Brighton, Hove & Sussex Sixth Form College

Carbon action planning:
2018/19 baseline footprint report

June 2021

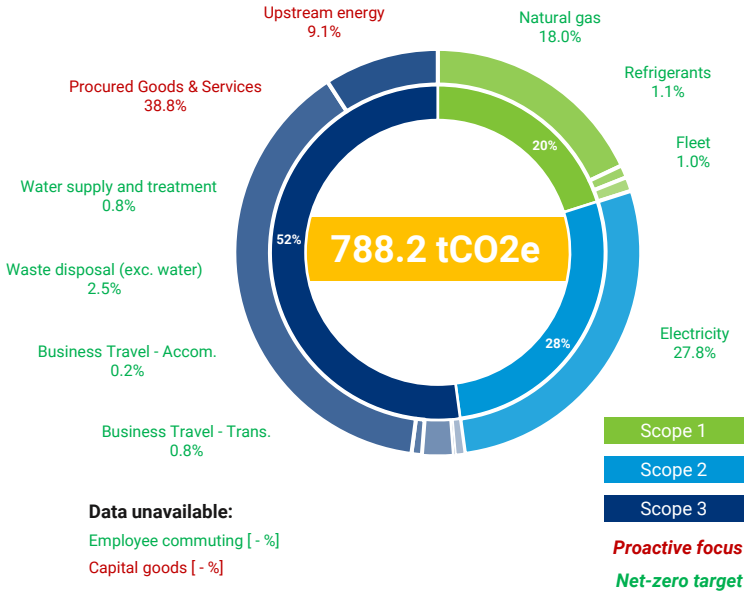
Executive summary

Brighton, Hove and Sussex Sixth Form College (BHASVIC) has committed to become a leading institution under the Further Education Climate Action and aims to be a net-zero organisation by 2030.

BHASVIC's baseline footprint (Academic Year 18/19) was calculated to be 788.2 tCO2e. The boundary of this assessment includes all scope 1 and 2 emissions and selected scope 3 emissions. Two Scope 3 emission sources that are relevant to the College's operations were omitted due to the availability of data.

Four emission categories make up 94% of the overall footprint: electricity and natural gas consumption in buildings, procurement of goods and services, and upstream emissions associated with energy consumption. Whilst large in absolute terms, benchmarking indicates good performance across the campus, with all buildings performing significantly better than the 'typical' benchmarks for both electricity and natural gas consumption.

Not all emission categories footprinted are recommended for inclusion in the College's net-zero target, and a qualitative review of data availability and the College's sphere of influence has been conducted to inform target setting. The College should still maintain a proactive focus to reduce indirect emissions recommended for exclusion of the net-zero target.



Summary of recommendations

1. **Carbon reduction Action Plan.** The College should develop an ambitious carbon reduction strategy that demonstrates how their net-zero target will be met with a pipeline of prioritised decarbonisation projects. The plan should inform an ambitious yet achievable decarbonisation target, with the remaining emissions being removed elsewhere to achieve 'net-zero'.
2. **Footprint monitoring and reporting.** BHASVIC should continually monitor their annual carbon footprint and report progress against their decarbonisation target.
3. **Interaction with value chain.** BHASVIC should minimise their indirect emissions and a concerted effort should be made to reduce wider value chain emissions.

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Context

BHASVIC's climate ambitions

Brighton, Hove and Sussex Sixth Form College (BHASVIC) is a Sixth Form College of over 3,000 students located in Brighton and Hove. The College has a vision to be a contemporary creative learning community and has recently laid out its 2021-2025 strategic plan to achieve the stated vision. Sustainability is embedded into the plan and is one of BHASVIC's five core values. In the plan, the college has committed to:

- Provide and embed carbon literacy education for all students by 2022-23.
- Being a net-zero organisation by 2030.

The Carbon Trust has been commissioned to support the College's sustainability ambitions and calculate their emissions for the academic year 2018-19 – the 'baseline' from which BHASVIC's future action plan and progress towards the net zero target will be reported against.

Brighton and Hove

Brighton and Hove is the only region in the UK that has an elected Green Party MP, and the City Council recently declared a climate and biodiversity emergency. As part of this deceleration the Council has set out their plan to achieve a carbon neutral City by 2030, committing to do everything they can to get to zero emissions by 2030 with any remaining emissions being offset. As an education provider to 3,000 local students, BHASVIC has the ability to widely influence positive change and contribute towards the City's wider sustainability ambitions.

To that end, BHASVIC have been instrumental in bringing colleges in the city and across Sussex together to progress the aims of the FE Climate Action Roadmap[1]. This is the first example of colleges working collaboratively across a region to address the impact of the sector on climate change. In May 2021 BHASVIC have piloted a level 3 Carbon Literacy qualification developed by the Carbon Literacy Project and Manchester Met University, with the aim of raising a generation of Carbon Literate teenagers.

[1] https://www.eauc.org.uk/fe_roadmap

Footprinting jargon buster

Carbon footprinting

A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organisation, service or product, and is calculated by multiplying activity data with an associated emissions factor. The accuracy of a carbon footprint is largely dependent on the quality of activity data available. Primary data related to the specific activity being footprinted (e.g. electricity meter readings) is preferred, but benchmarks and/or proxies can provide an estimation where primary activity data is not available. Emission factors define the carbon intensity of an activity, and the most common emission factors are updated and published annually by the UK Government.

Reporting framework and emission scopes

The greenhouse gas (GHG) protocol is an established and internationally recognised methodology for carbon reporting. In the protocol, emissions are categorised into three scopes:

- Scope 1 – Direct GHG emissions (i.e. occur at the point-of-use) from sources that are owned or controlled by the reporting organisation. For example, this would include emissions from the operation of a petrol vehicle owned/controlled by the reporting company, as emissions are directly released from the vehicle exhaust.
- Scope 2 – Indirect GHG emissions (i.e. do not occur at the point-of-use) from energy consumed by the reporting organisation's owned/controlled assets. This includes electricity consumption, where the emissions associated with the consumption do not occur at the point-of-use but have been produced in the initial generation of the consumed electricity (e.g. from the burning of natural gas at a power station).
- Scope 3 – All other indirect emissions that occur in the reporting company's value chain. For example, the production of paper used in the College's printers. The transportation of that paper from the manufacturer to the College would also be included, as would the processing and disposal of the waste paper after use.

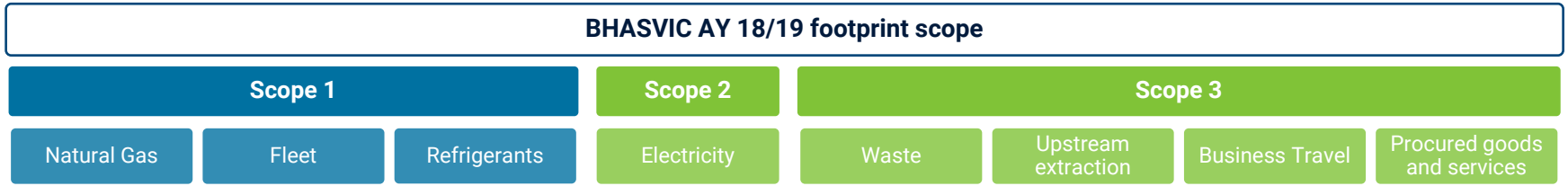
Carbon dioxide equivalent

Greenhouse gases contribute to global warming by 'trapping' in heat that would otherwise escape to space. Carbon dioxide is the most widely-produced GHG but there are many others. Some GHGs are more potent than others and (for a given amount) trap more heat in the Earth's atmosphere. The potency of GHGs is defined by their global warming potential. Carbon footprints are measured in tonnes or kg carbon dioxide equivalent (CO_2e), combining the impact of different greenhouse gases into one figure equivalent to if it were all CO_2, based on their global warming potential. The College's footprint therefore includes the impact of all greenhouse gases, not just carbon dioxide.

Footprinting scope

Direct emissions

Indirect emissions



The boundary of this assessment was agreed in consultation with BHASVIC, and includes all scope 1 and 2 emissions and selected scope 3 emissions, as detailed above. The boundary was selected based on data availability, though other factors such as the ability to achieve reductions through direct action should be considered when looking towards target setting and monitoring emissions reduction.

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

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

As scope 3 emissions are emitted by a third-party's operations they are generally more difficult to monitor, control and reduce. As a result, public (and private) sector carbon action has typically focused on Scope 1 and 2 emissions. The inclusion of the selected scope 3 emissions reflects BHASVIC's ambition to effect change beyond their own immediate control.

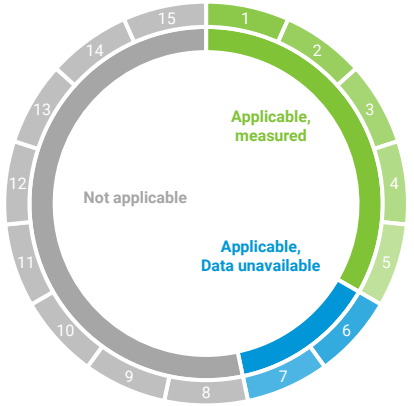
Footprinting scope: supply chain emissions

The GHG protocol separates scope 3 (i.e. supply chain) into fifteen different emission sources. Many of the emission sources are not applicable to the College's operations and therefore excluded from the baseline. Of the fifteen, six have been deemed applicable to the College's operations:

Applicable, measured. The scope 3 emission sources relevant to the College's operations have been included where data is available.

Applicable, data unavailable. Some scope 3 emission sources are relevant to the College's operations but have been omitted due to a lack of data for the reporting year. These include:

- **Employee commuting.** The anticipated magnitude of employee commuting relative to BHASVIC's overall baseline is low to medium. However, the emissions directly stem from employee behaviour and a commitment to reduce them will result in tangible differences noticed by employees and students alike, for example, the provision of EV charging points or the promotion of cycling to College. These actions can be powerful drivers for instilling a sustainability culture within and enable buy-in from employees and students for the overall net-zero target.
- **Capital goods** (def'n: assets with an extended life that are used to deliver services, for example, buildings, fleet vehicles, teaching materials). This category includes the emissions from the extraction of raw materials through to manufacture of capital goods purchased by the College. Capital goods are often large-scale and frequently-used assets, and their extended life can result in operational emissions being 'locked-in' for several years if sustainability is not appropriately considered at their conception. Although data to directly measure the emissions is generally harder to obtain, the College should proactively consider the emissions due to their potential magnitude.



1. Business travel
2. Waste generated in operations (inc. water)
3. Upstream transportation and distribution
4. Purchased goods and services
5. Upstream transportation and distribution[1]
6. Employee commuting
7. Capital goods
8. Downstream leased assets
9. Investments
10. Downstream transportation and distribution
11. End-of-life treatment of sold products
12. Processing of sold products
13. Use of sold products
14. Upstream leased assets
15. Franchises

[1] Upstream transportation and distribution is included in the EEIO factors used to estimate purchased goods and services emissions.

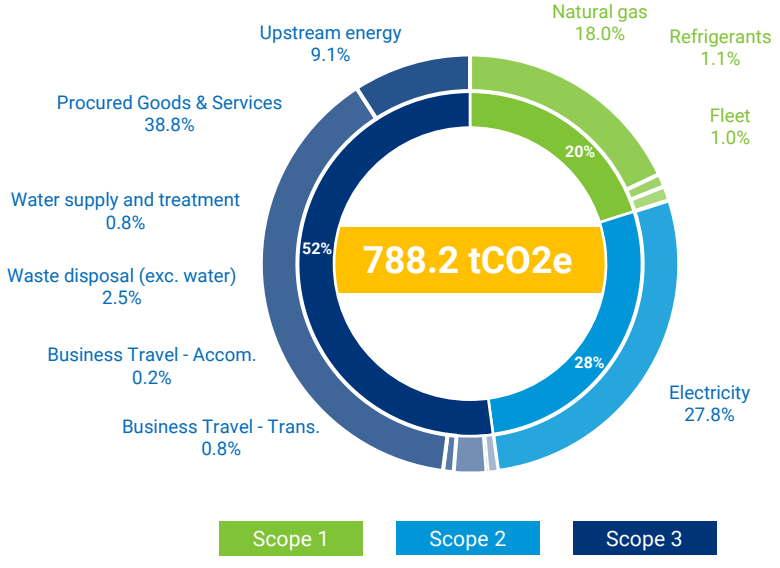
BHASVIC's carbon footprint

Footprint overview

BHASVIC's measured footprint for the academic year 2018/19 was calculated to be **788.2 tCO2e.** The footprint is relatively evenly split across scopes 1, 2 and 3, although scope 3 is anticipated to make up a larger proportion when emission categories omitted due to data availability are considered.

Four emission categories make up 93.6% of the footprint:

1. **Procurement of goods and services** from third parties (305.8 tCO2e)
2. **Electricity consumption** in buildings (218.8 tCO2e)
3. **Natural gas consumption** in buildings (141.7 tCO2e)
4. **Extraction, production and transportation** of fuels consumed (65.5 tCO2e)



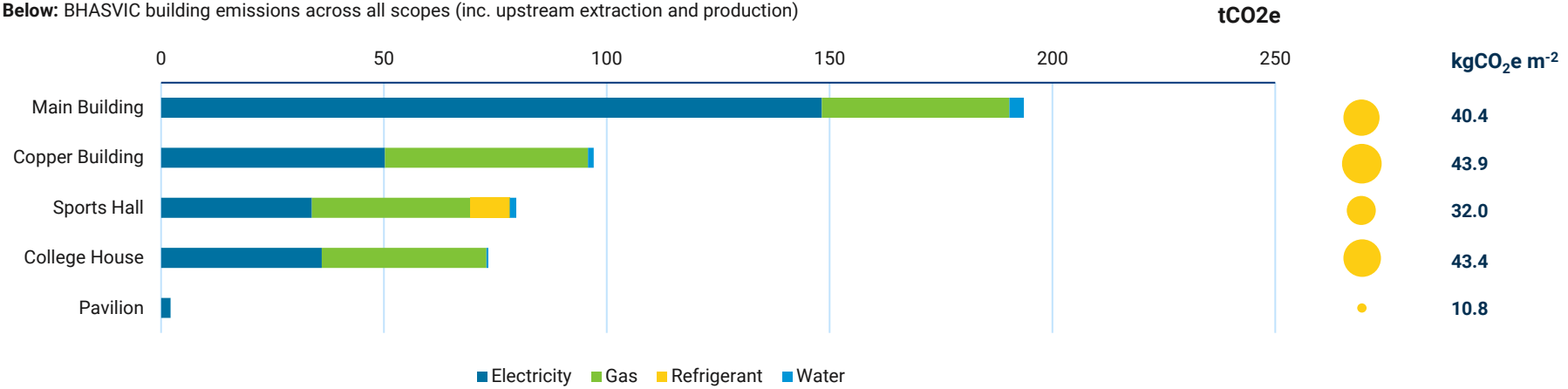
BHASVIC's carbon footprint: buildings

Across all scopes, emissions associated with the College's buildings make up 56.8% of BHASVIC's measured footprint.

The majority of building-related emissions come from the consumption of electricity, which is reflective of a teaching environment that has a high lighting load throughout the campus and regularly-used teaching facilities (e.g. computers, projectors). Electricity is also used as a source of space heating (Pavilion) and water heating (Pavilion, College House, Main Building) in some campus buildings. Natural gas is the second largest contributor to the footprint and is the primary source of space heating across the site. Remaining emissions are made up from the leakage of refrigerants associated with air conditioning in the Sports Hall and the supply and subsequent treatment of water.

The baseline year (2018/19) footprint contains the five buildings identified below. Since then, a new 4-storey teaching facility – The Elms Building – has been constructed and commissioned for use. The Elms Building contains classrooms, science labs and a theatre, and will increases BHASVIC's overall building footprint by 25%. The building is electrically heated and is expected to increase electricity consumption by ~225,000 kWh[1] (a 23.9% increase) per annum, although it may be higher due to the specialised facilities on-site (e.g. theatre). This would equate to an additional 64 tCO2e (21 kgCO2e m^{-2}) in the baseline year.

Below: BHASVIC building emissions across all scopes (inc. upstream extraction and production)



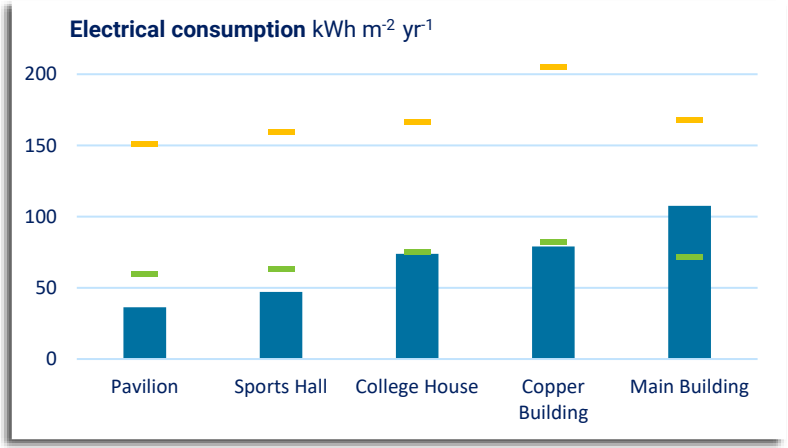
[1] Assumes a floor area of 3,000 m^2 and electricity usage of 75 kWh/m^2 per DfE design energy targets for secondary education

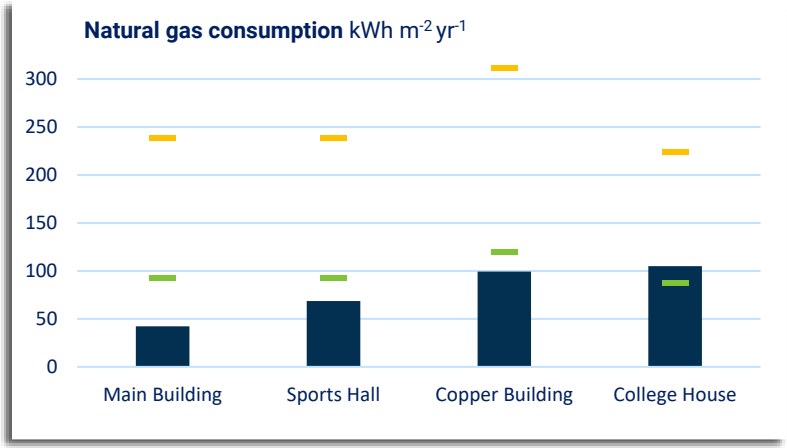
BHASVIC's carbon footprint: buildings

High-level benchmarking was performed to compare electric and natural gas consumption on the BHASVIC campus against 'typical' and 'good practice' benchmarks defined by Chartered Institution of Building Services Engineers (CIBSE)[1]. The benchmarks are bespoke to each building and derived from % use of floor area (catering, sports, classrooms etc).

The benchmarking indicates good performance across the campus, with all buildings performing significantly better than the 'typical' benchmarks for both electricity and natural gas consumption, and exceeding 'good practice' minus College House (natural gas) and Main Building (electricity). Partial electric water heating in the Main Building likely contributes to exceeding the good practice benchmark as gas heating is generally assumed in the benchmarks. The natural gas benchmarks suggest good thermal performance of buildings across the campus, which may make them suitable for low-temperature heat sources (e.g. electric heat pumps) that would significantly reduce the carbon footprint associated with the campus buildings.

Below: Benchmarking BHASVIC's operational buildings against 'typical' and 'good practice' benchmarks





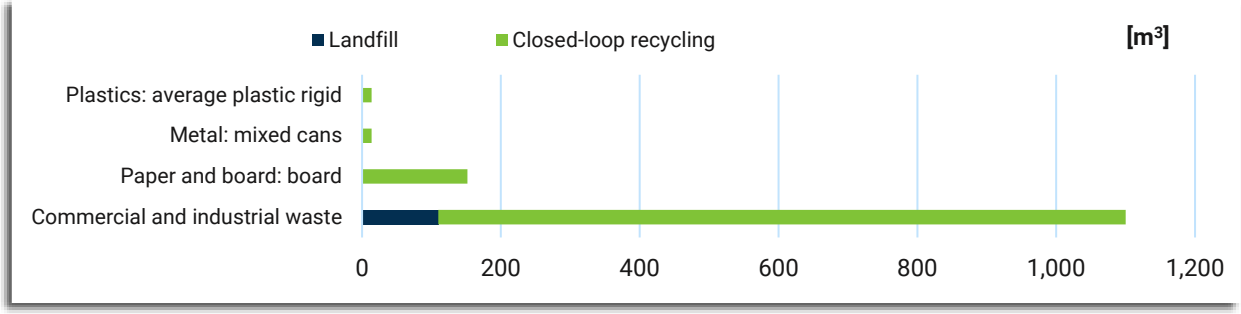
[1] https://www.cibse.org/

'Typical' benchmark

'Good practice' benchmark

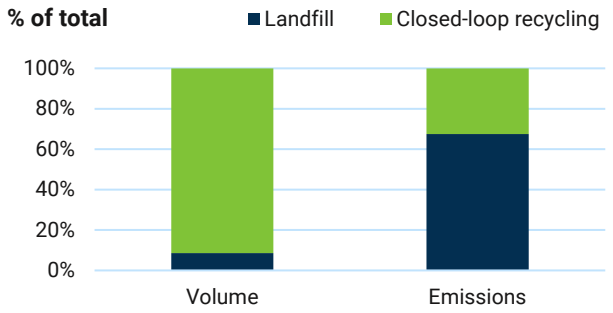
BHASVIC's carbon footprint: buildings

Waste treatment and disposal (exc. water) makes up 2.5% of the College's measured footprint. 1,279 m³ of waste was created and disposed of during the AY 18/19. Over 90% of this was recycled, with the remainder going to landfill:



The carbon intensity associated with disposing of commercial and industrial waste to landfill is c. 20x greater than recycling. As a result, waste-to-landfill makes up 67.5% of total waste emissions, despite only accounting for 8.6% of waste generated by volume.

12.5 tCO2e could be saved if waste-to-landfill was replaced with closed-loop recycling.

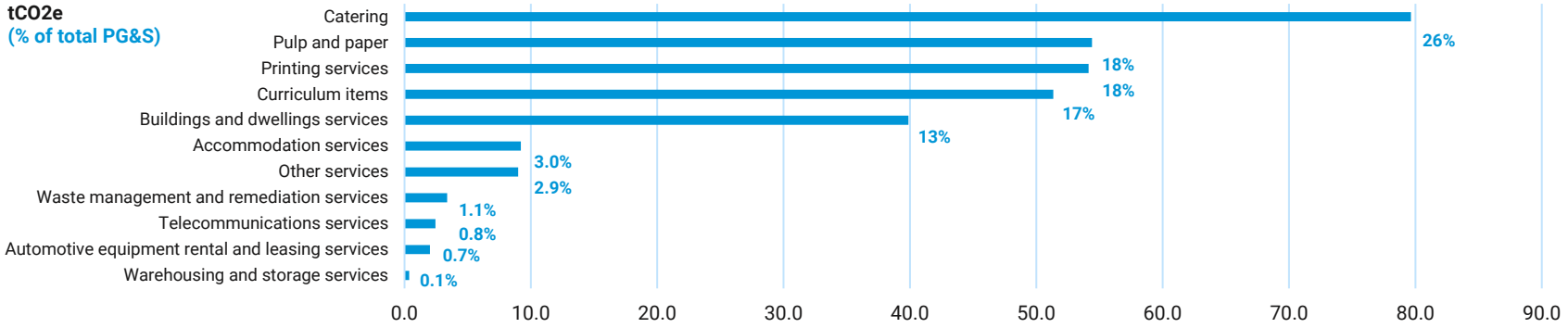


BHASVIC's carbon footprint: procured goods and services

Procured goods and services (PG&S) and upstream transportation and distribution includes all cradle-to-consumer emissions[1] from the goods/services purchased by the College. This ranges from the paper bought for use in the College to the manufacturing of concrete used by a construction contractor.

Due to its range, PG&S is often one of the largest contributors to a footprint. It is also one of the hardest to obtain primary activity data for as the data is often held by several organisations along the value chain with no direct contact to the reporting organisation. In the absence of activity data, environmentally extended input-out (EEIO) analysis has been performed to estimate emissions using contract type and value. Whilst EEIO's reduce data requirements and allow for hotspots to be identified, they are a function of industry national-level trends and are not sensitive to local factors (e.g. green procurement). A consistent and heavy reliance on EEIO factors is not recommended due to their approximate nature, and efforts should be made to make PG&S reporting more nuanced where possible, for example by engaging with core 'tier 1' suppliers.

A quarter of PG&S emissions are attributed to the supply of food for catering. Pulp and paper, printing services, and curriculum items (stationary, chemicals, paints etc.) are close to parity and each contribute 17-18% to the overall footprint. Buildings and dwellings services (e.g. maintenance, sanitation) is the second largest service contributor, with various other small expenditure against typically low-carbon services making up the remaining footprint. Engagement with service providers should be performed to encourage sustainable delivery and reduce service emissions, and sourcing and procuring low-carbon and sustainable goods should be promoted to minimise goods emissions. Where possible, the upcycling and reuse of existing goods should be explored as the first option.



[1] Cradle-to-consumer refers to the GHG emissions from the extraction of raw materials (i.e. cradle) through to product manufacture and upstream transport to the consumer.

BHASVIC's carbon footprint: procured goods and services

Catering – environmental impact

As a sector, Agriculture, Forestry and Other Land Use (AFOLU) is estimated to make up 25% of global GHG emissions. However, the environmental impact of the food we eat extends beyond just GHG emissions and directly interacts with other planetary boundaries such as land-use change and deforestation, nutrient pollution, loss of biodiversity, and water usage.

Food sourced for catering is estimated to make up ~10% of BHASVIC's total footprint and a net-zero aligned BHASVIC should consider and proactively reduce the environmental impact of the catering it provides. Some considerations include:

- Reducing food waste – globally, around a quarter of all food produced is estimated to be wasted, and monitoring and managing waste can be one of the largest drivers to improve environmental performance.
- Displacing meat consumption with more vegetable-led dishes, and sourcing meat and fish from sustainable and high welfare farming methods where used.
- Sourcing local and seasonal produce to reduce the environmental impact of the transport and storage.

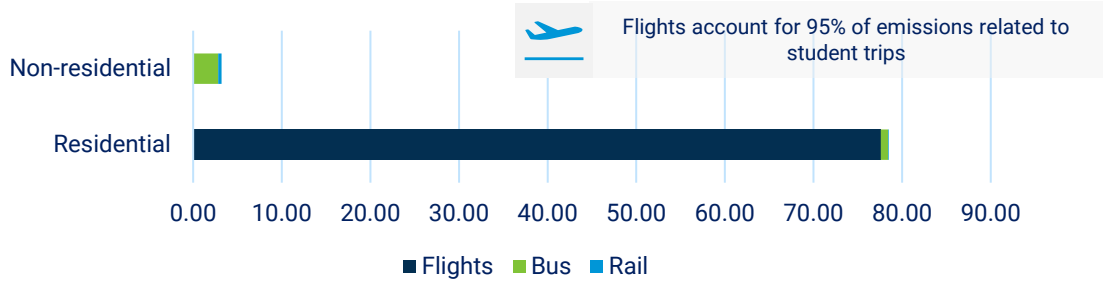
While several environmental and co-benefits (e.g., positive health impacts) can be realised, transitioning a catering service will ultimately have an impact on both cost and consumer experience. Careful consideration of these factors should be made in tandem with the environmental credentials of food to ensure that BHASVIC catering remains accessible and affordable. Engaging with services such as the Sustainable Restaurant Association and local sustainably-led restaurants is recommended, and internal engagement should be prioritised to ensure BHASVIC catering remains accessible and desirable.

BHASVIC's carbon footprint – College trips

Footprint overview

Student trips are considered outside of scope for BHASVIC as business travel is limited to employees in the GHG protocol. Additionally, student trips are a formative and valuable component of the College's provision of education and their inclusion in the core footprint and subsequent reduction activities was deemed unsuitable, particularly as the main action to reduce their emissions impact would be to directly reduce the number of trips (particularly those abroad).

However, as the data was available we have calculated the footprint associated with the College's residential and non-residential trips, which is equal to **81.70 tCO2e**.



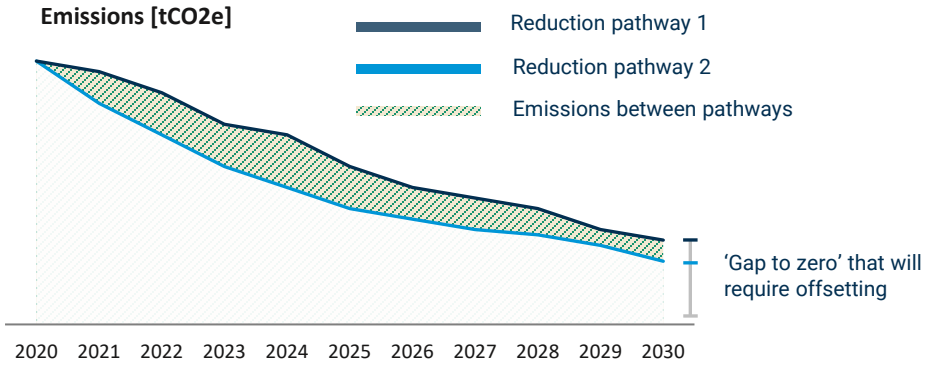
The large majority (95%) of these emissions are associated with international flights. Aviation is a carbon-intensive and hard-to-decarbonise sector, with no low-carbon alternative available to the market in the short term. Whilst alternative forms of travel can be considered for short-haul flights (e.g. rail, coach), all flights for the reporting period were long-haul and justified flight travel. It is therefore unlikely that the College can achieve significant emissions without reducing the number of flights taken, although BHASVIC are revising their trip policy to ask trip organisers to consider destinations closer to home or to offset the impact of flying.

Target setting and net-zero

BHASVIC has committed to becoming a net-zero organisation by 2030. In the Further Education Climate Roadmap, net-zero is defined as 'achieving an overall balance between emissions produced and taken out of the atmosphere'. Net-zero is different from zero carbon in that it allows for some GHG emissions to be produced and subsequently counterbalanced by an equal amount of greenhouse gas removals. For zero carbon, no emissions are ever produced. The College will have to purchase greenhouse gas removals (GGR) that result in carbon sequestration from the atmosphere to reach net-zero. Methods for GGR include:

- Biological, e.g. afforestation, peatland restoration
- Engineered / technological, e.g. direct air capture, CO2 cured concrete
- Hybrid, e.g. biochar, bioenergy with carbon capture and storage

GGR should be reserved for hard-to-decarbonise areas of the College's footprint, and efforts should be made to minimise the College's greenhouse gas emissions as much as feasibly possible before GGR is considered. The decarbonisation trajectory is a critical part of any net-zero target and should be transparently reported by the College. For corporations, the Carbon Trust advises a 'top-down' approach and a 4.2% year-on-year carbon reduction pathway (aligned to a 1.5 degree warming scenario). However, as a public institution and education provider, a 'bottom-up' approach has been proposed which acknowledges the potential resource requirement of a 4.2% year-on-year reduction. The trajectory to net-zero will therefore be informed by an Action Plan.



BHASVIC is pursuing a 'bottom-up' approach to target setting that will be informed by subsequent analysis of decarbonisation opportunities on the site, with the scale of opportunities ultimately determining a 2030 decarbonisation target. This target should be achievable but ambitious and reduce the requirement for any offsetting/GGR as much as possible.

As well as minimising the 'gap to zero' BHASVIC should endeavour to reduce emissions by as much and as quickly as possible. A steeper trajectory towards the eventual decarbonisation target will ultimately result in less emissions over the 10 year period between now and 2030. Interim carbon reduction targets can help to guide this pathway.

Target setting: emissions included

Before emission sources are included within a decarbonisation target, it is important to ensure the availability of quality data going forward to allow for accurate and regular reporting against the target. It is also important to consider the sphere of influence the College has over that emission source, such that reductions can be reasonably expected as a result of College action. However, for the College to achieve it's sustainability ambitions and become a 'leading' institution under the FE Climate Roadmap, a holistic approach to all emission categories should be promoted. The following categories of emissions are suggested:

- **Net-zero target:** Emission categories that can be readily monitored and have reasonable sensitivity to the College's actions should be included in the College's net-zero target. These emissions should be habitually reported on (every other year as a minimum) and measures should be implemented to reduce the emissions as much as feasibly possible. By 2030, remaining emissions should be offset with certified GHG removals to claim net-zero status. This should include all scope 1 and 2 emissions as well as select scope 3 categories.
- **Proactive focus:** Emission sources further removed from the College's influence that cannot be accurately reported on year-on-year and have a lower degree of sensitivity to the College's are considered outside of the net-zero target. However, these can still result in substantial value chain emissions and a proactive focus (e.g. policy implementation, supplier engagement) should be pursued to minimise any indirect emissions.

GHG Removals will be required for the College to achieve their net-zero ambition. Whilst guidance around this and the market supplying GHG removal as a service is expected to grow rapidly between now and 2030, it is likely that this will require some expenditure from the College. Ensuring that this expenditure does not detract from the College's supply of education and/or investment in reducing their core emissions is also a key consideration of target setting.

Target setting: emissions included

Scope 3 emission sources

A qualitative RAG analysis has been conducted on the College's Scope 3 emission sources. The analysis considers the two main influencing factors re including emission sources into a decarbonisation target: data availability and sphere of influence. It is recommended that four scope 3 emission sources are included in the College's net-zero target (water, waste, business travel and employee commuting), due to the College's ability to accurately measure and achieve reductions through direct action. The remaining scope 3 emission sources are deemed either hard to obtain accurate data for and/or too far removed from the College's sphere of influence. These emission sources should still be acknowledged as resulting from the College's activities and a proactive focus should be placed on reducing their magnitude where possible.

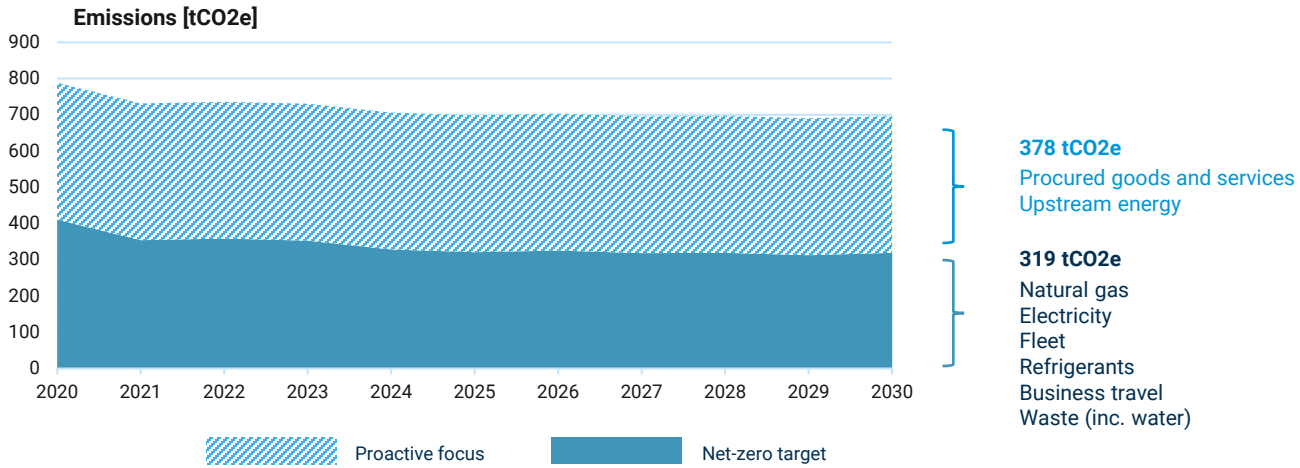
Scope 3 Emission Source	tCO2e	Data used	Data quality	Ideal Data	Data availability	Sphere of influence	Recommendation
Water	6.5	Water consumption data		Water consumption data			Include in **net-zero target**
Waste	19.4	Waste generation & treatment data		Waste generation & treatment data			Include in **net-zero target**
Business Travel	7.3	Transport type & mileage		Transport type & mileage			Include in **net-zero target**
Procured G&S	306	Contract description and values		Value chain consumption data			**Proactive focus**: efforts on procurement policy and engagement with tier 1 suppliers
Upstream energy	65.7	Scope 1 and 2 consumption data		Scope 1 and 2 consumption data			**Proactive focus:** exclude from target due to lack of control and potential to lead
Employee commuting	-	N/A		Employee survey			Include in **net-zero target**: conduct employee survey and take a proactive approach to reducing emissions
Capital goods	-	N/A		Value chain consumption data			**Proactive focus:** embed sustainability into the procurement of capital good products

Outlook to 2030

Emissions projection

At a national level, the carbon intensity of the UK's electricity supply is decreasing as low-carbon generation (wind, solar, nuclear etc.) is replacing traditional fossil fuels (e.g. coal, natural gas). This is expected to reduce the emissions associated with electricity that the College consumes by ~60% out to 2030. Therefore, in a 'do-nothing' scenario the College's emissions will decrease as a result of consuming 'greener' electricity.

A high-level emissions forecast is presented, which accounts for the decarbonisation of the electricity grid as well as the addition of the Elms Building from 2021/22[1]. Using these assumptions, the College's footprint in 2030 is expected to be 697 tCO2e. The emission sources recommended to be in the College's net-zero target account for 45.8% of this (319 tCO2e)[2]. Reducing these emissions as much as possible through energy efficiency, installation of low-carbon heat systems and behavioural change should be prioritised by the College.



[1] Assumes a 225,000 kWh increase in electricity usage per year (see page 8)

[2] This does not include employee commuting, which is also recommended to be in the College's net-zero target

Next steps

This baseline footprint report represents the first step on the College's recent climate ambitions. The following next steps are recommended to the College:

1. Carbon reduction Action Plan

BHASVIC has set an extremely ambitious decarbonisation target and aims to be net-zero 20 years ahead of England's national target. The College should develop an ambitious carbon reduction strategy that demonstrates how this target will be met with a pipeline of prioritised decarbonisation projects. As well as physical projects (e.g. electrification of heat, installation of energy efficient technologies, on-site renewable generation) BHASVIC should promote behavioural change and education initiatives to effectively embed sustainability across the College's activities. The plan should inform an ambitious yet achievable decarbonisation target, with the remaining emissions being removed elsewhere to achieve 'net-zero'.

2. Footprint monitoring and reporting

BHASVIC should continually monitor their annual carbon footprint and report progress against their decarbonisation target. An internal data management process should be initiated that sets out roles and responsibilities for data capture and verification, and reporting should be transparent and made publicly available.

3. Interaction with value chain

Recommendations to exclude emissions from the College's net-zero target should not discourage BHASVIC from minimising their indirect emissions and a concerted effort should be made to reduce wider value chain emissions. Clear communication of the College's sustainability ambitions to contractors and including low-carbon/wider sustainability metrics in procurement selection criteria are two practical methods of incorporating sustainability in interactions with the College's value chain.

The Carbon Trust is a company limited by guarantee and registered in England and Wales under company number 4190230 with its registered office at 4th Floor Dorset House, Stamford Street, London SE1 9NT.