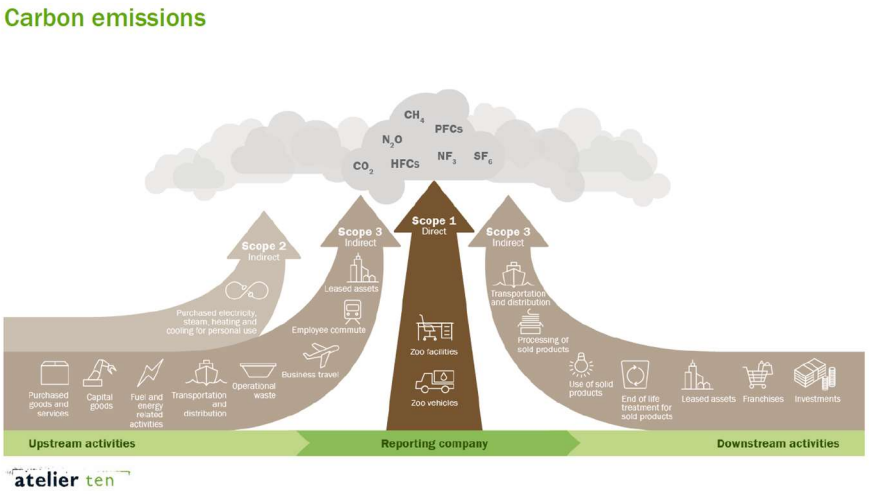


Figure 1: Carbon Emissions diagram, Credit: Atelier Ten

Scope 3 categories and current exclusions from the carbon footprint

Our indirect, or scope 3 emissions, are estimated to form a significant part of our overall carbon footprint, and the GHG Protocol separates these into 15 categories. We have limited control over scope 3 emissions and their calculation can be complex, making them very challenging to measure and more difficult to tackle. **Certain scope 3 emissions such as staff / volunteer commuting and visitor travel are currently excluded from our footprint**, as at this stage we do not have sufficient data.

Core scope 3

- Where we are reasonably confident we have accurate data for scope 3 categories, we have included these in our footprint calculation as 'core' scope 3 emissions. We can replicate the data calculation year-on-year, and will measure and report on progress in reducing these emissions. These core scope 3 emission categories include business travel, waste, water supply and treatment, and energy-related scope 3 emissions.

Wider scope 3

- For certain scope 3 categories, such as employee commuting and visitor travel, we currently lack data to be able to quantify an estimation. For purchased goods and services, we have included an estimation of emissions in our baseline year, as an indication of the large proportion this category forms and to highlight the importance of collaboration with

suppliers. However, this has a wide margin of error and we do not yet have sufficient clarity on the data to include in subsequent year emission calculations. We will work on improving how we can accurately measure these and seek to increase coverage of scope 3 in our future carbon footprint reporting.

See **Appendix A** for a full list of scope 3 categories, their applicability and inclusion in ZSL's carbon footprint.

Data from ZSL international activities and country offices is not yet included, apart from flights and other travel captured on travel authorisation forms in our ZPD database.

No deduction is made for energy and fuel used by third-parties onsite in the outsourced catering provision at either Regents Park or Whipsnade, because the activity and associated emissions are considered to be wholly in service of ZSL's visitors, staff and volunteers.

Scope 2 accounting and renewable energy

As outlined in GHG Protocol scope 2 guidance, ZSL reports its scope 2 emissions from purchased electricity by both market-based and location-based methodology. A "location-based method" uses grid-average carbon emissions factors for each kWh of electricity we use, regardless of the tariff paid. A "market-based method" takes into account the green tariff through ZSL's REGO-backed renewable energy purchasing and assigns it zero emissions (with REGO certificate data provided by the supplier for each annual period to March). As is best practice, ZSL reports on both methods, however a single and consistent approach shall be used for setting and tracking progress towards achieving the target.

ZSL intends to use a **location-based approach** to calculate base year emissions and to track performance against the science-based target. The scope 2 emission reduction target is based on the location-based method.

Boundary

Defining the system boundary is important in order to determine which sources of emissions we have control or influence over, and therefore should include within the footprint. This enables consistent measurement and reporting of progress over time by including the same sources.

ZSL's ISO14001 Environmental Management System (EMS), including associated policies and procedures, is a key enabler to achieve the Carbon Reduction Plan targets and effective emission reductions. The EMS is only certified for ZSL's activities in the UK, specifically the management and operation of London and Whipsnade Zoos.

Therefore, **currently**, **ZSL's international activities will be excluded from the emissions inventory** until there is expansion of the EMS to support effective data collection and reporting, measurement and management of emissions including responsibilities appropriately assigned across ZSL.

This aligns with the GHG Protocol operational control approach, and therefore, for ZSL the boundary of the carbon emission footprint has been set using the **Operational control approach**:

- **London and Whipsnade Zoos:** all activities in the management and operation of the sites, including Institute of Zoology and Main Offices, comprising electricity use, fuel for heating and running vehicles, on and off-site travel between the zoos and to meetings, site visits etc, overnight accommodation, waste generated on site, water consumption and disposal for off-site treatment, purchasing of goods and services recorded through centralised procurement systems.
- **International Conservation Programmes and Research:** Travel recorded in ZSL's Travel Authorisation Form (TAF) records e.g. to conservation field sites, meetings or conferences is included in the boundary as scope 3. In-country travel not recorded via TAFs and any goods or services or other scope 3 emissions associated with field research or country offices are currently excluded due to lack of available data.

Data sources and base year information

The baseline year has been selected as the most recent year for which accurate GHG data is available, which is **2019/20 financial year**. Emissions data is reported on a financial year basis, which for ZSL is 1st May to 30th April.

An effort has been made to include all material carbon emissions data to ensure the footprint is as complete as possible. Certain areas deemed to be less than 2% of the total, such as records of travel on our taxi account and staff expense claims other than for mileage in private cars, have been omitted due to effort involved in estimating this de minimus data.

- **Electricity and gas consumption** - data is obtained from our suppliers via our energy broker based on supplier invoices, prioritising accurate meter reads but sometimes relying on estimated reads or reasonable estimations if verifiable data cannot be obtained.
- **Fuel use** (Kerosene, SFGO, DERV, LPG) for heating and site vehicles - data is obtained from records of volumes delivered by contacting the appropriate supplier.
- **Coal use** – data is estimated from purchasing records of amount delivered.
- **Fugitive emissions** – data is recorded on PPM inspection sheets by our FM maintenance company during routine inspections of air-conditioning units.
- **Fuel in company owned pool cars or hire cars** - data is obtained from fuel card transaction reports from the provider.
- **Business travel in non-owned vehicles** – data is obtained by downloading travel authorisation form (TAF) records from the ZPD database. (Certain trips are recorded by our travel management companies, but this is a duplicate of TAF records, so is not used).
- **Other business travel** – data is obtained from mileage claim records submitted by staff.
- **Water consumption** – data is obtained via monthly reports provided by our water management consultant using accurate meter reads.
- Standard DEFRA Carbon conversion factors are used to calculate the carbon emissions associated with each of these data sets for the relevant year.
- **Waste disposal and treatment** – carbon emissions data is obtained as an ad hoc download from our waste broker portal, estimated according to disposal method.

- **Purchased goods and services** – carbon emissions data is obtained as an annual report from the LUPC procurement consortium, using non-pay spend analysis by procurement category to estimate emissions. This utilises the HESCET tool with the methodology updated in 2021 to expand the number of DEFRA categories to 311 and to include more geographical zones. *An estimation is included in our baseline, however this has a wide margin of error and we do not yet have sufficient clarity on the data to include in subsequent year emission calculations*

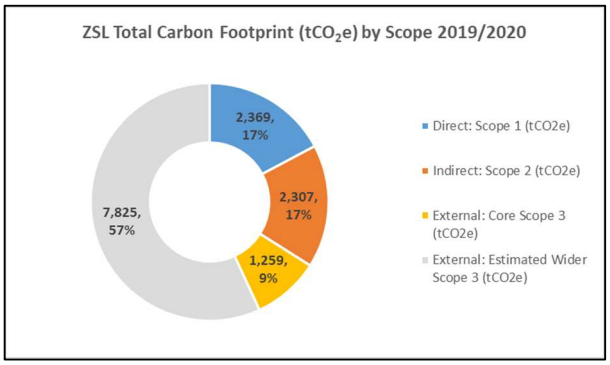
Carbon Footprint baseline

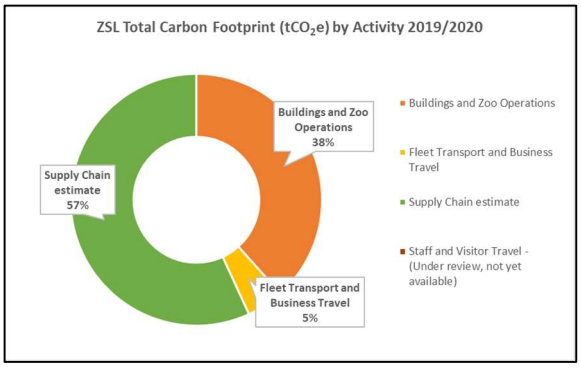
The 2019/20 financial year is the first year ZSL's carbon footprint has been fully calculated. Data on electricity, gas, fuel and water consumption has been collected and monitored for a number of years as part of the ISO14001 environmental management system. However, accurate application of conversion factors, and an estimation of scope 3 emissions has not been previously completed.

The **2019/20 financial year is considered the baseline year**, and provides initial baseline emissions data for target setting.

ZSL GHG Emissions by Scope (tCO_2e)	**2019/2020**	**2020/2021**	**2021/2022**
Direct: Scope 1 (tCO_2e)	2,369	1,945	2,108
Natural Gas	1,774	1,396	1,444
Gas Oil	75	61	118
Diesel	69	45	57
LPG	52	34	32
Kerosene	295	318	345
Coal	71	68	60
Company operated pool & hire vehicles	13	5	7
Refrigerant F-gas	21	17	45
Indirect: Scope 2 (tCO_2e)	2,307	1,741	1,774
Purchased Electricity (location-based)	2,307	1,741	1,774
Purchased Electricity (market-based)	0	0	0
External: Core Scope 3 (tCO_2e)	1,259	600	732
Upstream Well-To-Tank fuel emissions	342	287	373
Upstream Transmission & Distribution electricity losses	196	150	157
Business travel (air)	557	53	140
Business travel (road)	16	8	10
Business travel (rail)	2	0.3	1
Business travel (sea)			
Waste generation and disposal	34	21	16
Water supply and wastewater treatment	112	81	36
External: Estimated Wider Scope 3 (tCO2e)	*7,825*		
Employee commute	*No data*	*No data*	*No data*
Visitor travel	*under review*	*under review*	*under review*
Purchased Goods and Services (indicative estimate only)	*7,825*	*under review*	*under review*
Total Scope 1 & 2 GHG Emissions Location-based (tCO_2e)	4,676	3,686	3,881
Total Core Scope 3 Emissions (tCO_2e)	1,259	600	732
Total Scope 1, 2 and Core Scope 3 Emissions (tCO_2e)	5,935	4,286	4,613

To help us understand and tackle our carbon emissions, as well as showing the proportion by 'scope' defined by the GHG Protocol, emissions have been further broken down into three areas: Buildings and Zoo Operations; Fleet Transport and Business Travel; Supply Chain. Once data is reviewed for Staff and Visitor Travel, this will be added in.





3. Carbon reduction targets: ZSL commitment to achieving Net Zero

ZSL has made a commitment to:

- Reduce absolute greenhouse gas emissions in line with limiting global average temperature increase to 1.5^0c, and aim to achieve net zero for all residual GHG emissions by 2035.

ZSL has set the following targets:

- Reduce electricity emissions by 50% by end of FY 2030/31, based on FY 2019/20 baseline
- Reduce gas and other fossil fuel emissions by 50% by the end of FY 2030/31, based on FY 2019/20 baseline
- Reduce business travel emissions from air, road and rail by 50% by end of 2030/31, based on FY 2019/20
- Set a science-based Scope 3 target for significant value chain emissions by Dec 2024

The tool made available by the **Science Based Target initiative (SBTi)**[1] has been used to guide a best practice approach to setting ZSL's carbon reduction targets for scope 1 and 2 emissions. Whilst SBTi guidance has been followed, **ZSL does not intend to have its targets formally approved by the SBTi**. This is due to time and cost involved, which for ZSL would seem to offer little benefit when the tools and guidance available already help to identify sufficient hotspots in our carbon footprint to take action.

ZSL's baseline year was entered in the SBTi target setting tool as 2019, using the absolute contraction method, covering a minimum of buildings and travel by UK teams. The target year is 2030/31, entered into the SBTi target setting tool as 2030.

[1] https://sciencebasedtargets.org/resources/?tab=develop#resource

This provided a 46.2% reduction target, and for ease of communications, we have rounded this up to a **50% reduction for scope 1 and 2**.

Figure 2 below shows the baseline scope 1 and 2 emissions for ZSL's financial year 2019/20, and the output from the Science Based Target Setting Tool on an absolute contraction basis through to 2030:

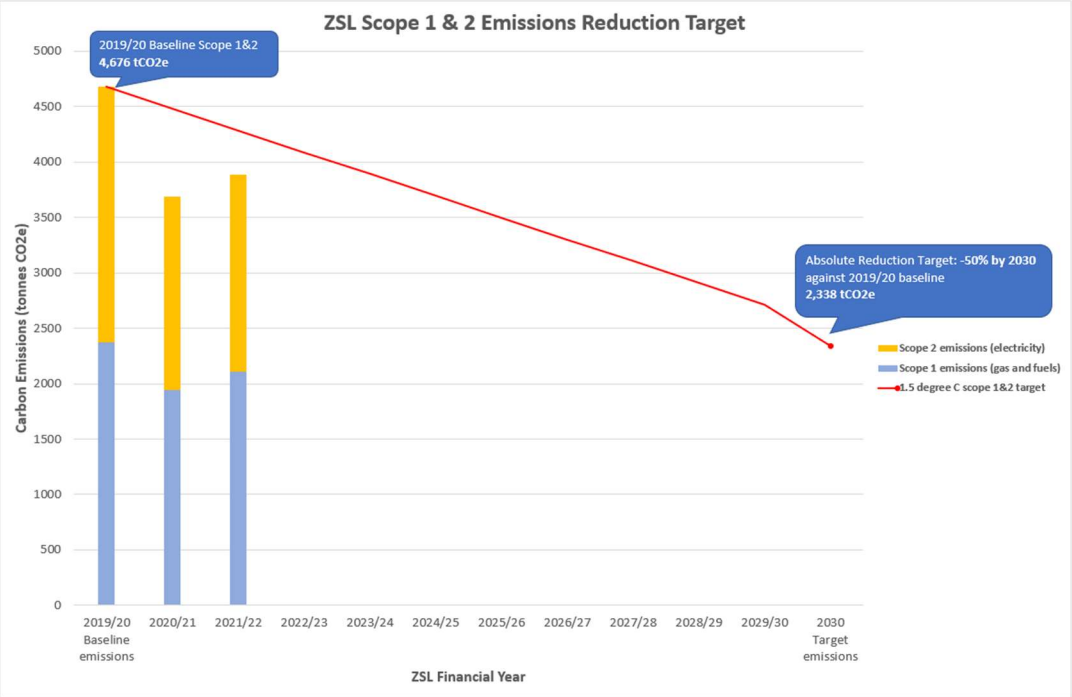


Figure 2: Absolute reduction target for scope 1 and 2 emissions

4. Reduce: Carbon reduction actions

ZSL does not have a long history of robust energy management across our estate but projects recently completed and underway include:

- Pipework insulation to lag hot water pipes; replacing lights in basement stores with LEDs and motion sensors; installing timers on electric heaters and point-of-use water heaters to switch off at night; upgrading gift shop lighting and other areas to LEDs with appropriate controls; reviewing thermostat set-points on boilers; installing butchers flap strips to draught-proof doors of animal enclosures and other areas to retain heat.

In order to meet the ambitious targets, ZSL requires a holistic carbon management plan and to increase the resources available for energy and carbon management. The success of this plan will be highly dependent on the governance structure put in place, the management approach to ensure sustained momentum, and the financial investment available to support implementation.

As a general principle we aim to follow the GHG mitigation hierarchy set out by the Institute of Environmental Management and Assessment (IEMA):

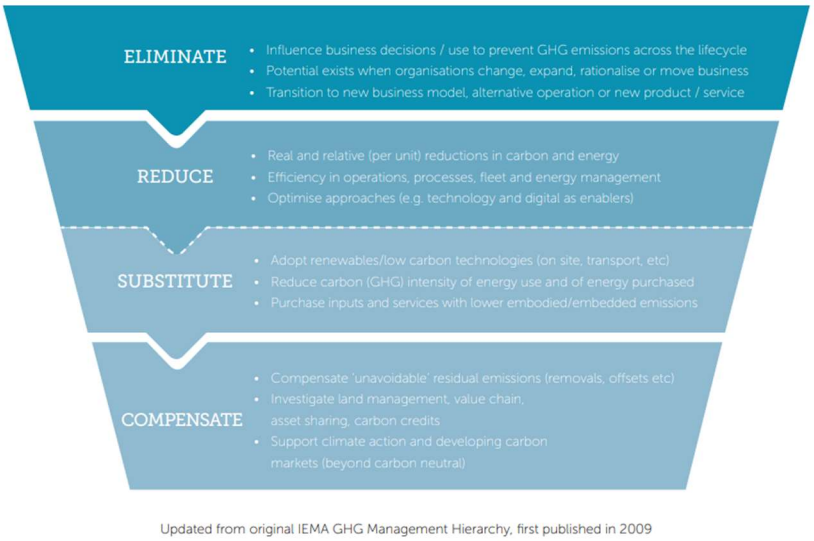


Figure 3: IEMA Greenhouse Gas Management Hierarchy (updated 2020)

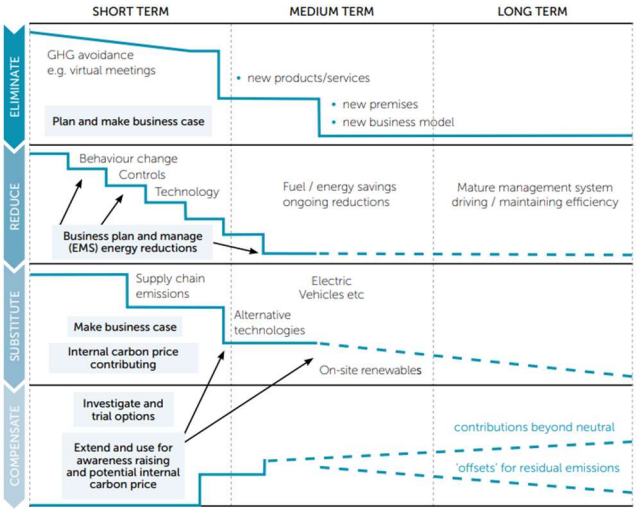


Figure 4: Diagram of transition planning using the IEMA greenhouse gas management hierarchy

The separate **Carbon Management Project Register** outlines different potential measures to reduce our carbon footprint, identified through consultation with ZSL stakeholders. The register lists individual opportunities, and at a high-level estimates simple payback savings where this can be calculated. To achieve the carbon reduction target, ZSL will need to decide which initiatives to implement, and carry out further evaluation including the level of investment needed.

The table below sets out headline areas of improvement we will focus on in future. For strategic capital projects in particular, detailed feasibility will need to be reviewed as projects develop.

No.	Initiative
2022-2026	
1	**Establishing a Carbon Steering Group**, or other suitable forum (which may initially be part of wider sustainability steering group), with departmental sub-groups as required to set appropriate departmental-level targets, net zero action plans and guidance for high-emitting areas across ZSL Potential sub-workstreams include: carbon removals or compensation; food & catering; zero carbon estate; animal management; procurement & waste; business travel; communications & engagement.
2	Complete a review of our fleet vehicles and their usage, and replace them with **fully electric and hybrid alternatives** or other vehicles with the lowest emissions that can perform the required function, wherever practically possible.
3	Review ZSL travel policy(s) and agree updates to **prioritise a reduction in business travel emissions**. Continue recording distance, mode and carbon emissions as part of the travel approval (TAF) process, and improve regular monitoring of trends by mode / frequency / Directorate. Assess feasibility to develop an internal carbon budget for each Directorate and/or offsetting levy on business travel flights.
4	Ensuring more efficient use of existing equipment including switching off when not in use if automatic controls are not in place, including the roll-out of **targeted shut-down procedures for staff working in high-usage areas.**
5	**Engaging staff, volunteers and visitors in energy and carbon reduction** through training, awareness and provision of other information including wider conservation messaging. This includes developing an online 'Energy Aware' training module for staff.
6	**Analyse available data for visitor travel and staff / volunteer commuting,** work on improving the accuracy, and seek to increase coverage to include these scope 3 emissions in future carbon footprint reporting. This will help us work on appropriate green travel solutions to cut visitor travel emissions.
7	**Develop a robust carbon removals or compensation policy** reflecting our expertise in nature-based solutions and blue carbon methodologies. This policy will identify and set rigorous requirements for the natural carbon sinks we can count as part of a removals pathway, either by purchasing voluntary carbon credits or by enhancing additional carbon sinks linked to our field conservation work in either the UK or overseas, known as 'insetting'.
8	**Ensure new buildings maximise self-generation and prioritise all-electric low-carbon heating technologies,** such as heat pumps, as a key design principle.
9	Consider **retrofitting low-carbon heating through asset replacement projects** in existing buildings where feasible with the age and condition of existing HVAC plant. Larger scale

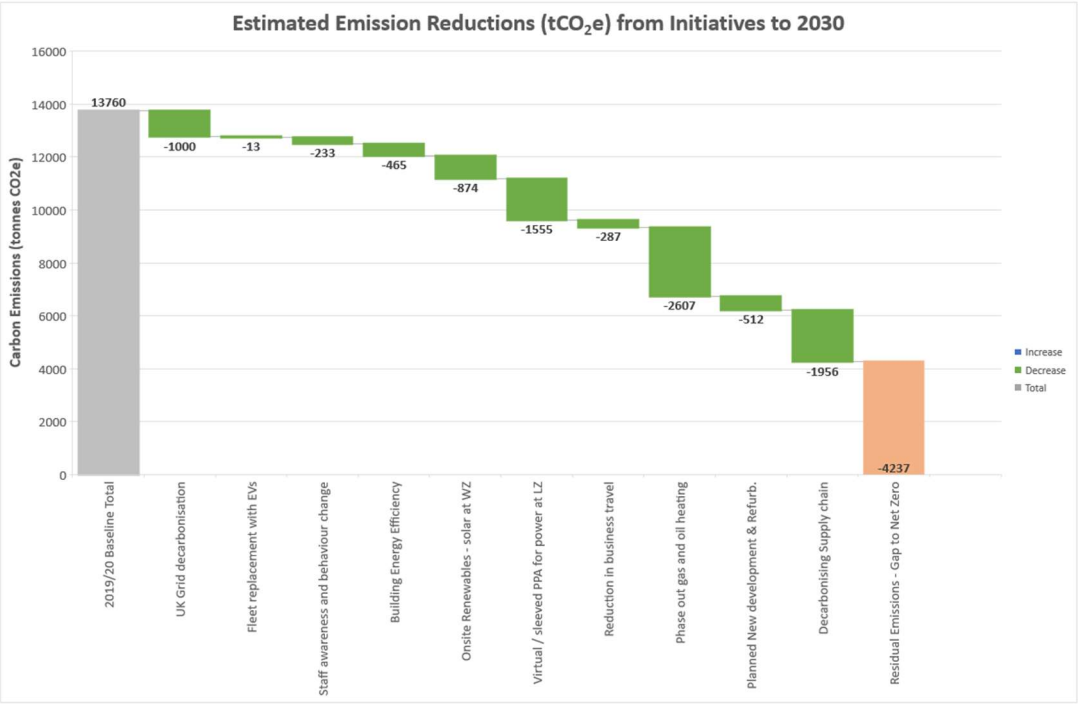
	heat decarbonisation is expected to be delivered through infrastructure improvements necessary in delivery of our masterplans.
10	**Develop and implement improved design standards and technical specifications** to ensure energy/water saving and low carbon measures, including net zero and embodied carbon considerations, are consistently incorporated into new build and refurbishment projects. In doing so, we will aim to be mindful of unintended consequences arising from an increase in embodied carbon resulting from extra technical solutions, and will also consider that the best performing buildings don't necessarily need the most equipment, rather tend to be reasonably simple.
11	All major projects to have a **client-side sustainability representative on the project team** to provide due diligence support for the optimal low carbon design across all development stages – and be responsible for ensuring the sustainable design guidance framework is followed.
12	**Improving utility monitoring, measuring and targeting** by installing sub-meters so that improvement measures can be prioritised and the impact can be monitored. • As well as installing meters, it is important to consider staff capacity to analyse the data, and where it is currently limited, to make appropriate provision either through additional in-house resource or external consultancy.
13	**Review energy use profiles and investigate night time set-backs**, in discussion with building users, animal management and curatorial teams.
14	Review and **upgrade the Building Management Systems (BMS)** to improve control in the buildings that have BMS installed. Seek to expand provision of BMS to improve automated control, thus taking an active approach to efficient control of energy in more of our buildings.
15	**Improve electric heating and controls for animal houses** by trialling and replacing new short-wave radiant heaters and controls, and commissioning expert heat studies to ensure the solutions implemented best meet animal welfare needs.
16	Significant investment to **retrofit energy conservation measures in existing buildings** where there is a reasonable payback period to improve efficiency of buildings that will be retained in the masterplan or are not planned as early priority refurbishments, including: • roof and wall insulation and building fabric upgrades, upgrading heating and hot water plant including considering heat recovery systems, reviewing excess lighting provision and lighting upgrades to LEDs and presence detection sensors, and improved water management.
17	Review opportunities to **install small-scale solar PV panels onto existing roof spaces at London,** and progress the **large-scale solar PV project at Whipsnade** with private wire connection or sleeved PPA to cover remainder of London electricity demand if feasible.

18	Review feasibility and determine the overall viable potential for **other renewable energy generation such as wind power or anaerobic digestion** to take advantage of animal waste and bedding produced on site, to provide longer-term energy security for ZSL as well as carbon reduction benefits.
19	Review and update appropriate policies to ensure that energy efficiency and carbon management is fully **integrated into strategic estate planning, and a core principle in business planning**, **operational activities, planning new developments, rationalisation of the estate**, and championing smart ways of working.
20	**Waste and Recycling:** Whilst a relatively small proportion of our carbon footprint, ensuring we recycle, reuse and avoid creating waste in the first place helps reduce energy consumption and use of finite raw materials. We will continue to work with our waste broker to improve waste segregation, data analysis and performance feedback to staff.
21	**Water Management:** The age of our sites means many of our water pipes are vulnerable to leaks, and for this reason we have focussed on infrastructure improvements to prevent large, expensive water leaks from occurring. Reducing water usage and the disposal of wastewater by implementing water efficiency measures and fixing leaks helps reduce our carbon footprint by reducing the power associated with pumping and treating water offsite. • Now we will focus on managing water consumption in buildings and enclosures, and further improve sub-metering to identify realistic target baselines for water use at exhibit-level.
22	**Responsible Procurement and Supply Chain:** Explore the available options including technology solutions for improving how we measure and report on carbon emissions associated with our supply chain, and encourage our suppliers to set their own emission reduction targets aligned to climate-science. Where appropriate, we will implement this by ensuring that sustainability criteria are built into the specification and tender evaluations, relevant to the items being purchased, including a requirement for suppliers to develop and publish a carbon reduction plan.
2026-2030	
23	Consider **battery storage** as an alternative to fossil fuel backup generators, and aim to move to electrification as the market options develop.
24	Reviewing space utilisation across the estate and **consolidating under-utilised space** more efficiently where feasible.
25	**Transition to low-carbon heat across the estate** through implementing large-scale site infrastructure improvements necessary in delivery of our masterplans.

Emissions Modelling

The chart below shows a high-level indication of what ZSL's decarbonisation pathway might look like. This is based on the estimated contribution of various activities, which have been simplified and modelled with assumptions on when and how they could be implemented.

After potential initiatives are further assessed and committed to, including level of investment needed, the pathway could be refined and mapped more precisely against a timeline. It is expected that the order actions are taken will fluctuate, especially in relation to major capital projects which will be dependent on external funding and partnerships.



5. Impact of the new Strategic Framework (2023 to 2032+) on scope 1 and 2 emissions

As part of developing our new Strategic Framework for both sites through 2021/22, consultants reviewed the site-wide energy demand using typical benchmarks to estimate a sitewide carbon balance as the Framework plan progresses. This included an estimated breakdown of carbon per building typology, energy hotspots at each phase of the Plan, and recommended building-level interventions (which have been added into our Carbon Management Project Register).

These studies provide an illustrative trajectory of carbon performance and percentage reduction over time, both absolute and area weighted on a per square meter basis, based on improvements and alterations to ZSL's building stock, i.e. refurbishments, new construction and demolition. These have been selected for presentation due to ZSL's direct control and influence over emissions.

The following graphs relate to <u>scope 1 and 2 emissions only</u>, showing estimated reductions from improvements in energy use – hence they do not represent the forecast for ZSL's whole carbon footprint which includes scope 3 indirect emissions. However, this provides an outline indication

of reductions in our carbon footprint that we could achieve through capital developments as we implement our strategic framework.

<u>The order that projects will be delivered is not fixed</u>, though early priority projects are identified. The data models include these in 'phase 1', however delivery timescales are yet to be formalised and therefore the estimated carbon balance shown per 'phase' may alter.

The carbon forecast graphs should be read with the following explanatory notes:

- The data models account for infrastructure upgrades, including an assumption that heating will be transitioned to all-electric, but the studies have not taken into account the benefit from proposals to install onsite renewable energy generation, which will deliver additional reductions.
- Energy benchmarks and modelling have been based on good practice performance data from CIBSE Guide F. As no benchmark data exists for the animal buildings an average of other building uses on site was taken – this might over predict some areas and under predict others, however, should give an approximate average performance.
- The final column indicates the reduction if all possible projects can be delivered, and takes into account predicted decarbonisation of the grid in 2032 (using Future Energy Scenarios steady progression model).
- Smart meter data at Regents Park being gathered through the review process would in future help to verify the results of energy modelling.
- This does not account for embodied carbon of new developments, we will consider an enhanced target for embodied carbon.

Combined carbon balance – scope 1 and 2:

- Looking at the carbon balance across both Regents Park and Whipsnade we can estimate the residual energy which needs to be generated locally through renewable generation or that requires offsetting.
- Through early priority projects ('phase 1') the carbon footprint slightly increases from the baseline due to likely increased development and refurbishment.
- As further projects are built the combined carbon footprint decreases.

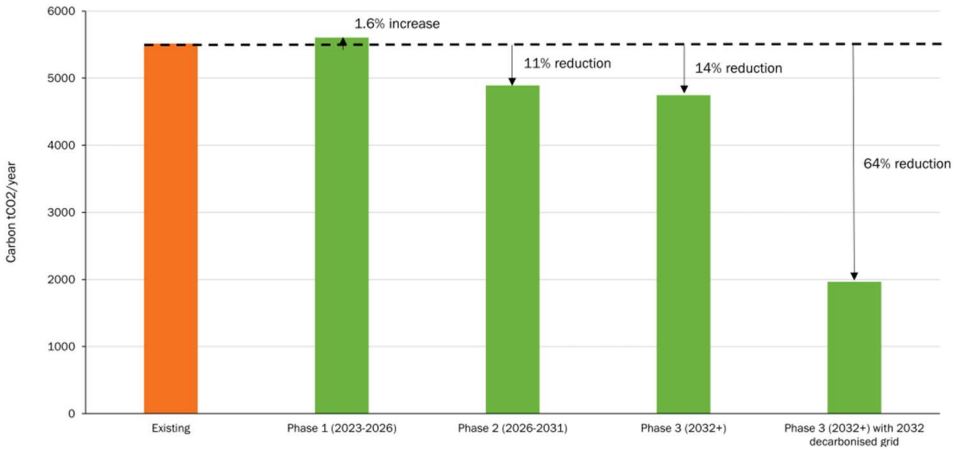


Figure 5: Sitewide carbon balance over time for scope 1 and 2 emissions, combined for London and Whipsnade

Regents Park carbon balance – area weighted:

- Absolute emissions decrease over time as the strategic plan progresses.
- When normalised by area, this decrease can be seen to be more significant on a per square meter basis, as shown in Figure 6.

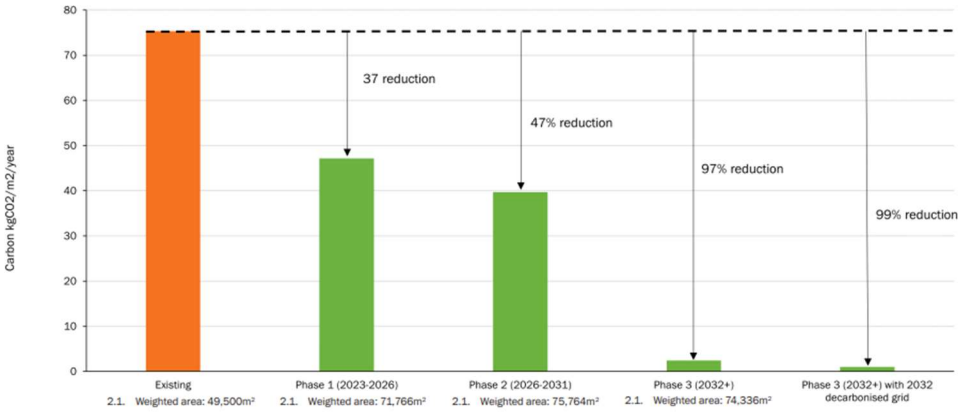


Figure 6: Regents Park area weighted sitewide carbon trajectory showing carbon performance over time (weighted area changes across phases as buildings are built and demolished)

Whipsnade carbon balance – area weighted:

- There is an uplift in absolute carbon emissions during early projects at Whipsnade. This is due to predicted energy usage by large new buildings being planned.
- When normalised by area however, carbon emissions decrease over time on a per square meter basis as should be expected as buildings are refurbished, move away from fossil fuels to be all-electric and new buildings constructed to a high standard.

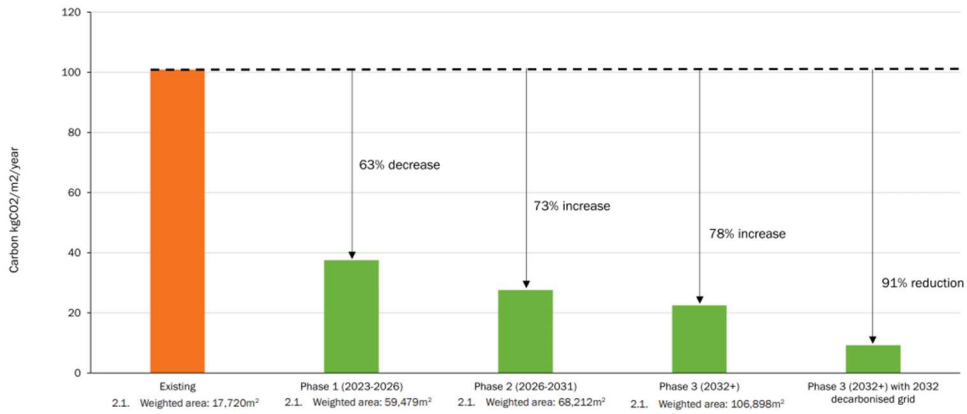


Figure 7: Whipsnade area weighted sitewide carbon trajectory showing carbon performance over time (weighted area changes across phases as buildings are built and demolished)

6. Renewable energy purchasing

For a number of years all the electricity ZSL purchases for its two zoos is on a renewable electricity tariff backed by Renewable Energy Guarantee of Origin (REGO) certificates. We will continue to do so, and as our carbon footprint is lower when using the market-based method, we will account for emissions from this via dual-reporting (location-based and market-based) as recommended in the Greenhouse Gas Protocol guidance and UK Government's Environmental Reporting Guidance. This dual-reporting ensures we continue our focus on efficiency measures to reduce electricity consumption within our direct control.

7. Mitigate: Carbon Offsetting and Insetting Policy

Our priority is reducing emissions as low as we can, as quickly as we can, through the actions outlined in this plan and associated policies. Alignment with the SBTi absolute emissions reduction pathway means our target is a minimum 50% reduce in carbon emission by 2030. However, it will likely not be possible to avoid all carbon emissions, especially since we include wider scope 3 indirect emissions in our footprint, until there is a wider societal shift into a low-carbon economy.

We will review carbon offsetting opportunities for residual carbon emissions where it is genuinely not possible to reduce, and we will look to develop a robust carbon removals / compensation policy reflecting our expertise in nature-based solutions and blue carbon methodologies – this policy will identify and set rigorous requirements for any voluntary carbon offsets we may select.

Where possible, we will aim to develop projects that enhance carbon sinks linked to our field conservation work in either the UK or overseas, rather than purchasing carbon credits on the voluntary market. This could allow ZSL to reach net zero while maximising biodiversity and other co-benefits within our value chain, and supporting our world-leading conservation work through nature restoration.

8. Engaging suppliers and managing supply chain impacts

ZSL has integrated ethical and environmental clauses into our Invitation to Tender document and our Supplier Code of Conduct to ensure our values are reflected in the suppliers with whom we do business. This includes ensuring their businesses, products and services are prioritising reducing energy consumption and carbon emissions.

The procurement of goods and services is estimated to account for over 55% of our total carbon footprint. To support the development of a carbon target for our supply chain, we have conducted an assessment with our top suppliers, to gauge how they are measuring and reporting their carbon emissions.

Via our supplier sustainability assessment, we contacted 142 suppliers, and of the 66 who responded:

- 47% have made a public commitment to respond to the climate emergency
- 33% measure and/or report on their organisation's carbon footprint
- 32% already have time-bound energy / carbon reduction plans
- 61% would be willing to work with ZSL to introduce a system to provide us with information on carbon emissions related to spend on the goods or services we buy.

We will engage with our top suppliers to seek ways to improve the accuracy of how we measure and report on carbon emissions associated with goods and services we purchase, with the goal of establishing and driving quantifiable reductions.

We will explore the available options including technology solutions for doing this and will encourage our suppliers to set their own emission reduction targets aligned to climate-science. Where appropriate, we will implement this by ensuring that sustainability criteria are built into the specification and tender evaluations, relevant to the items being purchased, including a requirement for suppliers to develop and publish a carbon reduction plan.

9. Other actions necessary to embed effective carbon management

Carbon Maturity Model:

The Carbon Management Maturity model shown at **Appendix B** has been adapted from a generic Carbon Trust template. It is used as an indicative guideline to help improve performance, showing elements across various themes that ideally should be in place for an organisation to effectively manage and reduce its carbon footprint. Shaded boxes indicate an assessment of ZSL's current position, helping to identify which areas need more attention, and where there may be barriers to progress.

Carbon management plan financing:

An appropriate level of resource, including both project funding and staff capacity, will need to be allocated to progress the significant amount of work involved in delivering the carbon reduction actions identified to achieve the ambitious commitments ZSL has made.

It is assumed that funds for many of the identified initiatives may be allocated in the long-term through the Masterplanning implementation process, through the capital plans, or in the short-term through minor works budgets to address smaller issues.

External sources of funding will be investigated and sought as supporting funding wherever possible.

Governance and responsibilities:

To ensure ZSL makes sustained progress in reducing carbon emissions across the organisation, it will be necessary to review governance arrangements to ensure the correct over-sight. To maintain

momentum and action over the longer term, an effective governance structure should be put in place.

Senior Leadership will need to ensure there is Executive-driven management of the carbon reduction plan and cross-functional accountability. This should include defined roles and responsibilities clearly allocated for each function and at all levels of the organisation, and progress appropriately monitored and reviewed in relation to climate-related risks and opportunities.

Appendix A: Scope 3 categories and applicability to ZSL

Category	Scope 3 Category	Applicability	Inclusion	Scope of inclusion
1	Purchased goods and services	Yes	No (only in baseline)	Estimated using a spend-based method and secondary data (industry average) emission factors. Total is calculated using the Higher Education Supply Chain Emissions Tool (HESCET), with carbon estimated based on spend against Proc HE codes mapped to DEFRA category conversion factors. ZSL acknowledges that using this tool with a financial proxy only produces a broad assessment which allows us to identify areas of priorities for action.
2	Capital goods	Yes	Not yet separately reported	We will look into the emissions associated with our capital goods but have not disclosed these emissions separately within this year's data report, we will seek to clarify any ambiguity over capital goods included within Purchased goods and services, and report separately only if required to avoid double counting,
3	Fuel and energy related activities (not included in scope 1 or 2)	Yes	Yes	WTT and T&D calculated in relation to Scope 1 and 2 using the UK Government emissions conversion factors for greenhouse gas company reporting
4	Upstream transport and distribution	Yes	Yes	Accounted for in category 1 in relation to Purchased goods and services emissions calculated using UK Government emissions conversion factors for greenhouse gas company reporting
5	Waste generated in operations	Yes	Yes	Calculated using UK Government emission conversion factors for greenhouse gas company reporting
6	Business travel in non-owned vehicles	Yes	Yes	Calculated for ZSL UK or Overseas based teams for trips recorded on internal Travel Authorisation Forms, using distance-based method to estimate emissions on distance and mode. (Scope 1 business travel for fuel used in company vehicles is calculated separately). Other business travel is obtained from mileage claim records submitted by staff. (Certain international trips are recorded by our travel management companies, but this is a duplicate of TAF records, so is not used).
7	Employee / volunteer commuting, and visitor travel	Yes	Not yet reported	Not currently reported in our data report. We will look to increase our coverage in future reports, and develop an approach to quantify commuting and visitor travel emissions.
8	Upstream leased assets	Yes	Yes	Reported as part of our Scope 1 & 2 emissions for any buildings leased by ZSL over which is has operational control
9	Downstream transport and distribution	No	N/A	ZSL manages the operation and development of two zoos in the UK, and various conservation projects. ZSL has not identified any material Scope 3 emissions associated with our operations to report for this category

10	Processing of sold products	No	N/A	ZSL retail shop only sells final not intermediate products. ZSL has not identified any material Scope 3 emissions associated with our operations to report under this category
11	Use of sold products	No	N/A	ZSL retail shop is responsible for some emissions from the disposal of sold products. However this is not deemed to be material, and therefore we have not included these emissions in our data boundary
12	End of life treatment of sold products	No	N/A	ZSL retail shop is responsible for some emissions from the disposal of sold products. However this is not deemed to be material, and therefore we have not included these emissions in our data boundary
13	Downstream leased assets	No	N/A	ZSL manages the operation and development of two zoos in the UK, and various conservation projects. ZSL has not identified any material Scope 3 emissions associated with our operations to report for this category
14	Franchises	No	N/A	ZSL manages the operation and development of two zoos in the UK, and various conservation projects. There are no relevant Scope 3 emissions associated with our operations to report for this category
15	Investments	Yes	Not yet reported	ZSL is not a financial institution and whilst we have limited investments including paying into company pensions, the approach to measuring this for non-financial institutions is a nascent and evolving methodology, and not a mandatory category. For this reason, we have not yet included this optional category 15, instead currently focus on other scope 3 categories where we have more available data. ZSL has not yet conducted a carbon footprint evaluation of its investment portfolio, and we will look at how we can include this in future disclosures.

Zoological Society of London

Appendix B: Carbon Management Maturity Model

	Policy	Responsibility	Data Management	Communication & Training	Finance & Investment	Procurement	Monitoring & Evaluation
5	• SMART Targets signed off and implemented • Action Plan contains clear goals enabling regular progress reviews, with active commitment of top management • Strategy launched internally and to external stakeholders	• Accountability for carbon management, energy consumption and climate change is fully integrated into senior management structure i.e. DG and COOs • Carbon management is formally integrated into responsibilities of Directors and section and Department Heads • CMP objectives are a part of all post-holder descriptions	• Appropriate data granularity for monthly and quarterly analysis and reporting for all sources • Emissions data externally verified	• Training strategy & comms plan for all staff and volunteers being fully implemented, covering: Induction; ongoing training; communications • Appropriate and comprehensive training tailored to identified needs, with evaluation • Carbon management matters regularly communicated internally and to external stakeholders and partners	• CMP has granular & effective financing mechanisms for carbon managements projects • Finance representation on Carbon Strategy team • Resources routinely committed to energy efficiency in support of organisational objectives • Ring-fenced fund for carbon reduction initiatives	• All purchasing points trained to adhere to internal sustainable procurement criteria • Sustainability comprehensively integrated in all PQQ and tendering criteria • Whole life cycle and costing taken into account	• Board members and Senior Management review carbon management progress at least quarterly • Core team review CMP progress at least monthly • Intranet has 'live' dashboard of CMP progress for all staff and volunteers • Performance and analysis published externally on website
4	• Formal Policy but no active commitment from top management • SMART Targets developed but not implemented	• Carbon management is full-time responsibility of a few individuals • Carbon management including accountability for consumption and responsibility for improvement is integrated into responsibilities of some departmental managers, but not all staff	• **Annual collation of CO2e emissions for all main sources: Buildings; transport; water supply; waste.** • **Data internally reviewed**	• Formalised CMP communication & training plan in place on energy and carbon matters. Includes induction and ongoing communications • Energy training targeted at major users following training needs analysis	• Regular financing for carbon management projects • Some external financing • Sufficient task management mechanism • Same appraisal criteria used for energy efficiency as for other cost reduction projects	• Environmental requirements, including CMP objectives incorporated in tendering • Joint procuring between similar organisations • Supply chain engagement well underway with targets set	• Senior management and core teams regularly review CMP progress on: Actions; Profile & targets; New opportunities quantification; • Quarterly and annual reports made available
3	• **Specific Environmental or Sustainability Policy with a Climate Change reference**	• Carbon management is part-time responsibility of a few non-senior people • Carbon management is the responsibility of department 'champions' i.e. not a formal responsibility and with unclear authority	• Collation of CO2e emissions for limited scope i.e. buildings and some transport only	• Ad hoc internal training for selected people as required e.g. Environmental / energy group(s) • Some use of organisation communication channels to promote energy efficiency	• **Ad hoc financing for carbon management projects** • **Low or medium cost measures considered if short payback** • **Resources not allocated strategically in line with organisational sustainability objectives**	• Carbon requirements covered in selected PQQ and tender criteria but not in sufficient detail • Ad hoc internal purchasing approach so not all suppliers fully checked for carbon credentials • Developing engagement with key suppliers	• Regular CMP review by Managers including: • Policies & strategies; Targets; Action Plans • Periodic reports to Directors and Board members
2	• No Policy • Climate Change aspiration • An unwritten set of guidelines	• **Carbon management is part-time responsibility of an individual** • **No departmental champions** • **Informal, mostly focused on energy supply**	• No CO2e emissions data compiled • Energy data compiled on a regular basis	• **Periodic poster / awareness campaigns** • **Ad hoc informal carbon management and energy efficiency communications to staff and volunteers** • **Low levels of CMP awareness** • **Technical staff occasionally attend specialist courses**	• Some internal financing for carbon or energy management related projects • Limited task coordination of resources • Only low or no cost measures taken	• **Low-carbon criteria occasionally considered** • **Products & services considered in isolation from supply chain issues** • **Little engagement with suppliers**	• **Ad hoc reviews of carbon management actions / progress against targets**
1	• No Policy • No Climate Change aspiration	• No individual responsibility for carbon or energy management	• Energy and CO2e emissions data not compiled	• No communication or promotion of energy issues, no energy related staff training provided	• No internal financing or funding for CM related projects • No investment in improving energy efficiency	• No climate or carbon related consideration • No life cycle impacts assessment or costing	• No carbon management monitoring

Glossary of Terms

1.5°C aligned: Target is aligned with scenarios that yield a long-term warming outcome of below 1.5°C with some probability and some amount of overshoot

Absolute zero: No greenhouse gas emissions are attributable to an actor's activities across all scopes. No offsets or balancing of residual emissions with removals are used.

BREEAM: Building Research Establishment Environmental Assessment Method, a sustainability assessment method and rating scheme for construction and refurbishment projects

Business travel: Transportation of employees for business-related activities.

Carbon dioxide (CO_2): One of the main greenhouse gases that contribute to global warming

Carbon dioxide equivalent (CO_2e): The universal unit to indicate the global warming potential of all greenhouse gases, including gases such as methane and nitrous oxide, expressed in terms of the global warming potential of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.

Direct emissions: Emissions from sources that are owned or controlled by the reporting company.

Emission factor: a factor that converts activity data into GHG emission data (e.g. kg CO_2e emitted per litre of fuel consumed, kg CO_2e emitted per mile travelled etc).

Employee commuting: Transportation of employees between their homes and their worksites.

Fuel- and energy- related activities: Upstream emissions of purchased fuels or energy (including extraction, production, and transportation of fuels and energy purchased by the reporting company) *see also 'Transmission & distribution (T&D) losses', 'Well-to-tank (WTT) losses'*

Greenhouse gas (GHG) emissions: Gases emitted from fuel combustion and other sources that contribute to the greenhouse effect and global warming. These include carbon dioxide, methane, nitrous oxide, ozone and chlorofluorocarbons.

Greenhouse gas inventory: A quantified list of an organisation's GHG emissions and sources.

Greenhouse Gas Protocol: Establishes comprehensive global standardised frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions.

Indirect emissions: Emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.

Intergovernmental Panel on Climate Change (IPCC): The United Nations body for assessing the science related to climate change.

Location-based emissions: The location-based method for calculating carbon emissions uses average carbon emission factors for each kWh of electricity we use, regardless of its origin or the tariff we have chosen. This means it does not take into account our purchasing of renewable electricity.

Market-based emissions: The market-based method for calculating carbon emissions takes into account the electricity we have purchased from renewable sources and assigns it zero carbon emissions. As ZSL purchases renewable power, our carbon footprint is lower when using the market-based method.

Net zero: A state in which the greenhouse gases going into the atmosphere are balanced by removal out of the atmosphere.

Operational boundaries: The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company.

Operational control: A consolidation approach whereby a company accounts for 100% of the GHG emissions over time over which it has operational control. It does not account for GHG emissions from operations in which it owns an interest but does not have operational control.

Offsetting: Reducing GHG emissions (including through avoided emissions) or increasing GHG removals through activities external to an actor, in order to compensate for GHG emissions, such that an actor's net contribution to global emissions is reduced. Offsetting is typically arranged through a marketplace for carbon credits or other exchange mechanism. Offsetting claims are only valid under a rigorous set of conditions, including that the reductions/ removals involved are additional, not over-estimated and exclusively claimed. Further, offsetting can only be used to claim net zero status to the extent it is 'like for like' with any residual emissions.

Power Purchase Agreement (PPA): A contract of sale of energy between an energy producer and customer.

Purchased goods and services: Extraction, production and transportation of goods and services purchased or acquired by the reporting company in the reporting year.

Science-based/Paris-aligned: Target is aligned with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well below 2°C above preindustrial levels and pursuing efforts to limit warming to 1.5°C, with no or low overshoot.

Science Based Targets initiative (SBTi): Science-based targets show companies how much and how quickly they need to reduce their GHG emissions to prevent the worst effects of climate change.

Scope 1 emissions: Direct company owned or controlled emissions occurring at source.

Scope 2 emissions: Emissions from the generation of purchased energy consumed by a company.

Scope 3 emissions: Indirect emissions associated with company activities from sources not owned or controlled by a company.

Sink: A reservoir (natural or human, in soil, ocean and plants) where a GHG, an aerosol or a precursor of a GHG is stored.

SKA rating: An environmental assessment method, benchmark and standard for non-domestic fit-out construction projects led by the Royal Institution of Chartered Surveyors

Sustainable Development Goals (SDGs): The 17 global goals for development for all countries established by the United Nations through a participatory process and detailed in the 2030 Agenda for Sustainable Development.

Transmission and distribution (T&D) losses: indirect emissions associated with generation of electricity that is lost in a T&D system between the point of generation and the end user.

Well-to-tank (WTT) losses: indirect emissions from the extraction, refining and transportation of fuels before they are used in electricity generation.