



# Rhondda Cynon Taf County Borough Council

Carbon Footprint 2020/21

September 2021

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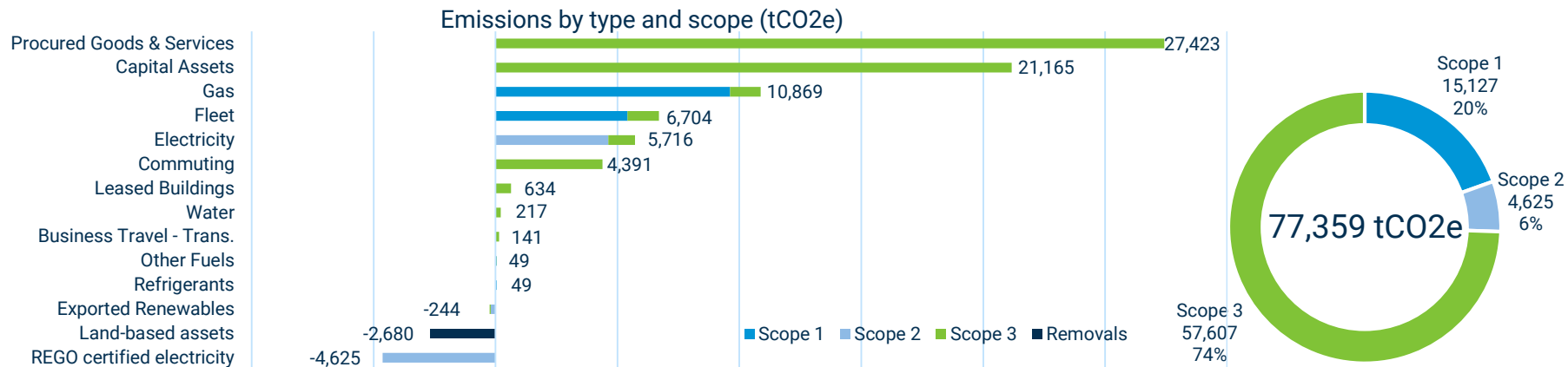
# 1. Executive Summary

# Carbon Footprint Summary

The total estimated carbon footprint of RCT in FY 20/21 has been calculated to be **77,359 tCO<sub>2</sub>e** (location based<sup>1</sup>). The indirect emissions associated with the council's procured goods and services account for 35% of the overall carbon footprint. Emissions associated with capital assets make up a further 27% of total emissions. Both of these main categories are broadly categorised as "supply chain" from RCT scope 3 indirect emission sources. The top 4 emitting categories are:

- Procured goods and services: 27,423 tCO<sub>2</sub>e (Scope 3)
- Capital assets: 21,165 tCO<sub>2</sub>e (Scope 3)
- Natural Gas consumption in buildings: 10,869 tCO<sub>2</sub>e (Scope 1 and upstream scope 3 impacts)
- Fleet energy consumption 6,704 tCO<sub>2</sub>e (Scope 1 and upstream scope 3 impacts)

The overall Net Emissions for RCT are **69,811 tCO<sub>2</sub>e** which accounts for the avoided emissions associated with exported renewables, market based electricity emissions (REGO certified electricity) and carbon removals from Land-based assets. The GHG protocol and UK Environmental Reporting Guidelines encourage dual reporting to allow for reflection of positive carbon activity which cannot currently be captured within a formal, reportable GHG protocol aligned carbon footprint. Net Emissions here also go beyond the scope of the Welsh Public Sector Net Zero Carbon Reporting Guide to include the avoided emissions from exported renewables and electricity purchased through REGO certified contracts (but including removals from land-based assets). All 14 emission categories assessed can be summarised below.



<sup>1</sup>70,533 tCO<sub>2</sub>e (market based) using zero emissions for all scope 2 electricity from 100% renewable "green" energy tariffs

# Footprint from 2019/20 vs 2020/21

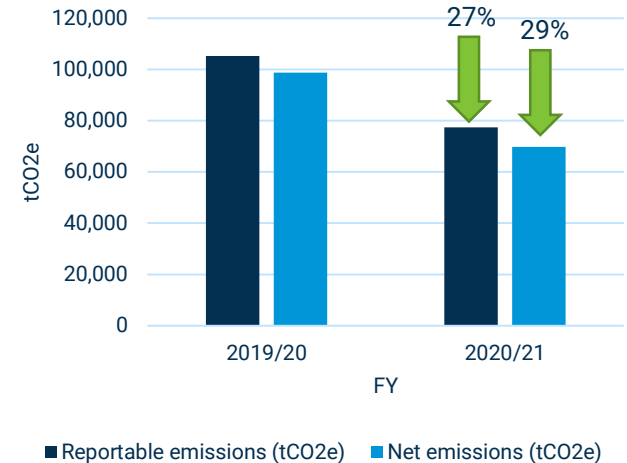
## Year on year changes

A comparison of RCT's summary 19/20 and 20/21 footprints can be seen in the chart on the right. A significant reduction in emissions can be seen between the two years which is assumed to be attributable to the cessation in a number of activities across various emission sources due to the COVID-19 pandemic. A 27% reduction in reportable gross emissions can be seen (not including Net reductions). This number increases to a 29% reduction in emissions where Net sources are included. This is primarily due to the addition of land-based asset removals which were not included in the 19/20 assessment.

Other key differences between the 19/20 and the 20/21 footprint data are:

- A 28% reduction in emission from purchased goods and services and a 25% reduction from capital assets. Whilst the overall expenditure did not decrease significantly between 19/20 and 20/21, the emission intensity of activities dropped, particularly for construction activities (e.g. greater emphasis on desk based design/feasibility/consultancy activities rather than actual construction)
- Emissions from natural gas and electricity use in RCT building operations reduced by 23% between 19/20 and 20/21
- Emissions from fleet reduced by 7% between 19/20 and 20/21. The comparatively low reduction is likely due to the continuation of essential services such as waste collection throughout the pandemic.
- Emissions from employee commuting reduced by 43% between 19/20 and 20/21 despite including an estimate of additional emissions as consequence of increased home working (in accordance with current reporting guidance). Without the WFH estimate the reduction is 69%.
- Emissions from business travel reduced by 90% between 19/20 and 20/21
- Emissions from the other scope 3 categories broadly remained constant
- The Land-based asset assessment has provided a greater reduction in reported net emissions (~3%).

Footprint comparison





## 2. Introduction

# Introduction & Context

- In 2017, the Welsh Government (WG) set the ambition of achieving a Net Zero public sector by 2030 and in March 2019, published Prosperity for All: A Low Carbon Wales which includes a policy to “Support the public sector to baseline, monitor and report progress towards carbon neutrality”.
- Welsh Public Sector Net Zero Carbon Reporting Guide is now in place (first submission expected in October 2021) and will form the basis of ongoing carbon reporting for the overall Net Zero Welsh public sector target.
- Rhondda Cynon Taf County Borough Council (RCT) commissioned the Carbon Trust to calculate the organisational carbon footprint of the council for the financial year 2020/2021, following on from two phases of work conducted earlier in 2021 (assessment of RCT 2019/20 and a supply chain engagement demonstration study).
- RCT have committed to a target aligned with the overall WG target of becoming Net zero by 2030 across its own estate.
- RCT have also committed to becoming “Net Zero” in their ‘Corporate Plan 2020-24 Making a difference’, which will align with RCT’s commitment to the Wellbeing of Future Generations Act.
- This report aims to build on the carbon reduction efforts made by RCT over the last 10 years including over 100 Solar PV installations, a mixture of micro-combined heat and power (CHP) installations, high efficiency boiler plant replacements, HVAC upgrades including pool plant, over 200 LED upgrades in buildings and LED street lighting.
- This footprint report will help RCT establish a revised carbon measurement for its own operations, taking into account a comprehensive set of Scope 1, 2 Scope 3 emissions sources.
- This carbon baseline will form a crucial part of the council’s Climate Action Planning efforts.
- The Council also recognises the importance of action at the County Borough level and should consider developing a separate Borough-wide carbon footprint to identify areas for action.





An aerial photograph of a rural landscape. A river flows through the scene, reflecting the sky. The land is divided into green fields and dense forests. In the distance, rolling hills are visible under a soft, golden light, suggesting either sunrise or sunset. The overall tone is warm and natural.

# Carbon Trust's Cities and Regions Team

We work with cities and regions to develop transformational sustainability strategies, reducing emissions and accelerating the uptake of smart infrastructure for liveable and resilient urban environments



## About Rhondda Cynon Taf County Borough Council

Rhondda Cynon Taf County Borough Council is the governing body for Rhondda Cynon Taf. The County Borough has an approximate population of 240,000 with the most populous areas centred around Aberdare and Pontypridd.

The council is responsible for delivering a wide range of services including: local refuse collection and recycling, social services, parks, provision of schools, leisure centres and office-based services such as local planning and building control.

Rhondda Cynon Taf has a strong track record of placing sustainability and the environment at the heart of its operations.



RHONDDA CYNON TAF



## 3. Methodology

# Greenhouse gas protocol

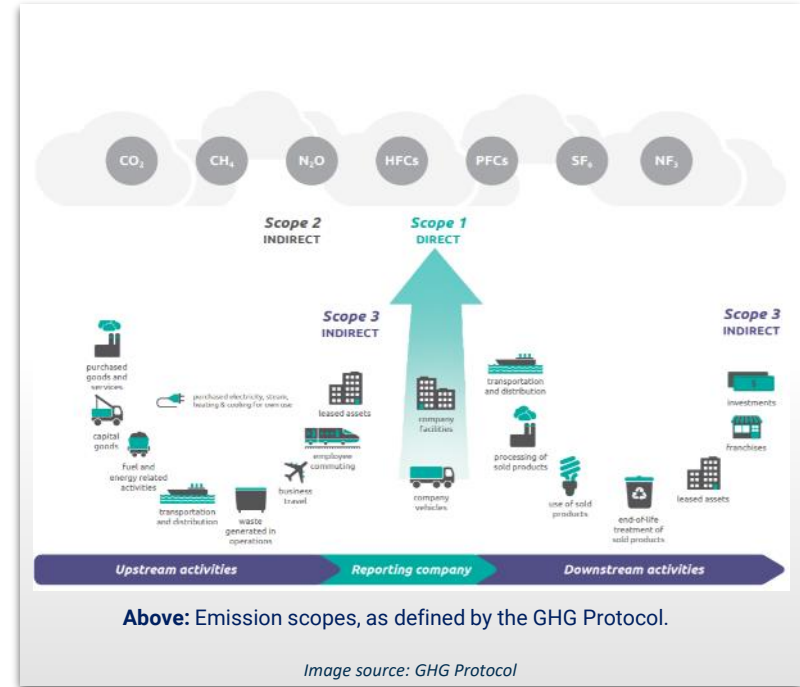
## Introduction to Carbon Footprinting

The Carbon Trust has conducted the carbon footprint for RCT in accordance with the greenhouse gas (GHG) protocol – the most widely used and accepted methodology for GHG accounting. The GHG protocol categorises emissions into three scopes:

- Scope 1:** All direct GHG emissions (i.e. 'on-site' emissions, such as gas from a gas boiler or tailpipe carbon emissions from owned vehicles).
- Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- Scope 3:** All other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc.

Direct and indirect emissions are defined according to operational control, such that:

- Direct GHG emissions are emissions from sources that are operationally controlled by RCT.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources controlled by another entity (for example, a power plant that generates the electricity consumed by RCT, or a waste-water treatment site that processes RCT's waste water).

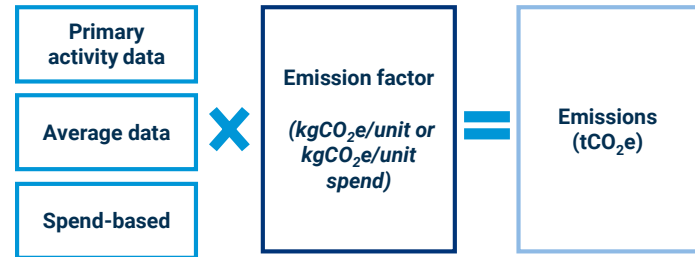


# Methodology

## GHG Protocol

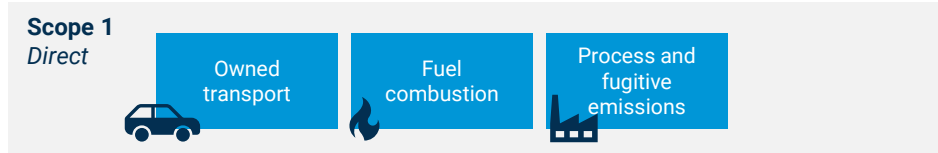
- When calculating emissions, the availability of certain data can influence what calculation method is used. Whilst RCT have strived to provide the most accurate data possible, certain data has been estimated due to a lack of availability or quality. Estimates have been carefully reviewed and applied where appropriate. These have been reported in the appendices along with data sources for other categories.
- In accordance with the Greenhouse Gas (GHG) Protocol, RCT has taken an operational control approach to calculating emissions. This means that the footprint is based on emissions from operations over which RCT has direct operational control.
- Under the GHG Protocol, emissions sources resulting from these operations are categorised into scopes:
  - **Scope 1:** Direct emissions from combustion of gas and other fuels.
  - **Scope 2:** Emissions resulting from the generation of electricity.
  - **Scope 3:** Emissions made by third parties in connection with operational activities. This includes, for example, emissions from business travel, employee commuting and purchased goods and services.

**Emissions are calculated by multiplying activity data by an appropriate emission factor**



# Methodology

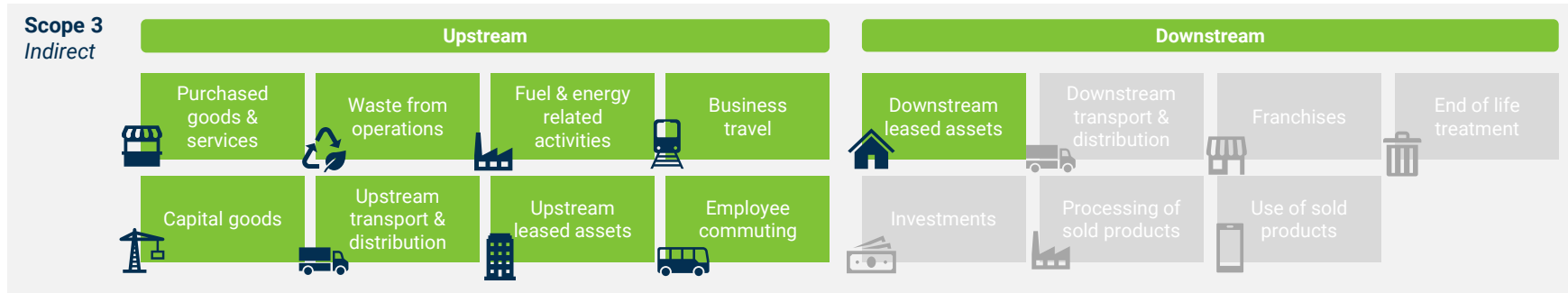
## GHG Protocol and Welsh Government Carbon Reporting Guidance



The boundary of this assessment was agreed by RCT, and includes all organisational scope 1 and 2 emissions and those scope 3 emissions required by WG reporting. The selection of emission sources was reviewed against the perceived magnitude, data availability, sphere of influence and ability to achieve reductions through direct action.



The emissions included are consistent with WG reporting requirements, some sources have been included in addition to all the sources calculated in the previous years reporting. Emission sources excluded from this assessment (as per the GHG protocol and WG guidance) can be found in the Appendix.



# Data collection

	Activity data	Source	Notes, assumptions and data quality comments
Scope 1	Natural gas consumption in buildings	Consumption data was made available for 236 sites. A further 11 sites were provided without data. kWh consumption and cost (£).	Consumption was assumed to be zero where data was not provided with no estimates included. Data was not available where the site was not under an RCT supply contract or no usage data was recorded. RCT should validate this in future years.
	Vehicle fossil fuel consumption	A comprehensive list of fleet data (including plant) was provided in primary fuel consumption format with associated vehicle type as requested within the data collection form.	N/A
	Other fuel consumption	LPG consumption for 2 sites was based upon communicated billing data provided by the sites concerned.	Data was provided in litres of annual consumption.
	Refrigerant leakage	Refrigerant leakage data was provided for 4 sites.	Data for F-gas leakage has been based on annual routine maintenance/top-ups of all refrigerant. The leakage data should be verified through an independent audit of the 3 <sup>rd</sup> party contractor maintaining the systems.
Scope 2	Electricity consumption in buildings	Consumption data was made available for 331 sites. A further 3 sites were provided without data. kWh consumption and cost (£). Renewable energy supply evidence was presented to demonstrate REGO power purchasing.	Consumption was assumed to be zero where data was not provided with no estimates included. Data was not available where the site was not under an RCT supply contract or no usage data was recorded. RCT should validate this in future years.
Scope 3	Procured goods and services	Spend report for RCT expenditure in 2019/20 (~£230million). Data removed includes public body / inter-authority spend, pensions and salaries spend and other capital / balance sheet spend (such as VAT related payments etc).	Economic proxies in the form of environmentally extended input output (EEIO) factors have been used to calculate the emissions associated with individual procured services (see next page).
	Capital assets	Spend report for RCT expenditure in 2019/20 as above. Spend categorised as "capital assets" where evidence suggests construction based activities e.g. "works". As such the category relates to construction based emissions e.g. embodied emissions in construction products and operations.	Economic proxies in the form of environmentally extended input output (EEIO) factors have not been used to calculate the emissions associated with individual capital projects.



# Data collection

	Activity data	Source	Notes, assumptions and data quality comments
Scope 3	Employee commuting	Anonymised employee home addresses and work destinations were provided. Average return distances were estimated using the home address and one central location (CF40). In addition an estimate of increased home working emissions was made based upon employee numbers and estimated closures following current reporting guidance.	Assumptions were made on the number of commuting days per year assumed to be 75% reduction on 19/20. Home working emissions were based upon estimates of average home energy use.
	Business Travel: Transport	All data labelled as "hire vehicles" was used for the assessment. Only mileage data was provided (no primary fuel data).	All vehicles provided in the 'Hire vehicles' spreadsheet have been included, it was noted that some vehicles had been hired out over a long period and could be considered under the 'Fleet' category. Vehicles not yet returned were not counted and their emissions will be considered in the footprint of the year in which they are returned to the vehicle owner.
	Water supply and treatment	m <sup>3</sup> consumption – consumption data provided for 383 sites, in addition to 61 sites which were recorded to have no consumption .	95% of water supplied has been assumed to be extracted for treatment. Actual water consumption was provided by the utility provider (an improvement on the 19/20 footprint), however a small sample of sites had been estimated based on average consumption of other sites (conducted by RCT).
	Waste disposal	Waste data not included. Evidence provided that confirm very limited waste to landfill occurs (<1%) therefore as per reporting guidelines and the GHG protocol, only waste collection (vehicle) emission are required.	Waste emissions are included under fleet emissions. It was not possible to disaggregate organisational waste from community waste.
	Leased Assets	42 sites were identified as either upstream sites where RCT is the landlord or downstream where RCT is the tenant. Electricity and gas consumption was provided for most downstream sites. Only floor area (m <sup>2</sup> ) was provided for upstream sites.	Only sites where RCT deliver services or have control of the utility bills have been included. Building energy benchmarks have been used (CIBSE) to estimate energy consumption where actual data is not available. This should be avoided where possible due to the increased uncertainty.
	Renewable electricity generation	Energy generation data from 68 small scale roof mounted solar PV installations were also provided.	Renewable energy data includes Solar PV generation data provided and estimated export data based on 50% export for schools, 25% export for offices, and no export for other sites. RCT's CHP are behind the meter and do not export, so therefore are considered within electricity and gas totals

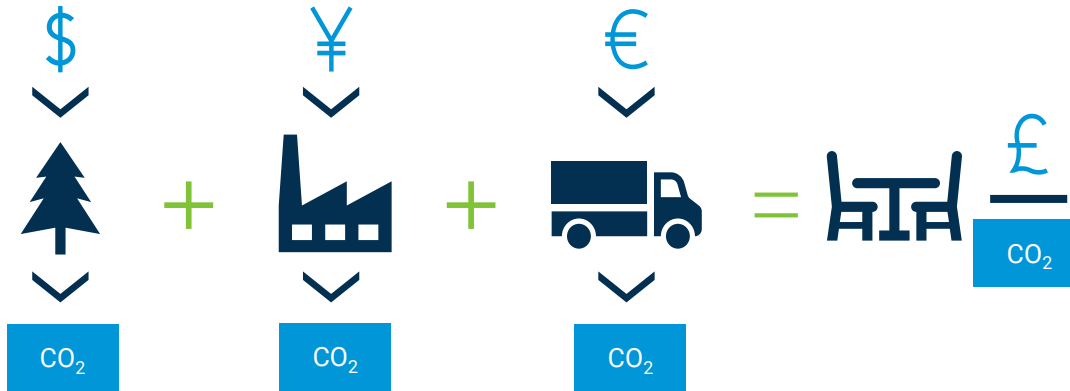


# Input-Output Factors

Input-Output values (I-O) are used to calculate the hidden, upstream, indirect or embodied environmental impacts associated with downstream consumption activity. The diagram below provides an overview schematic of how emissions factors for a purchased item (fast food in this example) may be calculated by looking at the emissions produced per major economic activity, associated emissions and output of each stage of the product's value chain.

They have been used as a means to calculate emissions relating to procured goods and services and capital good and represent an estimate of the full "cradle to gate" emissions for each item that has been assessed. Each I-O factor details the typical emissions of a product or activity per unit of spend on that produce or activity. We work from a database of 500 I-O factors for a range of different sub-sector goods and activities.

I-O factors are useful for providing a broad estimate of the emissions from procured goods and services and capital assets, however, they reflect the general emissions of a sub-sector and not of the specific supplier of that good or activity. It is recommended that I-O factors are used initially to identify emission hotspots within the supply chain that can then be further refined through primary data collection.



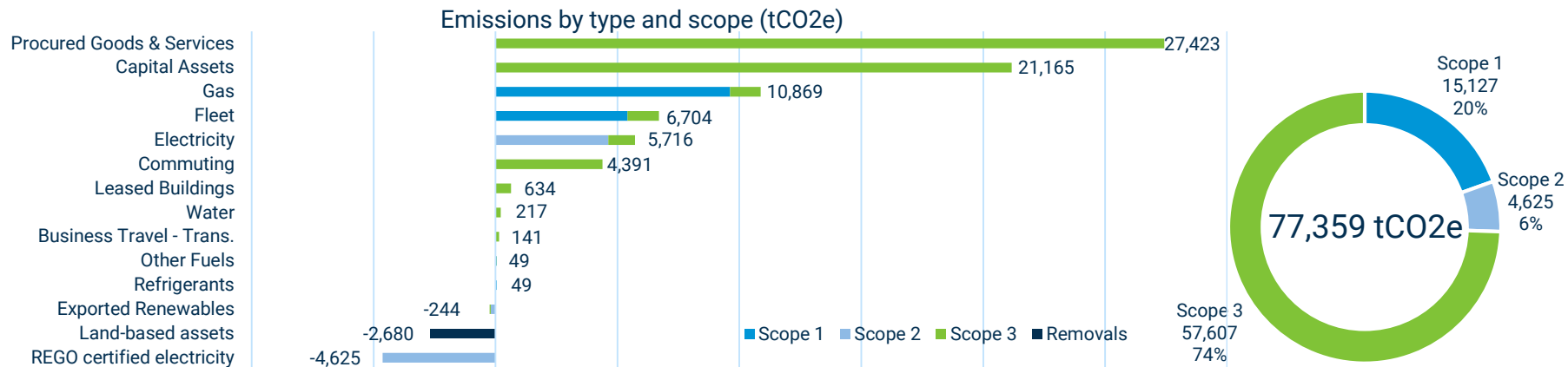
## 4. Analysis

# Carbon Footprint Summary

The total estimated carbon footprint of RCT in FY 20/21 has been calculated to be **77,359 tCO<sub>2</sub>e** (location based<sup>1</sup>). The indirect emissions associated with the council's procured goods and services account for 35% of the overall carbon footprint. Emissions associated with capital assets make up a further 27% of total emissions. Both of these main categories are broadly categorised as "supply chain" from RCT scope 3 indirect emission sources. The top 4 emitting categories are:

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<sup>1</sup>70,533 tCO<sub>2</sub>e (market based) using zero emissions for all scope 2 electricity from 100% renewable "green" energy tariffs

# Summary of Scope 1 and 2 emissions

Scope 1 & 2 emissions represent a combined figure of 19,753 tCO<sub>2</sub>e for 20/21 which is 26% of RCT’s total emissions<sup>1</sup>.

- **Scope 1 vs. Scope 2 emissions:** 20% of the footprint arises from scope 1 emissions from fleet vehicle use and building fuel consumption (primarily gas). Scope 2 emissions account for the remaining 6% from building electricity use.
- Upstream Scope 3 energy impacts from natural gas, fleet, other fuels and electricity account for a 3,634 tCO<sub>2</sub>e (T&D and WTT<sup>2</sup>).

Scope	Category	tCO <sub>2</sub> e <sup>3</sup>
1	Natural Gas	9,618
1	Fleet	5,417
1	Other Fuels	44
1	Refrigerants	49
2	Electricity	4,625

## Buildings



19%

## Fleet



5%

## REGO Certified Electricity



-4,588 tCO<sub>2</sub>e

- **Emissions by activity:** Approximately 19% of the total footprint emissions come from electricity and heat use in buildings. Fleet fuel consumption is responsible for a further 7% of emissions.
- **Net scope 1&2 Emissions:** approximately 197 tCO<sub>2</sub>e were avoided through renewable energy generation from solar PV exported back into the grid, in addition to scope 2 emissions from electricity usage as REGO certified electricity (~68 small to medium Solar PV rooftop mounted systems).
- All of RCT’s scope 2 electricity emissions can be classified as “zero” under the market-based reporting guidance (Net Emissions) as REGO<sup>4</sup> certified electricity (headline figures use the “location-based” UK grid average emission factor as per government guidelines).

<sup>1</sup> Not including scope 3 upstream impacts as shown on the summary chart (page 18)

<sup>2</sup> Transmission and distribution losses and Well to Tank emissions

<sup>3</sup> Electricity generation from micro CHP units not captured

<sup>4</sup> Renewable Energy Guarantees of Origin

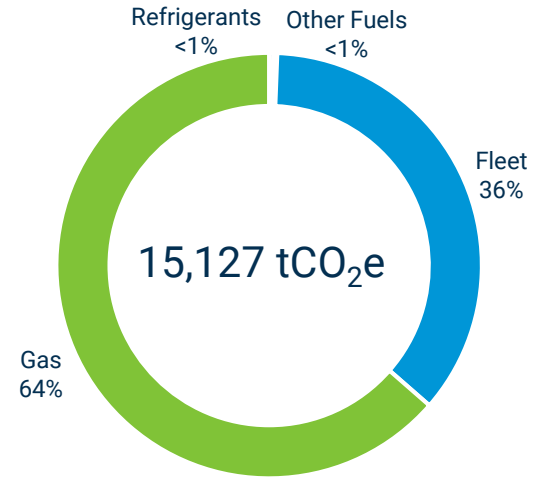
## Summary of scope 1 emissions

There are four sources of scope 1 emissions that have been assessed as part of RCT's footprint:

- Natural gas consumption: 9,618 tCO<sub>2</sub>e (10,869 tCO<sub>2</sub>e when including scope 3 upstream energy impacts)
- Operation of fleet vehicles and plant: 5,417 tCO<sub>2</sub>e (6,704 tCO<sub>2</sub>e when including scope 3 upstream energy impacts)
- Liquid fuel consumption (other fuels): 44 tCO<sub>2</sub>e (49 tCO<sub>2</sub>e when including scope 3 upstream energy impacts)
- Refrigerant leakage: 49 tCO<sub>2</sub>e (significant increase compared to 6 tCO<sub>2</sub>e in FY 19/20 due to planned preventative maintenance during COVID-19 pandemic office closures). This indicates the 2019/20 data may not have been accurately assessed and/or reported. This figure could be significantly higher if all AC systems were assessed in future years.

The vast majority of scope 1 emissions arise from those created by natural gas consumption and from use of petrol and diesel in fleet vehicles. Refrigerant emissions are associated with leakage of refrigerants from air conditioning systems. "Other fuels" represent the consumption of LPG at 2 x RCT sites.

## Summary of RCT's scope 1 emissions



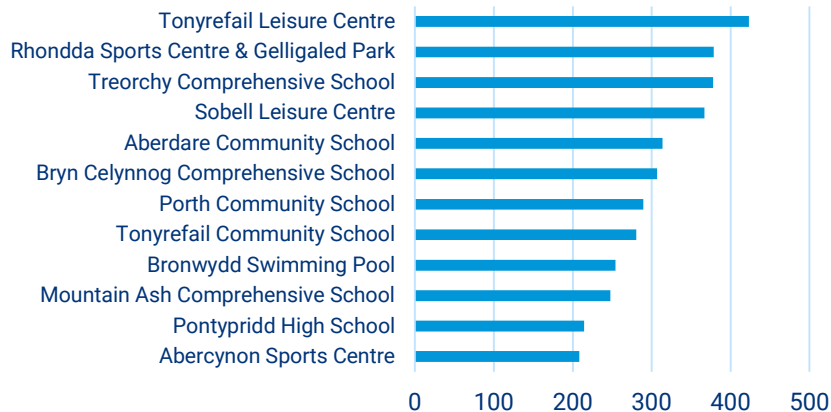
# Scope 1 Emissions Breakdown

## Natural Gas Consumption

Carbon emissions associated with gas consumption account for 9,618 tCO<sub>2</sub>e (10,869 tCO<sub>2</sub>e when including scope 3 upstream energy impacts). This represents 13% of total emissions (or 14% including the scope 3 upstream energy impacts).

Gas consumption records were provided for 236 RCT sites (in addition to 11 sites with no associated consumption data). The top 12 sites in terms of carbon emissions are shown below. These 12 sites represent 34% of natural gas emissions (3,662 tCO<sub>2</sub>e), which is ~5% of RCT's total emissions. Energy efficiency investigations should be prioritised at high consuming sites to understand the potential for heat efficiency improvements and electrification of systems.

Top 12 sites natural gas emissions (tCO<sub>2</sub>e)<sup>1</sup>



The emissions factor associated with Natural Gas is essentially a fixed factor. As such where a building uses roughly the same amount of gas year on year, the associated carbon emissions will not change.

On the contrary, due to the increasing amount of renewable energy being introduced to the national electricity grid, the emissions associated with electricity consumption are falling year on year and will very soon become more green than gas. Whilst the future for the UK's heating technologies isn't entirely known, the majority of forecasts assume that most heat and hot water for buildings will be supplied by heat pump solutions that take advantage of the lower grid emission factors and their high efficiencies (known as co-efficient of performance). Ground source and air source heat pumps are common types and alongside improvements to the insulation and fabric of buildings, RCT should be investigating moving towards these systems in the majority of buildings.

<sup>1</sup>10 of the 12 sites on the list remain unchanged from the 19/20 data.

# Scope 1 Emissions Breakdown

## Natural Gas Consumption Energy Benchmarking

A basic energy benchmarking exercise has been conducted below to highlight significant departures from expected gas consumption at the top 12 sites.

The data indicates poor energy efficiency at a number of sites (Tonyrefail Community School, Porth Community School, Treorchy Comprehensive School and Tonyrefail Leisure Centre). These sites are particularly poorly performing given the closures throughout large periods of FY 20/21. All of these sites should be investigated further since their consumption is high and discrepancies with benchmarked sites can sometimes inflate the comparative performance of a building.

The 12 highest emitting sites were identified as predominantly being leisure centres, sports facilities and comprehensive schools. The 5 sites with highest natural gas consumption make up 17% of the total natural gas consumption from all RCT buildings.

*<sup>1</sup>Good and typical practice benchmarks are prepared to complement operational rating procedures for display energy certificates. The benchmark figures describe energy use for a typical office buildings. "Typical" refers to the median of the sample. This should only be used indicatively, and further investigation would be required to understand the overall performance of the building.*

Site	m <sup>2</sup>	kWh/m <sup>2</sup>	kgCO <sub>2</sub> /m <sup>2</sup>	CIBSE Benchmark <sup>1</sup> (good-typical practice) kWh/m <sup>2</sup>
Abercynon Sports Centre	3,752	267	0.056	264-598
Pontypridd High School	11,539	89	0.019	108-144
Mountain Ash Comprehensive School	11,878	100	0.021	108-144
Bronwydd Swimming Pool	1,475	830	0.172	573-1336
Tonyrefail Community School	3,138	430	0.089	108-144
Porth Community School	9,207	151	0.031	108-144
Bryn Celynnog Comprehensive School	12,879	115	0.024	108-144
Aberdare Community School	13,728	110	0.023	108-144
Sobell Leisure Centre	2,920	605	0.126	573-1321
Treorchy Comprehensive School	12,417	146	0.030	108-144
Rhondda Sports Centre & Gelligaled Park	7,712	236	0.049	264-598
Tonyrefail Leisure Centre	3,543	575	0.120	264-598

# Scope 1 Emissions Breakdown

## Fleet Vehicle and Plant Emissions

- In total 5,417 tCO<sub>2</sub>e arise from fleet and plant emissions which is 7% of RCT's footprint (6,704 tCO<sub>2</sub>e and 9% when including scope 3 upstream energy impacts).
- Fleet vehicle emissions represent approximately 5% of RCT's total emissions at 3,639 tCO<sub>2</sub>e (4,512 tCO<sub>2</sub>e and 6% when including scope 3 upstream energy impacts). A further 1,778 tCO<sub>2</sub>e arise from plant equipment (2,192 tCO<sub>2</sub>e including scope 3 emissions)
- Data for more than 600 vehicles was included within the fleet submission. The top 10 categories of vehicle have been included in the table on the right.
- Vehicle types were provided for all vehicles to be assigned appropriate emissions factors which is an improvement from the FY 19/20 submission where a number of assumptions were made.
- Those vehicles identifiable as waste collection vehicles (refuse), represent the largest category of vehicles in terms of emissions. These vehicles are understood to represent community, as well as RCT's organisational waste emissions (due to no organisational waste to landfill) and the categorisation of emissions according to UK government and GHG protocol guidelines.
- Smaller refuse trucks (18T) can be seen to be one of the most emissions intensive vehicles (tCO<sub>2</sub>e / vehicle). This is potentially due to waste collection operations across rural areas within RCT's boundary, coupled with poor fuel efficiency for large diesel engines.
- The top 10 vehicle categories make up 77% of emissions from fleet vehicles (52% when including plant emissions).

Type	Emissions (tCO <sub>2</sub> e)	Percentage of fleet emissions (%)	Count	Average emissions per vehicle (tCO <sub>2</sub> e)
REFUSE 26T	1,073	16%	57	19
REFUSE 22T	556	8%	25	22
TIPPER 3.5T	354	5%	95	4
HOOKLOADER 32T	340	5%	10	34
SMALL VAN	325	5%	146	2
TIPPER 18T	288	4%	11	26
REFUSE 18T	185	3%	6	31
TIPPER 7.5T	129	2%	19	7
4X4	125	2%	30	4
GULLY 18T	120	2%	5	24
PLANT	2192	33%	89	25
All other vehicle types	1,018	17%	224	5



# Other Scope 1 Emissions

## Refrigerants

- Refrigerant leakage accounted for an estimated 49 tCO<sub>2</sub>e of emissions in 20/21, approximately 0.1% of RCT's emissions.
- This was a significant increase from previous years' footprint (6 tCO<sub>2</sub>e).
- From information provided by RCT, it is understood that the increase is due to an enhanced schedule of inspection and maintenance (more than the typical 5 year cycle) to take advantage of the office closures caused by the COVID-19 pandemic.
- Consequently, a number of leaks were detected, where refrigerant had to be topped up and AHU's/AC systems re-pressurised.
- Implementing a shorter maintenance cycle will ensure air handling units and other air conditioning systems are operating efficiently with minimal fugitive emission lost to atmosphere

## Other Fuels

- Liquid Petroleum Gas (LPG) is used in 2 x RCT sites (Dare Valley Country Park and Llanharan Primary School).
- As a result of the LPG consumption at these sites, 44 tCO<sub>2</sub>e have been estimated (49 tCO<sub>2</sub>e if upstream scope 3 emissions associated with the scope 3, Well-to-Tank emissions are included)
- Despite the very small number of sites utilising LPG and comparatively small consumption, the total emissions account for 0.1% of RCT's footprint.
- Switching to less emission intensive fuels at these sites should therefore be carefully considered to reduce RCT's footprint in future years (e.g. electrification).

# Summary of scope 2 emissions

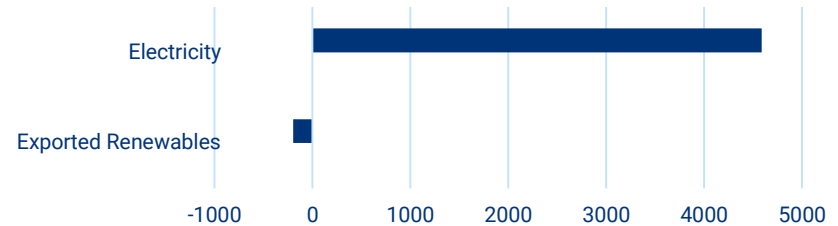
Scope 2 emissions from the electricity purchased from the national grid, for use in RCT buildings accounts for to 4,625 tCO<sub>2</sub>e (5,716 tCO<sub>2</sub>e when including scope 3 upstream energy impacts). Emissions from electricity therefore account for approximately 6% of the overall footprint (or 7% when accounting for additional upstream scope 3 emissions). Consumption data was provided for 341 sites, and an additional 3 sites where no consumption data was provided.

Use of Solar PV equates approximately 197 tCO<sub>2</sub>e avoided emissions annually. The emission estimate is based on the average grid emissions factor for 2020 as published by the UK government.

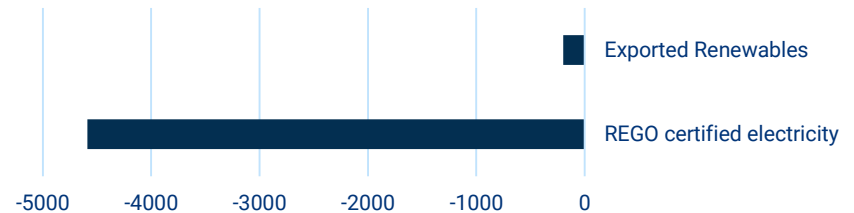
The reportable carbon footprint assumes the standard location based approach to scope 2 aligning with Welsh Government Carbon Reporting Guidance. It is understood that 100% of electricity is REGO procured<sup>1</sup>, this therefore can be reflected in RCT's Net Emissions total (calculated using a market-based approach).

The charts opposite illustrate the difference between the location based and market based scope 2 figures including the avoided emission from onsite Solar PV systems.

Summary of RCT's scope 2 location based emissions Net of avoided emissions from onsite electricity generation (tCO<sub>2</sub>e)



Summary of RCT's scope 2 market based emissions Net of avoided emissions from onsite electricity generation (tCO<sub>2</sub>e)



<sup>1</sup>Renewable Energy Guarantees of Origin

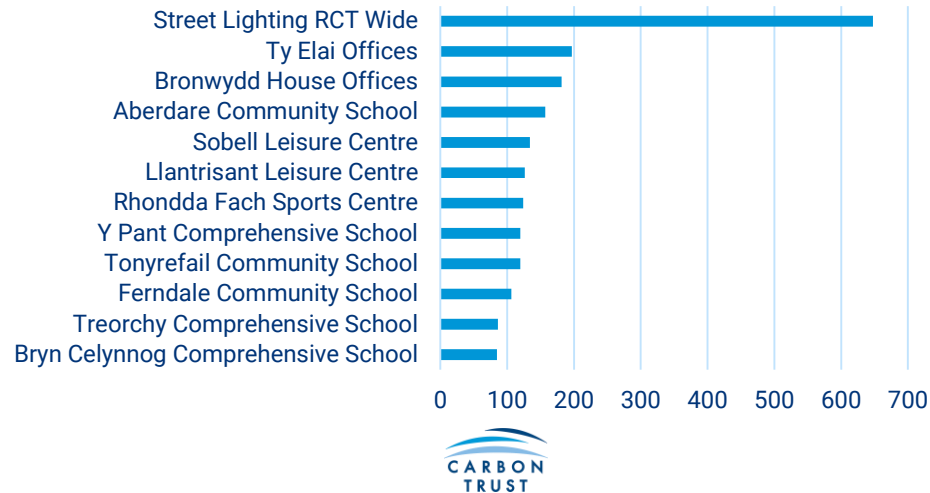
# Scope 2 Emissions Breakdown

## Electricity consumption

Carbon emissions associated with electricity consumption accounts for **4,625 tCO<sub>2</sub>e** (**5,716 tCO<sub>2</sub>e** when including scope 3 upstream energy impacts). This represents 6% of total emission (or 7% including the scope 3 upstream energy impacts elements).

Electricity consumption records were provided for 331 RCT sites and streetlighting (in addition to 3 sites with no associated consumption). The top 12 sources of electricity in terms of carbon emissions are shown below. These sites (including RCT owned street lighting) represent 37% of total RCT electricity based emissions (2,083 tCO<sub>2</sub>e) which is 3% of RCT total emissions. Streetlighting is the largest source of electricity consumption representing 11% of all electricity consumption emissions. It is understood that most street lights have been converted to LED already and any additional savings would need to come from dimming and trimming regimes and a lower associated emission factor (i.e. renewable energy sources).

Top 12 electricity consuming sites (tCO<sub>2</sub>e)



# Scope 2 Emissions Breakdown

## Electricity Consumption Energy Benchmarking

A basic energy benchmarking exercise has been conducted below to highlight any significant departures from expected electricity consumption at the top 12 sites (including street lighting).

The data indicates poor energy efficiency at a number of sites (particularly Tonyrefail community school and Bronwydd house offices), as well as some sites, with seemingly high efficiency compared to the benchmarked values. All sites should be investigated further since their consumption is high and discrepancies with benchmarked sites can sometimes inflate the comparative performance of a building

The top 12 sites with the highest electricity consumption as shown in the table. They make up 37% of all electricity consumption across all RCT buildings. Street lighting is not included (11% of all the electricity consumption emissions from RCT).

Site	m <sup>2</sup>	kWh /m <sup>2</sup>	kgCO <sub>2</sub> /m <sup>2</sup>	CIBSE Benchmark <sup>1</sup> (good-typical practice) kWh/m <sup>2</sup>
Bryn Celynnog Comprehensive School	12,879	23	0.007	25-33
Treorchy Comprehensive School	12,417	24	0.007	25-33
Ferndale Community School	10,377	35	0.010	25-33
Tonyrefail Community School	3,138	132	0.038	25-33
Y Pant Comprehensive School	13,444	31	0.009	25-33
Rhondda Fach Sports Centre	5,398	80	0.023	64-105
Llantrisant Leisure Centre	5,408	81	0.023	164-258
Sobell Leisure Centre	2,920	159	0.046	164-258
Aberdare Community School	13,728	40	0.011	25-33
Bronwydd House Offices	5,184	121	0.035	54-85
Ty Elai Offices	8,331	82	0.024	128-227
Street Lighting RCT Wide	N/A	N/A	N/A	N/A

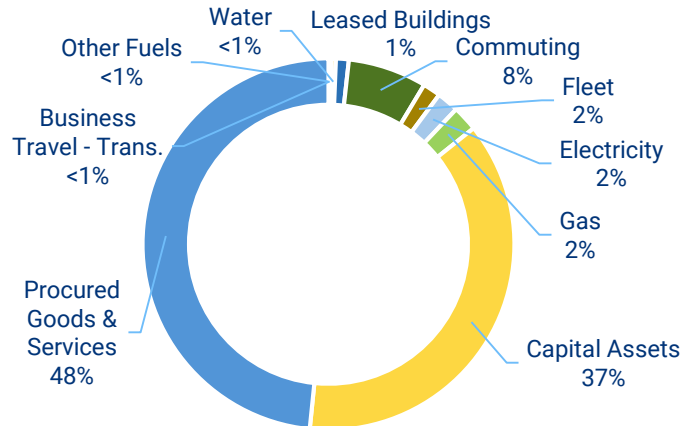
<sup>1</sup>Good and typical practice benchmarks are prepared to complement operational rating procedures for display energy certificates. The benchmark figures describe energy use for a typical office buildings. "Typical" refers to the median of the sample. This should only be used indicatively, and further investigation would be required to understand the overall performance of the building.

# Scope 3 emissions breakdown

## Summary of Scope 3 Emissions

Scope 3 emissions arise from indirect operations and third party services linked to RCT operations. The primary emission sources associated with RCT's footprint (and that of all other local authorities), arise from the procurement of goods and services and those linked with capital assets e.g. construction. These emissions arise from "upstream" activities used to create the products and deliver services that RCT require in order to run operations and deliver public services.

Another significant area of scope 3 emissions arise from commuting conducted by RCT employees (and working from home emissions). This is also a common significant category for other local authorities. The energy related emissions shown below represent "upstream" impacts<sup>1</sup> of scope 1 and 2 emissions for gas, electricity and fleet.



For the FY 20/21, total scope 3 emissions have been estimated at **57,607 tCO<sub>2</sub>e**. Overall, scope 3 emissions account for 74% of the total footprint, the largest source of emissions by GHG protocol scope.

The largest scope 3 source is associated with emissions from the council's procured goods and services, which have been calculated using Input-Output Factors (I-O) – an economic proxy used to calculate emissions. These emissions account for 48% of total scope 3 emissions.

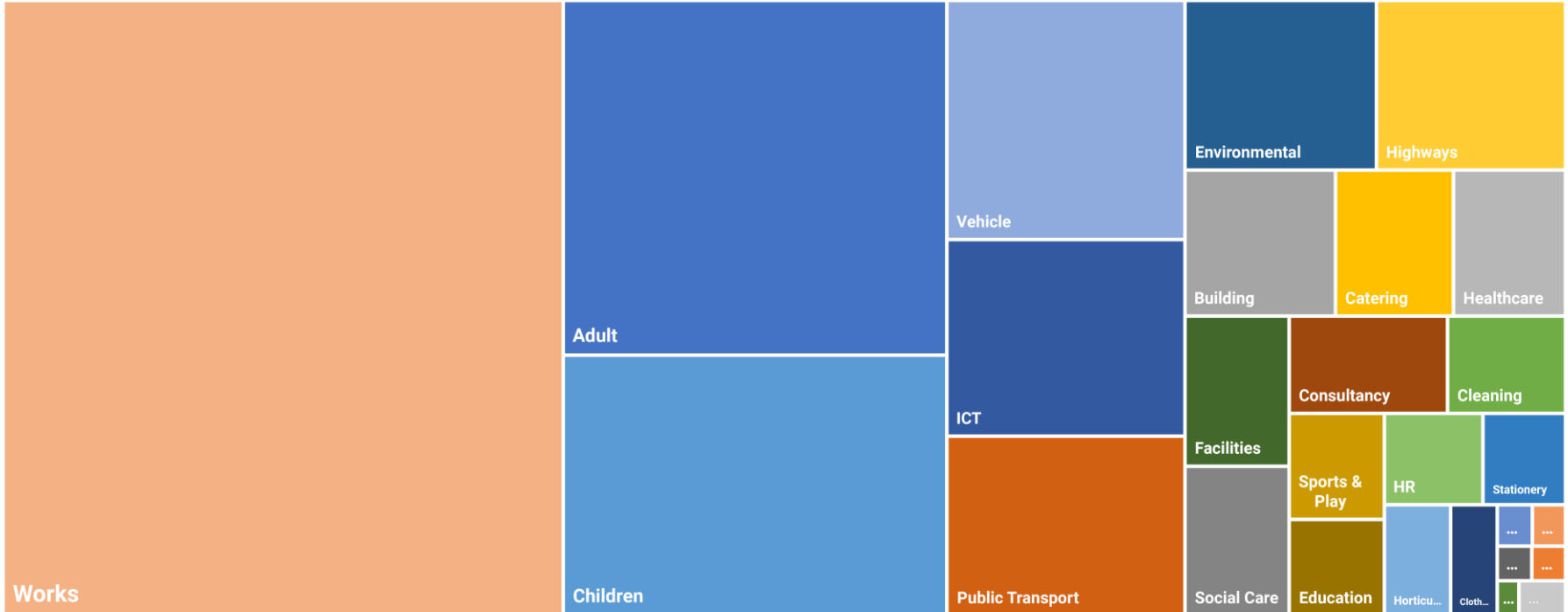
Capital projects account for a further 37% and employee commuting accounts for 8% of scope 3 emissions additionally.

<sup>1</sup>Gas, Electricity and Fleet scope 3 emissions are "Well-to-Tank" and "Transmission and distribution" emissions from the upstream supply chain. A Well-to-Tank emissions factor, also known as upstream or indirect emissions, is an average of all the GHG emissions released into the atmosphere from the production, processing and delivery of scope 1 fuels before they are consumed. Transmission & Distribution losses occur from the generation (upstream activities and combustion) of electricity, steam, heating, and cooling that is consumed (i.e., lost) in a T&D system.

# Scope 3 emissions breakdown

## Supply Chain

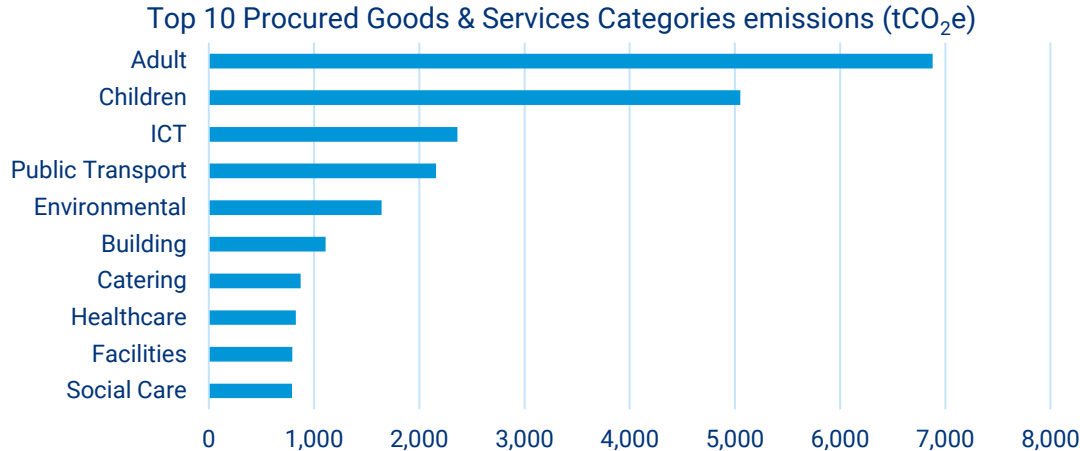
The below diagram shows a “tree-map” of proportional emissions arising from RCT’s main supply chain categories (All 31 categories not “visible” across both Purchased Goods & Services and Capital Goods). More than half of all supply chain emissions arise from “Works” (construction & capital purchases) and “Adult” and “Child” care services. Other significant emission sources from 20-21 include the embodied carbon in the purchase of vehicles, ICT, public transport, environmental (waste) and highways projects (further construction). Further information related to breakdown of the below is provided on the next pages. Purchased Goods and Services and Capital Asset emissions have been estimated to account for **48,589 tCO<sub>2</sub>e** which is **63%** of RCT’s total footprint in 20-21.



# Scope 3 emissions breakdown

## Procured Goods & Services

Emissions from the execution of services outsourced to third parties - RCT's Procured Goods and Services have been estimated to account for **27,423 tCO<sub>2</sub>e**, representing **35% of the total footprint**, the largest source of emissions for RCT. Below are the top 10 highest emitting categories estimated from the 31 broad categories footprinted. Emissions from "Adult" and "Children" services account for an estimated 11,930 tCO<sub>2</sub>e. The categories below are different to those presented in the 2019-20 footprint report following an additional piece of work that was carried out to conduct deeper analysis on RCT's supply chain data and engage with suppliers. Under each of the 31 broad categories footprinted, 223 sub-categories were assigned emissions factors in order to complete the estimate. Going forward, RCT can use these sub-categories for future supply chain work to "drill down" into the largest emitting broad categories to gain better insights into carbon hotspots (e.g. Adult > Mental Health Services or Adult > Nursing & Residential Care Homes).

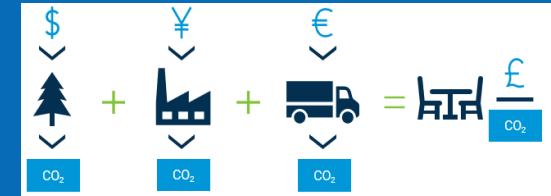


## Calculation approach

Emissions have been calculated using "input-output" economic proxies. These I-O proxies are a GHG Protocol approved method of calculating Scope 3 emissions and have the advantage of being simple to apply, facilitating manageable effort versus the collection of primary data from suppliers.

However, emissions that are calculated using I-O factors carry a degree of uncertainty due to the nature of these figures being based on benchmarks and global averages, as opposed to actual activity data from the supply chain.

Primary data sources for procured goods and services should be used wherever possible to calculate supply chain emissions, instead of using expenditure proxies e.g. the council should engage with suppliers to obtain information on suppliers scope 1 and 2 emissions (see the 19-20 "Insights and Recommendations" report for more info and a pilot demonstration study).



# Scope 3 emissions breakdown

## Capital Assets

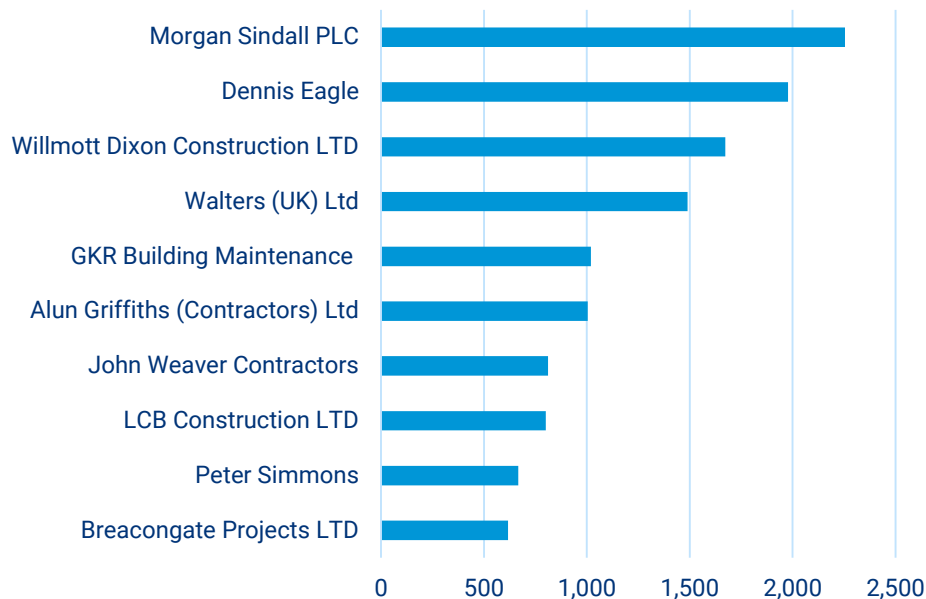
Emissions from capital assets have been estimated to account for **21,165 tCO<sub>2</sub>e** of emissions in 2020/21, which is **27% of the RCT total emissions**.

RCT's broad procurement categories of "Works", "Highways" and costs associated with the "phase 2 fleet purchase"<sup>1</sup> have been assigned to this category (~£75m). The expenditure data from 20-21 used to conduct the footprint was assigned to 794 individual suppliers. Of those 794 suppliers, the "top 10" shown on the right account for 12,316 tCO<sub>2</sub>e of emissions in 2020/21 which is 58% of capital asset emissions and 17% of the RCT's total emissions.

Emissions from this category were also assessed using the I-O approach explained on the previous slide. Additional project level disaggregation has not been possible due to data limitations. i.e. assigning carbon emissions to specific construction projects included within the capital asset category. Additional data may allow this however.

More than half of the "top suppliers" from the chart shown were also on the "top 10" list from the 2019-20 footprint exercise. This illustrates the importance of ongoing engagement with select suppliers to facilitate more direct measurement of the carbon associated with RCT's construction/capital projects/purchases and ultimately work with the suppliers to drive down supply chain emissions.

Capital asset/project suppliers with the highest associated emissions (tCO<sub>2</sub>e)



<sup>1</sup>£4.75m primarily associated with the purchase of waste collection vehicles from **Dennis Eagle** (see chart)



# Scope 3 emissions breakdown

## Employee Commuting & Home Working

Emissions associated with employee commuting from RCT staff have been based on estimates derived from the number of employees, a database of journeys and assumptions on UK/Wales specific travel type and mode split<sup>1</sup>. A factor was then applied based on the level to which RCT employees have been commuting, assumed to be a 75% reduction on 2019-20, due to the effects of the COVID-19 pandemic.

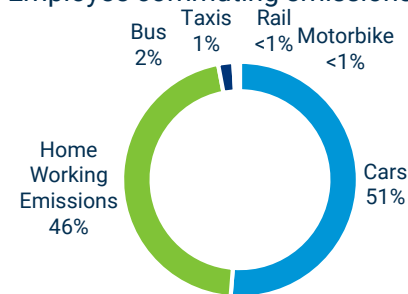
Emissions have therefore been estimated to be **2,383 tCO<sub>2</sub>e** (including WTT emissions), accounting for approximately 3% of RCTs total carbon footprint (as opposed to 7,770 tCO<sub>2</sub>e in 2019/20). The resulting figure does not directly correspond to all employees working from home as ~50% of RCT employees are school/social care staff which only had periodic closures in services during 20-21 given their “frontline” nature. The difference still represents a 43% reduction in employee commuting emission between 19/20 and 20/21.

In addition to employee commuting emissions estimated in 2019-20, due to its likely significant impact, an estimate on home working emissions has been made, in line with current carbon reporting guidance. Analysis resulted in a figure of **2,008 tCO<sub>2</sub>e** for 20/21 (a further 3% of RCTs total footprint). The figure was derived from an average estimated increase in gas consumption for home heating as well as the estimated average increase in electricity demand from office equipment and increased time spent at home. A parallel reduction in RCT core office energy emissions is difficult to ascertain but RCT’s direct Scope 1 natural gas and Scope 2 electricity emissions in 20/21 are more than **4,000 tCO<sub>2</sub>e** lower than they were in 19/20 (~23% reduction).

The COVID-19 pandemic has significantly changed the average work commuting pattern, with an increase in remote- and flexible-working and people moving further away from their place of work. Some of these changes could bring potential opportunities for RCT to maintain lower emissions from employee commuting as it transitions back to a “new normal”.

To better understand these impacts and identify opportunities, we would recommend developing an internal staff survey to ensure more in-depth data on distance travelled and modes of transport used for commuting amongst staff are recorded. This will improve the accuracy of emissions reporting but also provide more detailed picture on modes of transport and the distances travelled from which to base future decisions on.

Employee commuting emissions split



Employee commuting travel type/mode (remainder home working)	Percentage split
Car	64.0%
Car passenger	6.6%
Taxi/ mini cab	0.4%
Walking	9.5%
Moped/ Motorbike	0.6%
Bus	4.5%
Rail	1.9%
Cycling	1.4%

<sup>1</sup>[https://www.racfoundation.org/assets/rac\\_foundation/content/downloadables/car-and-the-commute-web-version.pdf](https://www.racfoundation.org/assets/rac_foundation/content/downloadables/car-and-the-commute-web-version.pdf)

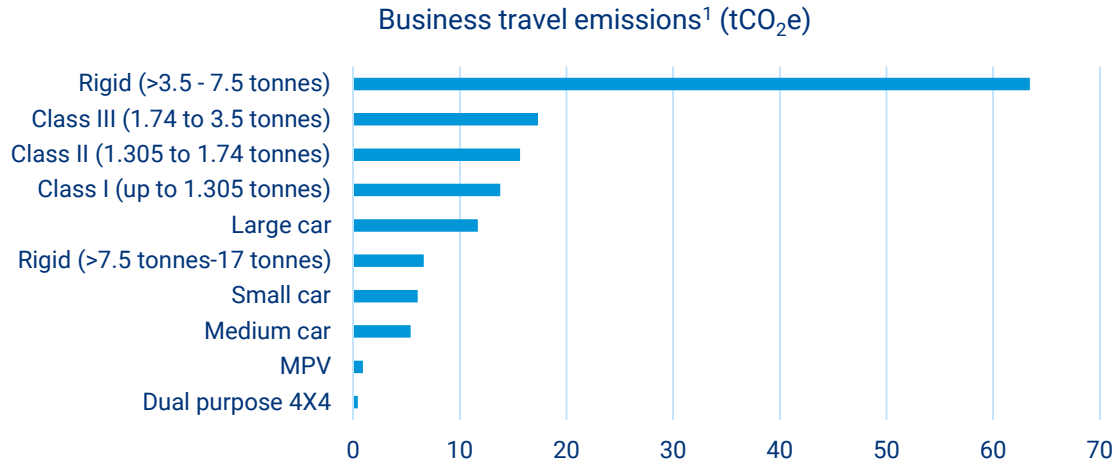
# Scope 3 emissions breakdown

## Business travel (Including operational vehicle hire)

Scope 3 emissions from business travel have been estimated to be **141 tCO<sub>2</sub>e** during 20/21, which is approximately 0.2% of the total footprint. Emissions are broken down by the main transport types in the chart below. Emissions have been estimated from data referred to as “hire car” information as agreed with RCT. Data was provided as mileages only due to the lack of primary fuel use figures. Although agreed in this manner, it can be seen from the data below that a large proportion of the vehicle emissions appear to be from “operational” goods vehicles rather than car hires used for traditional “business travel” purposes (i.e. there exists some cross over with what might be traditionally classified as “fleet” vehicles). The largest source of emissions for business travel are associated with the use of Rigid good vehicles (3.5-7.5 tonnes), with emissions totalling **63 tCO<sub>2</sub>e** in 20/21.

No data was present for other key forms of business travel such as taxi or rail transport. This is assumed to be due to a complete cessation in such travel during the COVID-19 pandemic. No data was available for overnight accommodation additionally – this data was also not available for 2019/20.

*<sup>1</sup>Rigid vehicles are assumed to be non-articulated small and medium good vehicles “lorries”. Classes 1 -3 vehicles are assumed to be small, medium and large “vans” (short, medium and long wheel base)*



# Scope 3 emissions breakdown

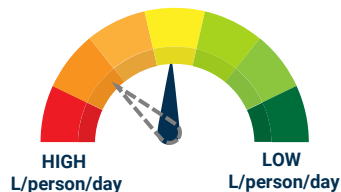
## Water

**Emissions associated with the treatment and supply of water account for less than 1% of the total footprint (~0.3%).**

Emissions from water use arising indirectly through the processes associated with the upstream supply and downstream treatment of water consumed across RCT's owned assets.

Total water supply and treatment emissions have been estimated to be **217 tCO<sub>2</sub>e**.

Emissions from water use have been calculated using volumes provided by Welsh Water.



On average, 24-36 Litres of water are used per person per day in an office<sup>1</sup>. RCT used approximately 75 litres/person/day in 20-21 which is much higher than the benchmark (especially as this does not take into account the increased home working over FY 20/21).

The chart (left) shows that water consumption of RCT (dotted gauge pointer) needs to be reduced to at least meet, or preferably exceed, typical range (solid gauge pointer).

## Waste

In line with the 2019-20 report, the only associated emissions arising from waste generated in RCT operations, are those that can be assigned to RCT fleet vehicles only (as per GHG protocol/BEIS reporting guidelines). The working assumption is that no waste from RCT operations goes to landfill (different to municipal waste to landfill).

For the purposes for Welsh Government Net Zero reporting, data for municipal waste collection was however provided. This data shows that approximately 5,150 tonnes of municipal waste was sent to landfill in 20/21.

The associated emissions with this waste is estimated as **2,252 tCO<sub>2</sub>e**. These emission would typically be reported directly as scope 1 emission by the waste management company operating the waste management facilities in which the waste is landfilled however (or as part of an area wide carbon footprint).



# Scope 3 emissions breakdown

## Leased Assets

Emissions associated with RCT’s 41 leased buildings (upstream and downstream), in addition to one site where no data was provided (Lee Gardens Paddling Pool), have been estimated to account for 634 tCO<sub>2</sub>e in 2020/21 which is approximately 1% of RCT’s total emissions.

Emissions from these sites arise from gas and electricity consumed in buildings that sit under the control of other users (downstream), or, where RCT are leasing space from other building owners for the delivery of RCT services (upstream).

The top 10 sites seen on the right represent 70% of total leased asset emissions, with Oldway House Porth representing 15% of all leased asset emissions.

In situations where RCT are the landlord (downstream), actual consumption data has been provided for the assessment (inc. Cynon Valley Indoor Bowls Centre).

For upstream leased assets, floor areas have mostly been utilised to estimate energy consumption in the absence of actual consumption data. This introduces a greater level of uncertainty into the assessment.

Top 10 sites	Lease type	Emissions (tCO <sub>2</sub> e)
Oldway House Porth	Upstream	94
Gilfach Goch Community Recreation Centre	Downstream	60
Cynon Valley Indoor Bowls Centre	Downstream	55
Capcoch Primary School	Upstream	39
Courthouse Community Services Office	Downstream	37
Rhondda Fach Hwb Infants School	Downstream	37
Caegarw Primary School	Upstream	35
Aman Early Years Centre	Downstream	24
Llys Cadwyn No 3 / Building A (TFW)	Downstream	19
Dai Davies Community Centre	Downstream	19

Leased building emissions (tCO<sub>2</sub>e)



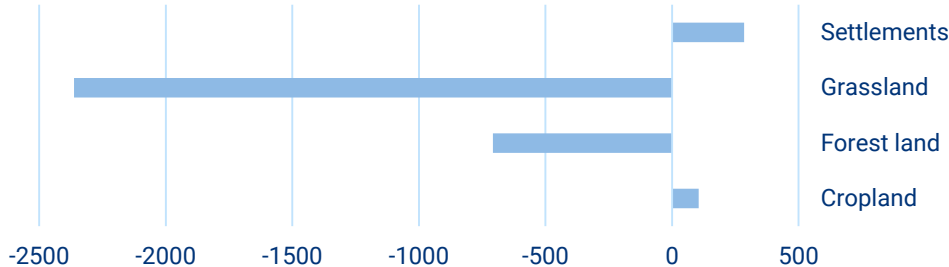
# Land Based Emissions & Sequestration

## Carbon Removals

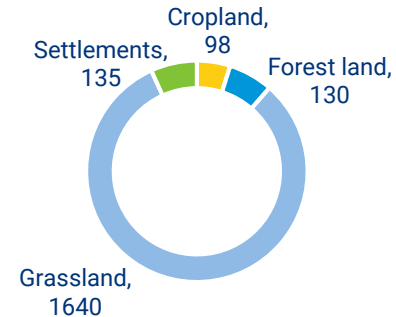
Welsh carbon reporting guidance requires all public bodies to report on carbon emissions and sequestration resulting from parcels of owned land which are greater than 10 ha. RCT supplied data for 63 sites with areas above 10 ha, totalling an area of 2,003 ha<sup>1</sup>. Each of the 63 sites were assigned a current land type, previous land type (if changes have occurred within the last 20 years) and a soil type (as per the WG Net Zero carbon reporting spreadsheet). The results of the assessment can be seen below with an estimated carbon removal potential of **-2,680 tCO<sub>2</sub>e**. Grassland represents the majority of land assessed (~80%), which provides most of the carbon removal for RCT currently. Settlements and cropland have been assessed to be carbon emitters, but with low influence due to the relatively small areas involved (233 Ha). Forestland whilst also only having a relatively small area as shown (130 Ha), contributes significantly to the overall net removal of emissions. This highlights that further studies should be undertaken to identify parcels of RCT owned land where reforestation, alongside other improvements to promote sequestration, would have a positive long term impact on emissions (making sure to carefully consider the additional emissions as a consequence of disturbing sequestered carbon within the soil).

Furthermore, as RCT will be required by WG to report land based emissions on an annual basis, enhanced record keeping of RCT's land-based assets should be implemented. This will also help to identify opportunity areas for improved land management (such as reforestation) resulting in increased carbon sequestration.

Emissions by land type (tCO<sub>2</sub>e)



RCT land by area (ha)



<sup>1</sup> Previously provided data shows that RCT own a further 2,000+ individual parcels of land below 10 ha, but these have been scoped out of the assessment currently due to the complexity and time involved to go through each piece of land and investigate/assign the required info. Further work is required to incorporate this info within future Land-based asset assessments for greater accuracy.

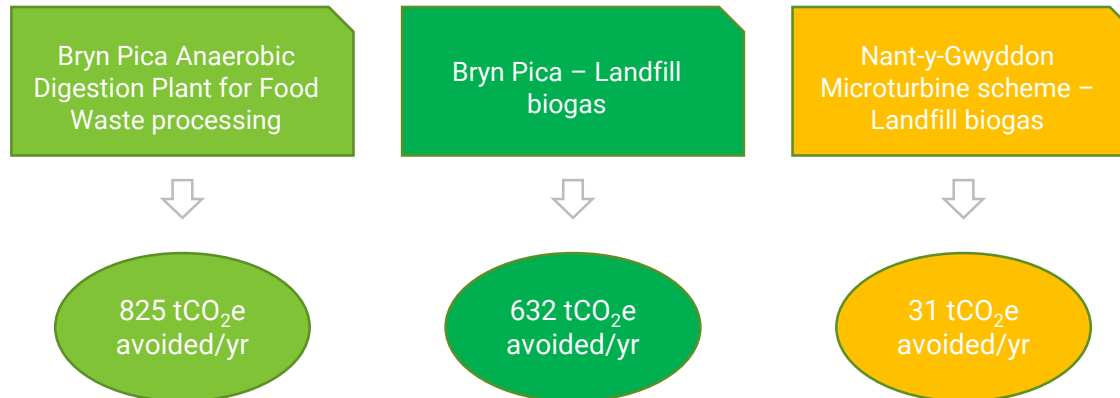
## 5. Other beneficial avoided emissions

# Other beneficial avoided emissions

## Avoided Emissions from Biogas Usage

In addition to the above emission sources and sinks, RCT also wish to include provisional information on the potential avoided emissions from biogas generated at the Bryn Pica Anaerobic Digestion Plant/Landfill Biogas Plant and the Nant-y-Gwyddon Microturbine scheme (Landfill biogas). The 3 schemes are not currently under RCT control and therefore any emissions or avoided emission benefits cannot currently be attributed to RCT (based on the current understanding of the sites ownership/operational control). However a basic estimate for the potential avoided emissions has been carried out below. These emissions should not be included within RCT current footprint, however it is understood that there is potential to bring the sites under RCT ownership/control in future years.

Basic information has been obtained relating to the outputs from the 3 schemes and an estimate of avoided emissions can be seen below. It has been assumed that the biogas is used for exported electricity generation only (no avoided heat emissions/generation) with a conservative estimate on the efficiency of the electricity generation plant. The current total figure is estimated at a potential avoided emission amount of 1,488 tCO<sub>2</sub>e. A further detailed study should be carried out in order to ascertain a more accurate estimate in the future.



## 6. Footprint comparison



# Footprint from 2019/20 vs 2020/21

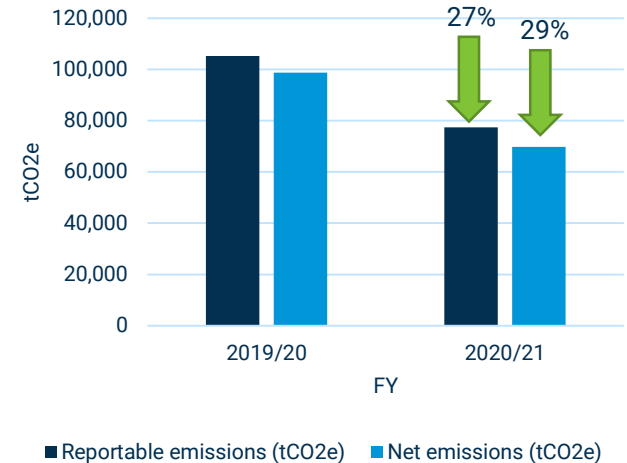
## Year on year changes

A comparison of RCT's summary 19/20 and 20/21 footprints can be seen in the chart on the right. A significant reduction in emissions can be seen between the two years which is assumed to be attributable to the cessation in a number of activities across various emission sources due to the COVID-19 pandemic. A 27% reduction in reportable gross emissions can be seen (not including Net reductions). This number increases to a 29% reduction in emissions where Net sources are included. This is primarily due to the addition of land-based asset removals which were not included in the 19/20 assessment.

Other key differences between the 19/20 and the 20/21 footprint data are:

- A 28% reduction in emission from purchased goods and services and a 25% reduction from capital assets. Whilst the overall expenditure did not decrease significantly between 19/20 and 20/21, the emission intensity of activities dropped, particularly for construction activities (e.g. greater emphasis on desk based design/feasibility/consultancy activities rather than actual construction)
- Emissions from natural gas and electricity use in RCT building operations reduced by 23% between 19/20 and 20/21
- Emissions from fleet reduced by 7% between 19/20 and 20/21. The comparatively low reduction is likely due to the continuation of essential services such as waste collection throughout the pandemic.
- Emissions from employee commuting reduced by 43% between 19/20 and 20/21 despite including an estimate of additional emissions as consequence of increased home working (in accordance with current reporting guidance). Without the WFH estimate the reduction is 69%.
- Emissions from business travel reduced by 90% between 19/20 and 20/21
- Emissions from the other scope 3 categories broadly remained constant
- The Land-based asset assessment has provided a greater reduction in reported net emissions (~3%).

Footprint comparison

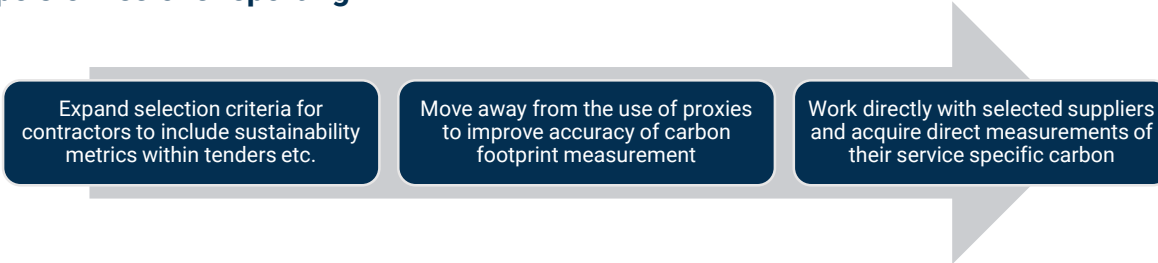


# 7. Recommendations

# Recommendations

## Summary - Future carbon accounting next steps

### 1. Enhance scope 3 emissions reporting



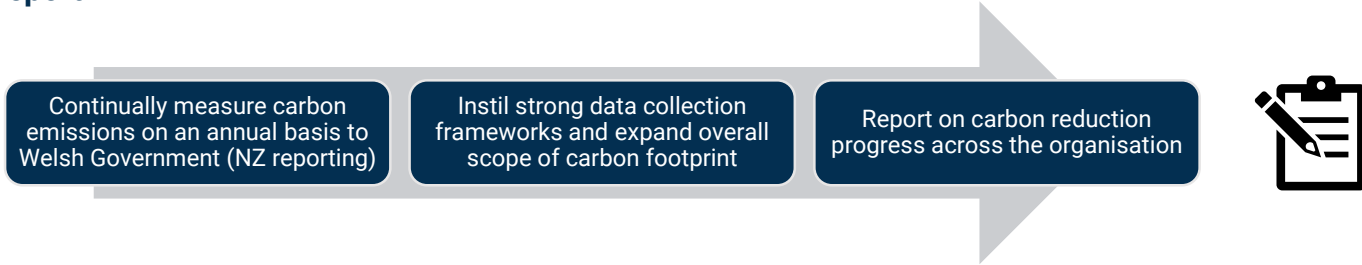
### 2. Improve data quality



# Recommendations

## Summary - Future carbon accounting next steps

### 3. Monitor and report



### 4. Engage and collaborate



# Recommendations

## Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

### 1. Emissions from Procured Goods and Services

- The emissions associated with the council's procured goods and services account for **35% of the overall footprint (27,423 tCO<sub>2</sub>e)**.
- More than half of all supply chain emissions arise from "Works" (construction & capital purchases) and "Adult" and "Child" care services.
- One key way which the council can reduce its Scope 3 emissions is through expanding its selection criteria for contractors to include sustainability metrics – for example minimum kilometres driven by Electric Vehicles in delivering the contract, or giving an X% weighting to environmental/social value in tender evaluation scoring.
- For further detail see 19/20 'Insights and Recommendations' report which presents a strategic approach to reducing RCT's supply chain emissions.

### 2. Emissions from Capital Assets

- The emissions associated with the council's capital projects account **21,165 tCO<sub>2</sub>e of emissions in 2020/21, which is 27% of the RCT total emissions**.
- Similarly to emissions associated with procured goods and services, by expanding its selection criteria for contractors to include sustainability metrics, RCT should move towards working with construction contractors who are also taking their sustainability journey seriously. They should also be able to support RCT with their move towards Net zero by providing better information related to carbon within their construction activities and work with RCT to design and deliver lower carbon buildings and infrastructure.
- For further detail see 19/20 'Insights and Recommendations' report which presents a strategic approach to reducing RCT's supply chain emissions.

# Recommendations

## Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

### 3. Gas consumption emissions

- The emissions associated with the council's gas consumption account for **14% of the overall footprint (10,869 tCO<sub>2</sub>e)**.
- 34% of gas emissions are associated with consumption at only 12 sites (3,662 tCO<sub>2</sub>e), which is ~5% of RCT's total emissions.
- As the national grid decarbonises, it is recommended that heat sources are generally electrified where possible (e.g. by the installation of heat pumps). This will help to reduce gas consumption significantly and the emissions associated with heating RCT operated buildings.
- RCT should continue to review all gas systems annually and implement upgrades where energy/carbon savings potential is identified.
- At leisure centres and large schools in particular, RCT should ensure that all equipment is running as efficiently as possible in order to reduce emissions. Examples of measures that can be implemented in order to reduce emissions include the installation of a heat exchanger which recovers waste heat to provide space heating to localised demand needs.

### 4. Fleet emissions

- The emissions associated with the council's fleet account for **9% of the overall footprint (6,704 tCO<sub>2</sub>e)**. This includes 2192 tCO<sub>2</sub>e from plant machinery.
- The majority of Fleet emissions arise from waste collection vehicles.
- Carbon Trust understand that ULEV have produced detailed analysis and recommendations on decarbonising RCTs fleet.
- Whilst larger vehicles and waste collection operations are seen as much harder to decarbonise elements of local authority fleets, there are various emerging examples of ways that councils are making moves to switch to low carbon alternatives utilising biofuel, hydrogen and electrified versions emerging on the market. A number of EV large vehicle and waste collection fleets are emerging which whilst have upfront high costs, show excellent returns over the lifetime with much lower maintenance costs and improved air quality, safety, comfort and user satisfaction levels.

# Recommendations

## Emissions hotpots

Six key sources of emissions have been identified which should be considered priority areas for carbon reduction across RCT services and operations.

### 5. Electricity consumption emissions

- The emissions associated with the council's electricity consumption account for **7% of the overall footprint (5,671 tCO<sub>2</sub>e)**.
- 37% of electricity emissions are associated with consumption at 12 RCT sites.
- Energy efficient LED lighting should be installed where it hasn't been already, as well as measures such as installing presence detection to reduce electricity consumption.
- Street Lighting has the highest electricity consumption at 11%, this is all now LED's with control regimes in place.
- Offices make up the majority of the highest consuming buildings, for these buildings, internal servers can be a highly consuming source, wherever possible cloud-based systems should be used. LED's and presence detection should also be installed wherever possible.
- For school buildings and leisure centres, lighting and small power should be assessed for areas where electricity consumption could be reduced (LEDs and presence detection installed where not already).

### 6. Employee Commuting and Home Working emissions

- The emissions associated with the council's commuting activities and additional emissions associated with an increased number of employees working from home account for **6% of the overall footprint (4,391 tCO<sub>2</sub>e)**.
- A large number of assumptions was used to determine the above figure therefore the first task for RCT in this area is to conduct a more accurate assessment of commuting emissions in future years.
- Typically this is done through employee surveys to gather information related to the journey type (vehicles) frequency and distance in order to calculate the emissions from primary data rather than through proxies.
- The larger the survey sample size the better although it is likely that extrapolation of data will need to be carried out.
- Once a more accurate figure has been determined then high consumers can be targeted for incentivisation for remote working, car sharing and shift towards lower carbon forms of transport. It is not possible to pinpoint carbon hotpots within commuting with the current data.

# Recommendations

## Natural gas & electricity consumption emissions

The total footprint from **natural gas and electricity consumption** across RCT operated sites is **16,585 tCO<sub>2</sub>e**. These emissions account for approximately 21% of emissions across RCT. Prioritising carbon reduction measures across operational sites will be key for RCT in the short-term as they work towards reducing operational emissions.

### Energy efficiency

- More efficient heating and cooling systems
- More efficient lights
- Premium efficiency equipment
- Building fabric improvements

### Reduce demand

- Improved management practices
- Better operational procedures
- Measurement, monitoring and targeting

### Renewable generation

- Non-fossil fuel sources
- Decentralised energy
- Solar/Bio-Fuel/Wind
- Biomass

### Low carbon generation

- High efficiency fossil fuels
- Decentralised energy
- Heat Pumps.
- Mechanical ventilation with Heat Recovery (MVHR)





# Recommendations

## Quality and expansion of footprint data

- To improve the accuracy of the overall carbon footprint, RCT should aim to enhance the data used for their scope 1, 2 and 3 carbon footprint measurement.
- RCT should ensure that actual consumption data for gas, electricity and water is always available for each building and site. In the absence of consumption data for a number of sites, assumptions can be made using industry benchmarks to calculate overall emissions. However efforts should be made to collect primary data, which will yield more reliable results and reduce uncertainty.
- Obtaining individual vehicle-level data relating to fuel consumption (not just mileage) should also be a priority for RCT moving forward (not just direct emissions from fleet) including business travel and commuting. Keeping up to date records of fuel consumption will help to provide a more reliable indication of those vehicles that are emitting the most emissions, and therefore where efforts to reduce emissions should be prioritised.
- In relation to scope 3 emissions sources, specifically data used to measure emissions from procured goods and services and capital projects, RCT should move away from using expenditure proxies and begin working closely with contracted suppliers to obtain more accurate information on the scope 1 and 2 emissions of specific services. The 'Insights and Recommendations' report give additional detail and a high-level strategy on steps to implement this approach.
- RCT should also look to improve the accuracy of first-hand data-sets used to calculate the emissions associated with employee commuting and business travel. The implementation of a staff survey, for example, would help to consolidate key information that could be used for such calculations e.g. mode of transport and distance travelled.
- RCT should may also consider expanding their scope 3 footprint to include emissions from investments in the future.

# Recommendations

## Monitoring

- RCT should continue to complete a carbon footprint at regular intervals (i.e. annually) in order to demonstrate progress in carbon reduction. A requirement of Welsh Government through the “Welsh Public Sector Net Zero Carbon Reporting Guide”. Note that the approach taken in this footprint aligns with the same principles of the guide.
- As RCT becomes increasingly familiar with the process required to complete a carbon footprint, and is able to instil a strong data collection framework, they can begin to look to expand their footprint to cover all emission sources and revisit existing sources to make them more accurate and less reliant on proxies.
- Fundamental to this is establishing clear roles and responsibilities for the different areas of data collection feeding into the footprint – i.e. electricity, gas, business travel, water, waste, leased buildings.
- RCT should use the findings of this footprint report to drive organisational change across the council and reduce overall emissions.
- In addition to monitoring the footprint itself, RCT should continually monitor how national and local plans and policies will affect RCT’s footprint and influence the ability to reach carbon reduction targets. This will help to identify other potential carbon reduction opportunities and ensure that any carbon reduction co-benefits of specific policies can be delivered.

## 8. Appendices

## Appendix 1: Key Data Sources

- Expenditure Report - all spend FY 20-21 (after exclusions) – PG&S and capital projects data
- RCT Carbon Footprint – Refrigerants 2020/21 – Fugitive emission data
- Waste data - waste data
- Copy of Hire mileage 2020-21 Carbon Trust report – Business travel
- Fleet data Carbon Footprint Data collection Form.v1.0 (003) – Fleet data
- Energy Data – RCT 20-21 Carbon Footprint Report data collection form – Building energy data
- Land use – RCT 20-21 Carbon Footprint Report data collection form – land-based assets
- Rhondda Cynon Taf CBC - Water Consumption 2020-21\_csv conversion - water data
- RCT Carbon Footprint - LPG 2020-21 – Other Fuels Data
- S Locke\_Adresses\_12.02.21 – RCT commuting data
- Email – School and office Closures – employee commuting / WFH data
- Email – Biogas assets – Out of scopes data
- Building energy benchmarks – Chartered Institution of Building Services Engineers (CIBSE)
- Government conversion factors for company reporting of greenhouse gas emissions for the year 2019 – [BEIS](#)

## Appendix 2: Excluded Emissions Sources

Scope 3 emissions are emitted by third-party operations and therefore are generally more difficult to monitor, control and reduce. However, there is now increasing appetite to include more scope 3 emissions in footprints to encourage carbon reduction in an organisations' supply chain.

Some emission categories are not relevant to Local Authority operations and have therefore been excluded from this footprint. In future, RCT could consider expanding it's boundary to include emissions from investments. This would require additional data.

	Emission Source (Scope 3)	Assessment
<b>Upstream</b>	Upstream transportation and distribution	Included elsewhere
<b>Downstream</b>	Investments	Not measured
	Downstream transportation and distribution	None anticipated
	Processing of sold products	None anticipated
	Use of sold products	None anticipated
	End-of-life treatment of sold products	None anticipated
	Franchises	None anticipated

# Appendix 3: Glossary

Term	Explanation
<b>Activity</b>	An action that leads to emissions of greenhouse gases. Examples include combustion of fossil fuels for heat, generation of electricity, transport, treatment of waste and wastewater, and industrial processes. Activity data is the measure of how much of this activity is taking place and has a variety of different units e.g. kWh, passenger kilometres, tonnes of waste etc.
<b>BEIS</b>	Department for Business, Energy & Industrial Strategy
<b>Emission(s)</b>	In the context of this report emission refers to carbon emission (equivalent)
<b>Heat Pump</b>	Heat pumps extract free heat from the soil, ambient air, or a body of water. This heat is then transferred for domestic use with the help of an electric compressor
<b>tCO<sub>2</sub>e</b>	One ton of carbon dioxide equivalent
<b>WG</b>	Welsh Government



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