

SWARTHMORE COLLEGE



GREENHOUSE GAS INVENTORY

FY 2020

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OVERVIEW

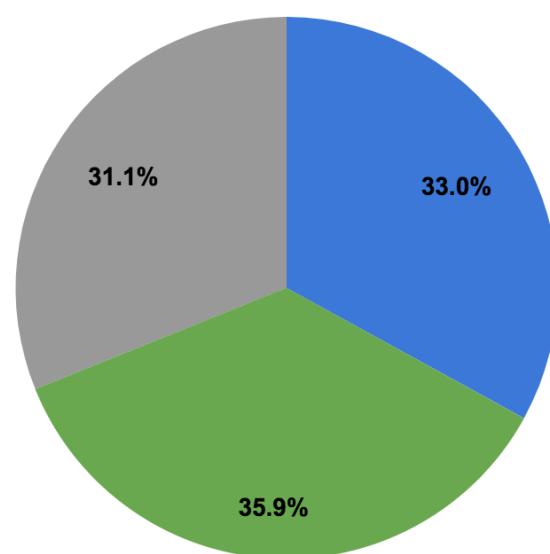
This report reviews Swarthmore College's emissions data from FY2020 by considering (1) the main emissions sources for FY2020 and (2) the methodological changes driving changes in emissions levels between FY2019 and FY2020. The College conducted the FY2020 inventory internally using the online tool SIMAP to calculate emissions for imputed emissions sources data. The College plans to continue to conduct inventory internally. The College's fiscal year starts on July 1 and ends on June 30. Limitations to data analysis include a significant change in methodology between fiscal years.

This report breaks down Swarthmore College's emissions data into three Scopes.

Scope 1 includes 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 includes emissions associated with electricity usage. Purchased electricity is the College's only source of Scope 2 emissions.

Scope 3 consists of indirect emissions, which include emissions associated with faculty and staff commuting to and from the College, business travel, off-campus study, paper purchasing, and waste and wastewater.

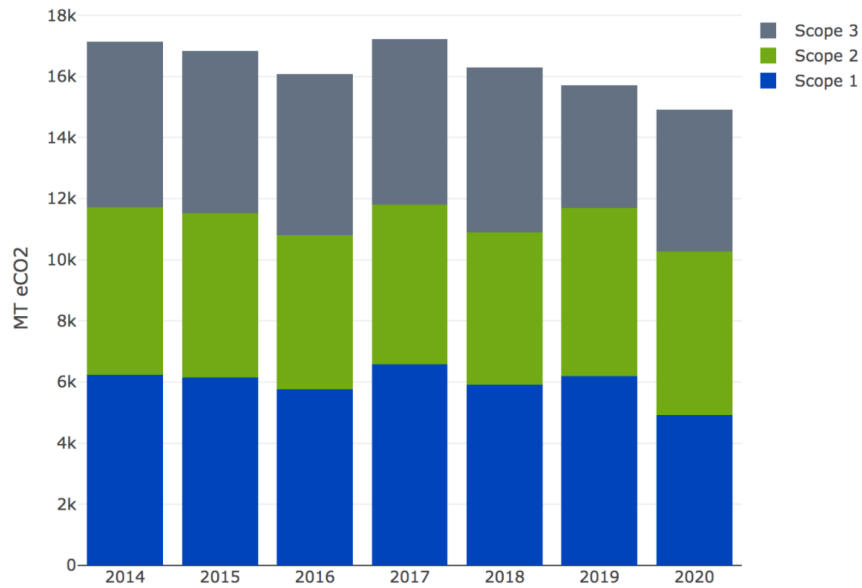


● **Scope 1** ● **Scope 2** ● **Scope 3**

FY2020 Emissions by Scope

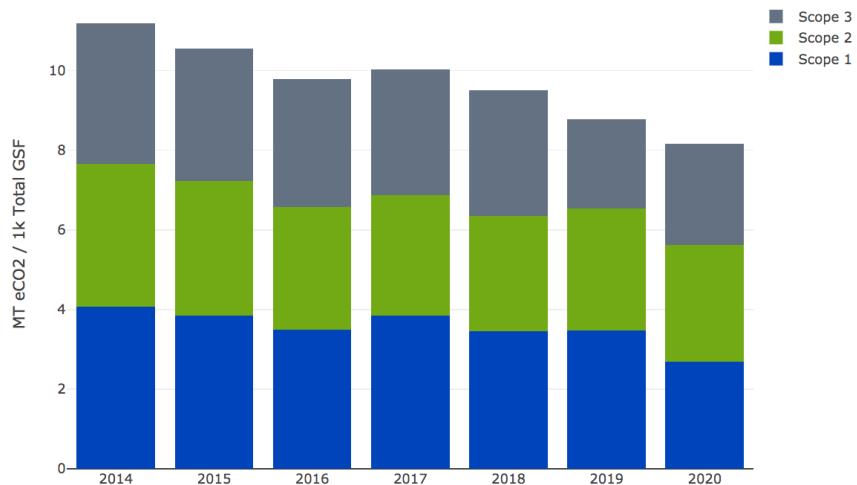
RESULTS

In general, Swarthmore College's emissions follow the trend of decreasing in comparison to the year previous. The total MTCO₂e for FY2020 was 14,906.9 MTCO₂e.



Trend of Swarthmore College's MTCO₂e (FY2014-FY2020)

Between FY2014 (1,532,214 sq. ft) and FY2020 (1,827,664 sq. ft), the College's gross square footage (GSF) increased by 295,450 sq. ft. The table below shows that given data normalization by GSF, the College's emissions levels (metric ton per GSF) follow the trend of decreasing in comparison to the year previous.



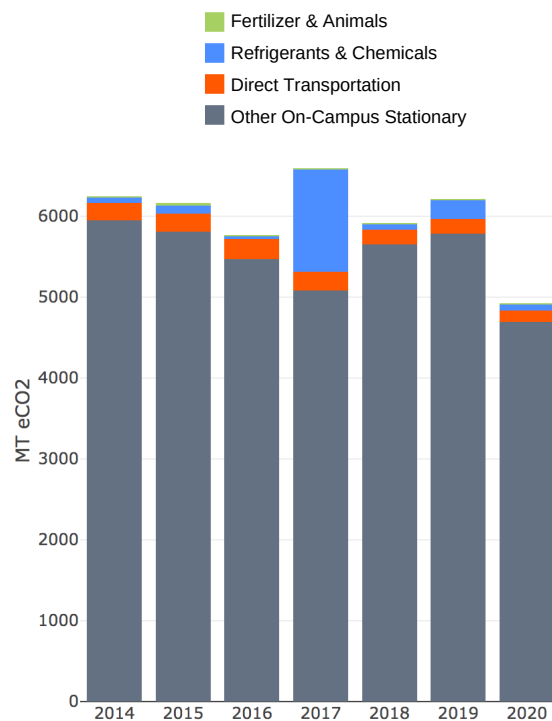
Trend of Swarthmore College's MTCO₂e Normalized by Gross Square Footage (FY2014-FY2020)

SCOPE 1

The decrease in Scope 1 emissions may be primarily attributed to lower natural gas and fuel oil use.

Burning natural gas in the steam plant is the primary source of Scope 1 stationary emissions. In the figure to the right, emissions from the steam plant are included within “On-Campus Stationary” emissions. Given that FY2020 included relatively average weather and lower campus building usage during some heating months as a result of the COVID-19 pandemic, the campus required lower levels of natural gas usage.

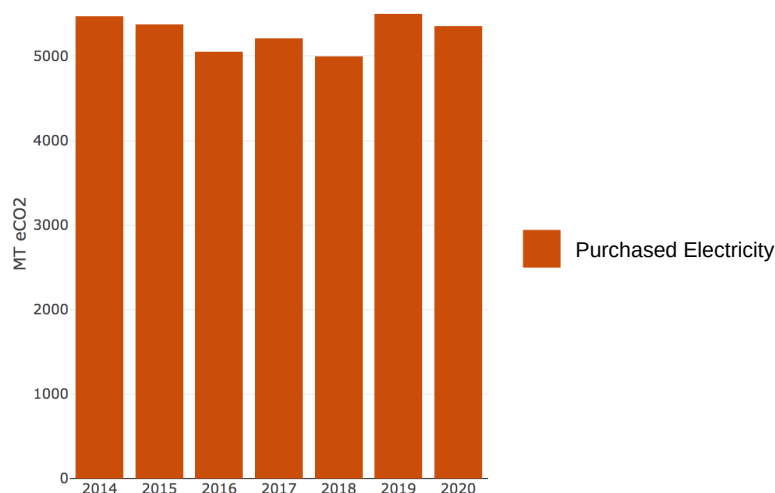
Lowered diesel use also drove the downward trend in Scope 1 emissions. Over FY2020, there was lowered use of diesel within (1) on-campus backup generators and (2) transportation on campus, which includes transportation related to ground equipment.



Trend of Swarthmore College's MTCO2e for Scope 1 emissions

SCOPE 2

Purchased electricity is the College's only source of Scope 2 emissions. Scope 2 emissions have remained largely stagnant. In FY2020, it is likely that electricity use from new construction (i.e. Singer Hall) counteracted the decreased use of buildings due to COVID-19. Given this, electricity usage will rise when buildings return to full capacity.

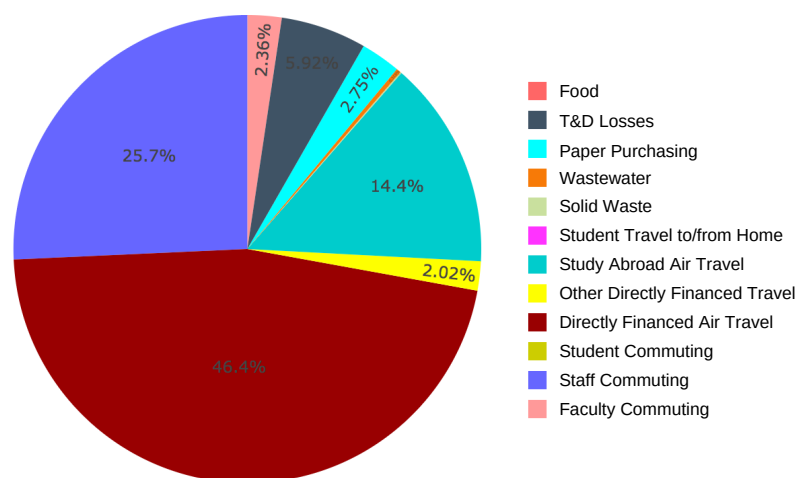


Trend of Swarthmore College's MTCO2e for Scope 2 emissions (FY2014-FY2020)

Currently, the College purchases unbundled Renewable Energy Credits (RECs) in the form of wind power. By purchasing RECs, the College is indirectly paying for renewable energy by buying credits from wind farms, despite also buying electricity from a local supplier. Because the College purchases enough RECs to cover the entire annual electricity load, the College could technically claim carbon neutrality with regard to Scope 2 emissions. However, the College recognizes that there is limited proof that buying unbundled RECs is actually driving the creation of new renewable energy on the grid, and so the College's location-based emissions reports do not claim carbon neutrality for Scope 2. Currently, the College is working to procure RECs through a virtual power purchase agreement that would result in the construction of a new renewable energy generation facility in the PJM grid, a more robust strategy for eliminating Scope 2 emissions.

SCOPE 3

As of FY2020, Scope 3 emissions data should be reviewed as stand alone data due to the large methodological changes driving changes in emissions levels.



Breakdown of Swarthmore College's MTCO_{2e} for Scope 3 emissions by category (FY2020)

Prior to FY2020, emissions calculations for transportation were based on broad assumptions about the type of transportation (plane, bus, train, etc.). As described in more detail in the Senior PSRF Concluding Report, these calculations were lacking accuracy. Over FY2020, the College adjusted its methodology to more accurately sort through travel charges to give a more accurate picture of air travel, which was likely undercounted in previous inventories. This change in methodology drove the increase in air travel emissions and counteracted the lower number of flights due to COVID-19.

The other driver of Scope 3 emissions was a change in methodology around faculty and staff commuting. Previously, the College based emissions numbers off commuting data that assumed faculty and staff came to campus 32 weeks out of the year. Over FY2020, the College calculated emissions for faculty and staff commuting to campus 52 weeks.

DISCUSSION

Lower campus usage during the months of the year impacted by the COVID-19 pandemic largely drove both (1) the decrease in Scope 1 emissions and (2) the lack of change in Scope 2 emissions despite an increase in campus square footage. It can be expected that both Scope 1 emissions and Scope 2 emissions will increase given a return to normal campus activity. As of FY2020, Scope 3 emissions data should be reviewed as stand alone data due to the large methodological changes driving changes in emissions levels. In future years, the College's commuting survey should give the College a better understanding of commuting data in order to calculate the most accurate emissions data for faculty and staff commuting. For now, the College will continue to conduct calculations under the assumption that faculty and staff commute 52 weeks out of the year to avoid under-calculating emissions levels. It can be expected that air travel emissions (Scope 3) will increase given the combination of (1) more accurate methodology for calculating emissions and (2) a return to normal levels of off-campus study and gradual return to some level of business and academic travel.

Swarthmore College's Energy Plan: Roadmap to Zero Carbon commits the College to reaching carbon neutral energy systems on-campus by 2035. Ultimately, campus heating and cooling will be supplied from a central heat recovery chiller plant coupled with a geo-exchange field, which will eliminate emissions from the outdated steam plant. As of FY2020, the main driver of Scope 1 emissions was on-campus stationary emissions (steam plant emissions); moving away from steam heating will eliminate Scope 1 emissions. The move towards solar electricity, both through on-campus panels and off-site renewable energy, will eliminate the need to purchase electricity, thereby eliminating Scope 2 emissions completely. However, the Energy Plan does not address Scope 3 emissions (31.1% of total emissions for FY2020) because mitigating the carbon footprint of travel and commuting is not feasible given current technology and travel's role within the College mission.

Moving forward, the College must consider the best approach to offsetting Scope 3 emissions. The College should examine pathways for offsetting air travel emissions (62.82% of Scope 3 emissions) as well as commuting emissions (28.06% of Scope 3 emissions). It is worth noting that COVID-19 has impacted air travel and commuting patterns. Current commuting data is from the College's last transportation survey completed in early 2020. Given a new transportation survey, the College will better understand commuting habits for the coming fiscal years.