

ABOUT US SUSTAINABILITY JOURNEY

OUR APPROACH, DESIGN ELEMENTS, MEASURING & CONCLUSION

OUR APPROACH

FORECASTING, TEAM COLLABORATION, EDUCATION

Our primary focus was to reduce impact,
aligning to science-based targets

STRATEGY

BEING DATA-LED WHEN APPROACHING CARBON REDUCTIONS

About Us is a touring large scale public art event combining multimedia installations with animation, poetry, original music and live performance to explore the myriad connections between us, our planet, and the wider cosmos. The live show uses animation and projection mapping to transform buildings and landmarks in five towns and cities across the UK into vast canvases on which we tell the story of 13.8 billion years of hyper-connected history.

The About Us project has been a fantastic opportunity for us to research and develop our sustainability strategies tailored to the various natures of our projects and find ways to act that are relevant to our own architectural, design, technical and production practices. For the first time, we had an in-house dedicated team member for sustainability, which made this approach possible.

Our strategy is to take a data-led approach when making decisions and anchoring our sustainability work in science-based targets. To implement this, we wanted a strong and as accurate as possible picture of where the carbon emissions of the project would be coming from and where efforts should be focused to reduce impact from the start. It was important for us to measure all we could, regardless of scopes and what was technically our responsibility and what was not - so we could make educated holistic decisions and bring our collaborators on this journey.

On top of carbon footprint analysis, as a design company, it was always important to us to follow circular economy principles and implement the re-use, re-purpose, and recycling hierarchy in our project, and ensure we have designed out waste and pollution, building a durable structure, and picking materials that would help and go towards a regenerative nature. On this point, we have been balancing out carbon emissions and circular economy, searching for areas where these two collided and worked together.

At the core of this strategy is to follow research, learn from it, and apply data-led learnings to our decision-making. We are working on a 50% reduction of emissions by 2030 based on a 2019 baseline.



FORECASTING

BEING DATA-LED WHEN APPROACHING CARBON REDUCTIONS

TOTAL FORECAST: 150 TONNES OF CO₂e

We anticipated the total emissions of the project to be 150 tonnes of CO₂e. Energy (34% - 51 tonnes) and Materials (24% - 36 tonnes) appeared to be our biggest issues and became our primary areas of focus.

WHAT WE MEASURED

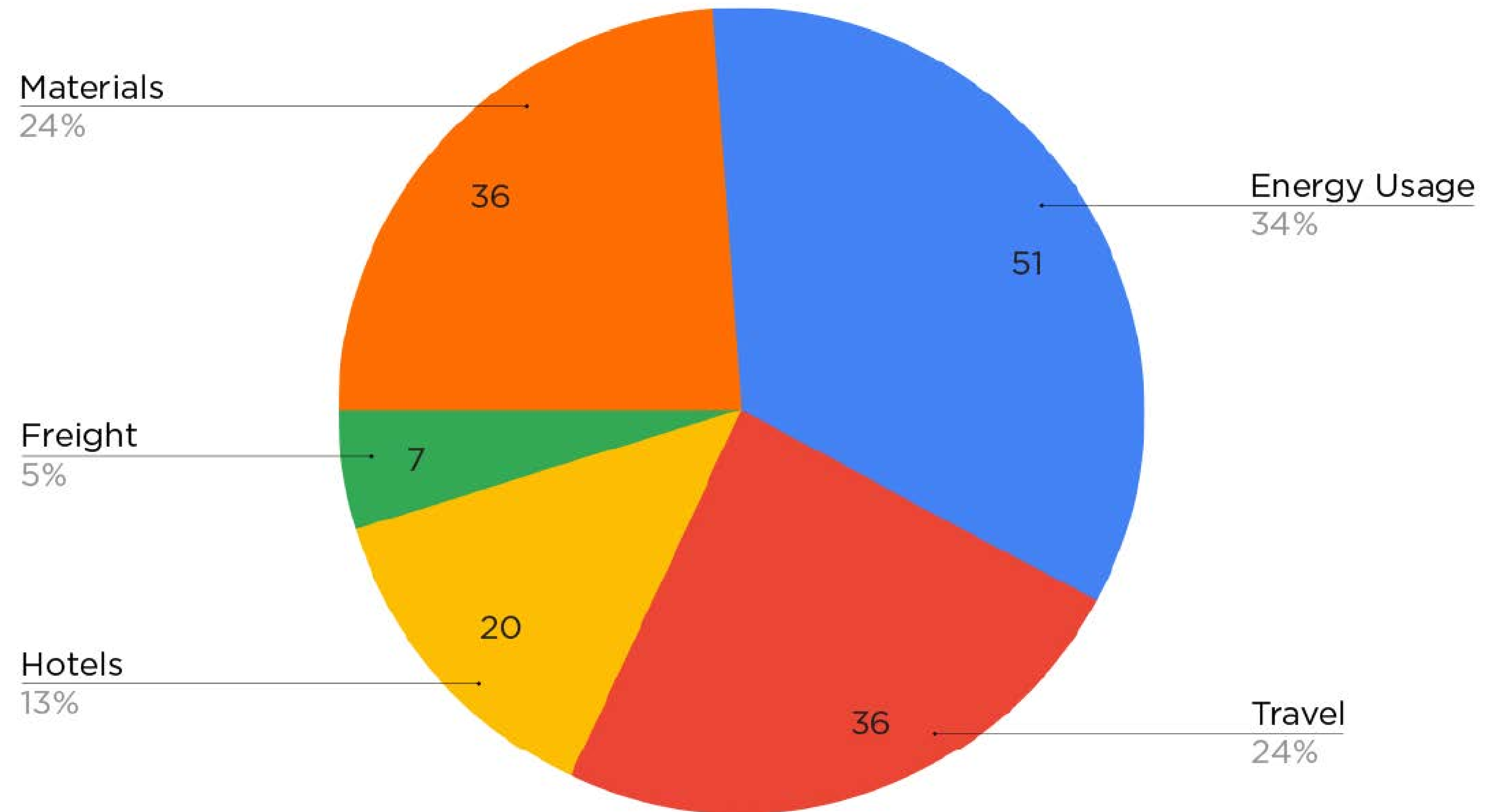
On energy, our baseline assumption was using diesel generators - the business-as-usual standard. To quantify the energy quantity required, we used the technical specifications of our AV and lighting equipment kit list. We looked at different fuels (diesel, HVO), and energy sources (mains power, solar-powered batteries, and hydrogen fuel cells).

On team travel and hotel nights, we estimated travelled distance, compared different methods of transport options, and anticipated nights spent at hotels with the production schedule. We also compared different star ratings' carbon footprint and staying on tour vs returning home mindful of the well-being consequences of such a rhythm.

On freight, we compared different truck sizes' environmental impact, picked lower-emission vehicles, and shared information with suppliers. We learnt it was preferable to use one more sizeable truck rather than two smaller ones on the road.

On material use, we used the prototype of our plinths to quantify what the 18 final plinths would consist of. Key parameters were that metals tend to have higher footprints, and source (i.e., Chinese steel vs German steel) will have a considerable impact on its carbon emissions. With plastics, using 100% recycled material will cut the total emissions by more than half - but the material will need to be thicker and heavier.

Forecasted tonnes CO₂e emissions per category



CLIMATE LEARNINGS

FIVE SESSIONS TO LEARN ABOUT: THE SCIENCE, SYSTEMS-THINKING, MORE-THAN-HUMANS, MATERIALS, PHYGITAL WORLD

We prepared five sessions to get the team up-to-date with current climate science understandings and main areas of interest in the field of sustainability. These were hosted on Zoom.

These calls were also opened to our project partners, The Poetry Society and Stemettes.

#1 CARBON & SCIENCE

The basics of Global Warming and Carbon Literacy

#2 SYSTEMS-THINKING

Looking at Circular Economy and Earth Systems feedback loops

#3 MORE-THAN-HUMANS

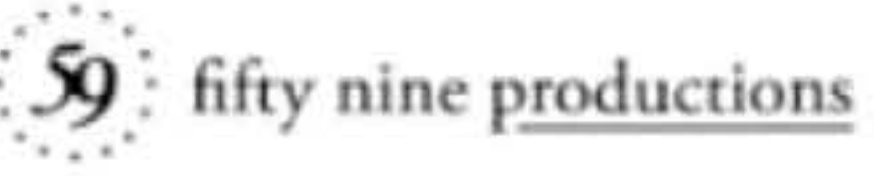
With the UN's Decade on Ecosystem Restoration, it is key to understand design's impact on biodiversity

#4 MATERIALS

Where things come from, how they are processed before they arrive finished

#5 PHYGITAL WORLD

Carbon impact of energy use and rare earth metals present in machines

CLIMATE LEARNINGS #1 

WHAT IS CO₂e: THE GREENHOUSE GASES' BIG FOUR

WITHOUT GREENHOUSE GASES, THE AVERAGE TEMPERATURE OF EARTH'S SURFACE WOULD BE ABOUT -18 °C (0 °F), RATHER THAN THE PRESENT AVERAGE OF 15 °C (59 °F) [SOURCE](#)

Gas	Percentage of CO ₂ e in 2016	Potency relative to CO ₂
Carbon Dioxide (CO ₂)	74.4%	1x
Methane (CH ₄)	17.3%	28x more potent than CO ₂
Nitrous Oxide (N ₂ O) aka LAUGHING GAS	6.2%	300x more potent than CO ₂
Ozone (O ₃)	-	1000x more potent than CO ₂

CARBON DIOXIDE (CO₂)

SOURCE/RISKS
Fossil fuel, decay, deforestation, ocean acidification

PROFILE
Sharp and acidic odor (like soda water) at high concentration
+ Colourless

EFFECTS ON HEALTH
Makes humans sleepy and *reduces nutrition* of food

LIFESPAN
Between 300 to 1,000 years

METHANE (CH₄)

SOURCE
Chemical processes, agriculture, livestock, landfills, waste, biomass, fossil fuel

PROFILE
Odorless + Colourless

EFFECTS ON HEALTH
Mood changes, slurred speech, vision problems, memory loss, nausea, vomiting, facial flushing and headache

LIFESPAN
17 years

NITROUS OXIDE (N₂O) aka LAUGHING GAS

SOURCE
Agriculture and livestock, fertilizers, energy combustion (cars), human sewage

PROFILE
Slight metallic scent and taste + Colourless

EFFECTS ON HEALTH
Anaesthetic and pain reducing, can lead to asthma on the long-term

LIFESPAN
110 years

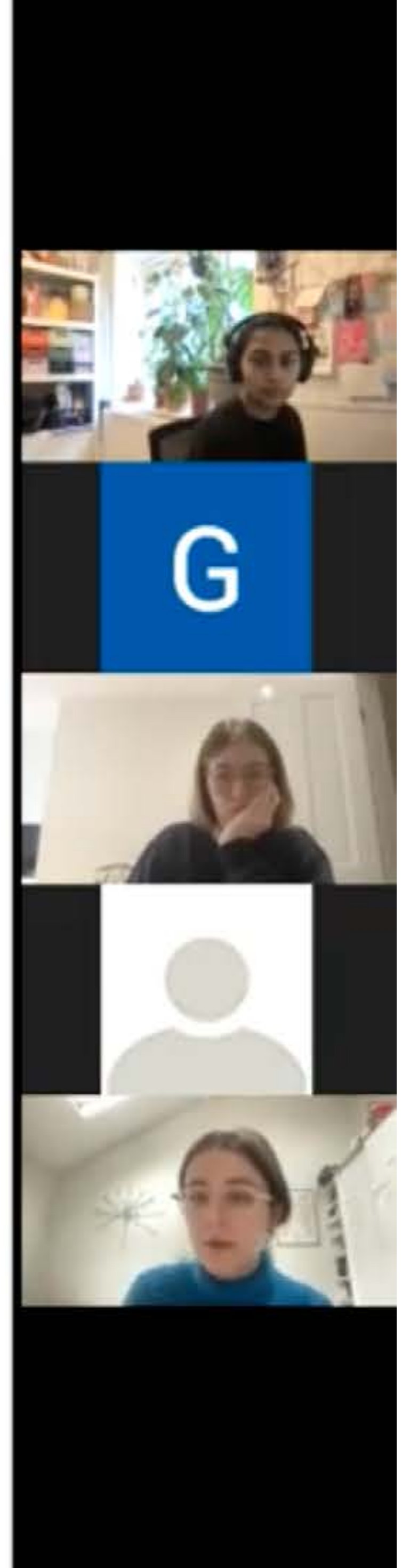
OZONE (O₃)

SOURCE
Cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight

PROFILE
Pungent smell (like chlorine) + Pale blue colour

EFFECTS ON HEALTH
Affects the respiratory, cardiovascular and central nervous system. Early death and problems in reproductive health and development and also vegetation

LIFESPAN
25 years



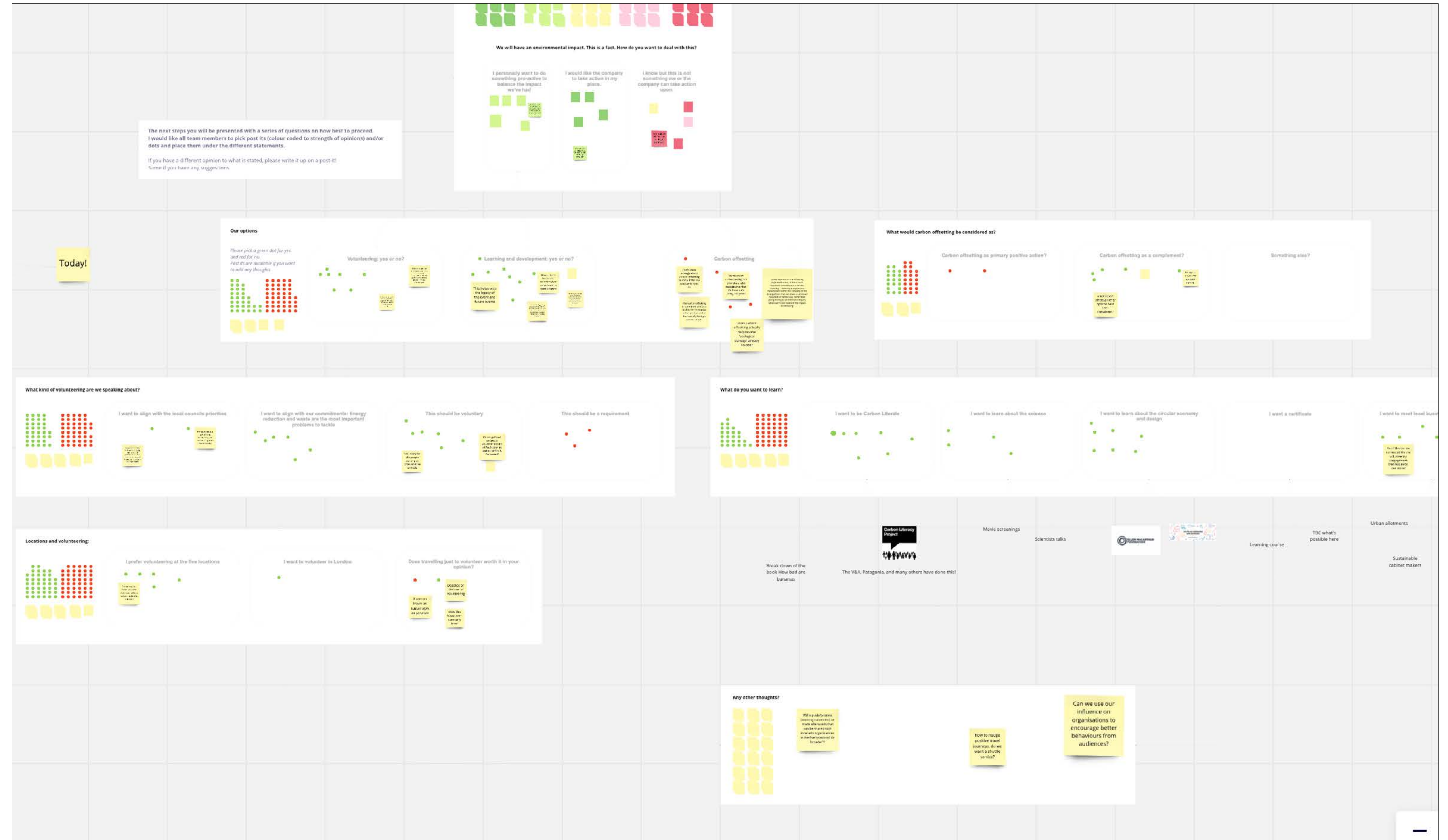
TEAM COLLABORATION

DEVELOPING A COLLECTIVE VISION

Building upon the Climate Learnings, it was important to us to make sustainability a collaborative process. This allowed to create a shared team vision on sustainability, and helped embed sustainability in every department at the company.

Meetings were hosted on the platform Miro. Key areas and questions that needed further strategy work were presented to the team, and the nature of the Miro platform allowed us to capture the feedback of the team, as well as their ideas and worries.

Smaller working groups were then able to take this data and make decisions that would not go against the desires of the team and ensure a democratic decision-making process. We strongly believe this helps reduce climate anxiety at work and give employees tools to feel empowered when discussing sustainability.

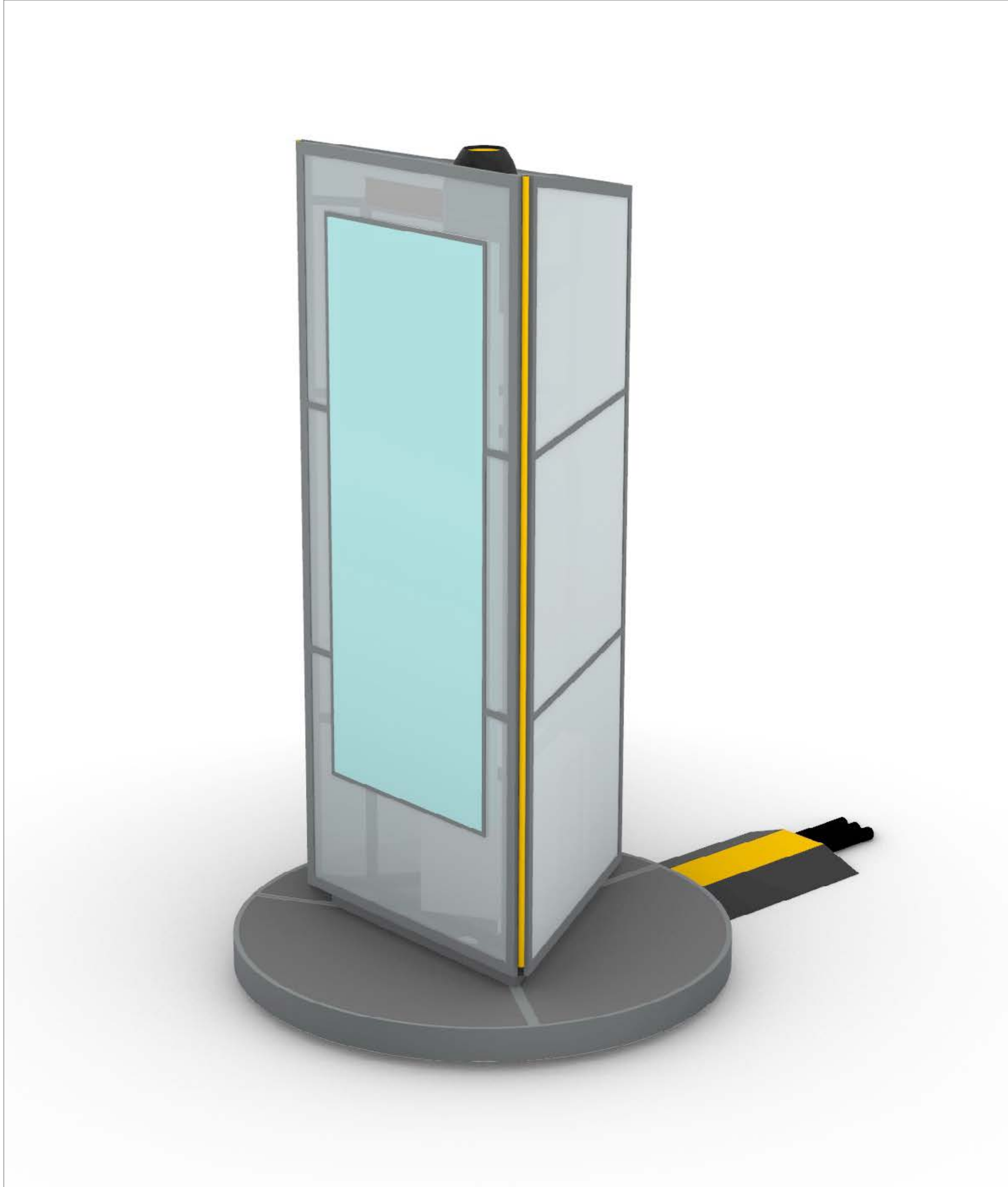


DESIGN ELEMENTS

IMPLEMENTING CIRCULAR ECONOMY

DESIGN FOR DISASSEMBLY AND NO WASTE TO LANDFILL

ANCHORING DESIGN IN CIRCULAR ECONOMY PRINCIPLES



PLASTICS

Smile Plastics, Swansea-based company, manufacturing plastics from UK waste from 100% recycled content. They can recycle in-house any offcuts or other pieces.

ALUMINIUM

Source unclear. 100% recyclable.

STEEL

Source unclear. 100% recyclable.

IRON

Source unclear. Will be re-used.

TIMBER/PLY

Certified. Combusted in biomass boiler in-house.

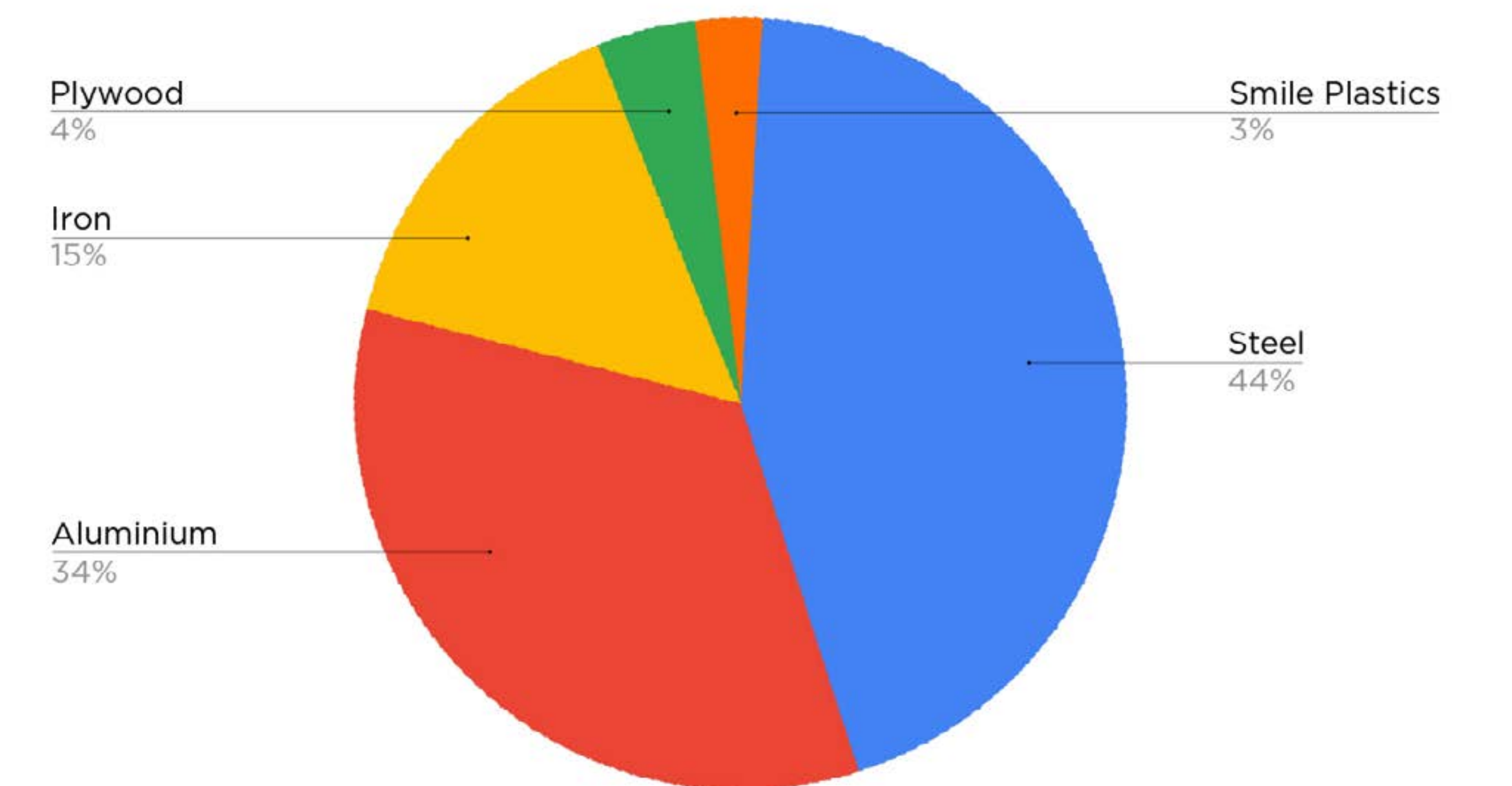
AV EQUIPMENT

Rented

AFTER LIFE

10 plinths have been sent to recycling. 8 plinths are kept in storage.

CO2e material breakdown per plinth



MODULAR TECH TOWERS

CHANGING THE USUAL SINGLE-USE PLASTIC WRAPPING

‘Tech towers’, the structures hosting the projectors for the show, are traditionally made with scaffolding surrounded by single-use wrapping plastic. This, unfortunately, does not align with circular economy principles, as the single-use plastics could not be recycled.

Through research realised with the technical department at 59 Productions, a company with a modular structure for these towers allowed us to remove the need for such plastics.

Moving to this modular structure allowed us to save approximately 7 tonnes of CO2e. We will take this modular structure onwards!



CABLE RAMPS

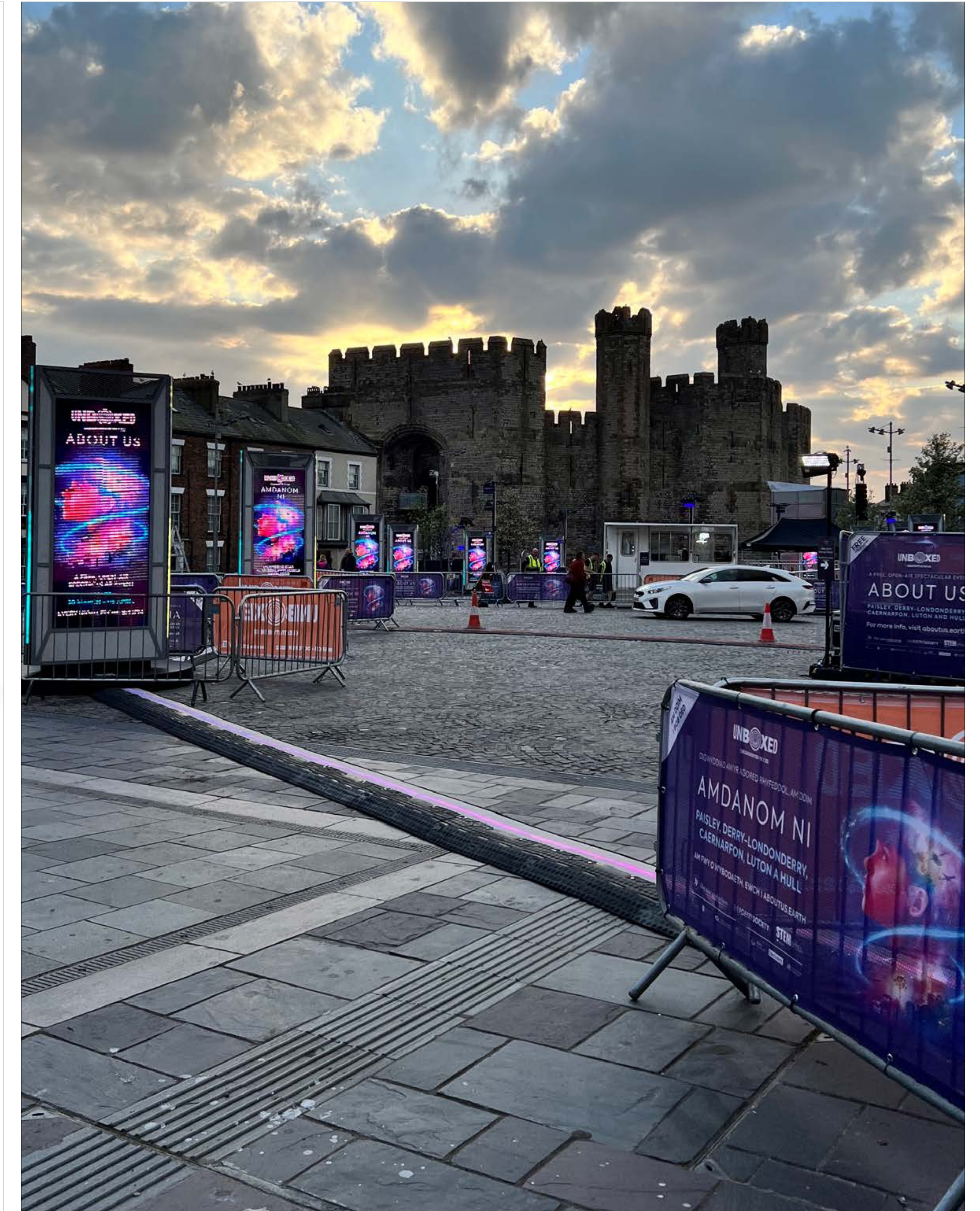
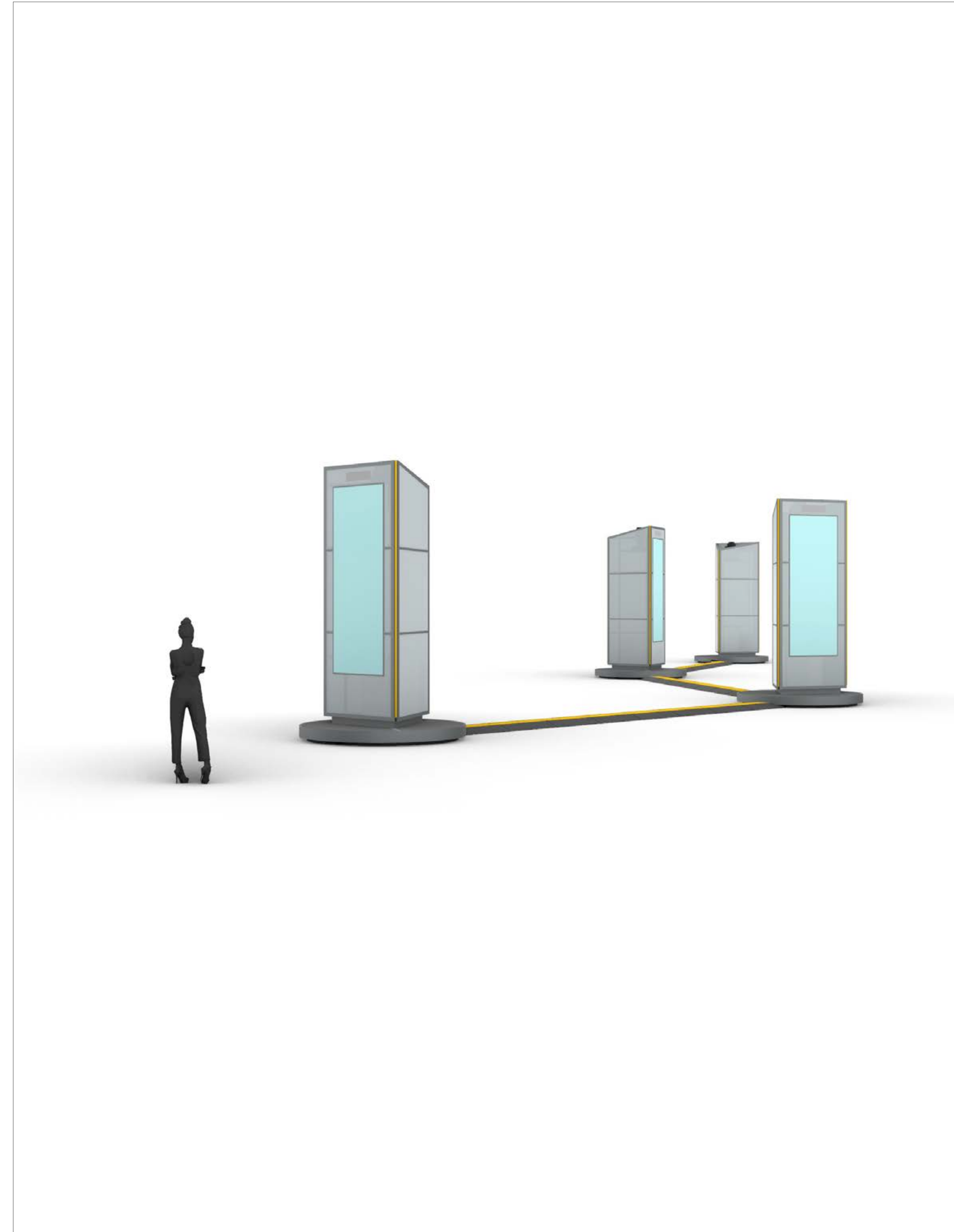
BESPOKE LIGHTING CABLE RAMPS

The cable ramps were a later addition to the design to help with lighting for the audience and overall experience, led by Health and Safety.

These cable ramps were bespoke to incorporate lights within their structure and were manufactured in Scotland.

Unfortunately, this later add meant it was a rushed process adding an unexpected 13 tonnes of CO₂e to our design.

To ensure circular economy principles were embedded, we collaborated with our supplier to minimise its end-of-life impact. The company was able to keep the bespoke ramp and adapt them to become standards ready to be re-used, which ensured waste was limited.

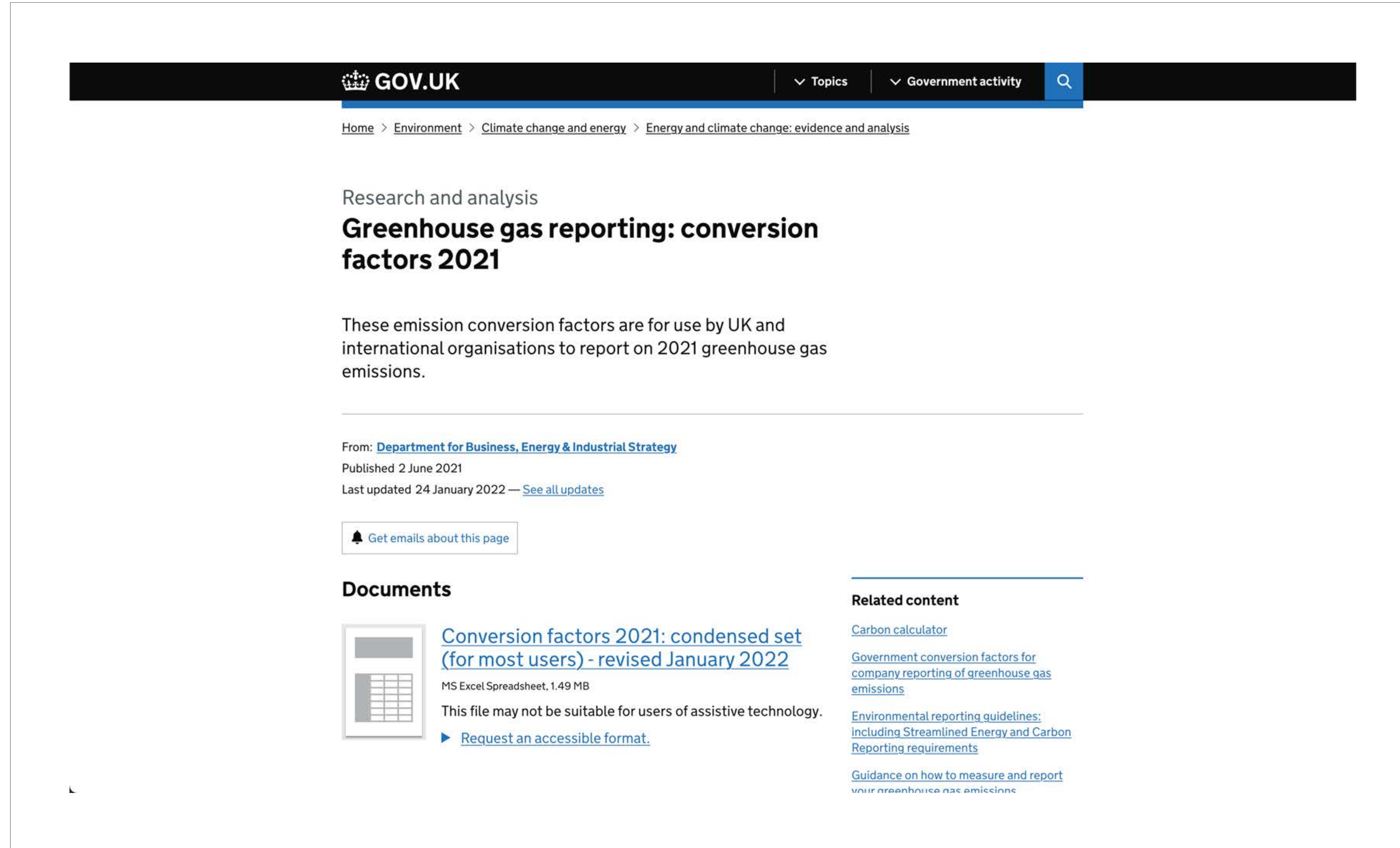


MEASURING

METHOD AND CAPTURE

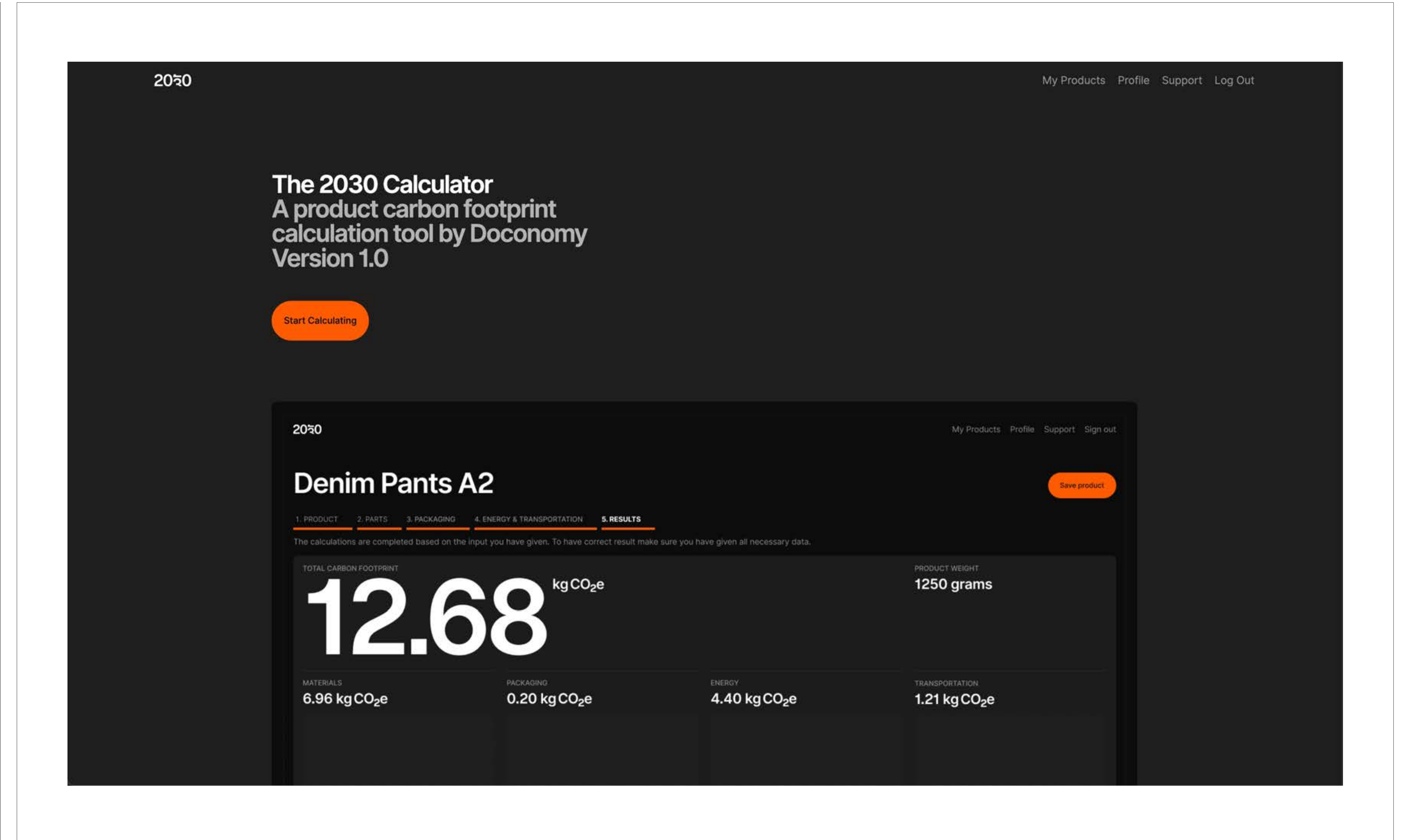
METHOD

DATA SOURCES IN USE



[BEIS conversion factors](#)

- BENEFITS**
- Transparent data
 - Covers many basics (travel, freight, hotels)
- DISADVANTAGES**
- Conversion factors of materials left to be desired
 - Conversion factors of waste left to be desired
 - Requires a good understanding of Scopes



[2030 Calculator](#)

- BENEFITS**
- The most comprehensive list of materials we have found
- DISADVANTAGES**
- Data is not transparent, measurements are made within the website and not outside of it

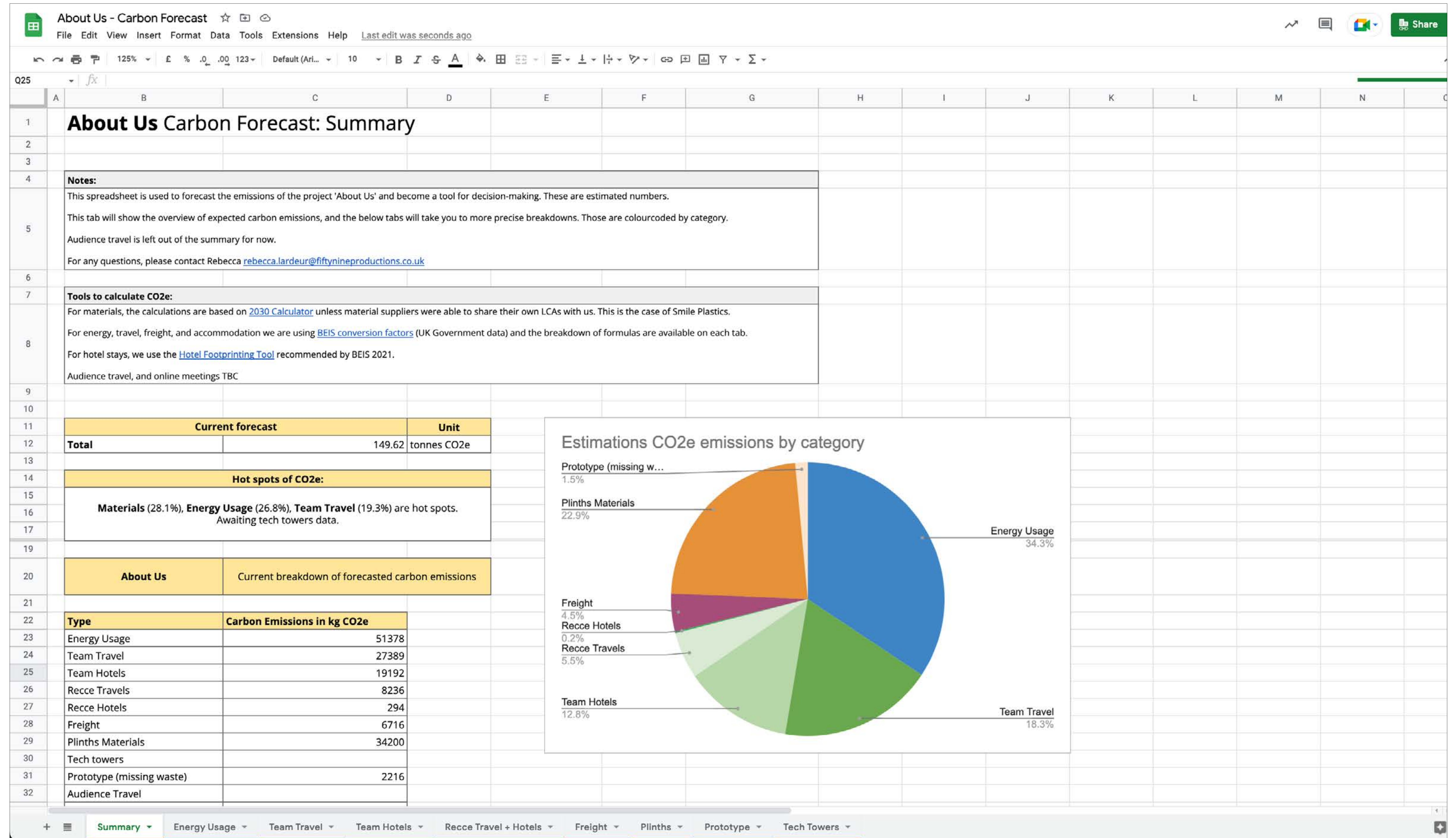
OUR SPREADSHEET

GOOGLE SPREADSHEET FOR EASY SHARING AND COLLABORATIONS

To measure our impact, we insert the carbon conversion factors mentioned in the previous slide and regrouped our data in a Google Spreadsheet. This platform allowed to share easily data with the team, and also with collaborators and suppliers for them to comprehend the approach taken.

All these calculations were done transparently and tabs were created to break down emissions type into categories: energy usage, team travel, team hotels, recce travel and hotels, freight, plinths, prototype, tech towers.

This acted as a bridge between data capture and data analysis and helped strengthen the team's ability to be carbon literate.



About Us Carbon Forecast: Summary

Notes:
 This spreadsheet is used to forecast the emissions of the project 'About Us' and become a tool for decision-making. These are estimated numbers.
 This tab will show the overview of expected carbon emissions, and the below tabs will take you to more precise breakdowns. Those are colourcoded by category.
 Audience travel is left out of the summary for now.
 For any questions, please contact Rebecca rebecca.lardeur@fifty-nineproductions.co.uk

Tools to calculate CO2e:
 For materials, the calculations are based on [2030 Calculator](#); unless material suppliers were able to share their own LCAs with us. This is the case of Smile Plastics.
 For energy, travel, freight, and accommodation we are using [BEIS conversion factors](#) (UK Government data) and the breakdown of formulas are available on each tab.
 For hotel stays, we use the [Hotel Footprinting Tool](#) recommended by BEIS 2021.
 Audience travel, and online meetings TBC.

Current forecast		Unit
Total	149.62	tonnes CO2e

Hot spots of CO2e:
 Materials (28.1%), Energy Usage (26.8%), Team Travel (19.3%) are hot spots.
 Awaiting tech towers data.

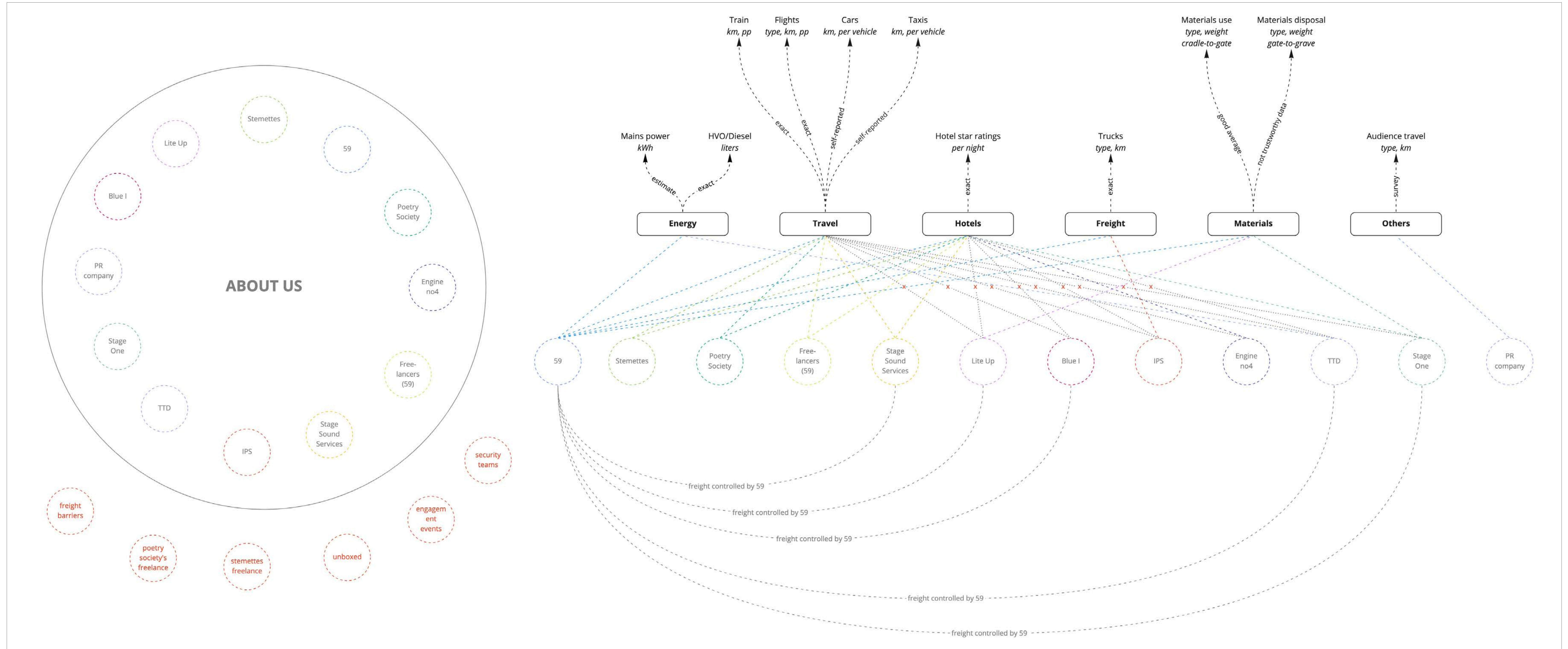
About Us		Current breakdown of forecasted carbon emissions
Type	Carbon Emissions in kg CO2e	
Energy Usage	51378	
Team Travel	27389	
Team Hotels	19192	
Recce Travels	8236	
Recce Hotels	294	
Freight	6716	
Plinths Materials	34200	
Tech towers		
Prototype (missing waste)	2216	
Audience Travel		

Estimations CO2e emissions by category

Category	Percentage
Energy Usage	34.3%
Team Travel	18.3%
Plinths Materials	22.9%
Team Hotels	12.8%
Freight	4.5%
Recce Travels	5.5%
Recce Hotels	0.2%
Prototype (missing waste)	1.5%

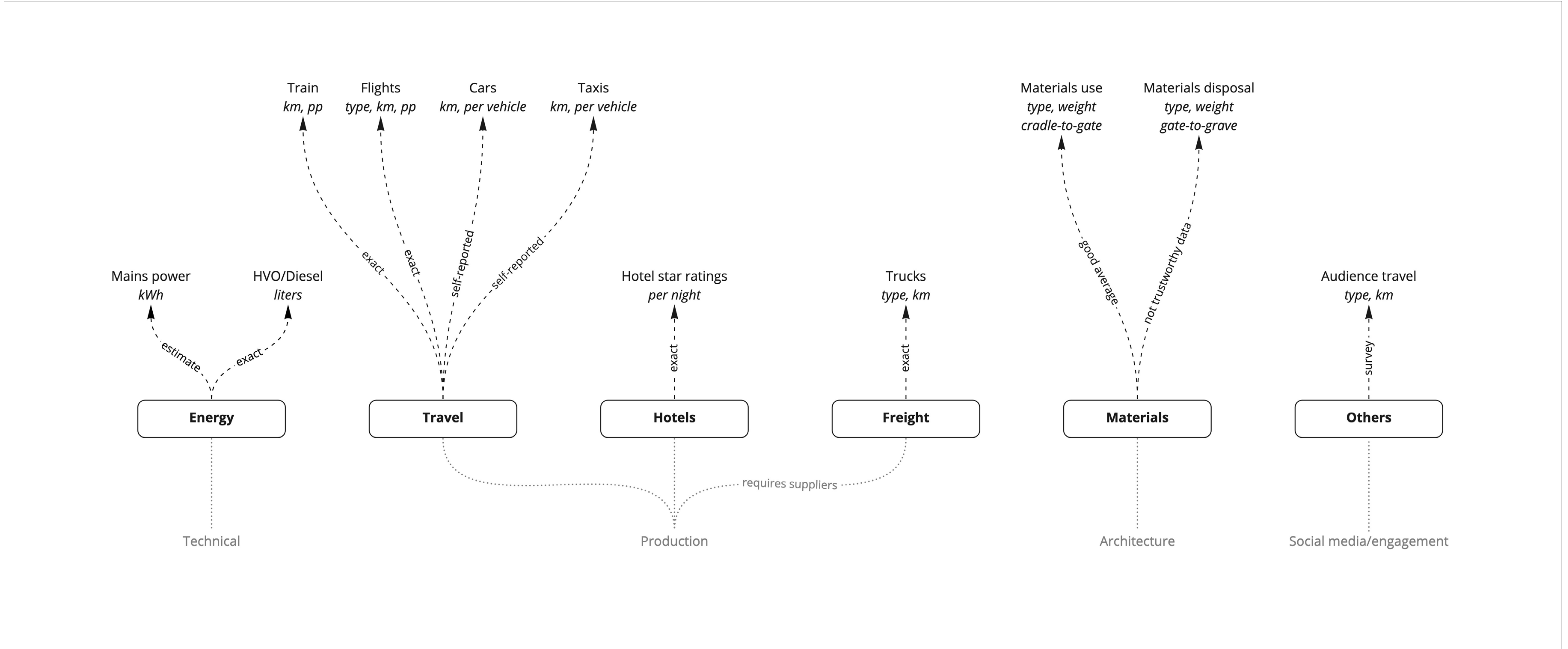
CAPTURED DATA WITH GAPS

LEFT: IN THE CIRCLE IS WHO WE GOT DATA FROM, IN RED WHAT WE DID NOT. RIGHT: DATA BROKEN DOWN BY TYPE AND STAKEHOLDER



INTERNAL DATA SHARING

RESPONSIBILITY WITHIN THE TEAM



CONCLUSION

ANALYSING RESULTS

CO₂e CARBON FOOTPRINT ANALYSIS

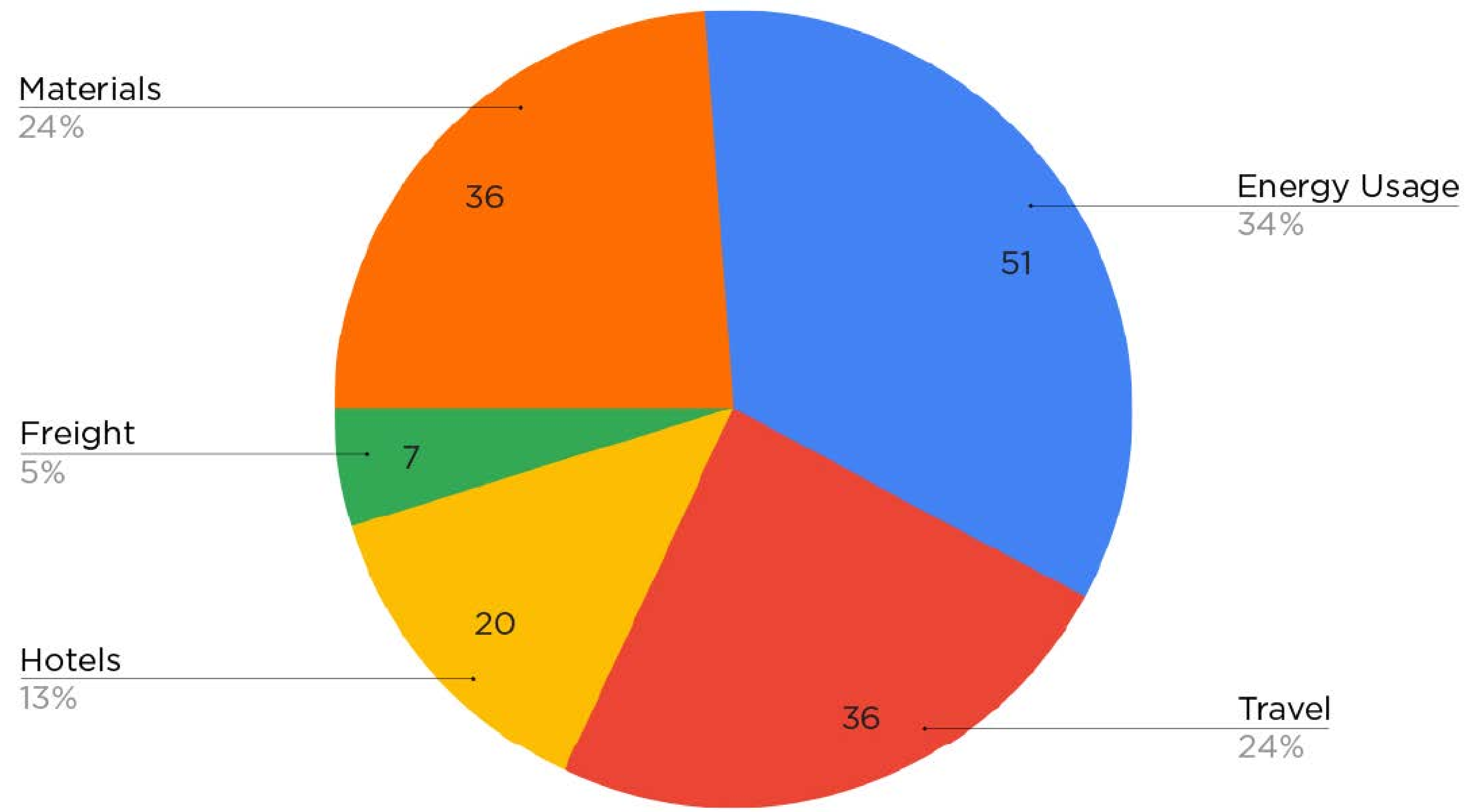
JUNE 2021 TO MAY 2022

215 tonnes of CO₂e

FORECAST VS RESULTS

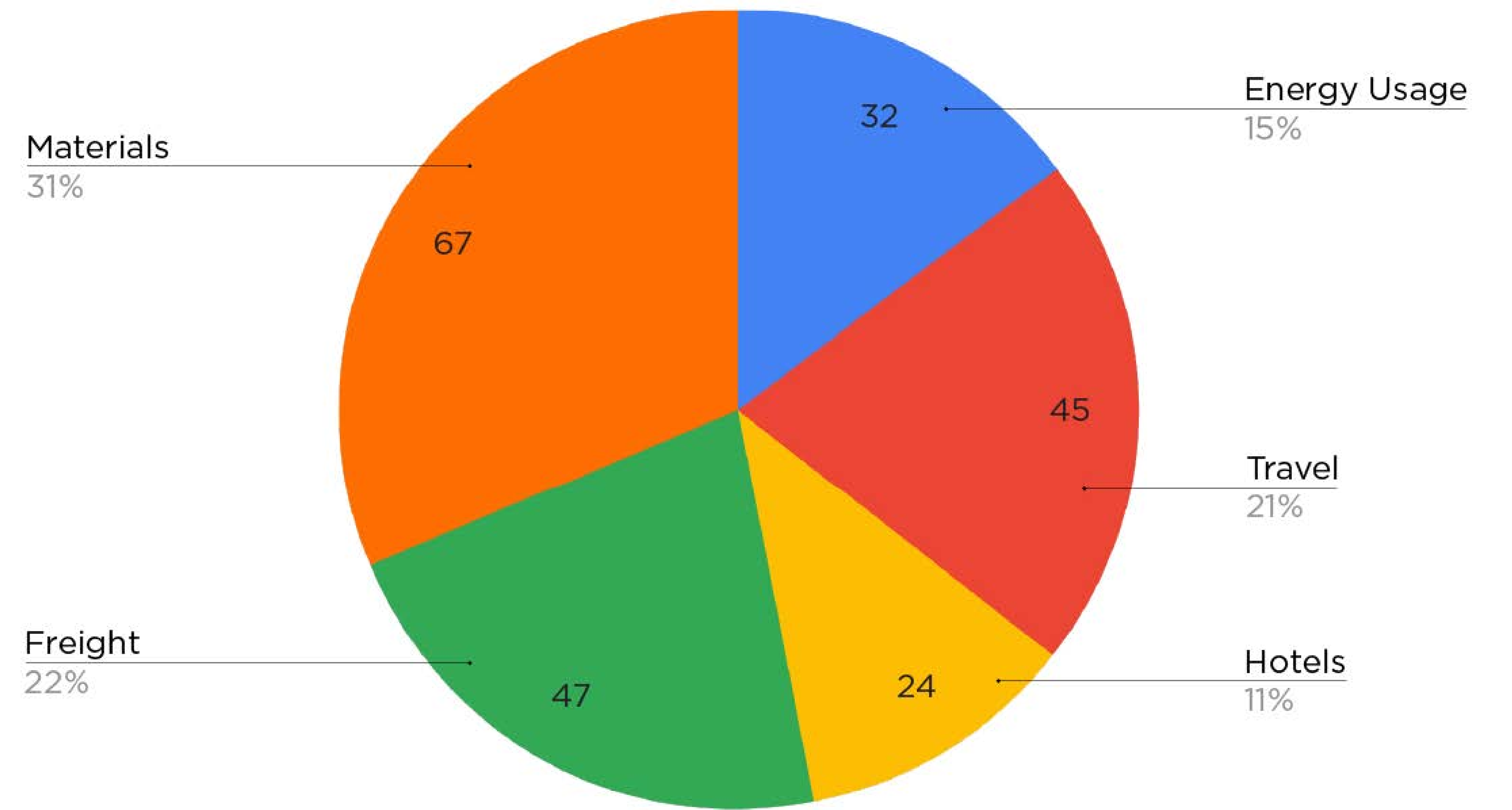
CARBON FOOTPRINT OF ABOUT US PER CATEGORY

Forecasted tonnes CO2e emissions per category



150 tonnes of CO2e

Tonnes CO2e emissions per category



215 tonnes of CO2e

SAVINGS AND EXCESS IN FORECASTING

WHERE WE SAVED AND WENT OVER

SAVINGS

SAVED 20 TONNES IN ENERGY BY SWITCHING DIESEL
TO HVO FUEL (FROM RECYCLED COOKING OIL)
& MAINS POWER

SAVED 6.8 TONNES IN SINGLE-USE PLASTICS,
AND 7.2 FROM USING RECYCLED PLASTICS

EXCESS

CHANGE IN THE TEAM AND MORE SUPPLIERS
ADDED TO TRAVEL/HOTELS

CABLE RAMPS (12.8 TONNES)

UNDERESTIMATED FREIGHT BY 7 TIMES

FINAL THOUGHTS

KEY TAKEAWAYS

The process of defining and delivering sustainable art projects is no easy task. It is something most art organisations are working on and are currently trying to figure out. It was important to us to share our successes and failures on this project with transparency, to exchange best practices and support each other. We believe this is the only way to get better.

We have identified places for improvement as well as final thoughts on certain matters, that you will be able to find below:

OVERALL:

- Concept/pre-production is a key stage to implement sustainability.
- The forecast and data flexibility helped disseminate information and eased the decision-making process within the team.
- Capturing data is a growing process, that gets refined after each project.

ENERGY:

- HVO fuel is harder to source in certain locations (i.e., North Wales was not possible)
- Hydrogen felt like a promising alternative, although due to size we were not able to use this in town centres.
- Mains power's kWh consumption is hard to measure without specific equipment.

TRAVEL & HOTELS:

- Greener travel methods need additional time and budget to work effectively.
- Hotels' carbon footprint is not an exact science.

FREIGHT:

- Flatpacking of set elements reduce carbon emissions by allowing for fewer trucks on the road.

MATERIALS:

- Implement circular economy further and earlier in the process.



CONCLUSION

MAIN TAKEAWAY

Key learning:
Sustainability needs to be embedded
throughout the process,
especially at the beginning



