PRINCETON'S GHG INVENTORY

March 27, 2018
Andlinger Center for Energy and the Environment

Greenhouse Gas Protocols

ICLEI's Greenhouse Gas (GHG) Protocols provide authoritative guidance for communities to account for carbon pollution accurately and consistently.

What are the GHG Protocols?

Developed through extensive stakeholder consultation and partnership with other leading GHG emissions experts, ICLEI's GHG Protocols are the national standards for local-scale accounting of emissions that contribute to climate change. ICLEI has developed four protocols for different emissions areas and needs:

- The **US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions** provides detailed, cutting-edge guidance on completing a GHG emissions inventory at the community scale in the United States — including emissions from businesses, residents, and transportation.
- The **Global Protocol for Community-Scale Emissions (GPC)** is the global counterpart to the US Community Protocol. While the US Community Protocol provides more detailed methodology tailored to US communities, those communities that want to report to international registries such as carbonn Climate Registry should also consult the GPC.

Who Uses GHG Protocols?

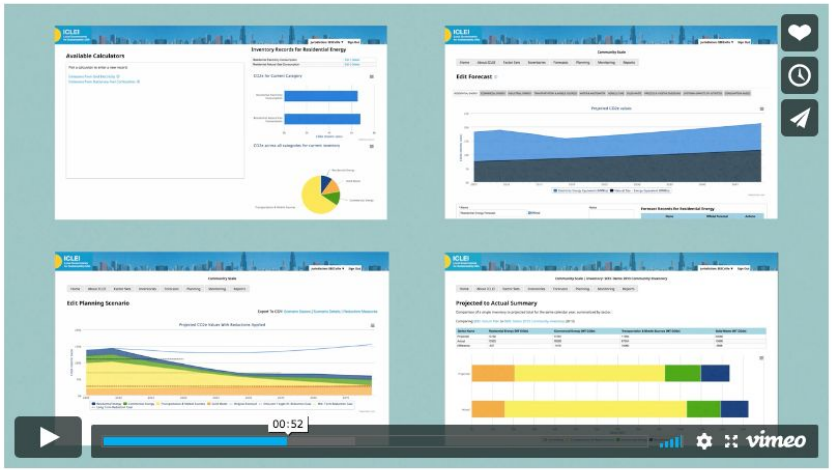
- Local government technical staff
- Partner organizations and other sustainability professionals

Events

- Energy and Climate Security 101 Webinar with Truman Project
  - 02/27/2018
- Climate Leadership Conference
  - 02/28/2018 - 03/02/2018
  - Denver
- Cities and Climate Change Science Conference
  - 03/05/2018 - 03/07/2018
  - Edmonton
- Smart Cities Connect Conference and Expo
  - 03/26/2018 - 03/29/2018
  - Kansas City
- NEXUS 2018: Water, Food, Energy, and Climate
  - 04/16/2018 - 04/18/2018
  - Chapel Hill

ClearPath

ClearPath™ is the leading online software platform for completing greenhouse gas inventories, forecasts, climate action plans, and monitoring at the community-wide or government-operations scales.



What is ClearPath?

ClearPath is a powerful, advanced web application for energy and emissions management. As a cloud-based tool, it's easier than ever to store your data, collaborate with colleagues, and use new features as soon as they are available. With hundreds of users and free availability of our community-scale inventory module to Global Covenant of Mayors signatories nationwide, ClearPath is the most widely-used software tool for managing local climate mitigation efforts.

ClearPath
AN ICLEI USA TOOL

Who Uses ClearPath?

- Hundreds of US Local Governments, available to any ICLEI member city, county or region
- Political decision-makers and technical staff who lead the climate change mitigation process in their cities and communities

Apply For ClearPath Today!

REGISTER

Member Testimonial

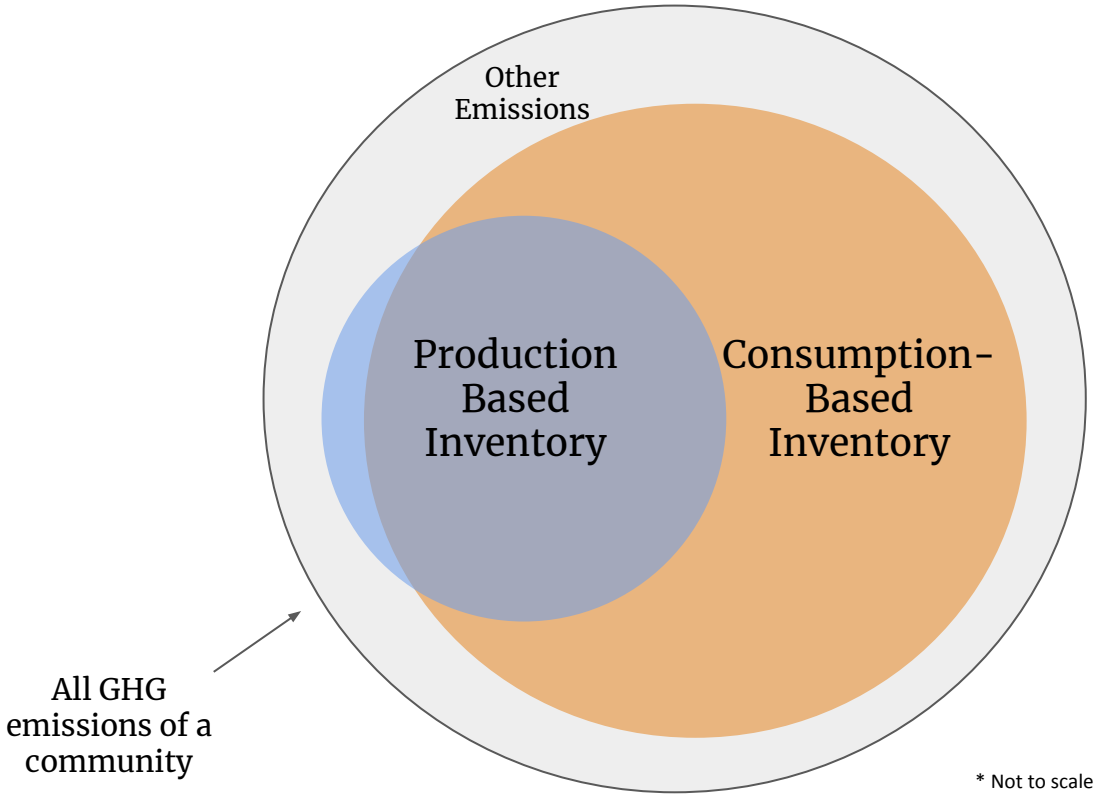
"This is the software we have been hoping for! With a web-based platform, ClearPath addresses several key challenges for local governments in tracking GHG emissions."

Kathy Jack

Sustainability Coordinator, Denton, TX

Share

Types of Inventories



Production Based Inventory - Looks at emissions from the production of energy and decomposition of waste. Energy can mean electricity, natural gas or powering a car.

Consumption-Based Inventory - Looks at emissions from all the things consumed by humans. This can mean housing, transportation, food, goods and services.

Other Emissions - Are emissions that aren't or can't be accounted for in typical production and/or consumption based inventories such as fugitive emissions or many natural processes.

Pros and Cons

Production Based Inventory

Pros

- More accurate
- Trackable

Cons

- Not comprehensive

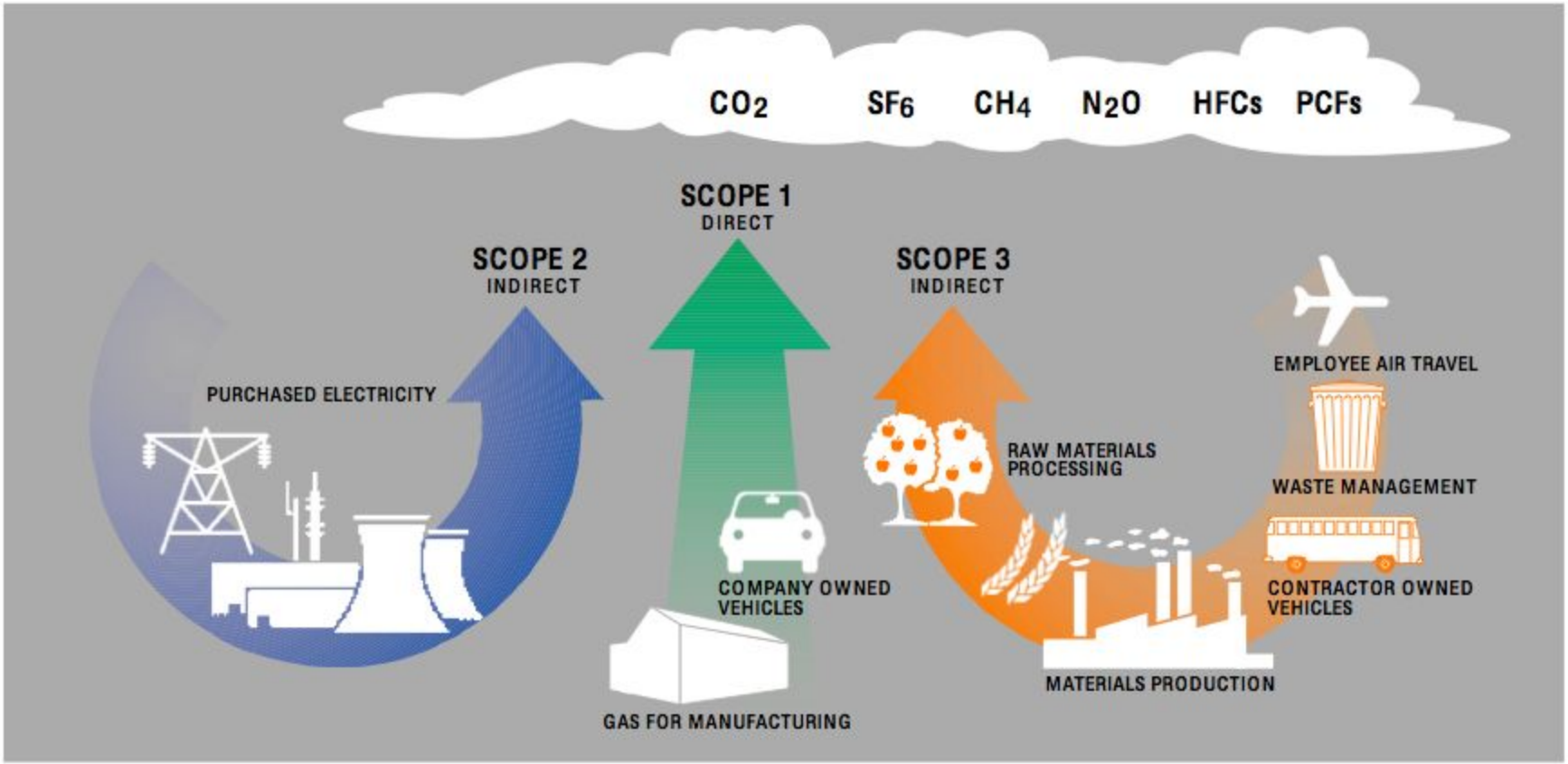
Consumption-Based Inventory

Pros

- More comprehensive

Cons

- Not trackable
- Higher level of uncertainty



Source: cnx.org

Scope 1

All emissions that happen within the boundary of the municipality. (ie. Local combustion of natural gas or the local fleet)

Scope 2

All emissions that happen as a result of electricity usage within the municipality.

Scope 3

All emissions that happen outside the boundary of the municipality as a result of things people do.

Production Inventory

Project Scope

Community

- Built Environment Emission Activities and Sources
  - Residential Energy (Electricity and Natural Gas)
  - Commercial Energy (Electricity and Natural Gas)
  - Industrial Energy (Electricity and Natural Gas)
- Transportation and Mobile Sources (Vehicle Miles Traveled “VMT”)
- Water (Energy and Gallons per Year)
- Solid Waste (Tonnage)

Government

- Buildings & Facilities (Electricity and Natural Gas)
- Street Lights & Traffic Lights (Electricity)
- Vehicle Fleet (Fuel)
- Transit (VMT)
- Employee Commuting (VMT)

Data and Sources

- Electricity & Natural Gas - PSEG (Public Service Enterprise Group)
- Vehicle Miles Traveled - DVRPC (Delaware Valley Regional Planning Commission)
- Solid Waste Tonnage - MCIA (Mercer County Improvement Authority)
- Wastewater Gallon per year + energy - Stony Brook Millstone Sewerage Authority
- Vehicle Fleet - Municipality of Princeton
- Transit - Municipality of Princeton
- Employee Commuting - Municipality of Princeton

Baseline Years

Community Inventory

2010

Municipal Inventory

2017

Factorsets

EPA United States Environmental Protection Agency

Environmental Topics | Laws & Regulations | About EPA | Search EPA.gov

CONTACT US SHARE

Energy and the Environment

Power Profiler

In the United States, electricity is generated in many different ways, with a wide variation in environmental impact. Electricity generation from the combustion of fossil fuels contributes toward unhealthy air quality, acid rain, and global climate change.

Many electricity customers can choose their provider of electricity or can purchase green power from their utility. In fact, you might now have the option of choosing cleaner, more environmentally friendly sources of energy.

Enter your ZIP code and electric utility to:

- Compare the fuel mix and air emissions rates of the electricity in your region to the national average.
- Determine the air emissions impacts of electricity use in your home or business

Your 5-digital ZIP code:
08540
Enter

Your electric utility (the company listed on your utility bill):
Public Service Elec & Gas Co - NJ

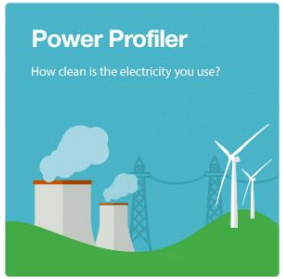
View Report

Your region: **RFC East**

Power Profiler does not provide information about the environmental attributes of electric power generated by individual companies. For company-specific information, access EPA's eGRID database.

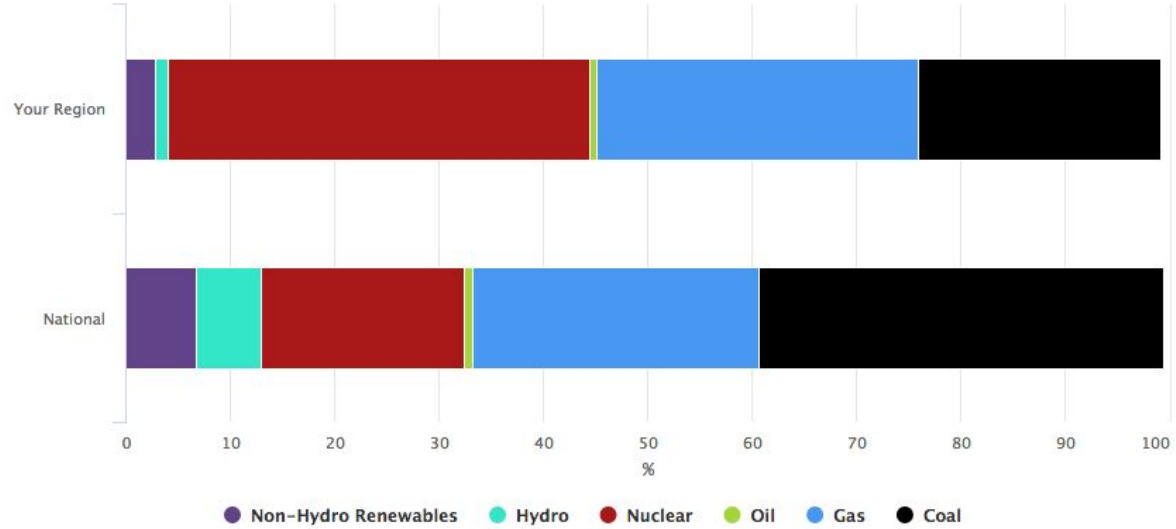
About Power Profiler

- Last Updated: June 1, 2017
- Data source: eGRID2014 data. Will be updated to eGRID2016 data in March 2018.
- Data in Excel format: Power Profiler Emissions Tool 2014 (XLS) (3.56M)



Fuel Mix Comparison

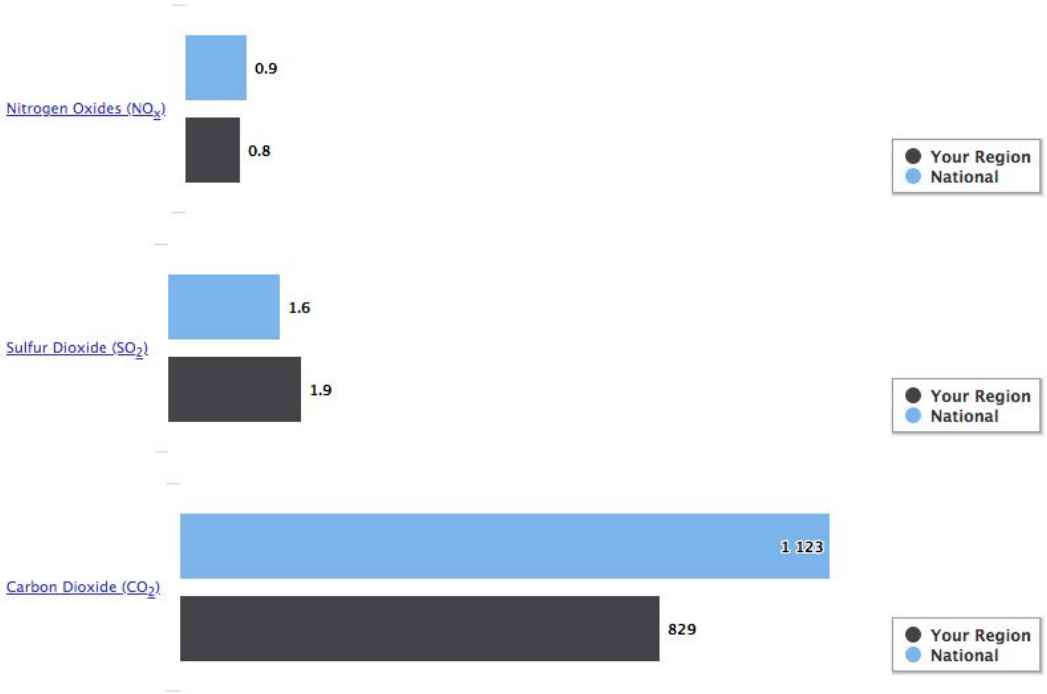
This chart compares fuel mix (%) of sources used to generate electricity in your region to the fuel mix (%) for the entire United States.



Source: EPA

Emission Rate Comparison

This chart compares the average emissions rates (lbs/MWh) in your geographical region to the national average emissions rates (lbs/MWh) for nitrogen oxide, sulfur dioxide, and carbon dioxide.



Source: EPA

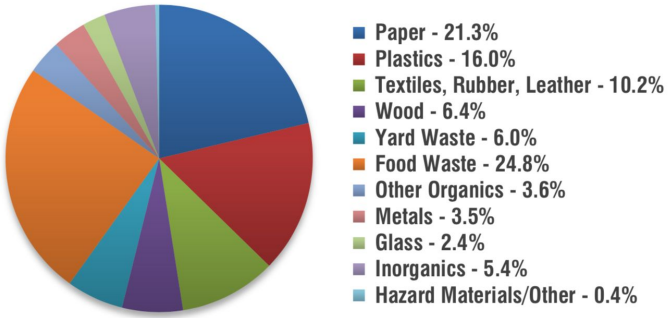
REPORT FOR

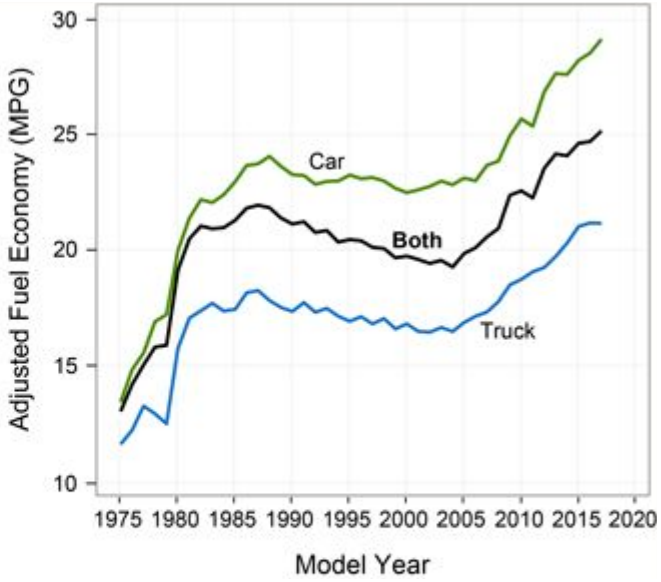
MERCER COUNTY IMPROVEMENT AUTHORITY
SOLID WASTE and RECYCLING
QUANTIFICATION and CHARACTERIZATION STUDY

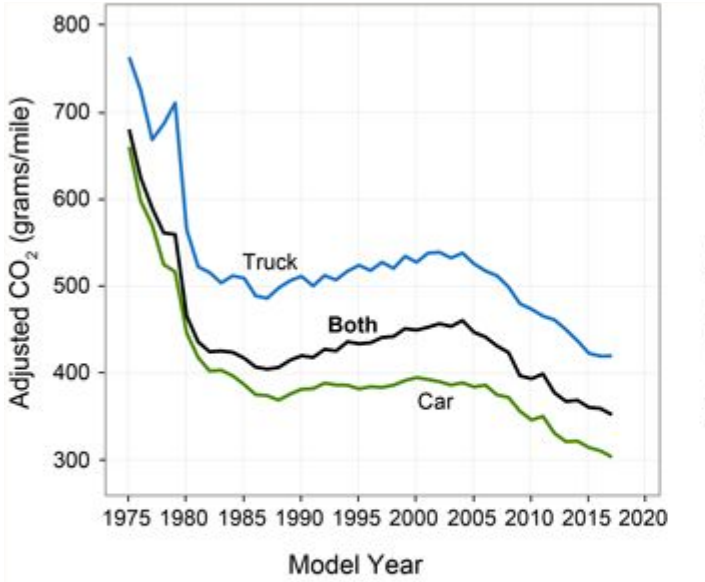
PREPARED BY T&M ASSOCIATES
1256 NORTH CHURCH STREET, MOORESTOWN, NJ 08057
856.722.6700 | TANDMASSOCIATES.COM

September 2015

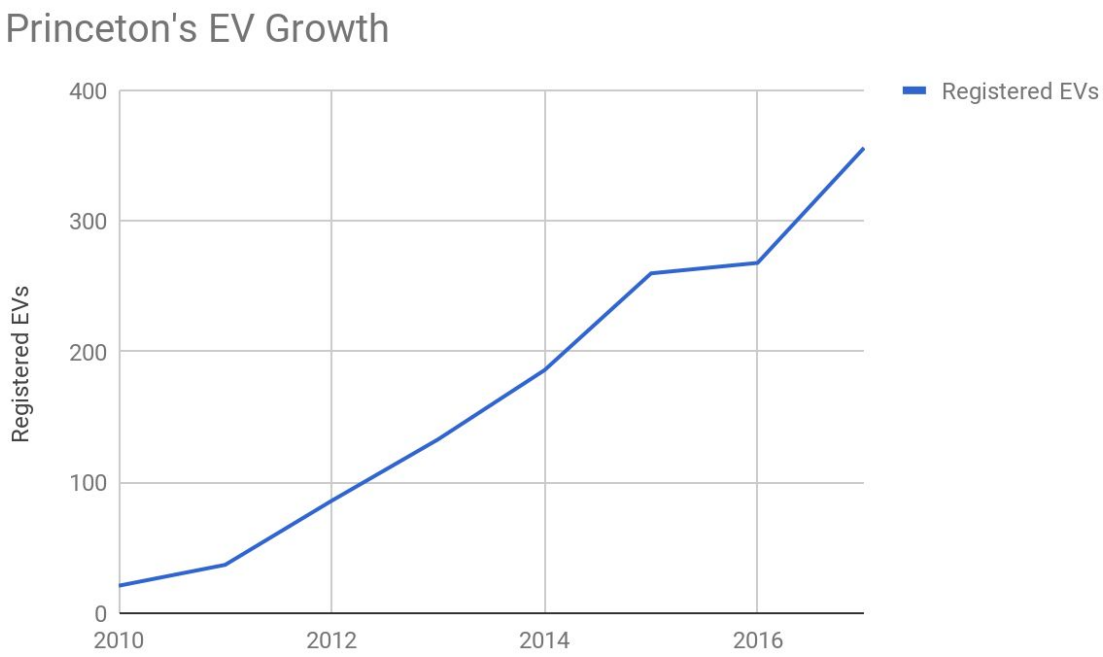
CHART 1 | 2013 MCIA WASTE COMPOSITION



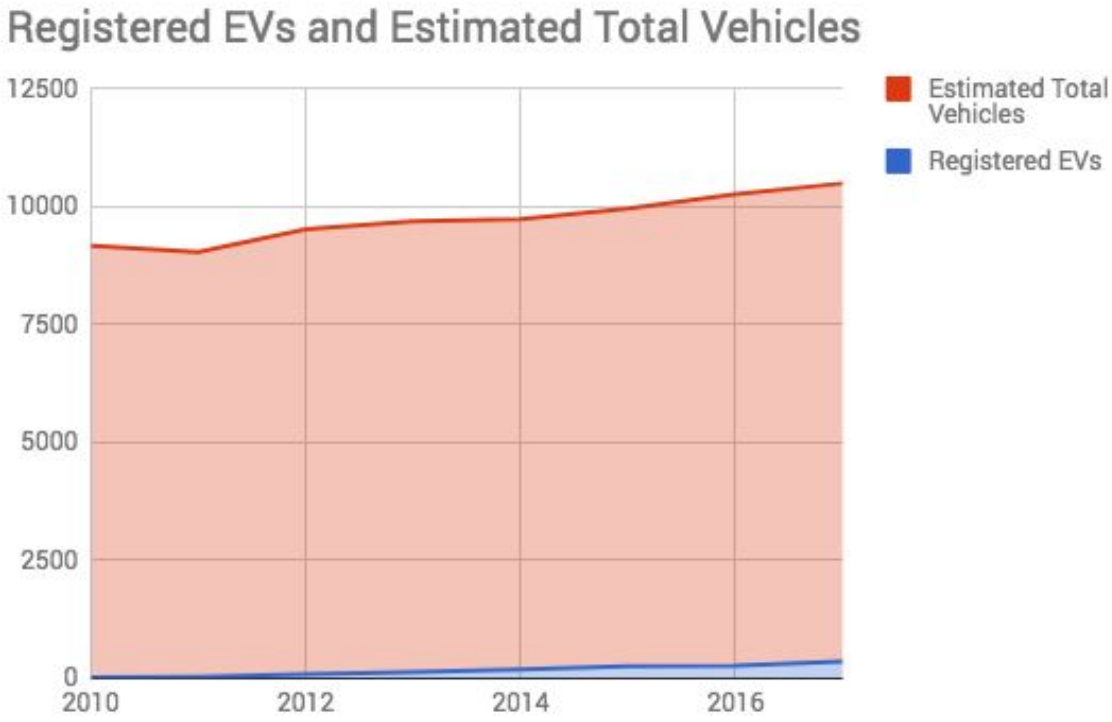

Adjusted Fuel Economy (MPG)
30
25
20
15
10
Car
Both
Truck
1975 1980 1985 1990 1995 2000 2005 2010 2015 2020
Model Year


Adjusted CO_2 (grams/mile)
800
700
600
500
400
300
Truck
Both
Car
1975 1980 1985 1990 1995 2000 2005 2010 2015 2020
Model Year

Source: EPA



Source: NJDEP


Registered EVs and Estimated Total Vehicles
12500
10000
7500
5000
2500
0
2010
2012
2014
2016
Estimated Total Vehicles
Registered EVs

Community Footprint

Princeton Community Overview (2017)

Total Population

31,692

Total Households

10,049

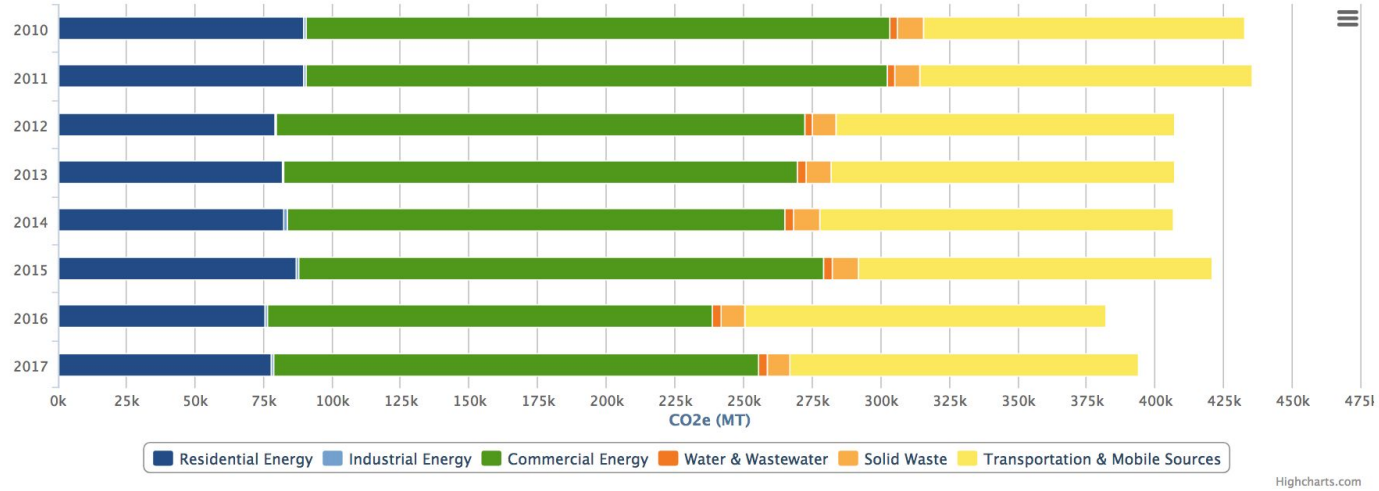
Total University Students

8,266

* Based on 2016 American Community Survey, University data and our estimates

Emissions Since 2010

Year	Transportation & Mobile Sources	Solid Waste	Water & Wastewater	Commercial Energy	Industrial Energy	Residential Energy
2010	117,152	9,618	2,749	212,739	821	89,484
2011	120,797	9,057	2,753	211,945	809	89,565
2012	123,289	8,602	2,864	192,670	339	79,154
2013	125,483	8,874	3,111	187,121	838	81,538
2014	128,904	9,296	3,307	181,403	1,359	81,966
2015	128,589	9,623	2,995	191,309	1,255	86,579
2016	131,233	8,880	3,348	161,713	968	75,491
2017	127,111	8,216	3,152	176,641	968	77,782

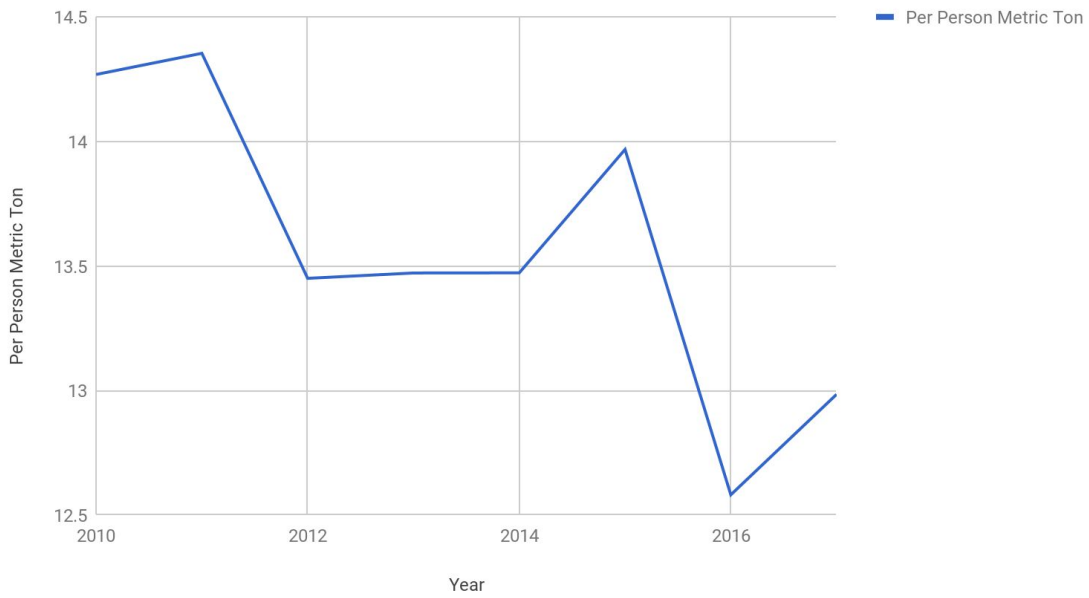


Carbon footprint of the Princeton community and average Princeton resident in 2017

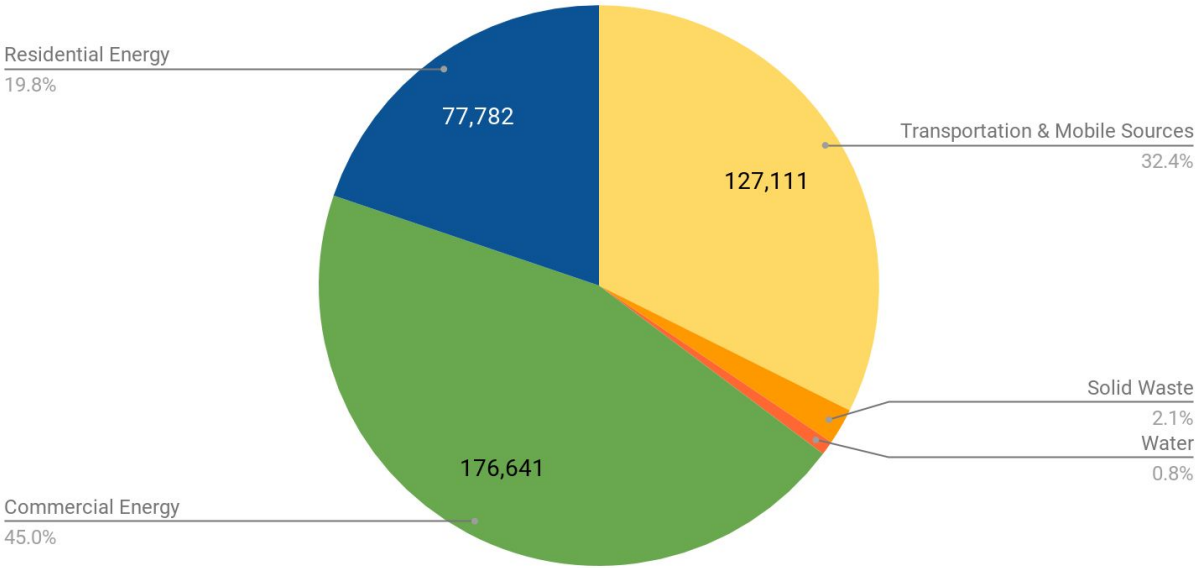
The whole community is responsible for **393,870** Tons CO_2e/Year

The average Princeton resident is responsible for **12.98** Tons CO_2e/Year

Carbon Footprint of the Average Princeton resident 2010-2017

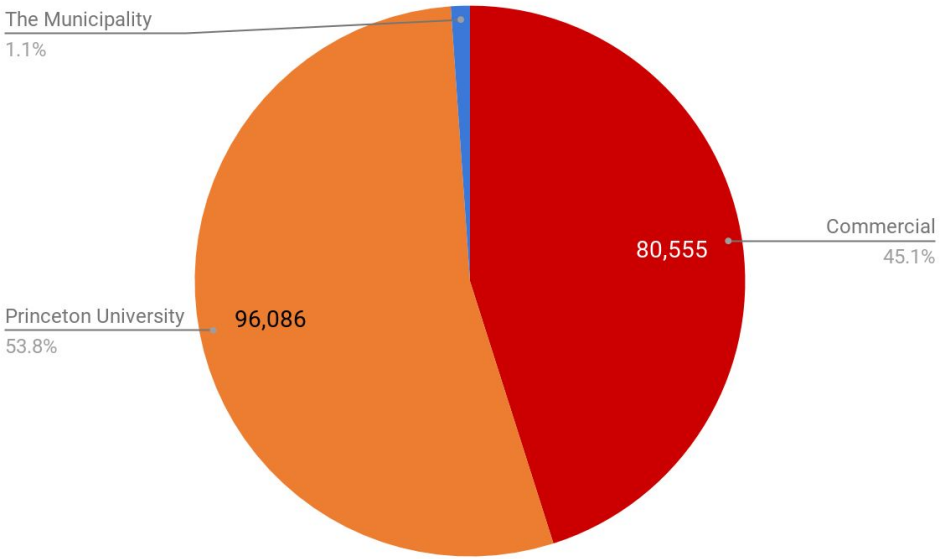


Sector Breakdown



units of measurement - CO2e

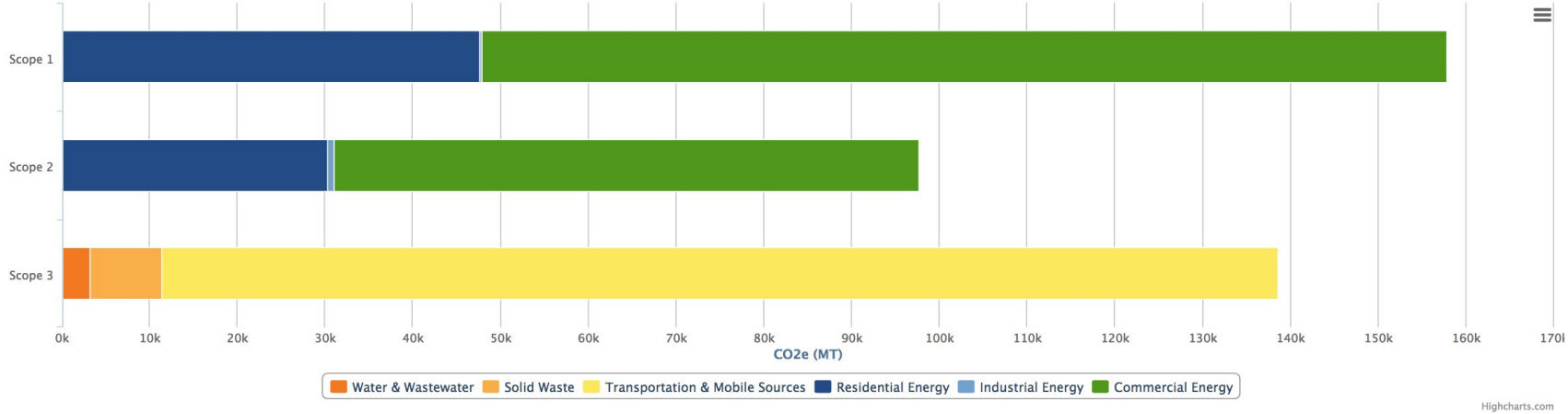
Commercial Breakdown



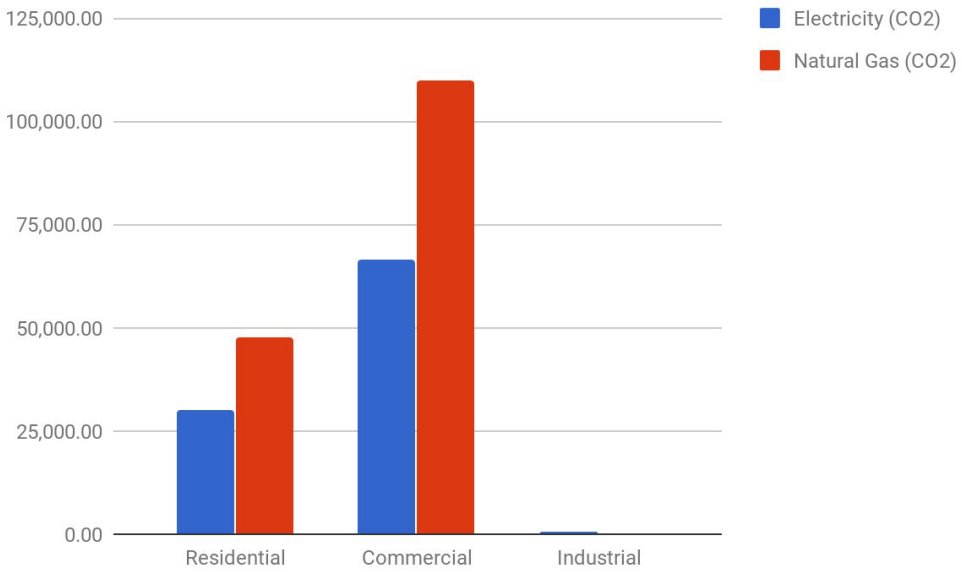
units of measurement - CO2e

Scope and Sector Breakdown

Scope	Sector	CO2e
Scope 1	Commercial Energy	109,977
Scope 1	Industrial Energy	264
Scope 1	Residential Energy	47,527
Scope 2	Commercial Energy	66,664
Scope 2	Residential Energy	30,255
Scope 2	Industrial Energy	704
Scope 3	Transportation & Mobile Sources	127,111
Scope 3	Solid Waste	8,216
Scope 3	Water & Wastewater	3,152



Built Environmental Energy Break Down



units of measurement - CO2e

Total Government Footprint (2017)

Princeton Municipal Government Overview (2017)

Total Employees

264

Building Square Feet

1,012,384

Fleet Vehicles

148

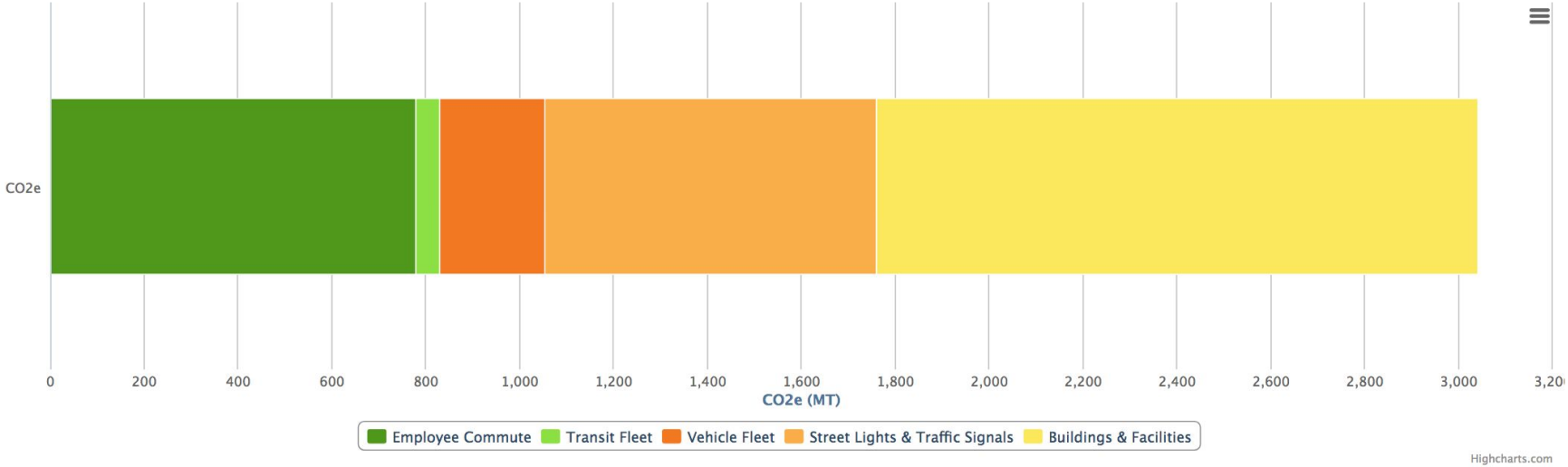
Carbon footprint of the Princeton municipality and average employee in 2017

The municipality is responsible for **3,043** Tons CO2e/Year

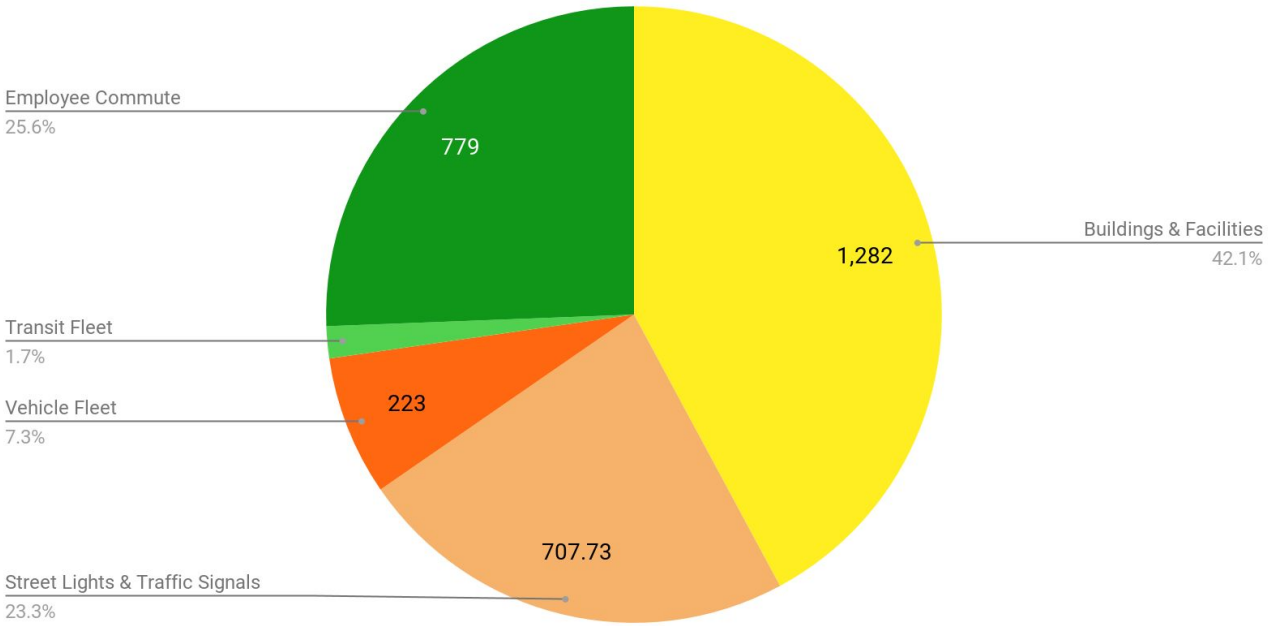
That’s 0.8% of the total municipal emissions

Sector Breakdown

Sector	CO2e
Buildings & Facilities	1,281
Street Lights & Traffic Signals	707
Vehicle Fleet	223
Transit Fleet	51
Employee Commute	779

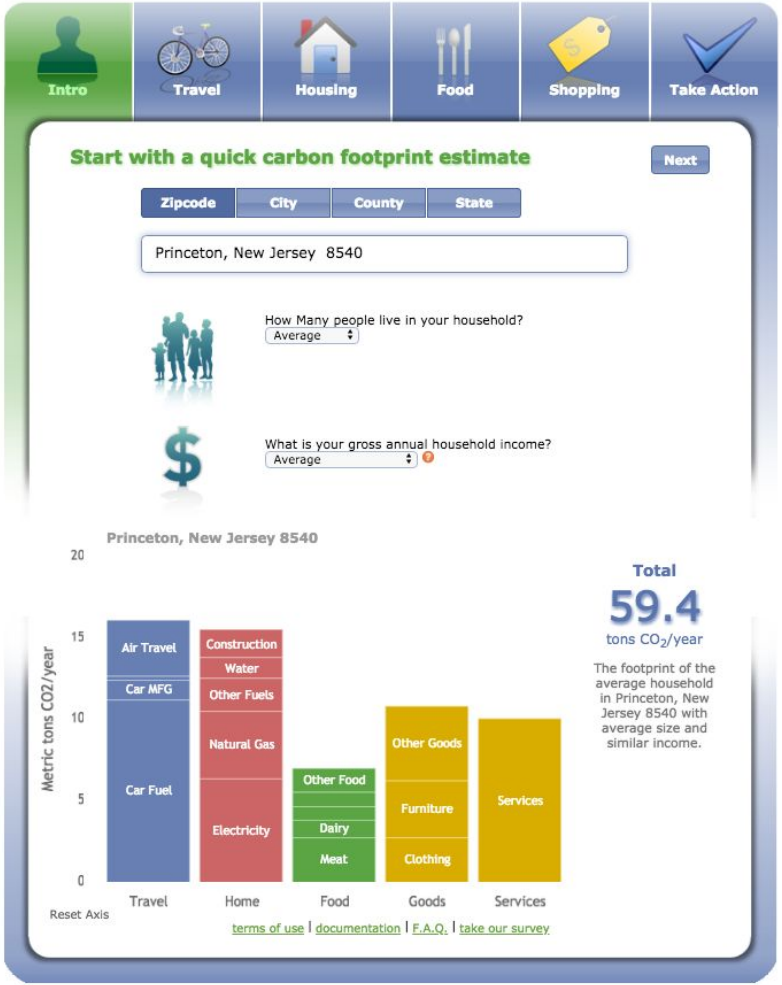


Sector Breakdown (% Pie)



units of measurement - CO2e

Consumption-Based Inventory


Intro
Travel
Housing
Food
Shopping
Take Action
Start with a quick carbon footprint estimate
Next
Zipcode
City
County
State
Princeton, New Jersey 8540
How Many people live in your household?
Average
What is your gross annual household income?
Average
Princeton, New Jersey 8540
Metric tons CO2/year
20
15
10
5
0
Air Travel
Car MFG
Car Fuel
Construction
Water
Other Fuels
Natural Gas
Electricity
Other Food
Dairy
Meat
Other Goods
Furniture
Clothing
Services
Travel
Home
Food
Goods
Services
Reset Axis
Total
59.4
tons CO2/year
The footprint of the average household in Princeton, New Jersey 8540 with average size and similar income.
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Carbon footprint of the average Princeton household and university student

The Average Princeton Household is responsible for **59.4** Tons CO_2e/Year

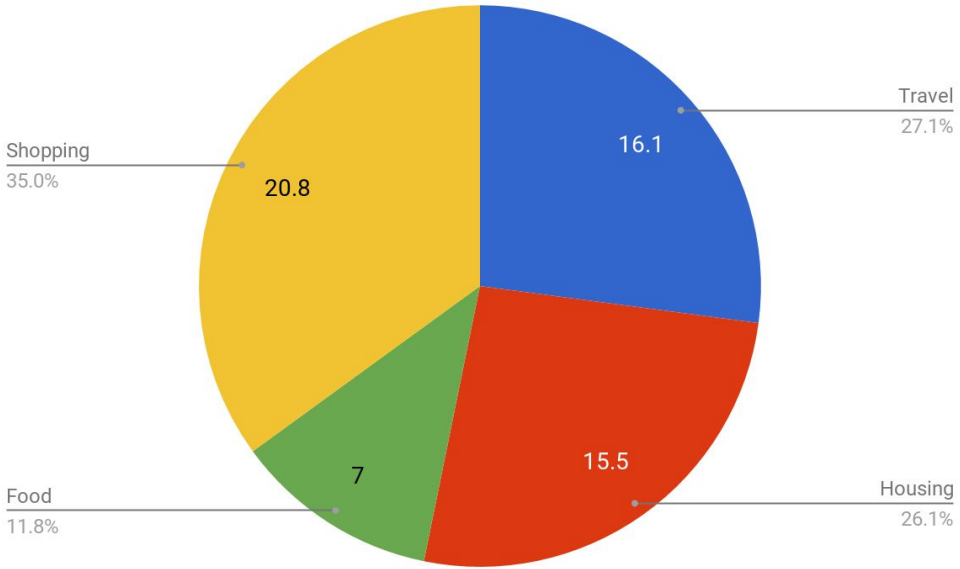
The Average Princeton University Student is responsible for **20.7** Tons CO_2e/Year

Carbon footprint of the whole community and average Princeton resident

The whole Community is responsible for **759,792** Tons CO_2e/Year

The Average Princeton Resident is responsible for **24.3** Tons CO_2e/Year

Household Category Breakdown



units of measurement - CO2e

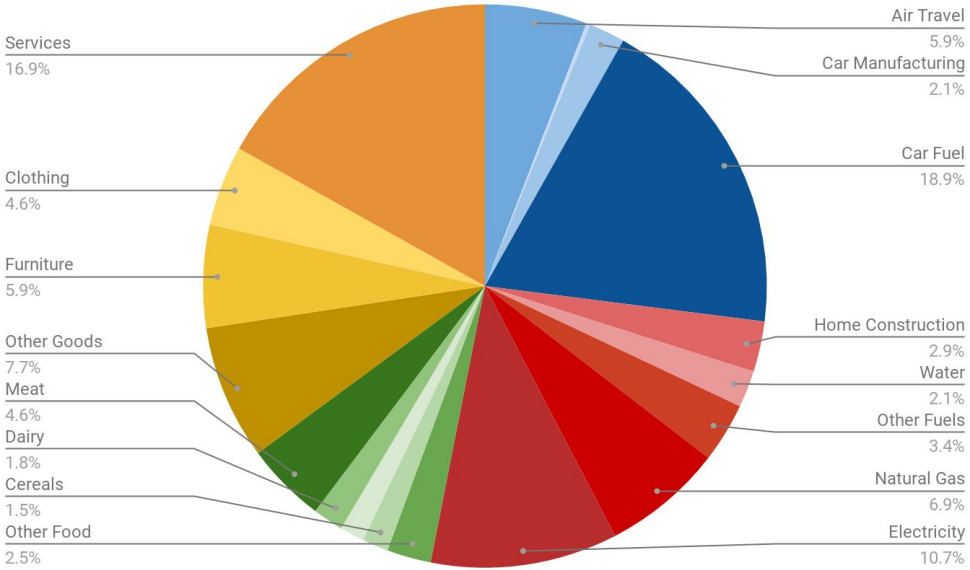
Household Sub-Category Breakdown

Services

- Health Care
- Education
- Information & Communication
- Vehicle services
- Personal business & finance
- Household maintenance & Repair
- Organizations & Charity
- Miscellaneous

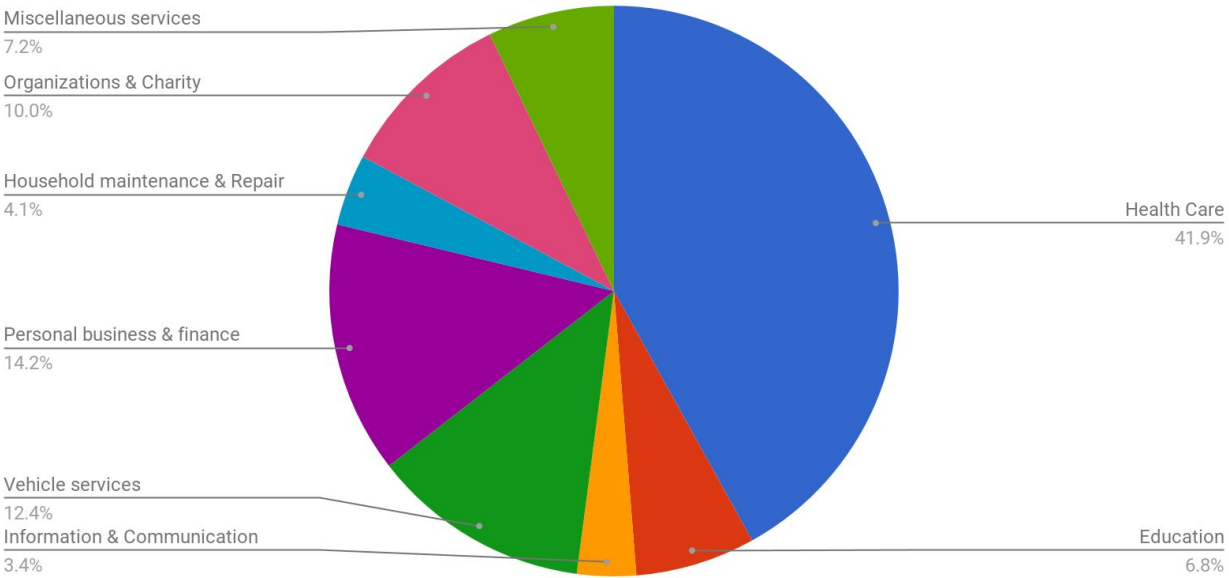
Other Goods

- Entertainment
- Paper, office & reading
- Personal care & cleaning
- Auto parts
- Medical



units of measurement - CO2e

Services Breakdown



units of measurement - CO2e

Quantifying Carbon Footprint Reduction Opportunities for U.S. Households and Communities

Supporting Materials

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[2] Daniel M. Kammen is the founding director of the Renewable and Appropriate Energy Laboratory (RAEL), where this research project is based. He is the Class of 1935 Distinguished Professor of Energy in the Energy and Resources Group, in the Goldman School of Public Policy, and in the Department of Nuclear Engineering at the University of California, Berkeley.
E-mail: kammen@berkeley.edu

Princeton Household and University Student Carbon Footprint Survey

Sustainable Princeton would like to learn more about the carbon footprints of Princetonians. So we are asking residents and university students to use UC Berkley's CoolClimate Calculator to calculate their footprint and let us know the results.

To do this, go to: http://coolclimate.berkeley.edu/calculator

Type in "Princeton, New Jersey" and your zip code.

If you are a resident, select your household size and income and proceed with the other questions.

If you are a university student, select "One" individual in the household dropdown, "less than $10,000" for income, and proceed with the other questions.

As you complete the calculator, fill in the results in this survey.

* All the results are completely anonymous, unless you would like to provide your information for follow up and to potentially get involved in a long term study. If you share your person information, Sustainable Princeton will keep it private.

Also, once you are done, share this survey with your friends! Here is the url: http://bit.ly/princetoncarbonfootprintsurvey

Your zip code

Choose

bit.ly/princetoncarbonfootprintsurvey