ANNUAL GREENHOUSE GAS INVENTORY

Fiscal Year 2021-2022

SWARTHMORE COLLEGE

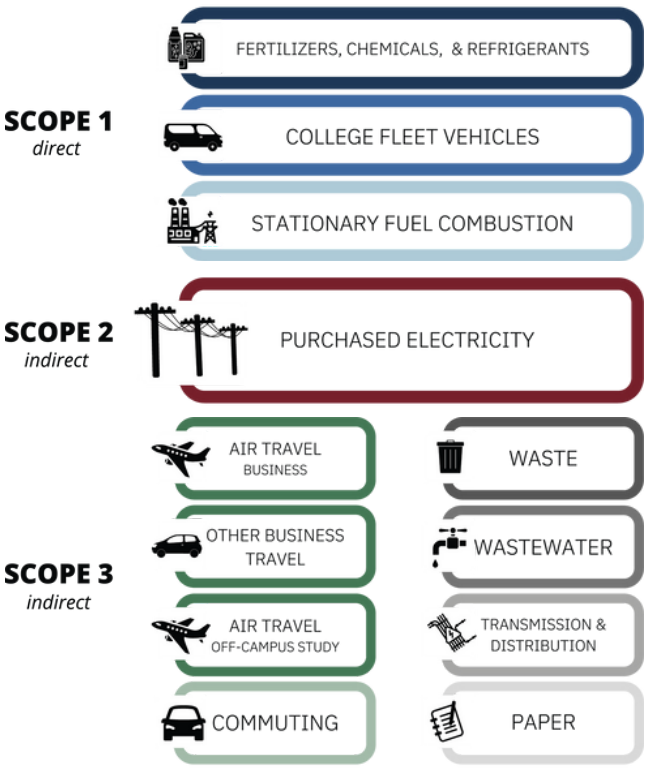
OVERVIEW

To support long-term climate and carbon neutrality goals, Swarthmore College conducts an **annual inventory of greenhouse gas emissions (GHG) associated with campus facilities and operations.** This report reviews the College's emissions data from the previous fiscal year, including the major emissions sources. This report also reviews the various factors driving year-to-year changes in emissions levels, including changes in habits, improved data tracking, updated calculation methodology, and other impacts.

Methodology

The Swarthmore College Office of Sustainability collaborates with several campus partners to compile the GHG inventory **internally for each fiscal year** (July 1 - June 30). Through the Sustainability Indicator Management & Analysis Platform (**SIMAP**) — a widely-recognized online tool originally developed by the University of New Hampshire (UNH) — the College is able to calculate and track emissions data, as well as **monitor trends** and compare with other campuses.

As a signatory of the **Presidents' Climate Commitment** (overseen by national organizing body Second Nature), Swarthmore is required to report on a baseline set of emissions categories. While the annual GHG inventory may not completely capture our climate impact, it reflects the major categories of emissions that we are currently able to track accurately with available methodology. Additionally, it follows industry standards to account for several greenhouse gases (including CO_2, N_2O and CH_4) in **Metric Tons of Carbon Dioxide equivalent ($MTCO_2e$)**.



Categories of Emissions

Following international GHG reporting standards, emissions are categorized into three **"scopes".** Swarthmore's emissions sources fall into these scopes:

Scope 1: Emissions produced directly on campus - stationary fuels, transportation fuels, fertilizer, refrigerants, and other chemicals. The primary source of Scope 1 emissions is the steam plant, which burns natural gas.

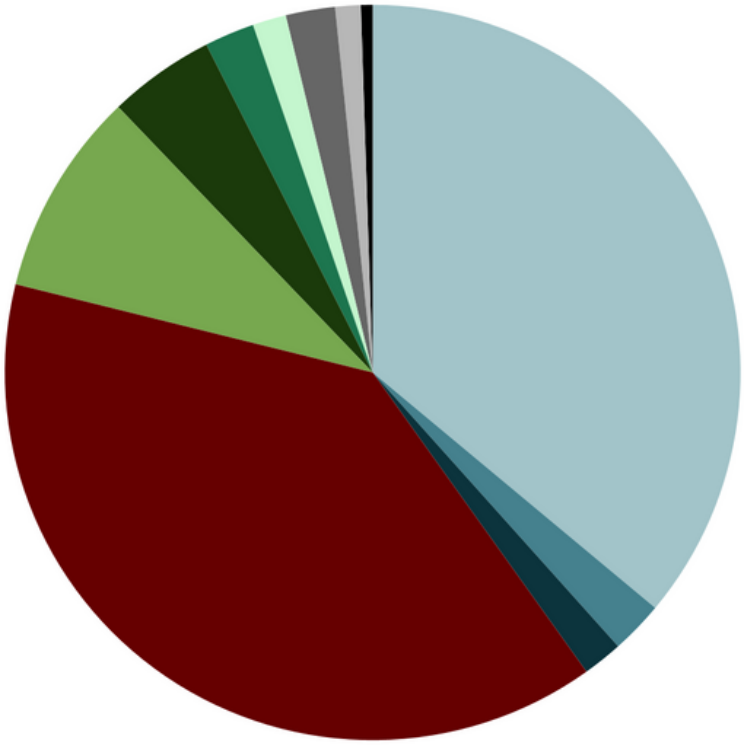
Scope 2: Indirect emissions associated with electricity usage. Purchased electricity is the College's only source of Scope 2 emissions.

Scope 3: Indirect emissions, including faculty and staff commuting to and from the College, business travel, off-campus study, paper purchasing, waste, and wastewater.

RESULTS

For **Fiscal Year 2022** (FY22), Swarthmore College emitted a total of **15076.9 MTCO$_2$e.** The largest categories included **stationary fuel combustion** (i.e. emissions from natural gas burned at the on-campus steam plant) and **purchased electricity**. Within Scope 3, the largest categories included employee commuting and air travel for business (i.e. not for off-campus study).

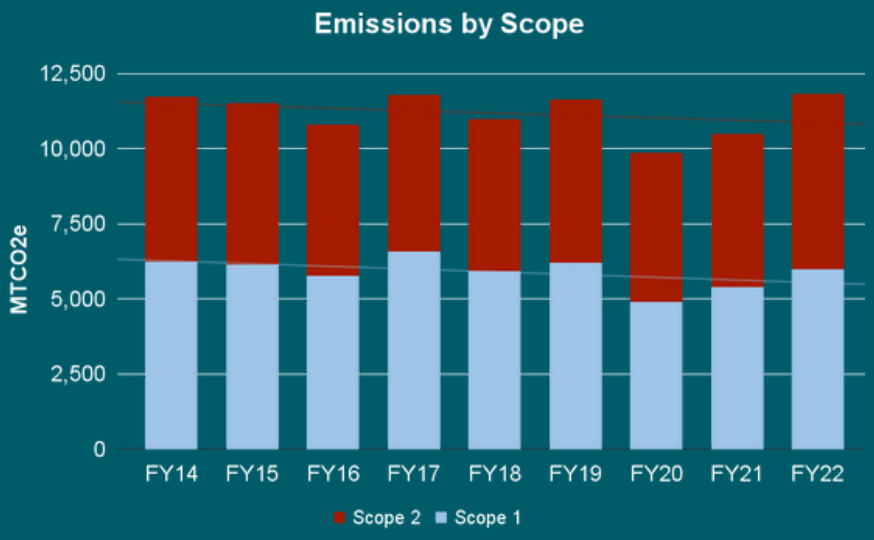
Emissions by Source



EMISSIONS SOURCE	MTCO$_2$e	% of TOTAL
Stationary Fuel Combustion	5,453.02	36.17%
Refrigerants, Chemicals, and Fertilizers	350	2.32%
Fleet Vehicles	265.51	1.76%
Purchased Electricity	5,856.65	38.85%
Employee Commuting	1358.85	9.01%
Air Travel - Business	695.91	4.62%
Air Travel - Off-Campus Study	331.68	2.20%
Other Travel - Business	190.15	1.26%
T&D losses	327.77	2.17%
Paper	169.76	1.13%
Waste and Wastewater	77.6	0.51%
Total	**15076.9**	**100.00%**

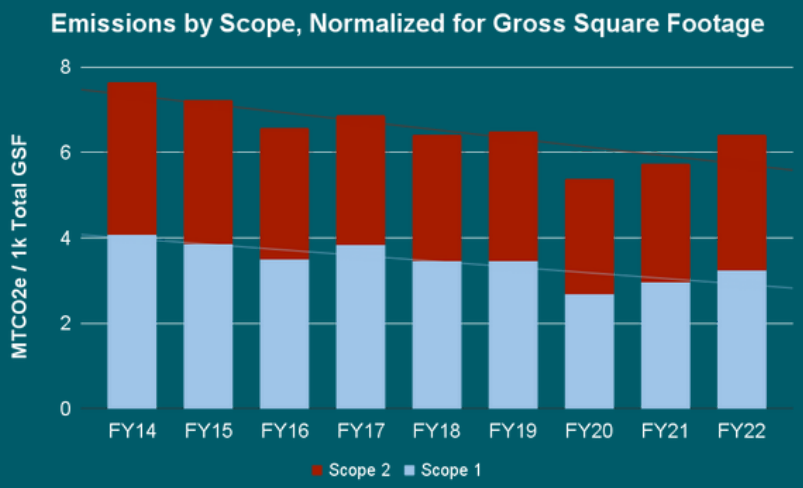
Scope 1 & Scope 2

The College's Scope 1 and Scope 2 emissions have maintained similar levels over the years since FY14, with FY22 showing an increase compared to the previous fiscal year. This increase can be attributed to the return to typical campus occupancy and operations after the COVID-19 pandemic, as well as increased energy and electricity usage for capital projects and energy infrastructure improvements.



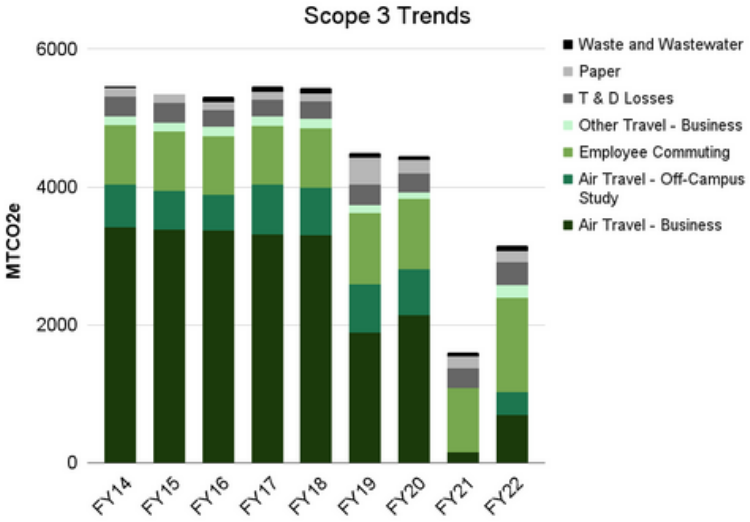
Scope 1 & Scope 2, per gross square foot

When normalized for gross square footage (GSF), the downward trend of Scope 1 and 2 **emissions intensity** over time is more noticeable. This is likely due to significant investments in energy efficiency through programs such as the Swarthmore's **Green Revolving Fund,** even as square footage has grown since 2014 (by ~ 313,159 sq. ft.)

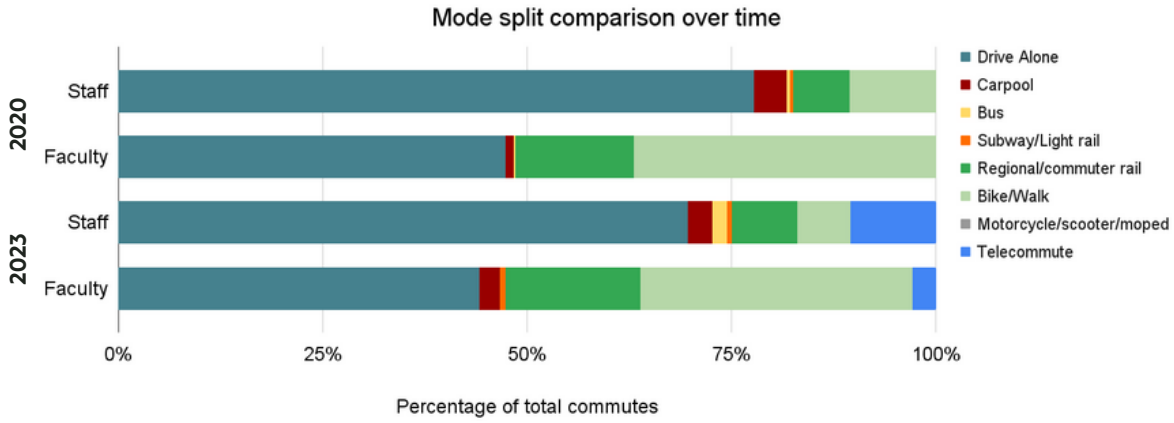


Scope 3

In FY20 and FY21, the COVID-19 pandemic led to significantly lower scope 3 emissions. In FY22, the **return to typical patterns of travel and commuting led to an increase in Scope 3 emissions** compared to the previous fiscal year. However, overall Scope 3 emissions are **lower than FY19 levels**, which could be attributed to changes in travel habits or improved calculation methods. To help calculate emissions from employee commuting, the Office of Sustainability distributed an **employee commuting survey** in spring 2023.



Overall emissions from employee commuting show an increase compared to previous years. Based on survey data, this seems to be due to increased number of employees as well as slightly longer commuting distances. The survey also shows a slight shift in commuting habits for both staff and faculty - **away from driving alone and toward alternative modes**. This is likely due to impacts of COVID-19 and/or survey questions that better reflect commute choices. Annual surveys will help determine more reliable trends.



LOOKING AHEAD

Swarthmore is currently implementing **several strategies** to address various categories and continue to **drive the downward trend of emissions each year**.

Carbon Neutrality by 2035

The College's energy plan, the **To Zero by Thirty-Five**, outlines several steps to decarbonize campus energy systems that are already underway. Replacing the outdated steam system (which relies on natural gas combustion) with the **geoexchange system** — including the geoexchange plant, wellfield, and distribution system — is a key part of making our campus energy systems efficient and resilient. This work, in addition to the ongoing efforts to increase energy efficiency and renewable energy, work together to **eliminate 98% of emissions related to on-site energy and purchased-electricity.**

Renewable Energy

The College currently purchases **unbundled Renewable Energy Credits (RECs)** for 100% of our annual electricity load. In this way, the College pays indirectly for renewable energy (in this case - wind power). However, unbundled RECs, which are not directly tied to the energy being purchased, have not been shown to significantly incentivize new renewable energy projects. As a **more robust renewable energy strategy** for eliminating Scope 2 emissions, the college is looking to procure RECs through **a virtual power purchase agreement** that would lead to **new** renewable energy generation.

Offsets for Scope 3 Emissions

In addition to continuing efforts to reduce or avoid emissions as much as possible, the College is working to outline options to offset those emissions that cannot yet be reduced to zero. Through programs like the new **air travel carbon fee**, the College can pursue high-quality verified offsets while encouraging behavior change that reduces scope 3 emissions.

For FY22, the College offset 100% of emissions related to air travel through **Climate Vault**, a non-profit founded by Swarthmore alumni Michael Greenstone ('91) and Andrew Dailey ('91). Climate Vault uses regulated compliance markets to purchase and "vault" CO_2 allowances, thereby preventing major emitters in those markets from utilizing them to emit carbon dioxide into the atmosphere. For Swarthmore College, Climate Vault purchases carbon allowance permits in the **Regional Greenhouse Gas Initiative (RGGI)**, a cooperative effort among twelve states, including Pennsylvania. Though up to the discretion of each state, proceeds from the RGGI market are often invested by states back into their communities, including funding of clean energy programs, energy efficiency, and bill assistance to local businesses and communities.

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