CARBON AUDIT

2020

acme

2020
MISSION

ACME will continue to produce an annual Carbon Audit

ACME will offset the Carbon Footprint every year to achieve Net Zero

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ACME will seek to reduce the Carbon Footprint each year

ACME will work towards buildings that are Net Zero Carbon in construction & Carbon Free in use

2020
CARBON SUMMARY - LONDON & BERLIN

We have audited everything we have used in the London and Berlin office over the year.
Each element was converted to kg of Carbon based on generally published conversion factors, noted for each category.

46.8 tonnes

0.69 tonnes per employee

** Not inclusive of WFH / Renovation*

41,010
KWH OF GAS

$KgCO_2e/Kwh: 0.18$[1]
Enough to power 2.3 households a year

2019: 56,200

75,194
KWH OF ELECTRICITY

$KgCO_2e/Kwh: 0.23$[2]
Enough to power 20 households a year

2019: 37,156

62
KG OF COFFEE BEANS

$KgC0_2e/Kg: 17.8$[3]
8857 cups of coffee
130 cups per person

2019: 230

178/299
KITCHEN/TOILET ROLLS

Kitchen Roll
$KgC0_2e/Kg: 0.750$[4]
Toilet Paper
$KgC0_2e/Kg: 0.221$

2019: 560/978

285
LITRES OF MILK

$KgC0_2e/Ltr: 1.16$[5]
57k cups of tea with milk
838 cups per person

2019: 1,690

0.2
TONS OF PAPER

$KgC0_2e/Kg: 919$[6]
42,900 sheets of A4
630 per person

2019: 0.762

4,840
KM ON THE BUS

$KgCO_2e/Km: 0.0786$[7]
0.12 times around the Earth

2019: 38,512

48,313
KM ON THE TUBE

$KgCO_2e/Km: 0.0275$[8]
1.21 times around the Earth

2019: 120,054

67,124
KM ON THE TRAIN (COMMUTE)

$KgCO_2e/Km: 0.0369$[10]
1.67 times around the Earth

2019: 251,845

1,279
KM IN UBERS

$KgCO_2e/Km: 0.1714$[9]
0.61 times around the Earth

2019: 38,836

43,049
KM ON THE TRAIN (CORPORATE)

$KgCO_2e/Km: 0.0369$[10]
1.07 times around the Earth

2019: 251,845

58,470
KM BY AIR

$KgCO_2e/Km:$ [11]
Economy Short Haul - 0.1530
Economy Long Haul - 0.1462
Business Short Haul - 0.4239
Business Long Haul - 0.2295
1.46 times around the Earth

2019: 219,171

263
CM WATER SUPPLY

$KgCO_2e/Kwh: 0.344$[12]

263
CM WATER TREATMENT

$KgCO_2e/Kwh: 0.708$[12]

1,780
WASTE BAGS

$KgC0_2e/Kg: 0.033$[13]

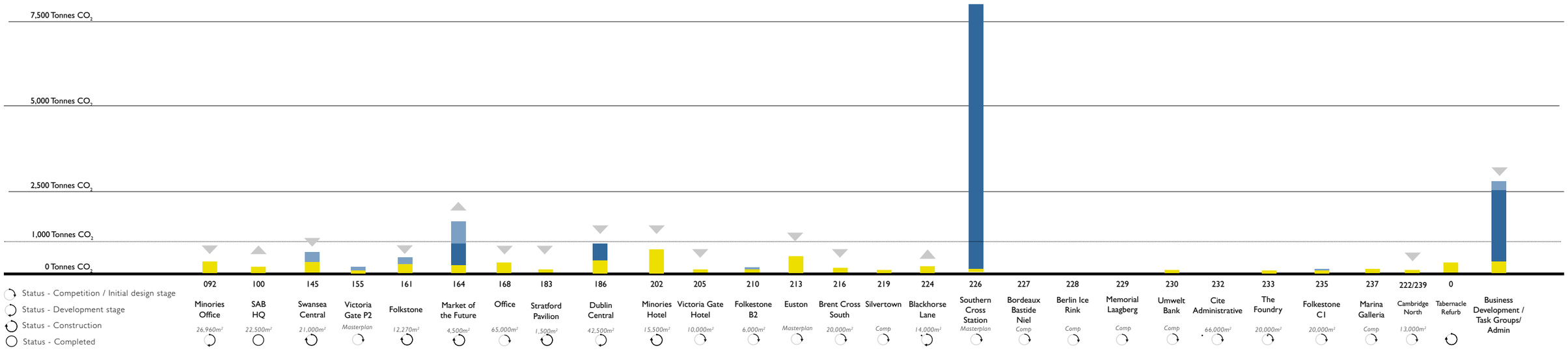
5.4
TONNES WASTE NON-RECYCLING

$KgC0_2e/Kg: 437.372$[13]

4.4
TONNES WASTE - RECYCLING

$KgC0_2e/Ltr: 21.317$[13]

2020
TRAVEL



PROJECT TRANSPORT

- Project Train Corporate
- Project Air Corporate
- Project Commute / Transport average (minus Air)

London Office Total:
Transport/Commuting (minus Air travel) : 3,735 KG Co2e
Corporate Travel (inc Air travel) : 10,992 KG Co2e
Berlin Office Total:
Transport/Commuting (minus Air travel) : 453 KG Co2e
Corporate Travel (inc Air travel) : 2,368 KG Co2e

This year office travel was significantly reduced mainly due to the impacts of Covid 19.
Corporate Travel made up 29% of Carbon .
Staff Commuting (mostly accounting for the pre-pandemic months) made up 9% of the total.
Office supplies accounted for the majority at 62.5% this year. (Not including WFH & Refurb figures)
Several employees worked from various locations abroad during the year. Carbon has not been accounted for these trips.

PROJECT FLIGHT LOCATION WORKING LOCATIONS

*Note Working Location Figures based on survey of 44 employees.

FLIGHT LOCATIONS 2020	WORK LOCATIONS 2020
AMSTERDAM	LONDON
BERLIN	BERLIN
BORDEAUX	
BRUSSELS	BUCKINGHAMSHIRE
DUBLIN	CZECH REPUBLIC
FRANKFURT	DORSET
LYON	GREECE
MELBOURNE	HONG KONG
NICE	WILTSHIRE
PARIS	JAPAN
TOULOUSE	PORTUGAL
	SINGAPORE
	YORKSHIRE

2020
WORKING FROM HOME

We have audit items that are normally consumed in the office but which have been consumed at home for the period of 2020 where the office was working from home due to Covid.
Each element was converted to kg of Carbon based on generally published conversion factors, noted for each category.

26.7 tonnes

0.39 tonnes per employee

** WFH London and Berlin*

104,027

KWH OF GAS[1][6]

$KgCO_2e/Kwh: 0.18$[1]
Enough to power 5.8 households a year

14,746

KWH OF ELECTRICITY[1][6]

$KgCO_2e/Kwh: 0.23$[2]
Enough to power 3.9 households a year

203

KG OF COFFEE BEANS[3]

$KgC0_2e/Kg: 17.8$[3]
24,428 cups of coffee
359 cups per person

314/472

KITCHEN/TOILET ROLLS[4]

Kitchen Roll
$KgC0_2e/Kg: 0.750$[4]
Toilet Paper
$KgC0_2e/Kg: 0.221$

806

LITRES OF MILK[5]

$KgC0_2e/Ltr: 1.16$[5]
99k cups of tea with milk
1453 cups per person

0

TONS OF PAPER[6]

$KgC0_2e/Kg: 919$[6]

Additional

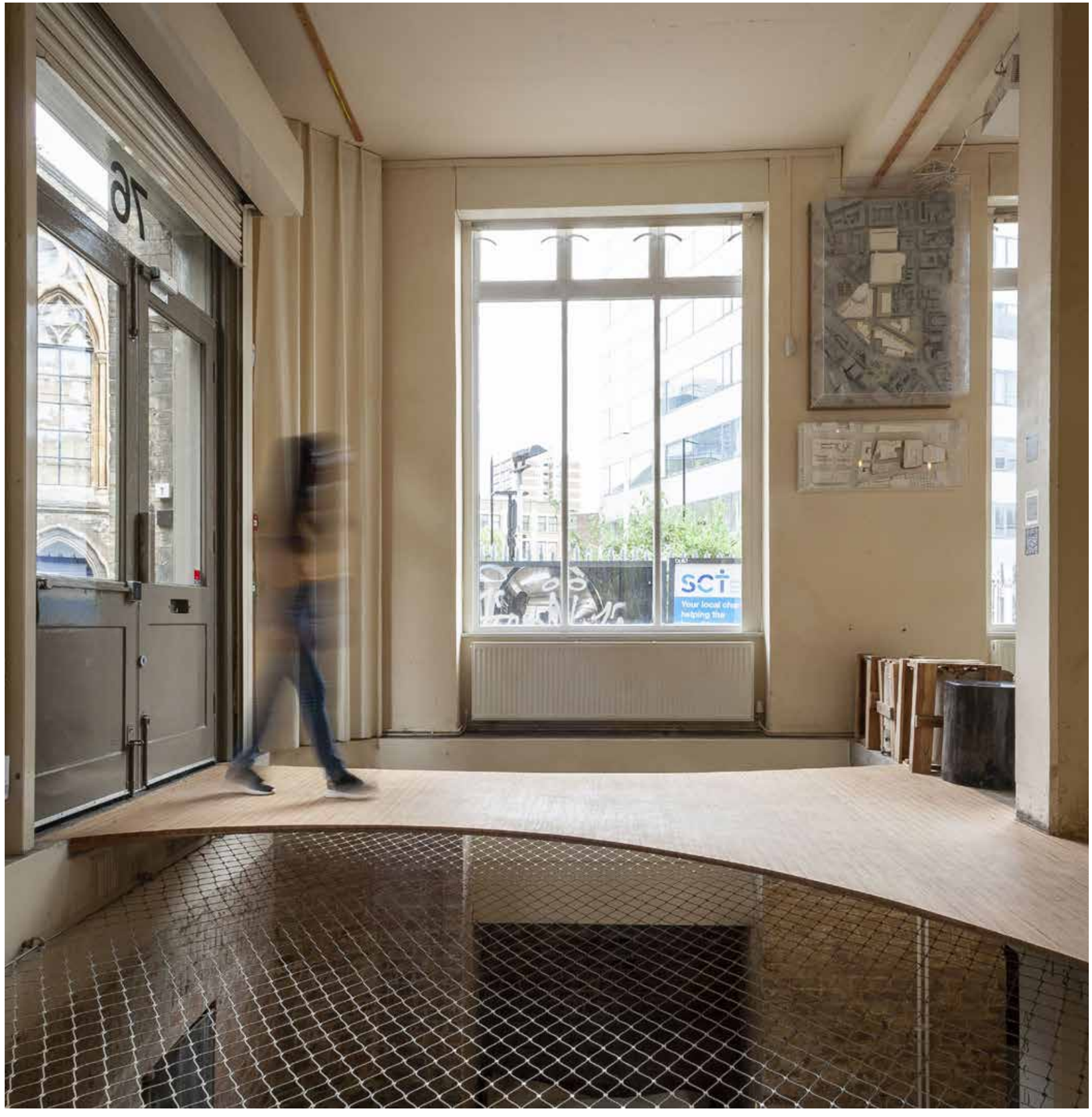
Transferred from use in the office

1) Figure Calculated using The Homeworking Emissions Whitepaper for 2020
2)Figure derived from quantity used in the office from pre working from home months
3) Assumed negligible printing whilst people are working from home

2020
OFFICE RENOVATION

In 2020 ACME started an expansion and renovation of its London office.
The project was designed & coordinated internally
We evaluate in detail the embodied carbon of the materials used for the renovation during 2020.

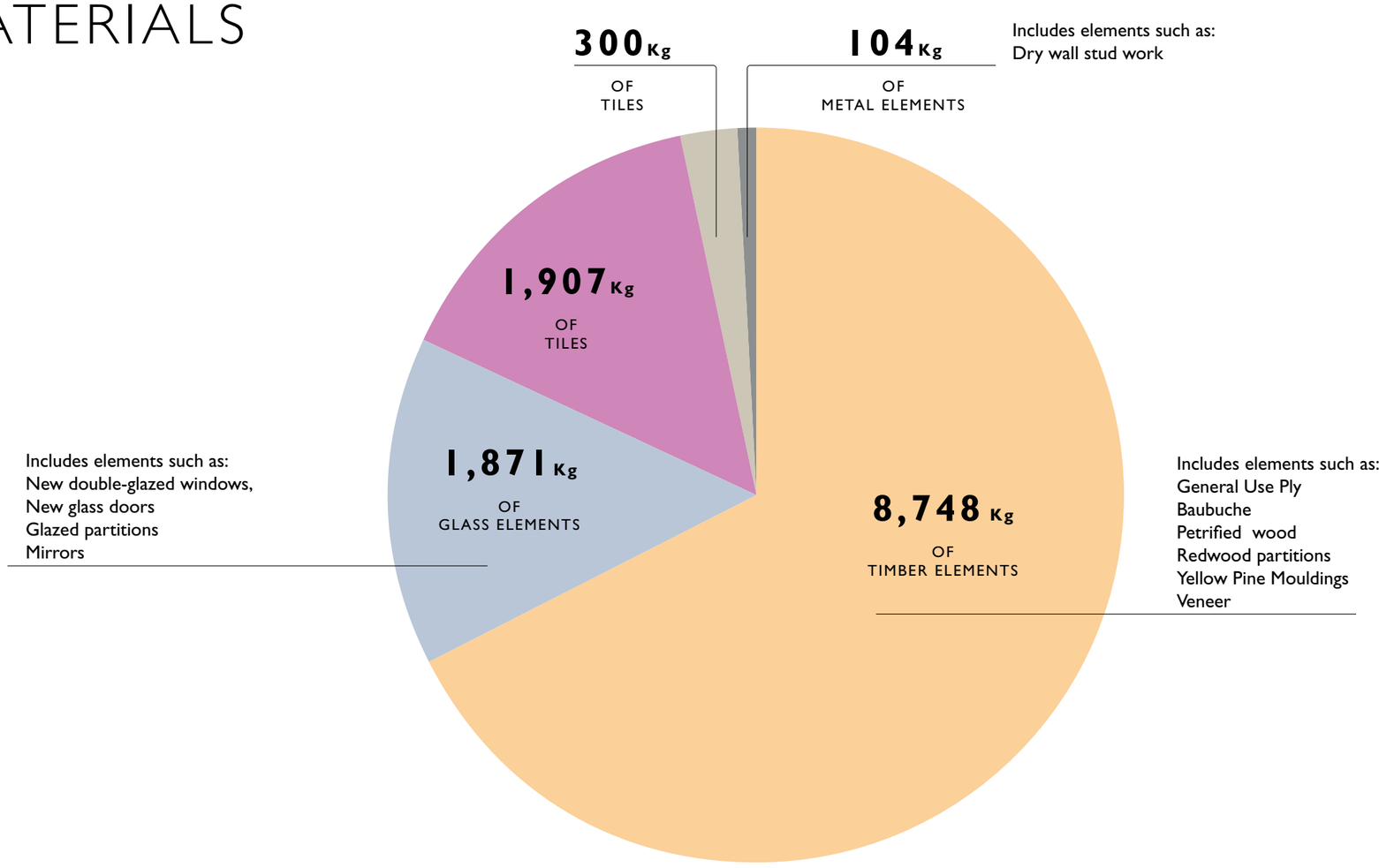
We have gathered the quantities of purchased raw materials to be able to establish its carbon footprint.

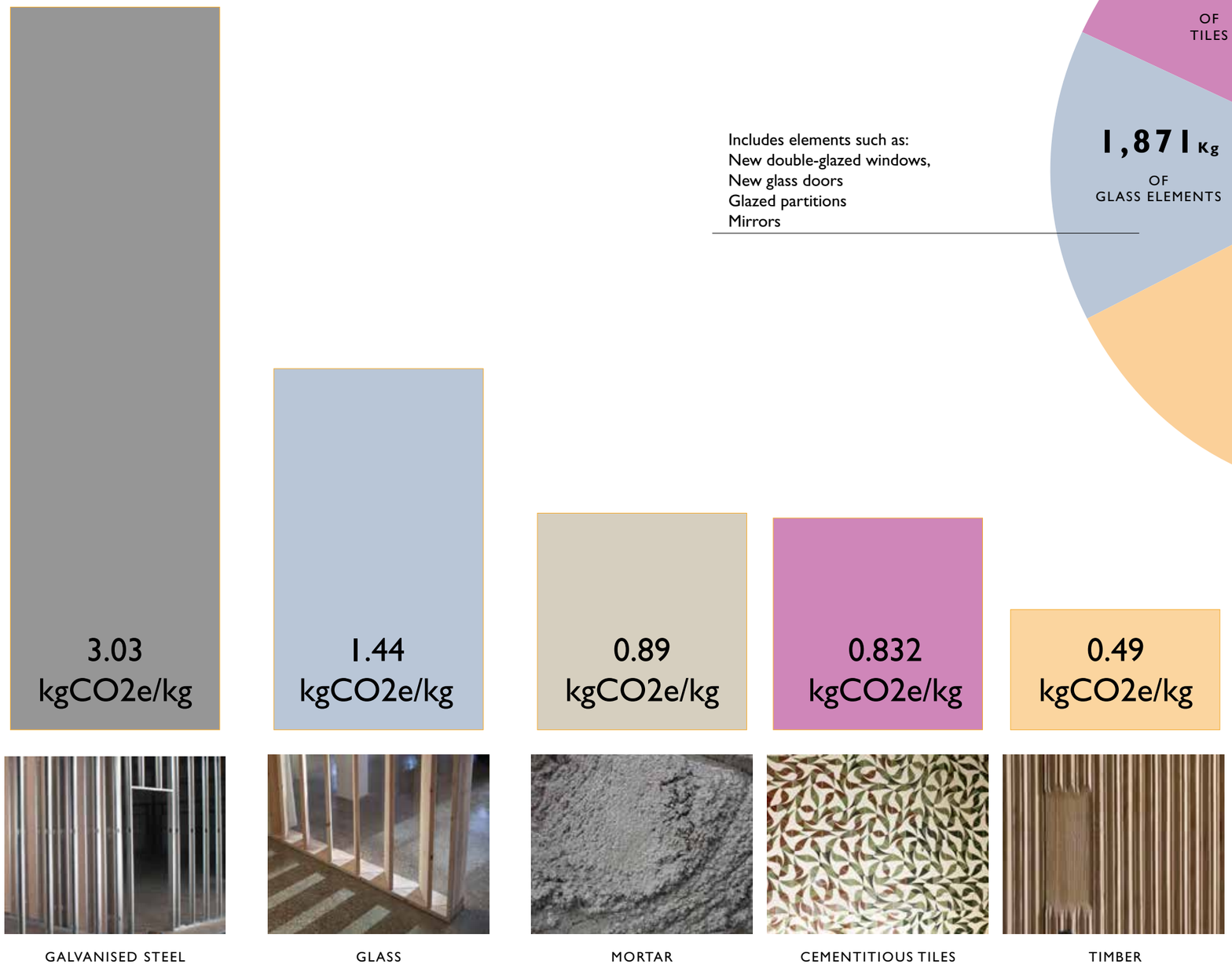


2020
OFFICE RENOVATION - MATERIALS

Only materials purchased during 2020 for the renovation are included in the calculations.

Embodied carbon values are based on the Inventory of Carbon & Energy published by Circular Economy and the University of Bath in 2019[15]





GALVANISED STEEL

GLASS

MORTAR

CEMENTITIOUS TILES

TIMBER

2020
OFFICE RENOVATION - EMBODIED CARBON

Only materials purchased during 2020 for the renovation are included in the calculations.

Embodied carbon values are based on the Inventory of Carbon & Energy published by Circular Economy and the University of Bath in 2019[15]

9.0 tonnes

Embodied Carbon In Office Renovation

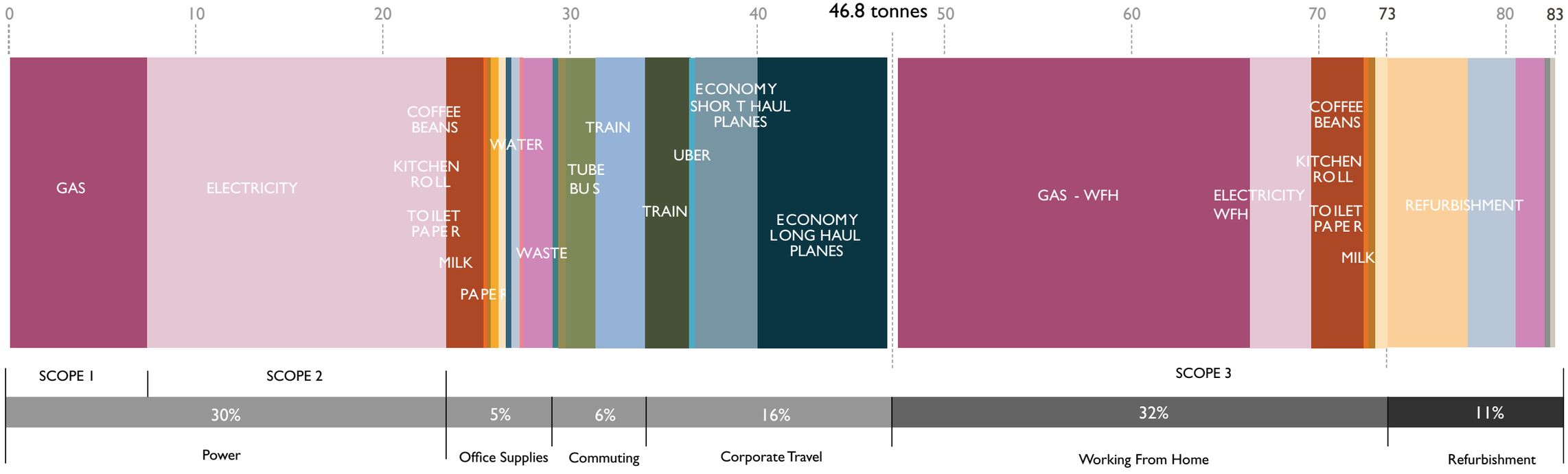
2020
CARBON USE

The Carbon used by ACME this year is shown below, broken down into the three internationally recognized Scopes.
Scope 1, Primary Energy use, was 7t.
Scope 2, Secondary Energy use was 17t.
Scope 3 amounted to 59t.

Travel represented 22% of all Carbon used.

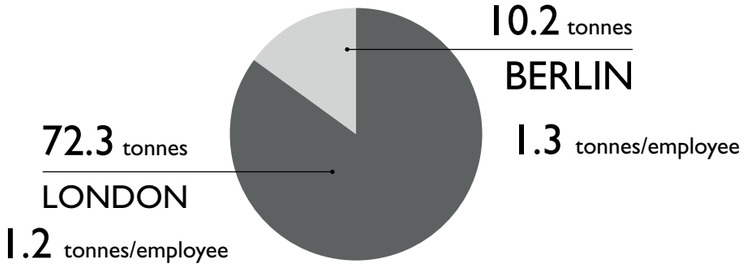
82.6 tonnes

1.21 tonnes per employee

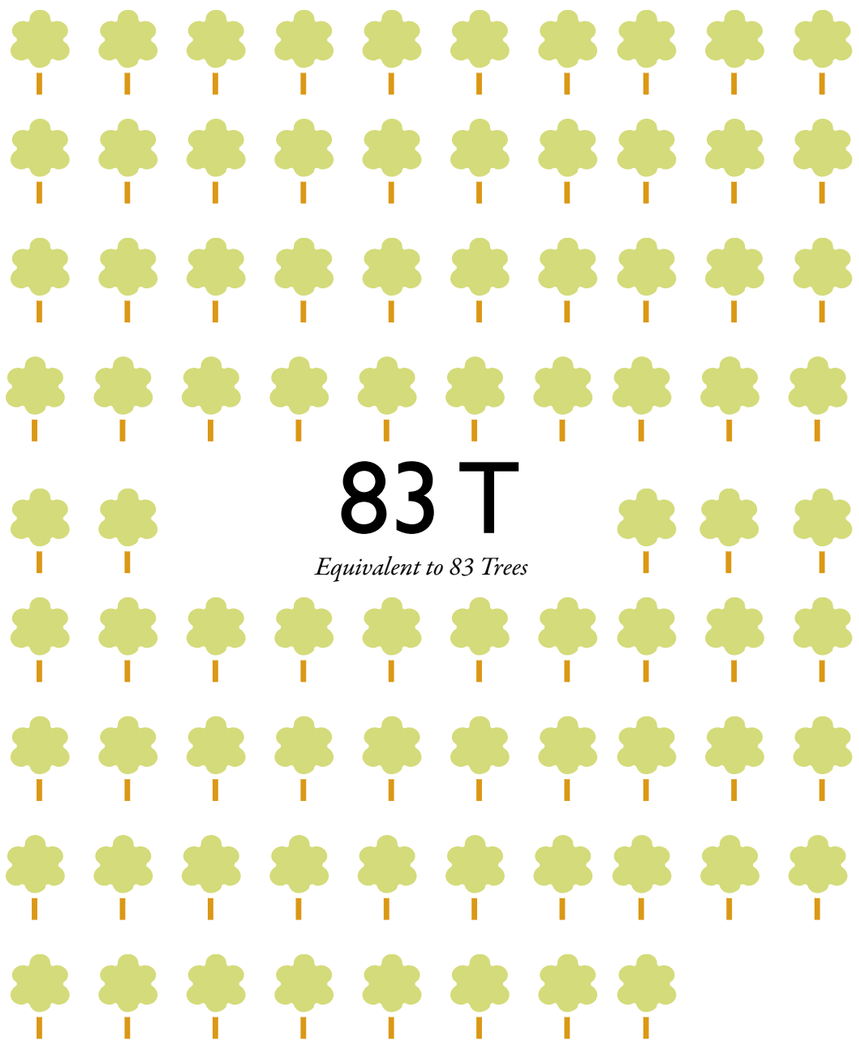


2019 Office Supplies - 84.4 tonnes

2020 Office Supplies - 46.8 tonnes



2020
CARBON OFFSETTING



We have offset all Carbon used in 2020 by investing via 'Carbon Footprint' in the following scheme:

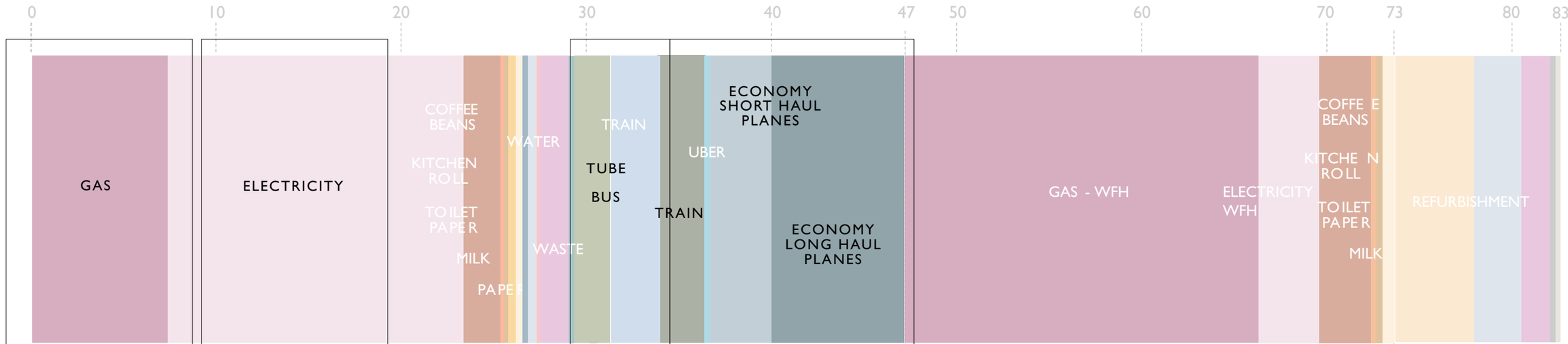
UK Tree Planting Scheme

Planting takes place in school locations and other biodiversity sites in the South East of the UK. For every tree that is pledged, a tonne of carbon will also be saved in the Brazilian Amazon via a VCS avoided deforestation programme.

This meets BSI's PAS 2060 guidance on carbon neutrality.

2021
TARGET

Reduce Carbon In Use



2021: Switch to carbon free gas. Biogas in both ACME London & Berlin

2019: Switch to carbon free power.

ACME London switched to BULB in August 2020.

2021: Further review whether BULB provides 100% renewable power or partial offset. Review in ACME Berlin

2019: Encourage more cycling by installing showers and secure storage.

ACME has planned the installation of cycle facilities with showers in the Basement as part of the office refurbishment.

2021: Completion of the cycle facilities.

2021: Working From Home. Trial continuation of partial working from home policy to continue on an optional basis

2019: Encourage more use of video conferencing.

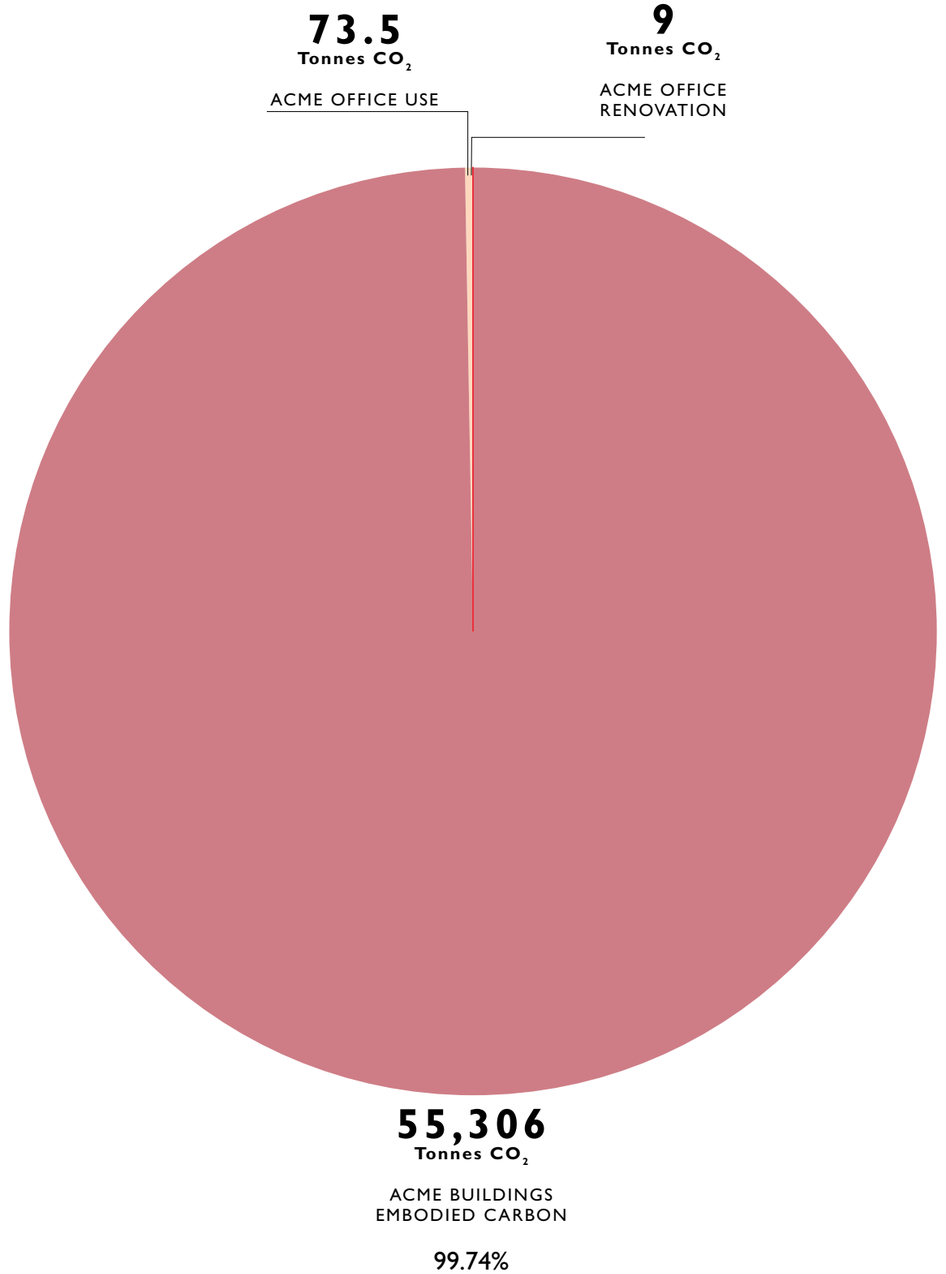
COVID 19 has had a significant impact on Corporate & Commuter travel in 2020. Video conferencing and WFH capabilities have been used at their full capacity during parts of the year.

2021: Continuation of use of technology where appropriate. (Optimisation & auditing of carbon footprint of technology use)

2020
CARBON IN USE
CARBON IN DESIGN

ACME have used 83t of Carbon for heating and power, supplies, staff commuting and the office refubrishment. This equates to 1.21t of Carbon per employee.
As designers, we create buildings. The buildings we design use Carbon during construction, and in operation. As responsible designers, we need to review our own use of Carbon, and the use of Carbon to construct and use our buildings.
While we have used 83t of Carbon over the course of the year, we have designed buildings that need 55.950t of Carbon to construct the structural frames.

The Carbon Embodied in the Structural Frame of the buildings we design is 660 times more than the Carbon we use ourselves.



2020
EMBODIED CARBON

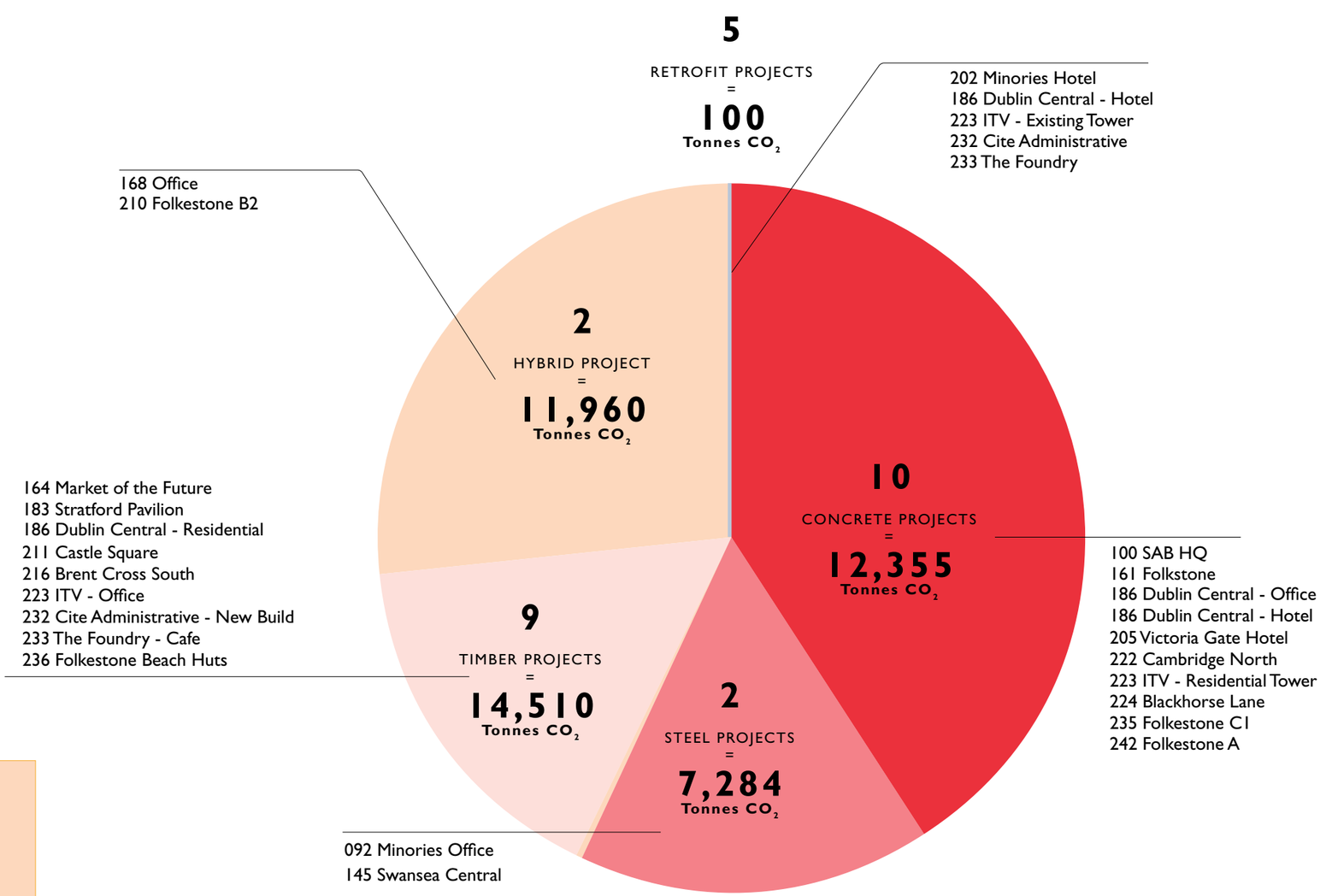
ACME design buildings. These buildings use Carbon in construction (Embodied Carbon) and in use (Operational Carbon).

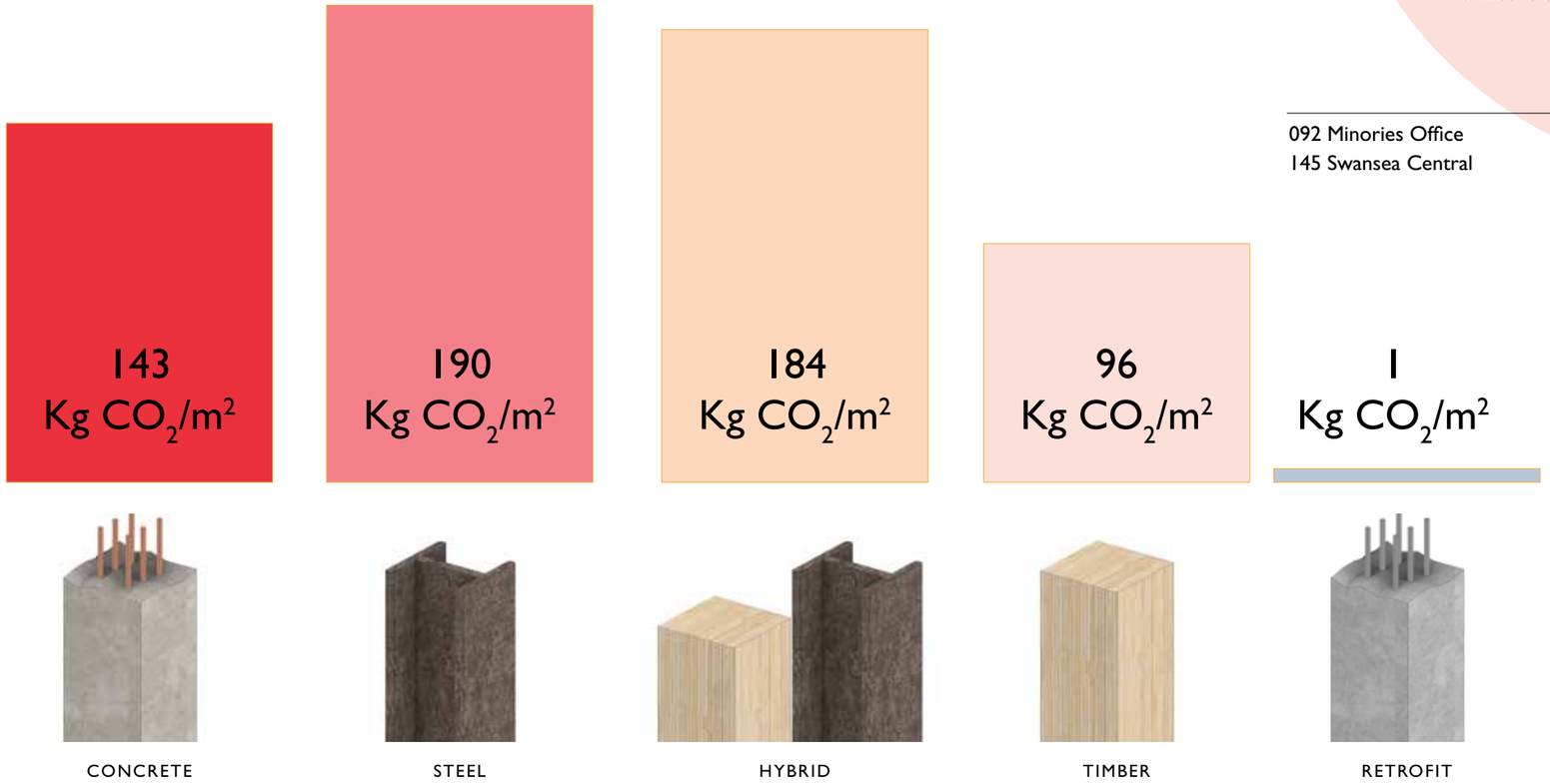
The primary structure of a building is responsible for approximately 75% of the overall embodied carbon.
(Francesco Ranaudo ETH, Zurich).

We have audited the primary structural frame in this embodied carbon assessment.

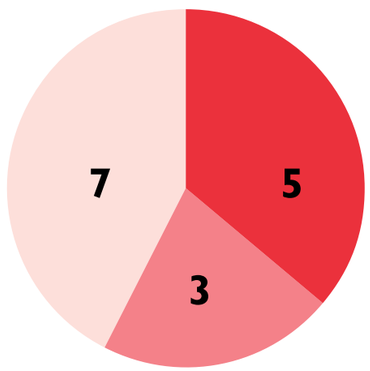
The carbon values are based on a study conducted by HTS Engineers and represent the amount of embodied carbon per square metre of GIA.
Excludes masterplans & lost competitions.

Included all Projects within the Office between Stage 0-7[14]





2019 - DIAGRAM



2020
EMBODIED CARBON

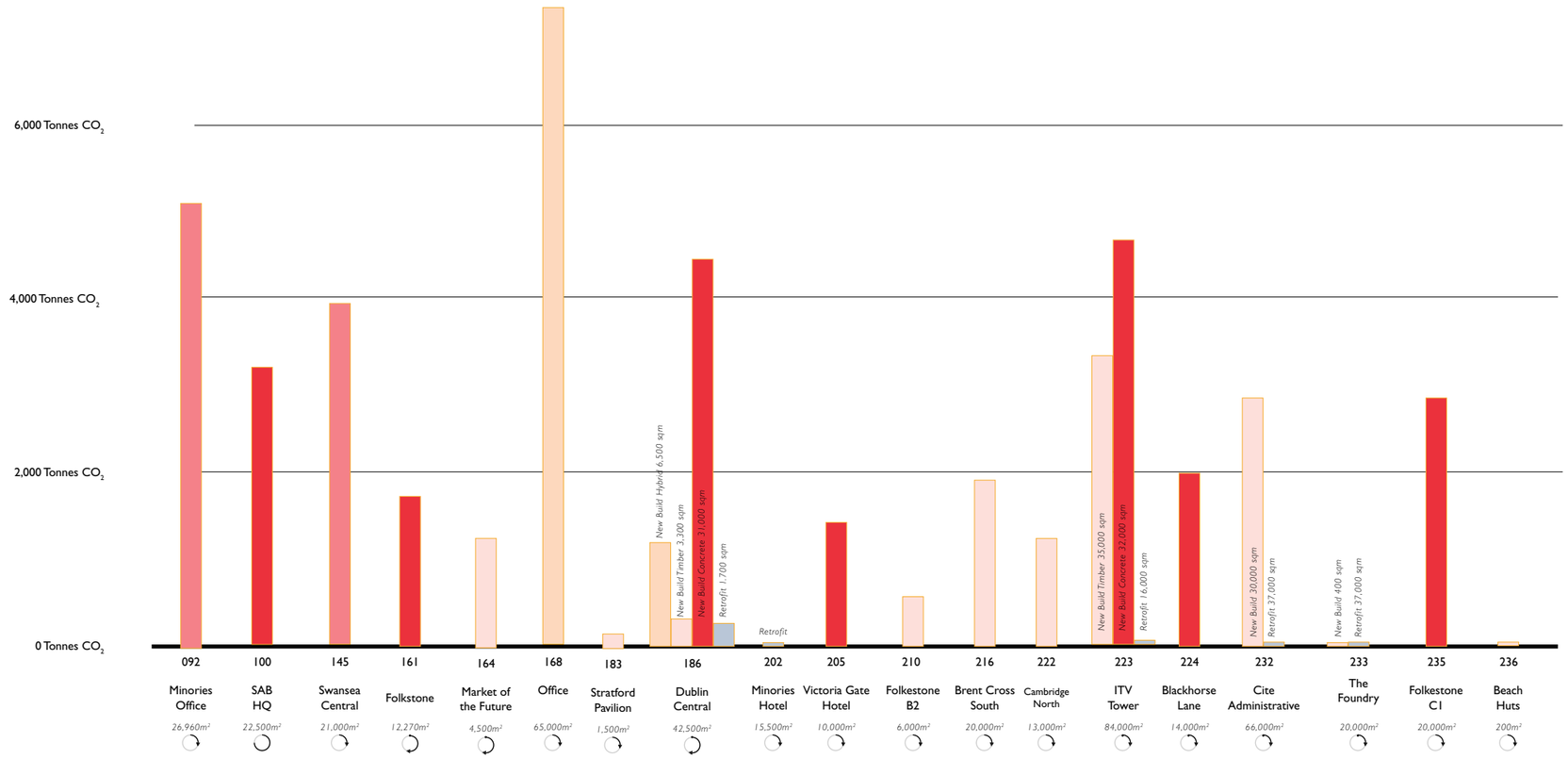
ACME projects in RIBA Stages 0-7 in 2020. ACME worked on 19th unique projects which made up a total of 27 buildings. The projects are assessed by the Carbon needed to construct their structural frames.
Methodology:
GIA x Embodied carbon of structural system

Note:
The graph illustrates the embodied carbon per project based on the structural system only.

PROJECT STRUCTURAL MATERIAL & STAGES

- Concrete Structure
- Steel Frame
- CLT/Timber Frame
- Hybrid Structure
- Retrofit

- Status - Competition / Initial design stage
- Status - Development stage
- Status - Construction
- Status - Completed



PROJECT LOCATION

2020
EMBODIED CARBON

Methodology:
GIA x Embodied carbon of structural system

Note:
The graph illustrates the embodied total embodied carbon per project based on its structural system only.

The graphs exclude masterplans & lost competitions

55,306 tonnes

2,047 tonnes per building

2019: 32,119 tonnes

2,141 tonnes per building

2021
TARGET

Reduce Embodied Carbon

Assess Operational Carbon of completed ACME buildings

Evaluate and Increase Biodiversity within our projects

Audit the positive impact of green spaces and trees within ACME projects

CONCRETE STRUCTURES

We will encourage use of materials with lower embodied carbon such as timber or stone as primary structure.

TIMBER STRUCTURES

We will aim to encourage a circular economy for the full cycle of structural timber including post-demolition recycling, so the carbon stored inside the timber could be counted as sequestered.

STEEL STRUCTURES

We will encourage use of materials with lower embodied carbon such as timber or stone as primary structure.

HYBRID STRUCTURES

We will strive to argue for the benefits of fully timber building compared with the hybrid structures

RETROFIT STRUCTURES

We will aim to prevent demolition of any existing structure and will work creatively to encourage retrofitting existing premises for future uses.

SOURCES & REFERENCES

1. Gas
A conversion factor of 0.18 $KgCo_2e$/Kwh has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

2. Electricity
A conversion factor of 0.23 $KgCo_2e$/Kwh has been used to calculate the emitted carbon.
Source: https://www.eonenergy.com/About-eon/Fuel-Mix
https://bulb.co.uk/carbon-calculator/calculating-carbon-emissions/

3. Coffee Beans
A conversion factor of 17.8 $KgCo_2e$/Kg has been used to calculate the emitted carbon.
Source: https://www.vegansociety.com/take-action/campaigns/plate-planet/carbon-calculator

4. Kitchen Rolls and Toilet Paper
A conversion factor of 0.750 $KgCo_2e$/Kg has been used to calculate the emitted carbon of Kitchen Roll.
A conversion factor of 0.221 $KgCo_2e$/Kg has been used to calculate the emitted carbon of Toilet Paper.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

5. Milk
A conversion factor of 1.16 $KgCo_2e$/Ltr has been used to calculate the emitted carbon.
Source: https://www.vegansociety.com/take-action/campaigns/plate-planet/carbon-calculator

6. Paper
A conversion factor of 919 $KgCo_2e$/tonne has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

7. Bus
A conversion factor of 0.0786 $KgCo_2e$/Km has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

8. Tube
A conversion factor of 0.0275 $KgCo_2e$/Km has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

9. Uber
A conversion factor of 0.1714 $KgCo_2e$/Km has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

10. Train
A conversion factor of 0.369 $KgCo_2e$/Km has been used to calculate the emitted carbon.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

11. Plane
A conversion factor of 0.1530 $KgCo_2e$/Km has been used to calculate the emitted carbon of Economy Short Haul Flights.
A conversion factor of 0.1462 $KgCo_2e$/Km has been used to calculate the emitted carbon of Economy Long Haul Flights.
A conversion factor of 0.4239 $KgCo_2e$/Km has been used to calculate the emitted carbon of Business Short Haul Flights.
A conversion factor of 0.2295 $KgCo_2e$/Km has been used to calculate the emitted carbon of Business Long Haul Flights.
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

12. Water
A conversion factor of 0.344 $KgCo_2e$/cm has been used to calculate the emitted carbon for Water Supply
A conversion factor of 0.708 $KgCo_2e$/cm has been used to calculate the emitted carbon for Water Treatment
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

13. Waste
A conversion factor of 437.372 $KgCo_2e$/tonne has been used to calculate the emitted carbon for Water Supply
A conversion factor of 21.317 $KgCo_2e$/tonne has been used to calculate the emitted carbon for Water Treatment
Source: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2020

14. Office Project Carbon Calculations
The carbon values are based on a study conducted by HTS Engineers and represent the amount of embodied carbon per square metre of GIA.
Excludes masterplans & lost competitions.
Included all Projects within the Office between Stage 0-7

15. Refurbishment
A conversion factor of 0.493 $KgCo_2e$/kg was used for all timber elements
A conversion factor of 3.03 $KgCo_2e$/kg was used for all metal elements
A conversion factor of 45 $KgCo_2e/m^2$ was used for all glass elements
A conversion factor of 21.6 $KgCo_2e/m^2$ was used for all mirror elements
A conversion factor of 0.832 $KgCo_2e$/kg was used for all cement tiles & mortar
Source: ICE DB V3

16. Working From Home
Working hours per year - 1920 (For 2020 a factor of 0.8 has been applied to account for the period of work from the office resulting in 1536 hours being the figure used)
Average Domestic Gas Usage (OFGEM) - 12000kWh / year
Gas usage attributed to heating (OFGEM) - 77%
Average Domestic Homeworking Electricity power per person (OFGEM) - 150 W / hour
Source: Homeworking Emissions Whitepaper 2020