

sightlines

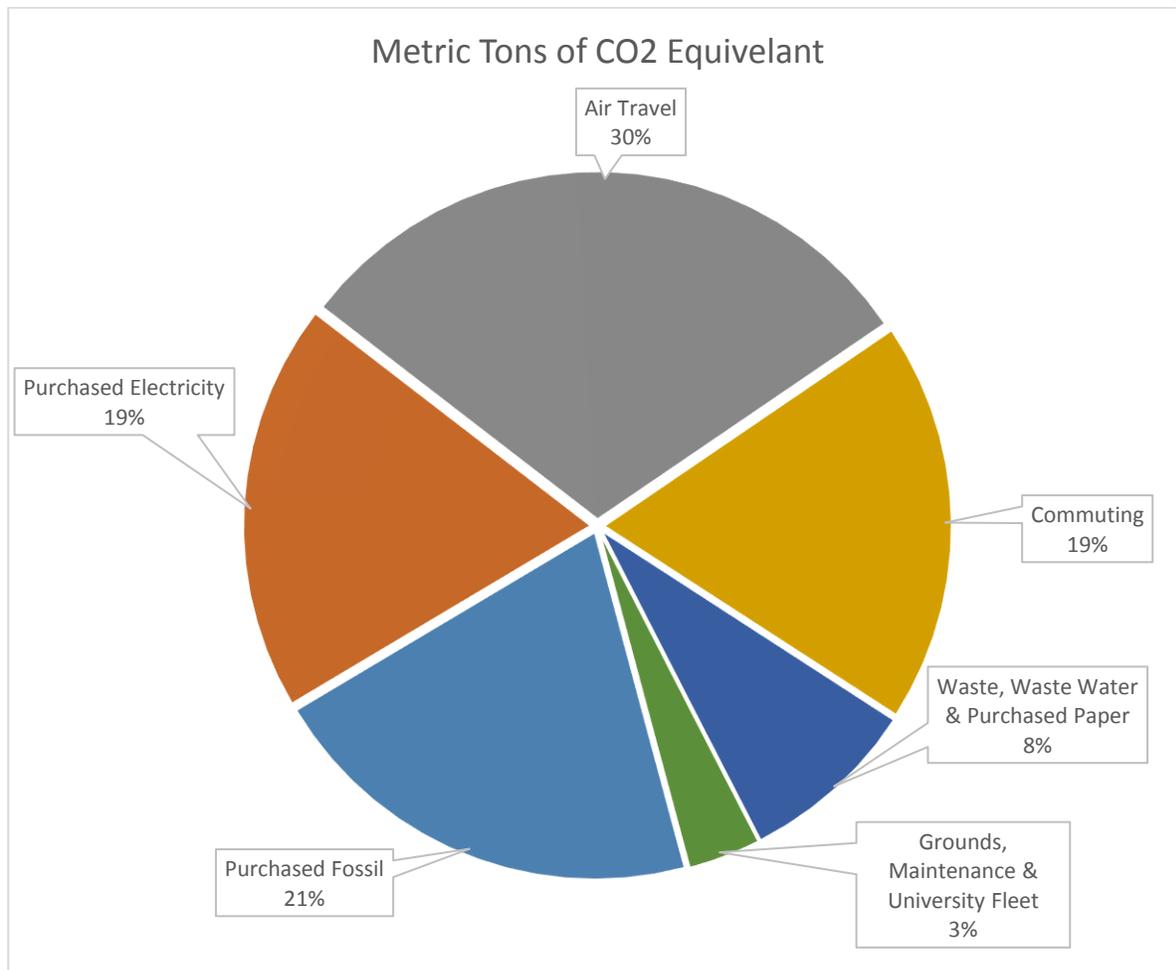
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Greenhouse Gas Inventory

Summary of Findings 2016

Saint Mary's College of California



19531 Metric Tons CO2 Equivalent

| EMISSIONS SOURCE | METRIC TONS OF CO2 EQUIVALENT |
|------------------------------------|-------------------------------|
| Purchased Fossil | 4,122 |
| Directly Financed Air Travel | 3,755 |
| Purchased Electricity | 3,573 |
| Study Abroad Travel | 2,250 |
| Faculty / Staff Commuting | 1,725 |
| Student Commuting | 1,549 |
| Solid Waste | 1,579 |
| Refrigerants | 442 |
| Transmission & Distribution Losses | 219 |
| Direct Transportation | 218 |
| Paper Purchasing | 61 |
| Waste Water | 24 |
| Fertilizer | 14 |



GREENHOUSE GAS ASSESSMENT

SMCC's 2016 Fiscal Year Greenhouse Gas inventory was produced in a collaborative effort with the expertise of Jacob Bodie and Adam Gogolski from the Sightlines data analytics team, the dedicated commitment from Riley Smith and different departments at Saint Mary's College to provide the most accurate data and the "Clean Air/Cool Planet Campus Carbon Calculator™" tool developed by The University of New Hampshire. This calculator accounts for the greenhouse gases specified by the Kyoto Protocol. This inventory summarizes the GHG emissions generated by SMCC from FY 2016 (July 1, 2015 through June 30, 2016) with added context of emissions from FY 2015 (July 1, 2014 through June 30, 2015). Emissions are calculated in terms of metric tons of carbon dioxide equivalents (mtCO₂e or MTCDE).

Sightlines has advised SMCC on facilities and emissions management for the last decade. During this time Sightlines has work diligently with campus representatives to acquire data of the strongest integrity with which to advise SMCC on best practices. With assistance from multi-disciplinary staff across campus, Sightlines and SMCC were able to gather the most accurate and available data to produce the SMCC FY 2016 carbon emission profile. These data sets were then entered into the Clean Air-Cool Planet (CA-CP) Carbon Calculation tool. Data collection and processing took approximately six months.

Information collected by Sightlines was then organized into categories defined by the CA-CP calculator as **Scope 1, Scope 2 and Scope 3**

emissions. Scope 1 emissions include sources related to the heating and cooling of campus facilities, university-owned vehicles, and grounds and maintenance activities. Scope 2 emissions include emissions from electricity purchased by SMCC from Constellation Energy and from PG&E. Scope 3 represents the majority of SMCC's emissions, including GHG emissions stemming from air travel and automobile commuting, solid waste disposal, distribution losses from transmitting electricity across power lines, waste water treatment, and paper products. It is important to note that with no reliable estimates for the carbon emissions related to food purchased by the university, these emissions were excluded from this report.

SAINT MARY'S COLLEGE OF CALIFORNIA GHG EMISSIONS IN 2015 AND 2016

To simplify reporting of SMCC's carbon footprint for 2015 and 2016, the following categories were devised: air travel (30%), purchased fossil (21%), purchased electricity combined with transmission and distribution losses (19%), commuting (19%), waste, wastewater & purchased paper (8%) with grounds, maintenance & vehicle fleet accounting for the remainder of emissions (3%).

SMCC included all university-owned or operated buildings in its calculations. In FY 2016 SMCC was responsible for 19,531 Metric Tons of CO₂ equivalent emissions.

Scope 1 Emissions:

On-Campus Sources

Scope 1 emissions totaled 4,797 metric tons of CO₂e in FY 2016. These emissions include natural gas related to heating of facilities, operation of university-owned vehicles, and grounds and maintenance activities. The majority of on-campus emissions resulted from the combustion of natural gas for heating of campus facilities. In FY 2016, combustion of natural gas resulted in emissions of 4,122 metric tons of CO₂e. All remaining sources of on-campus Scope 1 emissions totaled 675 metric tons.

University Fleet

University Fleet emissions were calculated from the total amount of gasoline and diesel fuel consumed by university vehicles. In FY 2016, 22,619 gallons of gasoline and 1,817 gallons of diesel fuel were consumed by university-owned vehicles, resulting in emissions of 218.2 metric tons of CO₂e.

Grounds and Campus Maintenance

Grounds and campus maintenance (agriculture and refrigerant usage) also produce on-campus GHG emissions. Emissions related to turf and grounds management were calculated from the total weight of nitrogen in the synthetic fertilizers used on campus grounds. Refrigerant emissions were calculated from the weight of various types of refrigerants used by maintenance teams, the freezers, chillers and

lab equipment at SMCC. Emissions from these sources total 456 metric tons of CO₂e.

Scope 2 Emissions:

Purchased Energy

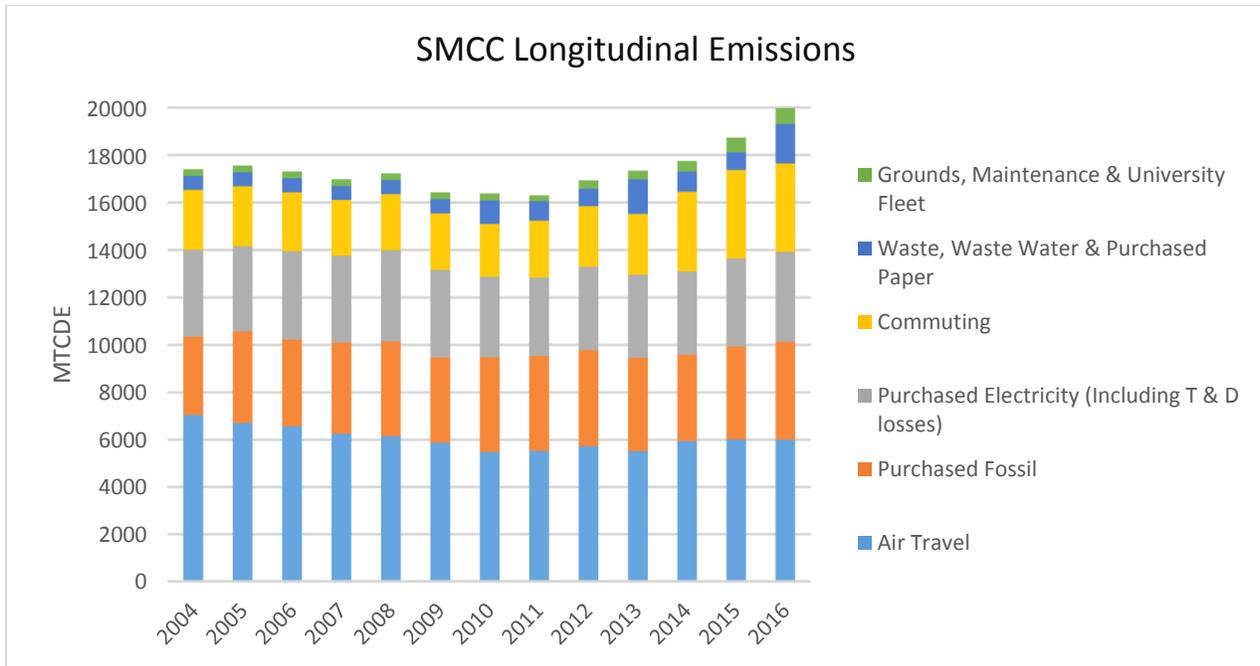
Scope 2 emissions include emissions from electricity purchased from Constellation Energy and PG&E. Both providers belong to the CAMX (California) E-Grid. The fuel mix used in this E-Grid has remained fairly consistent in recent years, and in FY 2016 it consisted of 58.6% Natural Gas, 25.9% Renewable Energy, 9% Nuclear, 5.3% Coal, and 1.2% Other Fossil.

In FY 2016, SMCC purchased 12,026,459 kWh of electricity, resulting in emissions of 3,573 metric tons of CO₂e.

Note: In our graphs we report emissions due to transmission and distribution losses as a part of purchased electricity emissions.

Scope 3 Emissions:

The remaining emissions in FY 2016 make up the majority of SMCC's emission profile and come from commuting activities, as well as business travel, air travel (including Study Abroad programs), and solid waste taken to landfills. Scope 3 emissions also include emissions due to distribution losses across power lines. Scope 3 emissions were 11,161 metric tons of CO₂e in FY 2016.



Commuting and Travel

Commuting data was extrapolated from information provided by the SMCC office of institutional research, the SMCC department of public safety, a traffic monitoring study and a vehicle occupancy survey conducted by Kittelson & Associates transportation engineering and planning. National miles per gallon averages were used to estimate fuel efficiency of those vehicles commuting to and from campus.

Air Travel represents the largest source of emissions for SMCC. A culture of competitive athletics and robust study abroad programs (including directly financed travel for faculty/staff) naturally leads towards high emissions in this field. Offering options to travel has become integral to the SMCC experience, and while this offering will increase emissions, SMCC has begun to purchase Renewable Energy Credits to help offset this large source of emissions.

Commuting activities resulted in emissions of 3,274.2 metric tons of CO₂e and air travel resulted in emission of 6,005 metric tons of CO₂e in FY 2016.

Solid Waste

In FY 2016, 509 short tons of solid waste were sent to a landfill, 247 short tons were recycled and 221 short tons were composted. A more comprehensive data collection method in FY 2016 speaks to the magnitude of the change in SMCC's total waste stream compared to years previous. Solid waste resulted in emissions of 1,579 metric tons of CO₂e in FY 2016.

Other sources

Transmission and distribution of electricity losses are directly calculated by the CA-CP tool and amounted to 218.5 metric tons of CO₂e in FY 2016. The remainder of our emissions in scope 3 were in the wastewater category (23.9 metric tons of CO₂e in FY 2016) and emissions associated with SMCC's paper use (60.9 metric tons of CO₂e in FY 2016).

A GHG emissions inventory was also conducted for FY 2015 (July 1, 2014 to June 30, 2015). The university's carbon footprint for 2015 was 18,286 MTCDE (1,245 MTCDE less than FY 16). This is largely due to improved reporting efforts across campus. Information that has historically been omitted is now entering SMCC's profile, and while this does drive higher emissions, it

also more honestly depicts what’s occurring on campus which is an effort to be supported.

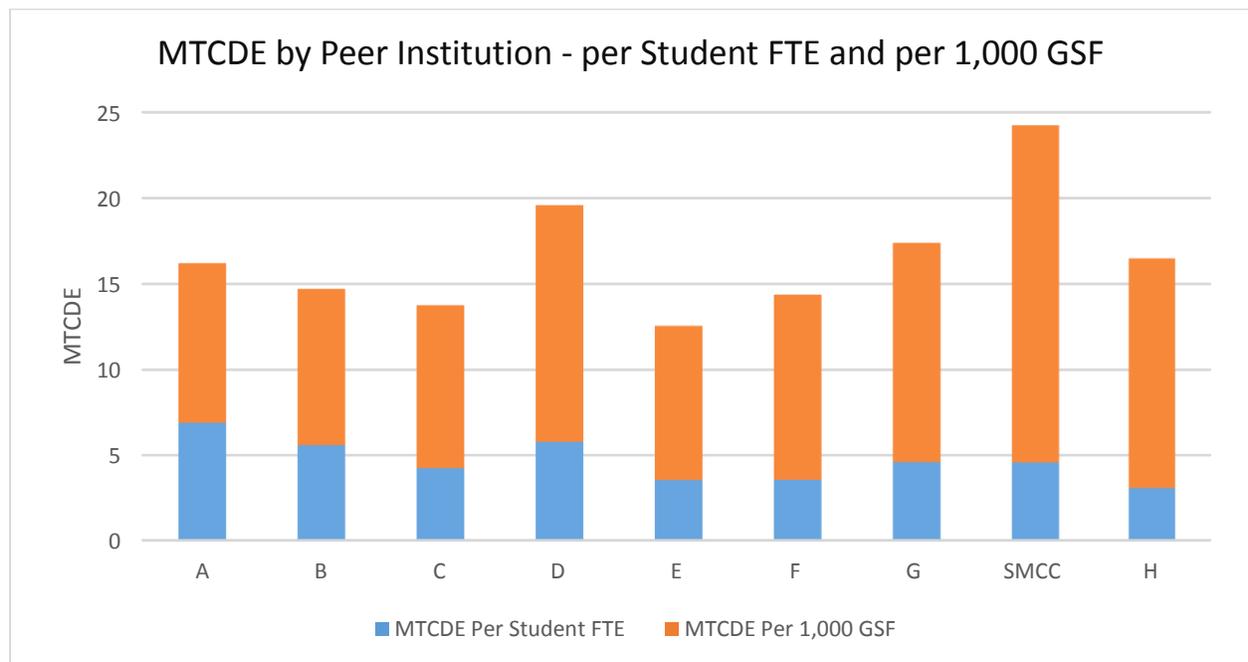
GHG EMISSIONS FROM COMPARABLE INSTITUTIONS

The table below summarizes the GHG inventories for several institutions comparable to SMCC, presenting information from the schools that are similar in terms of academic rigor and size.

SMCC’s GHG emissions, normalized by enrollment, fall within the range of values reported by their peers listed below. As SMCC operates with a higher density than most peer institutions it is reasonable for SMCC’s emissions normalized by GSF to be higher than peers. Variation across these institutions is the

result of many factors. Local climate has a significant impact on energy use, as is the emphasis placed on research at different institutions (resulting in varying amounts of highly energy-intensive laboratory spaces). Universities located in rural areas may use energy differently than universities located in dense urban areas (for example, emissions from transportation are likely to be very different for such universities). The energy mix of a university’s electricity provider also has a large impact on a university’s carbon footprint. Schools with smaller faculty-student ratios may also have higher carbon emissions due to the need for more classroom and office space per student. Finally, methodological differences in data collection and reporting of GHG emissions likely contribute to the variation observed among our peer institutions.

Saint Mary’s College of California Sustainability Peers: Babson College, Occidental College, Pacific Lutheran University, Loyola University Maryland, Siena College, Bentley University, University of Redlands, University of San Francisco (Institutions arranged by density factor from low to high)



OPPORTUNITIES IN FY17

It is a significant challenge for an institution to truly grasp the nature of its emissions profile. As all activity carries some consequence of emissions, every year the science of calculating emissions is changing; there are new sources of emissions and new ways to understand existing emissions. A great example of this is provided in SMCC's increase in waste related emissions from FY15 to FY16. Through conversations on campus the Sightlines team discovered that the physical amount of waste produced in FY15 and FY16 were very similar, however, in FY16 Saint Mary's had access to more of that information. As such, waste related emissions increased in FY16 even though activity has remained quite constant.

As such, Saint Mary's College of California has put emphasis on gathering even higher quality data to create a more honest emissions profile. In FY17, Saint Mary's will see many opportunities to report on emissions that were previously omitted. One of the most significant opportunities lies in Air Travel. In FY16 Air travel represented roughly one third of all emissions produced by SMCC. In FY17 Sightlines and SMCC will add athletic travel to the emissions profile and will scrutinize Directly Financed Air Travel to ensure the accuracy of that information.

More areas of opportunity exist within commuting and in the other scope 3 sources. Commuting is a difficult emissions source to dial in on, if a survey is conducted it's unlikely to get a 100% response rate but it's even more difficult to get an accurate report just using available data (parking permits, traffic studies, etc.). Therefore, Sightlines recommends using both tactics, a traffic survey and available data to create a composite result.

The other opportunities within the scope 3 sources involve enhanced tracking just like the example of the solid waste stream from FY16. As the importance of tracking information becomes more of an institutional norm it will be

expected to get more reliable information across the board; pounds of paper consumed (both academically and for custodial services), more specific split-outs of what/how much got recycled vs composted vs landfilled, more specific split-outs of what/how much chemical application was used for agricultural/maintenance purposes.

Also, SMCC's participation in a Renewable Energy Credit program has helped to reduce net emissions and will surely become an important part in developing a robust Climate Action Plan. Saint Mary's College of California has worked with Sightlines for a decade to understand SMCC'S state of facilities and the state of sustainability. In the next iteration of analysis Sightlines and SMCC will collaborate to create a Climate Action Plan that works towards Saint Mary's strategic mission and goal to embrace knowledge, to persevere through challenges, and to make a lasting change in the world.