Carbon Footprint Audit

Loyola University Chicago Jesuit Community
Completed: September 2020

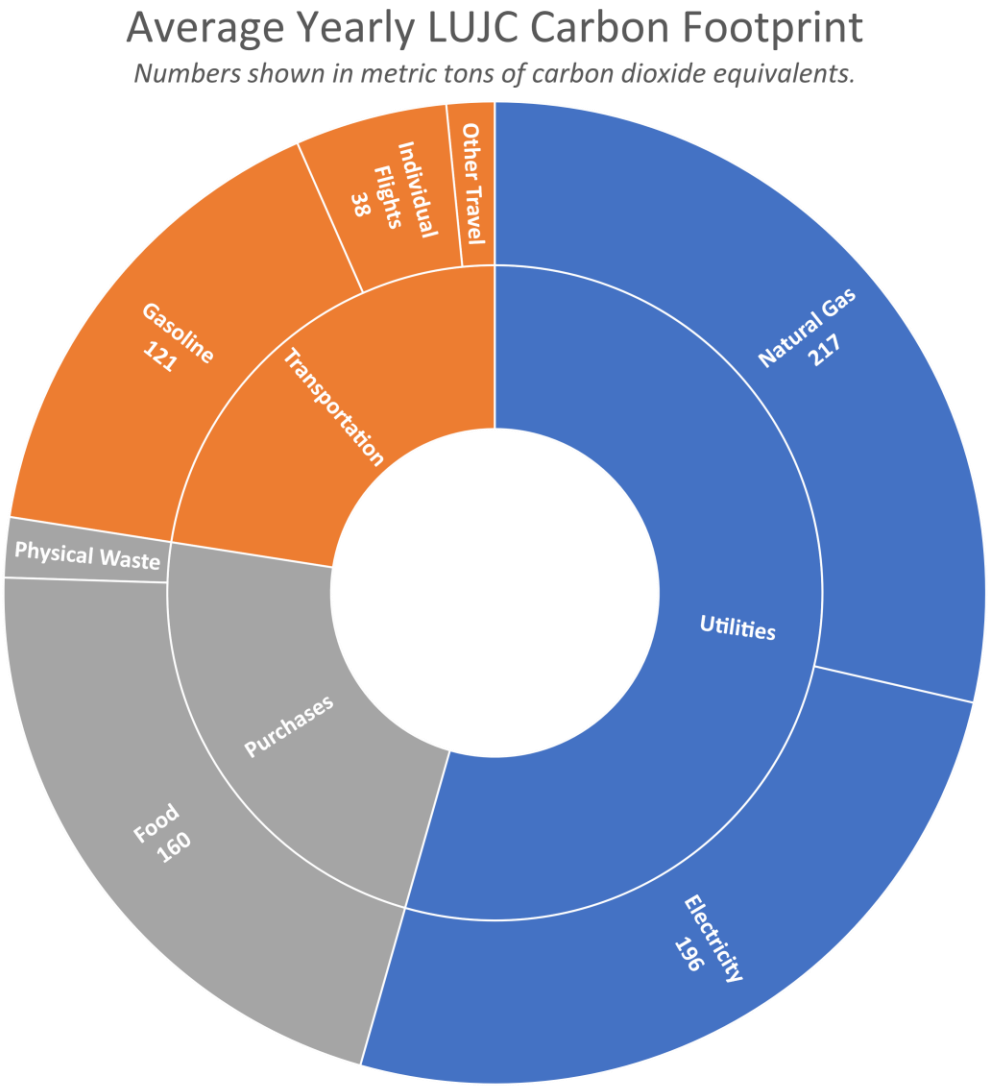
> *Self-improvement on the part of individuals will not by itself remedy the extremely complex situation facing our world today. Isolated individuals can lose their ability and freedom to escape the utilitarian mindset, and end up prey to an unethical consumerism bereft of social or ecological awareness. Social problems must be addressed by community networks and not simply by the sum of individual good deeds… The ecological conversion needed to bring about lasting change is also a community conversion.*
>
> -Pope Francis, *Laudato Si'* (219)

Motivation: This report grew out of the Green Team's desire to understand our communal and individual impact on the planet and to live in a way that gives more faithful witness to our Gospel call to reconciliation with all of creation. We hope that it will provide a basis for conversation, a call to deeper discernment, and some guidance for concrete action within the Jesuit community at Loyola University Chicago (LUJC). The success of this report will be defined not by how accurately it captures data numerically but by how it prompts us to live out our call for reconciliation with creation.

Acknowledgements: The Green Team is a group of Jesuits at LUC who meet monthly to discuss ecology and consider actions within our own community. This report includes specific contributions from Nathan Krawetzke, Erin Kast, Mark Blancke, Michael Pederson, Bryan Galligan, Collin Price, and Philip Nahlik. Thanks to Dave Godleski for providing access to many of these data. We also acknowledge other people who contributed their time, including: Joe Hogan, Aaron Durnbaugh, and several Loyola students who gathered utility data as part of a larger university audit.

Notes on Format and Assumptions: Due to incomplete data and the size of our community, we had to make many types of assumptions in this report, including: extrapolating incomplete data to cover a full year, using averages as representative data, and combining similar types of data for the sake of simplicity. We used direct data wherever possible and tried to fill in gaps as reasonably as we could. Community averages are calculated as if we had 80 members in the community. Yet many of these data categories (especially food) might appear higher because of the hospitality we offer to guests in our communities. It is difficult to capture all aspects of our community at once, but we felt it was important to give as complete an overview as possible rather than a strict report on definitive data. To focus on the data, we limit our commentary mostly to explanatory notes. External links are included throughout for further reference. Please reach out to the Green Team if you have questions about any of these data or this report.

Introduction and Key Definitions: A "carbon footprint" is a common way of expressing the total emissions caused by an individual or group in terms of carbon dioxide "equivalent" or CO_2e. This equivalent does not express literally the amount of CO_2 emitted by an action but is a single value that tries to account for a wide range of impact—including production, consumption, water use, greenhouse gas emissions, and other factors. These values can help us compare actions to get a sense of scale and the effects of our lifestyle. Below is an estimated total and breakdown of our community's footprint for an average year.



Annual Total Carbon Footprint: **759 Metric Tons of CO_2e**

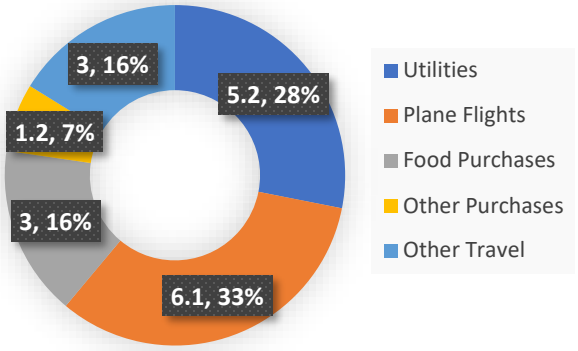
Equivalent to:

164 passenger vehicles driven for one year	129 US homes' electrical use for one year	Carbon captured by 991 acres of US forests in one year
		

Representative Individual Carbon Footprint Profiles:
Along with our communal impact, individual lifestyles can also affect our footprint. Below are a few imagined examples of different kinds of Jesuits and two worldwide comparisons.

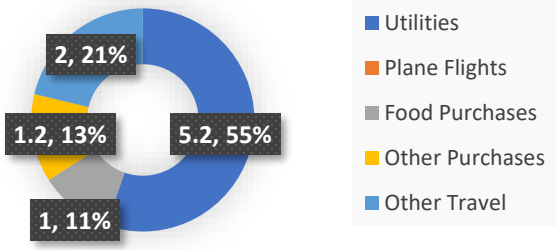
Jesuit Traveler

Total Footprint: 18.5 metric tons CO2e



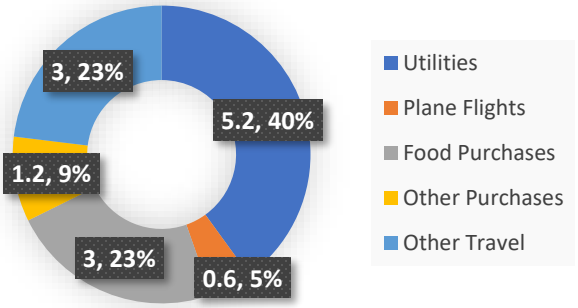
Minimal Jesuit

Total Footprint: 9.4 metric tons CO2e



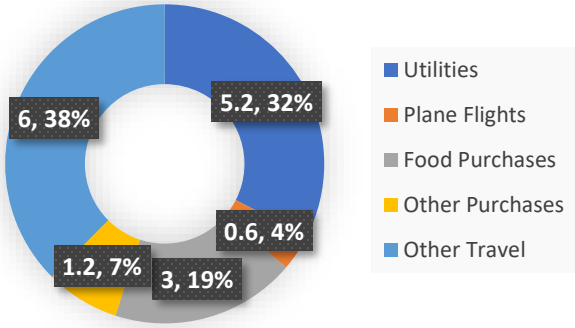
Average Jesuit

Total Footprint: 13.0 metric tons CO2e



Jesuit Driver

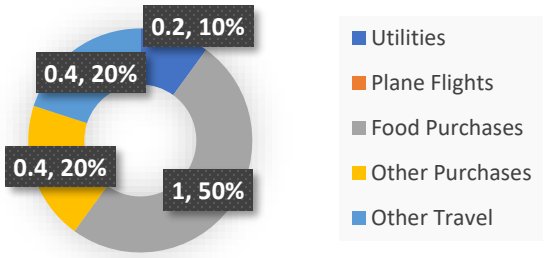
Total Footprint: 16.0 metric tons CO2e



Dramatized Comparisons: These examples help situate our community in a global context.

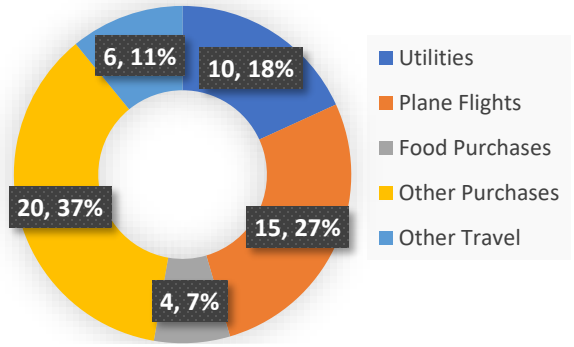
Average Person in Poorest 50% Worldwide

Total Footprint: 2.0 metric tons CO2e



Average Person in Richest 10% of U.S.

Total Footprint: 55.0 metric tons CO2e



Focus on Transportation:

The largest portion of our carbon footprint from transportation is likely our gasoline use in community vehicles. From October 2018 through September 2019, we used about **11,000 gallons of gasoline** in the vehicles across our four houses (based on Shell and BP receipts and, therefore, likely an underestimate). This total divides into about **135 gallons per Jesuit per year**, a number that is significantly lower than the average American's use of 370 gallons per year but still high considering that the vast majority of us have no daily commute. The carbon footprint from this gasoline production and use is equivalent to about **120 metric tons** of CO_2e. That footprint is approximately equivalent to:

the amount of carbon sequestered by **115 acres** of US forests in one year,

the electricity use of **17 US homes** in one year, or

253 round-trip flights between Chicago and NYC.

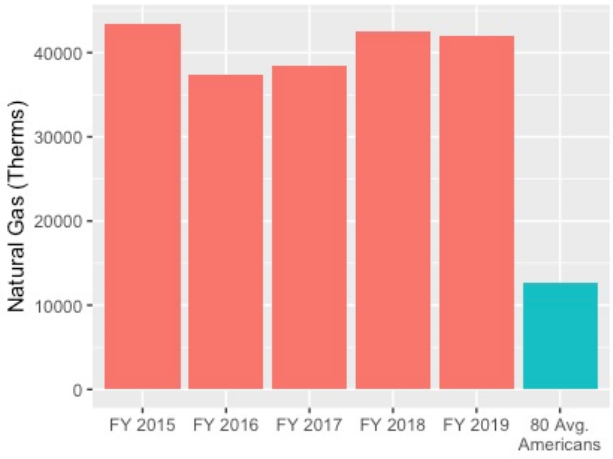
Individual plane flights also account for a significant portion of our travel footprint, although exact numbers would be difficult to gather. We use a conservative example here. If 80 members of our community each took two round-trip flights between Chicago and NYC each year, that would account for about **38 metric tons** of CO_2e.

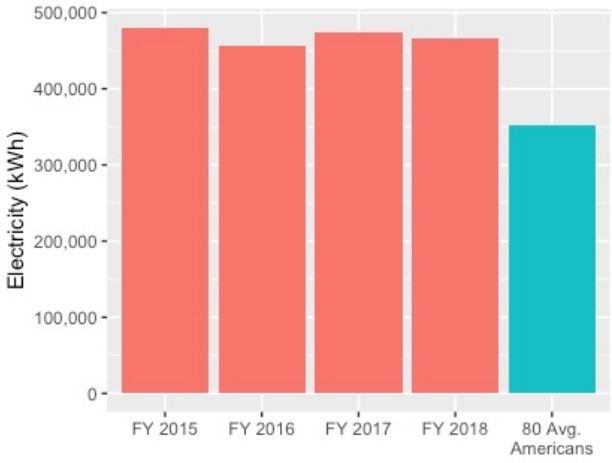
Other forms of travel include public transportation, ride-sharing services, and our electric car. These services are still part of our carbon footprint but are less impactful than flights and driving. We estimate that our other transportation—including public transportation—accounts for about **12 metric tons** of CO_2e.

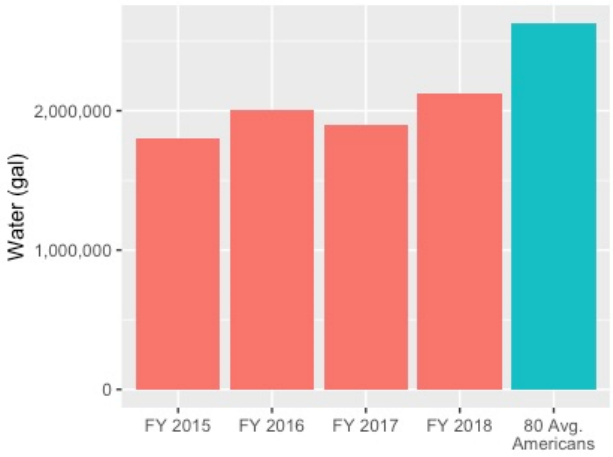
You can calculate and learn about the impact of different forms of travel at these links:

"Carbon Emissions from Flights Calculator," the UN's ICAO
"Carbon Pollution from Transportation." US EPA
"Household Carbon Footprint Calculator," US EPA

Focus on Utilities: Natural Gas, Electricity, Water







Average Annual Utility Use Graphs

Comparison values for natural gas and electricity are from EIA statistics for residential use in 2019. Water comparison value is from USGS. Both assume an average household size of 2.5 people.

We estimate that natural gas accounts for the largest share of our carbon footprint at **217 metric tons** of CO_2e per year. Electricity accounts for the second largest portion of our overall carbon footprint at **196 metric tons** of CO_2e for an average year. For some perspective:

Our yearly average natural gas use of 40,796 Therms is equivalent to running all 6 burners of one of our stoves on full blast constantly for 2.8 years.

Our yearly average electricity use of 469,494 kWh is equivalent to the yearly electricity use of 43 average US households or 134 average world households.

Our yearly average water use of 1,958,000 gallons is equivalent to about 559,429 toilet flushes or about 65,267 loads of laundry.

Water use does not directly account for a significant portion of our carbon footprint, although the energy we use to heat and pump it likely does. Two considerations help explain this fact. First, the source of our water is Lake Michigan, which means it does not need to be transported very far before it reaches our homes. Second, domestic water use generally has a lower carbon footprint when compared to other sectors. However, water consumption intersects with climate change in a number of ways and still makes up a part of our overall ecological footprint. In fact, heating and pumping water likely accounts for a significant portion of our natural gas and electricity use. Reducing our water consumption would be one part of lowering our non-carbon impact and would help us lower our emissions in other areas, especially electricity and natural gas.

Individual Actions and Utility Use

Our natural gas, electricity, and water use have remained relatively consistent over the past five years. That trend suggests that the impact of these utilities is communal rather than individual. However, while institutional change is a real need, individual action is still important, both because our individual choices have the power to accumulate and because they have spiritual and witness value. Below are some examples of individual actions that impact our utility use.

Clothes Dryers:

Individual Load of Laundry: 0.001 metric tons of CO_2e

Not drying one load of laundry saves the equivalent of 1.6 lbs of coal.

Yearly Dryer Use (one load per week): 0.077 metric tons of CO_2e

Never drying your clothing saves the equivalent of 191 miles driven.

Yearly Communal Dryer Use (for 80 Jesuits): 6.08 metric tons of CO_2e

Stopping our communal dryer use would save the equivalent of the amount of carbon sequestered by 7.9 acres of US forests in one year.

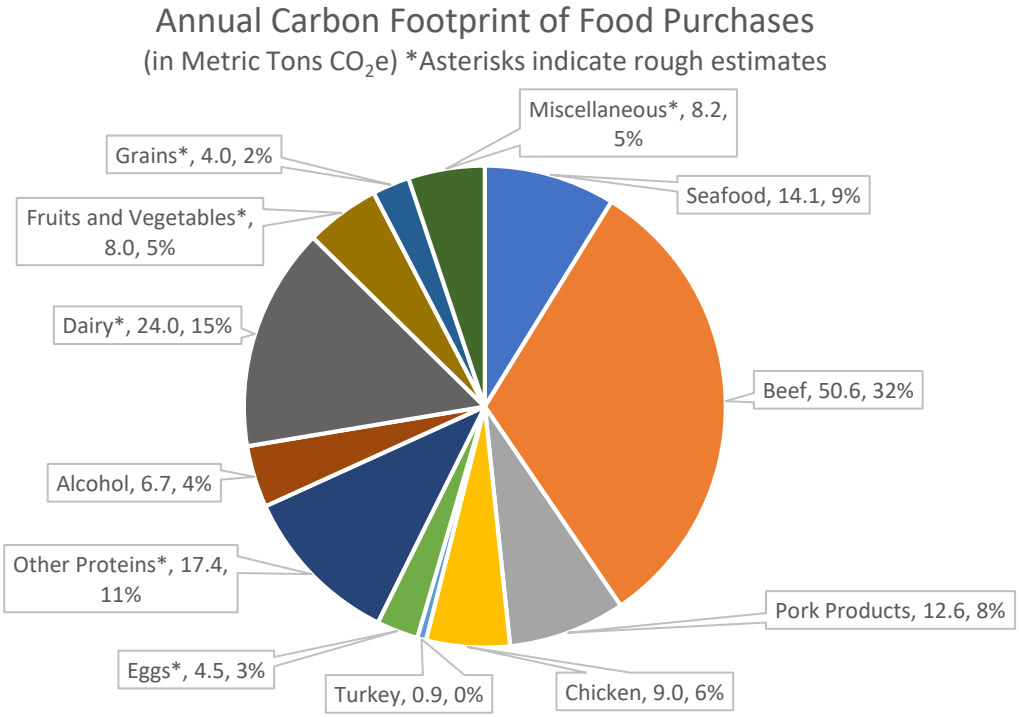
Renewable Energy Credits for Electricity

Our utilities are managed through the LUC campus and benefit from some university-wide initiatives. For example, as part of the commitment to carbon neutrality by 2025, LUC procures and retires Renewable Energy Credits that serve as the evidence that electricity used on campus was generated from clean sources (Wind or Solar). These credits are connected to specific renewable energy projects for a defined volume of power and allow Loyola to make claims related to the environmental attributes and associated impacts for electricity used on campus.

Additional References

"Use of Electricity," U.S. Energy Information Administration.
"Estimating Appliance and Home Electronic Energy Use," U.S. Department of Energy
Comprehensive Carbon Footprint Calculator, Nature.org

Focus on Community Purchases: Food and Physical Waste



Total Footprint from food: at least 160 metric tons CO_2e

Physical Trash or Recycling: Impact

Related to our food purchases is our physical waste and recycling. We estimate our communal (80 Jesuits') physical waste based on the yearly average waste of a person in the US to be:

32,046 lbs (or 14.5 metric tons CO_2e), with recycling, compared to:

55,320 lbs (or 25.1 metric tons CO_2e) without recycling.

Therefore, by recycling properly, we save about 11 metric tons CO_2e each year.

A Focused Example: Paper Towels (see the impact of Paper Towels from Ocean Conservancy)
From 7/12/19 to 5/27/20, Gonzaga House used 45 boxes or 196,875 individual paper towels, or:

- 2.7 U.S. short tons of trees, equivalent to 16.1 trees
- 20.5 million BTUs of energy, equivalent to 24.3 residential refrigerators operated/year
- 13,000 pounds of CO_2e, equivalent to 1.2 cars/year (or 5.9 metric tons CO_2e)
- 22,300 gallons of water, equivalent to 16.1 clothes washers operated/year

Additional References: Food Footprint Breakdown, Our World in Data
Average American Footprint, University of Michigan