

Taylor Wimpey carbon footprinting methodology (2020)

Scope 1 and 2 Methodology Statement

Specification of data sources

Moving on from the transitional year of 2014, AJR Management (AJR) has been responsible for data collection and reporting ever since. AJR through 2020 has been responsible for the utility management process commencing at the point that Taylor Wimpey (TW) become responsible for the supply, usually at the point of installation, through to successful handover to buyer, Housing Association (HA) or Management Company, or disconnection. However, during 2020, AJR has also been fully involved in the meter call-off process giving greater visibility of meter requests.

As a backdrop to this management process, AJR complete regular site visits (minimum quarterly), obtain weekly legal completion reports from each TW Business Unit (BU), liaise with site and sales staff, receive and process all invoices and obtain missing data direct from suppliers where necessary.

During the course of this work, AJR monitor closely the release of new sites to ensure all sites are covered and complete a site checklist at each quarterly visit to each site to ensure all meters are covered. AJR receive a weekly legal completions report from each BU which is used to ensure all handover meter readings have been received and processed onto AJR system. On a monthly basis, a consolidated legal completions report is obtained from Head Office and this is used to ensure all completions are accounted for in terms of consumption or that any missing is explained, namely because they are HA plots that have invoiced but have not physically been built. There are also additions to this list which are HA plots built and handed over which have already “legally completed” but were not reported on at that point due to the circumstances previously mentioned above.

AJR system produces a suite of reports to identify missing data or to question data integrity measured against a set of expected criteria. It highlights contradictory meter data for further investigation, requests validation of things such as clocked meters, meter removals and identifies duplicated or potentially erroneous data.

The methodology below explains the protocols in place from which the 2020 data has been drawn together.

Please note that the onset of COVID-19 in the early part of 2020 and the impact throughout the remainder of the year has dramatically affected data collection in that site visits were cancelled from the end of March through to the end of July. We used this time to work with suppliers to obtain any and all data available from their side and utilised this wherever possible. In addition, the closure of sites and the ceasing of house purchase completions has caused a substantial (circa 35%) drop in plot completions. Plots which subsequently completed in quarters 3 and 4 in many cases had sat metered for longer and there was no overall reduction in sites. These factors will certainly skew the intensity figures for 2020.

Meter Types

All meters are divided into two categories – A and B. Within a given category, there are a number of different meter types.

The full list of meter types for electricity meters in category A is Temp Building Supply, Office, Compound, Showhome, Site Office, Pumping Station, Feeder Pillar, Unmetered, Communal Areas, Community Centre, Sales Centre, Car Park, Business Premises, Crane Supply, Existing Buildings, Silo, Street Lighting, Car Charging Point, Telecommunications, Undercroft Lighting and Bin Store. All of these are grouped into 'Site', with the exception of 'Office', which constitutes its own grouping.

The full list of meter types for gas meters in category A is Showhome, Site Office, Office, Communal Areas, Community Centre, Temp Building Supply, Sales Centre, Energy Centre and Business Premises. All of these are grouped into 'Site', with the exception of 'Office', which constitutes its own grouping.

The full list of meter types for electricity and gas meters in category B is Plot and Stock Plot. These are grouped into 'Plot' meters for electricity and gas.

Electricity

The data included is from a variety of sources with the preferred, coming via direct data collection from site. However, on occasion, access to the meter is not possible, photographs do not turn out as expected and therefore invoices are used and failing invoices being available, data gathered from supplier databases and as a last resort, estimation using prior consumption data. For unmetered street lighting supplies, all consumption is recorded from invoices or on occasion, the unmetered supply inventory. Please see below the breakdown of meter types for electricity and the normal and fall-back method of data collection.

1. Site Meters (All except half-hourly, Profile – 00) – Data collection is preferred by photograph quarterly on site by AJR site visit staff. Where a photograph is not possible, contact is made with the supplier to obtain up to date invoices where not already received or as a minimum recent consumption data and failing that, an estimate is generated using the average consumption from previous readings. Installation readings are obtained where possible from tags left with the meter or by initial invoice. Last resort would be contacting the supplier where the reading is required for a data set prior to the normal invoicing cycle. Final readings when the meter changes responsibility away from TW or is disconnected is taken from final invoices but AJR liaise closely with site staff in the periods leading up to site closure or meter disconnections to obtain readings direct from site at this point also.
2. Site Meters (Half-Hourly, Profile – 00) – Data collection has to be by invoiced consumption. This type of meter is connected to a modem for half-hourly data collection and therefore all invoices are accurate and the most effective source of consumption data. There should never be cause for estimation for this meter type. As invoices show consumption over a period rather than an opening and closing reading, there is no requirement to obtain initial readings and similarly, change of responsibility readings are not required with the final consumption being by way of the final invoice.
3. Site Meters (Unmetered Street Lighting) – Data collection is by invoiced consumption as there is no physical meter to read. An inventory of equipment is held by the network operator and an agreed amount of consumption is set, against which invoices are raised by the supplier.
4. Office Meters – Data collection for offices is exactly the same as for Site Meters above and will be as described in Point 1 or 2 depending on whether a standard or half hourly meter.
5. Plot Meters (except Showhomes which are treated as Site Meters above) – Data collection is on site by site or sales staff at the point of handover with initial readings being gathered (by AJR) either from tags left with the meter or from initial invoice or as a last resort by contacting the supplier where the reading is required for a data set prior

to the normal invoicing cycle. In the exceptional circumstance that readings are not taken on handover by site or sale staff, AJR ensure meter readings are taken at the earliest possible opportunity thereafter by contacting site staff to obtain or as a last resort, taking readings on the next quarterly cycle and using estimation for the handover date.

Please note that where a meter is found to have clocked, it is flagged as such and in reporting, calculates the total consumption from supply start reading or quarter start reading to the point the meter returns to 0 plus the reading from 0 to the supply end reading or quarter end reading.

Please note that plot consumption is reported entirely within the quarter that it legally completes. This can sometimes mean consumption from prior quarters and even prior years is reported for that quarter. However, this was decided upon due to the fact that it was totally impractical to obtain quarterly meter readings for all plots given the volumes and also that the majority of plots legally complete roughly 90 days after meter installation and there are usually a similar number of stock plots, meaning the approach is consistent.

Plot supplies will be reported in a single quarter only. Category A supplies will be reported in all 4 quarters unless they were installed or ceased to be the responsibility of TW in a later or earlier quarter respectively. Where a supply becomes TW responsibility in a later quarter the opening reading will be Installation or Sysgen Installation and where a supply ceases to be TW responsibility earlier than quarter 4, the closing reading will be COR or COR Sysgen.

Gas

Data collection is exactly the same for gas as for electricity with site (including showhomes) or office meters being collected quarterly and plot meters being assessed upon handover to either a private buyer or housing association.

The meters, metered consumption units and conversions are described below.

1. Metric Meter – Records consumption in Cubic Metres and this is the reading held on the AJR system. The assumed Loss Conversion Factor and Calorific Value are 1.02264 and 39.36 (an average arrived at by averaging National Figures for a 12 month period provided by National Grid - <https://www.nationalgridgas.com/data-and-operations/calorific-value-cv>) and the conversion calculation is as follows.
 - a. Metered Units x Loss Factor (1.02264) x Calorific Value (39.36) divided by 3.6
2. Imperial Meter – Records in 100 cubic feet and this is the reading held on the AJR system. The assumed Loss Conversion Factor and Calorific Value are 1.02264 and 39.36 (an average arrived at by averaging National Figures for a 12 month period provided by National Grid - <https://www.nationalgridgas.com/data-and-operations/calorific-value-cv>) and the conversion calculation is as follows.
 - a. Metered Units x Loss Factor (1.02264) x Calorific Value (39.36) x Imperial to Metric Conversion (2.83) divided by 3.6
3. Heat Meter – Records in kWh and no conversion is required.

Please note that where a meter is found to have clocked, it is flagged as such and in reporting, calculates the total consumption from supply start reading or quarter start reading to the point the meter returns to 0 plus the reading from 0 to the supply end reading or quarter end reading.

Plot gas meters are treated in the same way as plot electricity meters in that they are reported within the quarter in which they legally complete.

Plot supplies will be reported in a single quarter only. Category A supplies will be reported in all 4 quarters unless they were installed or ceased to be the responsibility of TW in a later or earlier quarter respectively. Where a supply becomes TW responsibility in a later quarter the opening reading will be Installation or Sysgen Installation and where a supply ceases to be TW responsibility earlier than quarter 4, the closing reading will be COR or COR Sysgen.

Fleet fuel consumption

The methodology applied for 2020 vehicles fleet consumption has been reported on a more accurate basis than simply the contracted mileage.

This year we have received regular vehicle mileage reports providing mileage readings. Where we have two or more readings for a vehicle we have calculated the average daily mileage between the two readings that are closest to the extremes of the year. If the contract was live for the full year, we get the reading closest to 1/1/2020 and that closest to 31/12/2020 and calculate an average daily mileage which is then applied across the full year by creating estimated mileage readings for each and of the year.

Where a contract commenced within year, we have used the start date and reading and where available, used an additional reading later in the year to create a daily average which we have then applied for the active period.

Where a contract terminated during the year, we have used that end date and reading and where available, used an additional prior reading to create a daily average which has then been applied for the active period.

It was deemed that using the actual mileages available would always give us the best chance of an accurate reflection given that many of the contracts are substantially above or below the contracted mileage.

Where only one reading is available for a vehicle, we have taken an average daily mileage by dividing the contract mileage by the contract length in days and applied this to the active period during the year.

Please note that no deduction has been made for personal mileage as in prior years because there is no knowledge base or data available to assist.

A consideration for future reporting years is the impact of recent allegations regarding manufacturer quoted emissions figures. Thoughts may be given to an uplift to take account of 'real-life' figures.

Other fuels

Other Fuels consumption has for all of 2020 been tracked by AJR requesting invoices from BUs on a monthly or quarterly basis depending upon the working practices of the individual BU and inputting data onto the AJR system.

1. Run an "Other Fuels" Report on a quarterly basis and advise BUs of all sites where there had been prior "Other Fuels" consumption that had reported zero for this quarter. Request confirmation that this was correct from the BU. The BUs confirm on a quarterly basis that we have received all invoices.
2. Verify sites taking delivery of "Other Fuels" as part of a site checklist completed on first site visit to any site and then reviewed quarterly as part of our audit process.

Data is input onto our system by AJR following receipt of approved invoices from the BU.

Following guidance last year, all Diesel used on sites which had previously been reported using a 100% Mineral Diesel emissions factor, is now being reported using the emissions factor for Gas Oil as this was deemed to be more closely aligned to the “Red” diesel typically used on site.

Please note that under “Metered LPG”, this is metered in cubic metres and then converted to Litres of LPG on the invoices by using a multiplier of 3.85. In order to report using the metered consumption, we report in Cubic Metres and then use the product of the Litre Conversion multiplier (3.85) and the Litres of LPG to KgCO₂e conversion (1.555370), a factor of 5.988175, to calculate the CO₂e in Kg.

Estimates

What

It is important to be clear on the two types of “Estimation” that may exist within the data.

- Validated System Generated Reading – This is a reading estimated to a quarter end date that has been produced using two evidenced readings from that quarter and the previous quarter. This was implemented last year in order to standardise the quarters and thereby lend greater credibility to year on year comparisons that up until then could have been for significantly different periods had data for one quarter been gathered before the deadline and the following quarter after the deadline. Unless an actual reading type was taken on the actual quarter end date (31/3, 30/6, 30/9, 31/12), or the supply was installed or handed over / disconnected during the quarter, all reported readings will be “Validated System Generated”.
- System Generated Reading – This would be a reading estimated where we were unable to validate it due to the data available being outside of the current quarter and either previous or subsequent quarter. These estimates are still based on consumption for the supply using averages but are used to signify that the readings used are outside the usual tolerances of current and previous quarter. TW have for 2020 (as in at least three previous years) decided to include estimates for offices where TW do not pay the bill directly. This is covered in the methodology section below.

Electricity and Gas Category A (Site, Sales and Offices) are covered by estimates and “Other Fuels” are not. There is no estimation within the Category B plot data.

Methodology

Estimations are carried out by AJR in line with the following.

- Where Estimation date is between two known actual readings – Calculate average daily consumption between the two readings by dividing the total consumption (Later Reading minus Earlier Reading) by the total number of days between the readings (Later Reading Date minus Earlier reading Date). Work out the number of days from whichever reading date is closest to the desired reading date to the date of the required reading, multiply this number of days by the average daily consumption and then add this result to the Closest Reading.
- Where Estimation Date is prior to earliest known reading but at least two actual readings exist for the supply – Calculate current daily supply average (using latest reading and closest actual reading to 1 year apart). Work out the number of days from

the nearest actual reading to the required reading date, multiply by the number of days between this date and the required reading date and then deduct the result from the nearest actual reading.

- Where Estimation Date is after latest known reading but at least two actual readings exist for the supply – Calculate current daily supply average (using latest reading and closest actual reading to 1 year apart). Work out the number of days from the nearest actual reading to the required reading date, multiply by the number of days between this date and the required reading date and then add the result from the nearest actual reading.
- The priority order for estimations would be as follows.
 - Calculate reading between two actual readings
 - Calculate reading using closest actual and annual consumption average
 - Calculate reading using average for that supply type on that site
 - Calculate reading using average for that supply type for that BU
 - Calculate reading using average for that supply type for TW nationally

TW Offices with no directly metered supply

For 2020 TW have decided to report on these offices where there is no direct metered supply, rather that the costs of these elements are folded into the service charge / rent. We have assumed for the purposes of this assessment that all offices being estimated have both gas and electricity supplies and in order to estimate the consumption we have used the quarterly consumption in 2020 for the offices that have metered gas and electricity supplies.

For each quarter, we worked out an average kwh/ft² value for gas and electricity individually taking account of the total gas or electricity consumption across these offices and dividing these totals by the combined ft² of the same offices.

We have then applied this kwh/ft² to the unmetered offices by multiplying the ft² of each unmetered office by the kwh/ft² and applying the resulting value as gas or electricity consumption for that office. This has been added to the main raw data and factored into all subsequent totals.

Spain

Electricity data is available for TW Spain. Data collected relates only to category A meters (please see meter types above).

TW Spain does not report on category B meters (plots) as all plots are managed by sub-contractors prior to sale. TW Spain pays for negligible amounts of energy so it is deemed to be de minimis.

TW Spain does not consume natural gas.

Data was provided in relation to a small amount of other fuels consumption for 2017. However, the Golf site to which this related is now closed and there is therefore no other fuels consumption for Spain.

Fleet data has been provided for 2020 in the form of mileage figures for specific vehicles on a quarterly basis. Although the fuel type of each vehicle is not known, we have added those that we can be sure of and used the appropriate factors. For those classified as unknown we have used a factor for unknown fuel kgCO₂e per km provided by DEFRA but in other cases

(kgCO₂e per litre and kWh per litre) have erred on the side of caution and opted for a Diesel Factor as the worst case scenario.

2020 'location based' and 'market-based' Scope 2 emissions

Under the new GHG Protocol Scope 2 Guidance (http://www.ghgprotocol.org/scope_2_guidance), organisations wishing to report their carbon emissions are now required to publish two numbers for their Scope 2 emissions. The first of these is calculated under the location-based method, using a national or regional emission factor, as in previous years. The second is generated using the market-based method. This method enables organisations to report the carbon emissions of the electricity they have chosen to purchase based on specific suppliers fuel mix disclosure, and/or on the emissions from specific tariffs and/or based on a residual grid mix.

Both the 'location based' and 'market-based' Scope 2 emissions are published in our Annual Report and Accounts and our Sustainability Report. The calculation methodology for the market-based Scope 2 emissions is given below.

For 2020, in addition to the usual model, we have extracted all actual consumption by supplier and included where known the specific tariff name. In this extract we have not included carbon emissions factors as these will be obtained by the carbon trust through dialogue with suppliers. Please note that where there have been changes of supplier, the supplier quoted is the one in place at the commencement of that quarter.

Location	Supplier / Contractual Instrument Type	Determination of Factor Used	Energy Consumption (MWh)	Emission Factor (KgCO ₂ e / kWh)	Emissions (tCO ₂ e)
UK	British Gas	Supplier Specific Residual Fuel Mix Excluding Renewable	2,570.32	0.000000	0.00
	British Gas	REGO Backed Renewable Tariff	2,180.11	0.000000	0.00
	British Gas Business	Supplier Specific Residual Fuel Mix Excluding Renewable	1,080.37	0.000000	0.00
	EDF	Supplier Specific Residual Fuel Mix Excluding Renewable	277.20	0.183000	50.73
	EON	Supplier Specific Residual Fuel Mix Excluding Renewable	2,003.32	0.356000	713.18
	Npower	Supplier Specific Residual Fuel Mix Excluding Renewable	120.58	0.377000	45.46
	Npower	REGO Backed Renewable Tariff	10,826.37	0.000000	0.00
	Opus Energy	Fuel Mix Disclosure	64.93	0.000000	0.00
	SSE	Supplier Specific Residual Fuel Mix Excluding Renewable	474.72	0.377000	178.97
	Scottish Power	Supplier Specific Residual Fuel Mix Excluding Renewable	1,908.88	0.326000	622.29
	Unknown	GB Residual Mix	503.65	0.348000	175.27
	Utility Warehouse	Supplier Specific Residual Fuel Mix Excluding Renewable	13.66	0.377000	5.15
	Spain	Unknown	520.67	0.343000	178.59
Total			22,544.77		1,969.64

Operational Boundary

Scope 1 and 2 footprint of Electricity, Gas, and other on-site fuels and fuels used by vehicles owned or based within the organisational boundary and based on financial control.

Specifically in relation to CHP / District Heating Systems these are treated as follows.

- Where TW are responsible financially for the input supply (main incoming gas or electricity supply), then this is reported under the usual reporting terms as described earlier in this document. However, in these circumstances, the output supplies, namely plots before sale, are excluded as this would constitute double reporting.

- Where TW are responsible for the input supply but receive financial recompense for plots that have handed over, we have calculated for each quarter the number of plots that are not the responsibility of TW versus the number that are. We have then turned that into a Multiplier for the TW responsibility by calculating the percentage (as a fraction) of the plots that were theirs during that quarter. We have added this multiplier under the Column Heading “Joint Venture Multiplier” such that the consumption is calculated appropriately. A note has been added to all affected “Joint Venture Multipliers” in the affected cells.
- Where TW are not responsible financially for the input supply, this is not reported and the output supplies (typically heat meters for the plots before sale) are reported as for conventional plot supplies.

The following sources of emissions were excluded or part-excluded from this report:

- Fugitive emissions (refrigerant gases): excluded on the basis of expected immateriality and difficulty in acquiring.
- Gas and electricity of part-exchange properties: excluded on the basis of immateriality due to very few completions of this type;
- Certain joint venture properties: where Taylor Wimpey was not part of the handover process. In these cases other house builders have captured MCR-related data;

Scope 3 Methodology

This part of the document states the methodology used to calculate Taylor Wimpey’s Scope 3 emissions for the following categories:

- Category 1 – Purchased goods and Services
- Category 4 – Upstream transportation and distribution
- Category 3 – Fuel and energy related activities
- Category 5 – Waste
- Category 6 – Business travel
- Category 7 – Employee commuting
- Category 11 – Use of sold products
- Category 12 – End of life treatment of sold products
- Category 13 – Downstream leased assets

The methodology holds true for the footprint calculated for the calendar year 2020.

Some of the calculations for various categories rely on extrapolations or estimations based on Taylor Wimpey’s full-time employee (FTE) figures, the number of legal completions and the completed square footage of Taylor Wimpey completions. These figures are provided by Taylor Wimpey and have the following assumptions:

- The ‘TW Central London’ Business Unit (BU) is excluded due to being a different part of the business.
- Two joint ventures (JVs) (Greenwich Millennium Village and Winstanley York Road Regeneration) are related to ‘TW Central London’ and therefore excluded along with TW Central London’s other completions. Other JVs (Bordon and Chobham Manor) are related to TW East London and TW South Thames and added to the other completions built by these BUs.
- All JVs are excluded from the square footage figure because they have been included in the relevant BU’s numbers – so adding them in would lead to double-counting.

Purchased goods and services

Purchased goods and services is broken down into two categories: overheads and construction materials. It should be noted that the Upstream Transportation part of the Purchased Goods and Services in 2020 has been subtracted and added to 'Category 4 – Upstream transportation and distribution'. This is described in further in Section 2.

Overheads

Each business unit in Taylor Wimpey enters their financial figures monthly onto the financial spend portal, Onestream. These figures cover overheads such as salaries, marketing, estate agent commissions, etc. At the end of the financial year, the central finance team in Head Office runs a report to show the breakdown of overhead expenses across business units (including Spain). The report also calculates the total spend on each overhead category.

The total annual spend for each overhead category is multiplied by the relevant environmentally extended input-output (EEIO) factor¹ to calculate Scope 3 emissions. 50% of Joint Venture spend is included to align with the Scope 1+2 methodology.

Construction

It would require extensive time and effort to gather data on the volume of building materials used by Taylor Wimpey across all projects. Taylor Wimpey has therefore adopted a practical and pragmatic solution.

In 2018 the Carbon Trust manually mapped Taylor Wimpey's cost codes from the 'Inquire' system, firstly to the procurement categories which had been used before and secondly to the EEIO categories. The first level of mapping was done so that Taylor Wimpey still had a comparison of the most material spends against previous years.

The mapping information, which should be reviewed and then used in future is provided in the excel file 'TW_Matching'. This maps out the IT system, Taylor Wimpey's supply head cost code, the procurement category and the EEIO category. This should ease the process of mapping the spend in future years and allow a regular review to ensure that categories are mapped correctly.

The overall spend for each of the Inquire categories is then multiplied by environmentally extended input output (EEIO) emission factors to calculate the Scope 3 emissions of construction materials.

In an update to the methodology for 2020, some spend has been split in two to reflect that some spend is attributed to labour and some to materials. In each case two EEIO categories as been assigned to reflect the labour and materials associated. The proportion of the split to each category has been manually assigned based on the experience of the Carbon Trust in this sector.

The current approach combines procurement data with spend-based emission factors. A potential improvement would be for Taylor Wimpey to gather the mass of purchased construction materials. It would be possible to ask suppliers for this information; however, the task would be time-consuming and requires re-baselining emissions calculated for the last few years. Taylor Wimpey is currently happy to continue with the extrapolation approach.

¹ EEIO factors sourced from the OPEN-IO database and updated through Carbon Trust analysis to take into account inflation, currency conversion and purchasing power parity

Upstream Transportation and Distribution

Due to data availability calculating Taylor Wimpey's upstream transportation and distribution was split into two distinct methodologies.

Firstly, Taylor Wimpey Logistics data was used from 2020. The logistics data was provided as mileage split into 'Arctic Works' and 'Rigid Works'. BEIS provide emission factors for these two distinct categories so these were applied to the mileage. Without any data on the weight the vehicles were carrying the 'Average Laden' emission factor was used. TWL in 2017 estimated that they account for approximately 10% of the total logistics. Therefore, this calculated figure was used for 10% of the overall Upstream Transportation and Distribution footprint.

To calculate the rest of this category EEIO emission factors were used. EEIO emission factors are broken down into Tier 1 Scope 1&2, Tier 1's upstream purchased goods and services, and upstream transport. Taylor Wimpey's Purchased Goods and Services, which had already been categorised into EEIO sectors, were then multiplied by just the Upstream Transport part of the EEIO emission factors. To avoid double counting this figure was then subtracted from the Purchased Goods and Services category. To also avoid double counting 10% of the total footprint calculated via this method was also removed to allow the 10% calculated from the TWL data.

Fuel and energy related activities

Data managers AJR Management Ltd are responsible for gathering Taylor Wimpey's energy data. At the end of the reporting year, AJR compile a complete model of all energy data and send this (February 2021) to the Carbon Trust. This model holds data for a range of energy categories, covering offices, sites, plots and fleet:

- Electricity
- Natural gas
- Burning oil
- Butane
- Diesel
- Petrol
- Gas oil
- LPG
- Propane

Consumption data is multiplied by the latest upstream carbon emission factors. Electricity consumption is also multiplied by electricity distribution and transmission losses factors. For electricity, both these factors and upstream emission factors vary between the UK and Spain. All factors are published by BEIS² (Department of Business, Energy and Industrial Strategy) or IEA (International Energy Agency).

The resulting emissions are summed to give Taylor Wimpey's emissions under the Scope 3 category 'fuel and energy related activities'.

² <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

Waste

Much of Taylor Wimpey's construction waste data comes from Reconomy, a waste management company who handle Taylor Wimpey's construction waste across the UK. They have well developed data collection and management systems, and a portal where construction waste data can be interrogated. Reconomy split the data into multiple categories, the most important of which are general waste, compactable waste, wood and inert waste.

A further set of data covers plasterboard waste, which is mainly handled by British Gypsum. Plasterboard is handled separately from other waste because when mixed with organic material and exposed to rain in an anaerobic environment, it can generate hydrogen sulphide gas (H₂S). As a result, plasterboard must be disposed of in a controlled environment. In addition, mixing plasterboard with other waste streams increases disposal costs. Therefore, plasterboard waste is segregated and collected by British Gypsum for reuse in new products. Occasionally Reconomy disposes of some plasterboard and this data is added to the total.

It should be noted that waste data is for the UK only and excludes Spain. However, given the size of operations in Spain, its contribution to total waste is considered to be negligible.

Other waste streams (i.e., remediation and demolition wastes, or where information is unavailable) are estimated each year due to the difficulty in obtaining the data. These estimates are based on 2008 data, which is multiplied year on year by the percentage increase in completions compared to the year previous. Thus, the 2020 waste volume will be the 2019 volume multiplied by the percentage increase in completions. Estimates will also on occasion consider an estimate of efficiency improvements.

The following categories - demolition, excavation, remediation, earthworks recovered (i.e., processed then reused as in the example of recycled aggregate) and reused (i.e., no processing prior to reuse) both on site, and sent to landfill, are subject to the extrapolation method described above.

In 2015 Taylor Wimpey's group construction waste recycling rate was 93%, and therefore only 7% of construction waste type was sent to landfill. The figure of 93% is calculated by Reconomy on the basis of UK-wide data from the Material Recycling Facilities that receive Taylor Wimpey's waste.

Since 2017 the direct emissions associated with end of life for the waste types 'Earthworks Soil', 'Excavation Soil', 'Contaminated Soil' and 'Silt/Soil' have been excluded on the basis that these types of soil waste are particularly difficult to measure due to multiple layers of contracting and that the majority of soil waste is treated and reused on site or reused on another site. For the analysis in 2019 however, the emissions associated with transporting soil waste off site was calculated and previous years' waste footprints were recalculated in order to have a representative baseline. 2020 used the same methodology as 2019.

The effort to measure the impacts of landfilled soil waste compared to the emissions that it generates is disproportionate to the value that Taylor Wimpey would gain from this information. Taylor Wimpey is also conscious of the reliance on old outdated data and methodology to estimate emissions from soil. Taylor Wimpey will continue to look for appropriate and less resource intensive methods of measuring this type of waste in future reporting years.

The total volume of waste in each category is multiplied by the latest waste emission factors published by BEIS in order to calculate Scope 3 emissions.

The final list of waste types sent to landfill is:

- Plasterboard ¹
- Wood ²
- Paper and Card ³
- Plastic (film) ³
- General Waste and other waste ²
- Asbestos ⁴
- Aggregate materials ⁴

Notes:

1 : From British Gypsum and Reconomy data

2 : From Reconomy data

3 : There are no separate categories for plastic film and paper/card waste. These are combined in a Reconomy category of 'compactable waste'. It is then assumed that 50% of this category is paper/card, and 50% is plastic film.

4 : Using the extrapolation method outlined above.

Business travel

Taylor Wimpey is divided into 24 regional business units (RBUs), each of which has its own processes around purchasing business travel. It is therefore not currently possible for Taylor Wimpey to collect the travel expenses for every staff member for the entire year. To resolve this issue, Taylor Wimpey collects a sample of staff expenses from four to five business units. The exact number of RBUs involved per year will depend on the response rate.

Each RBU will provide H1 (January – June) expense claims for approximately 15 staff members. To achieve a representative sample, RBUs are asked to provide data for a variety of roles and departments, since some staff members will travel more than others. The sample data only covers staff members who travel for business, which is a subset of Taylor Wimpey's entire workforce. Once expenses data is received by Taylor Wimpey's sustainability team, it is stored on a single excel sheet. This captures total car, taxi, aviation and train travel for each employee in Q1 and Q2. Mileage figures are calculated as follows:

- Car mileage data is taken directly from the mileage claimed within the expenses data.
- Distance by taxi distance is calculated using Google Maps if origin and destination is included in the expense claim. If no data is available for origin and destination, a conversion rate of £1 = 1 mile is used, which we consider to be conservative.
- Distance by train is calculated by entering origin and destination, included in the expense claim, into Google Maps
- Distance by plane is calculated by entering origin and destination, where these are included in the expense claim, into Google Maps

Mileage is converted to kgCO₂e using the latest BEIS emissions factors. These emission factors are stated in the Excel model. Based on the available sample of expenses data, each RBU business travel sheet then calculates total distance, total carbon emissions and average emissions per travelling employee. This data is then entered into a totals sheet with all sampled RBUs. This sheet calculates the average travel (distance and emissions) per travelling staff member for H1 of the reporting year. These values are multiplied by two to give a combined average figure (kg CO₂e/travelling employee) for the sampled business units for the entire year.

The average emissions per travelling employee is multiplied by the total number of employees³ that travel for business. To avoid double-counting, the Scope 1 emissions from Taylor Wimpey's grey fleet is subtracted from Scope 3 business travel emissions.

As stated in this methodology, each year 4-5 RBUs are sampled. The latest sample of data is added to the existing data samples taken in previous years, and an average is taken across the entire dataset. Data from previous years is included in order to smooth out fluctuations in business travel emissions which are due to the particular circumstances and characteristics of the business units sampled in the reporting year. For reporting the 2020 footprint, 5 additional RBUs were sampled, bringing the total to 27 RBUs that have been sampled. Over time, all business units will have been sampled, and emissions per employee will therefore become increasingly representative over time. It should also be noted that travel emissions within a given business unit are unlikely to vary substantially between years. Over time, as business units are resampled, this will replace and update their calculated emissions.

Employee Commuting

10% of employees have been surveyed with the distance they travel to work. This distance was calculated firstly to 'site', if this data wasn't available then the distance to the 'Business Unit' was used. These distances were then multiplied by the average number of days worked in the UK in a year (233). The total distance driven in a year was then multiplied by the average car emission factor per kilometre driven. It is assumed that all employees commute by car.

Data was used from 2020 as a granular breakdown of employees travelling to either the site or the office was provided. Postcode data was provided and distance was calculated using a distance calculator tool. Where distance could not be calculated, the average distance travelled was applied. The data for the 10% of employees was then extrapolated to the total Taylor Wimpey FTEs.

Use of sold products

In previous work with the Carbon Trust Taylor Wimpey had provided the dwelling emission rate (DER) for three of their BUs (Bristol, Manchester and East London). This included 1,967 dwellings, broken down by the type of dwelling, the floor area of each dwelling and the DER figure, provided in kgCO₂e/m². The carbon per home was then calculated by multiplying the floor area of each dwelling by the DER figure. An average kgCO₂e/m² was then calculated for all DERs. To extrapolate for all of Taylor Wimpey the number of completions in m² was multiplied by the kgCO₂e/m² figure for both DERs.

For 2020, figures for 'TW Noth Thames' DER were also provided, therefore this was combined with the three previous DERs. The more DERs that can be added from various parts of Taylor Wimpey the more the accuracy of the footprint can be provided. This is also important as new building regulations come in, energy efficiency is improved and therefore this category should decrease over time.

To calculate the total emissions for this category the DER calculated for all three business units was multiplied by the design life estimate for Taylor Wimpey dwellings of 60 years.

In 2020, an amendment to the methodology has meant that emissions have been split into Gas (77%) and Electricity (23%) based on published typical Domestic Consumption Values

³ The total number of employees that travel for business is the total number of FTEs multiplied by the percentage of FTEs who travel for business. The percentage of FTEs who travel for business is estimated to be 85%.

from Ofgem. It has been assumed that the Gas emission factor for combustion will not change over the 60 year period. However, it has been assumed that the grid electricity emission factor will change over this period. Therefore, the Energy and Emissions Projections (published by BEIS in 2019) have been factored in to account for grid decarbonisation.

End of life treatment of sold products

Due to the relatively small materiality of the 'end of life treatment of sold products' category data from 2017 was re-used. This data consists of the end-of-life emissions for a typical TW three-bedroom semi-detached home built in 2017 and extrapolated to all of TW homes built in 2020.

The home used was from built in Gosford and material items which were used to build the house were compiled. The unit (e.g. m² or tonnes) and the quantity of the material was then used to calculate the overall tonnes for each material, the unit was converted into tonnes when necessary. Online sources were then used to categorise the various materials into types of waste. The categories of each waste material in tonnes was multiplied by the 2019 emission factors from DEFRA. A recycling rate of 91.4% was used to estimate the proportion of waste was going to landfill and what was being recycled and the appropriate emission factor was applied. The total kgCO₂e for the one three bed semi-detached house was extrapolated by multiplying this figure by Taylor Wimpey's total completions in 2019.

Whilst the resources needed to calculate this category more accurately may not reflect the materiality of this category, improvements could be made. For the next footprint if data for another completion could be provided, potentially different to the 3-bed semi-detached, this would improve the accuracy. If Taylor Wimpey could then provide the breakdown of their completions broken down by 3-bed semi-detached and other this could then be reflected in the overall footprint.

Downstream leased assets

Taylor Wimpey provided their 2020 freehold lease portfolio; this data is held by Savills. This data is broken down into different locations across the UK and the type of land. The three types of land categorised are Agricultural, Brownfield and Woodland. For both Brownfield and Woodland areas, the emission factor is assumed to be 0. To calculate the downstream leased assets emissions for agriculture and average emission factor for agriculture in the UK was used. This was calculated by taking total emissions from agriculture in the UK⁴ and dividing it by the total area of land for agriculture in the UK⁵. This factor was then multiplied by the total agricultural land leased by Taylor Wimpey.

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835762/agriclimate-9edition-02oct19.pdf (pg15)

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/848641/AUK_2018_09jul19a.pdf (pg10)