Jackson School Greenhouse Gas Inventory Executive Summary

Project Purpose

The Carbon Roadshow is a Green Fee project concerned with the greenhouse gas footprint of The University of Texas operations. The CSD partnered with the Jackson School of Geosciences to test the departmental carbon accounting method. My role in this project was to replicate the process developed through the School of Architecture's pilot project to calculate the carbon footprint of the Jackson School. The departmental test has verified the methods and identified areas where the various colleges and schools of the university may diverge. As an Energy and Earth Resources student this project was closely aligned with my studies. The Energy and Earth Resources Graduate Program provides the opportunity for students to pursue interdisciplinary studies in areas of geosciences, engineering, management, finance, economics. A major part of this project was collecting and analyzing data from various departments such as the Jackson School Business Office and the Utilities and Energy Management.

This project included an effort to calculate and describe the carbon emissions of individual departments and colleges on the university's main campus in order to discover new insights for mitigation strategies on a more refined operational level. By moving beyond the scope of power plant efficiency, the Carbon Roadshow seeks to illustrate how day-to-day activities influence the university's carbon footprint. This project has calculated the greenhouse gas emissions for two schools within the university: the School of Architecture and the Jackson School of Geosciences. This executive summary concerns the findings of the Jackson School inventory, which investigated the school's emissions from the 2015 – 2016 school year (FY2016).

Scope of Analysis

The Carbon Roadshow analysis for the Jackson School of Geosciences (JSG) analyzed emissions stemming from the school's building electricity, chilled water, steam, water, and wastewater use, as well as emission from school-sponsored travel. The Jackson School of Geosciences operates in two buildings on the university's main campus: the Jackson School of Geosciences Building (JGB) and the E.P. Schoch Building (EPS). The JGB houses the majority of the school's operations and is much larger in size than EPS. EPS is used as office space houses institutes such as the Environmental Science Institute. EPS is not used primarily for teaching students in a classroom atmosphere.

The Carbon Roadshow study gathered data for FY2016 and calculated carbon dioxide emissions (CO_2) sourced from energy consumption, cool water, and steam—collectively referred to as Scope 1 emissions. The study also calculated emissions associated with domestic and wastewater, referred to as Scope 3 emissions, for both the JGB and EPS buildings. This project took a unique approach in that it weighted each building's square footage by emissions intensity and then carved out which spaces are under operational purview of the Jackson School. This eliminated spaces that cannot be influenced by Jackson School policy from the scope of analysis and the results.

Results

Emissions Source	Scope	Emissions (Short Tons CO2e)
Electricity	1	1,080
Cool Water	1	208
Steam	1	negligible
Domestic Water	3	0.07
Waste Water	3	0.37
Travel	3	953
Vehicle Fleet	1	50
Scope 1 Emissions	1	1,338
Scope 3 Emissions	3	953
Total Emissions	1 & 3	2,291

EPS Building Emissions - During FY2016, EPS consumed a total of 392,739 kilowatt-hours (kWh) of electricity. Of this total, the Jackson School was responsible for 71% of the total building consumption. This electricity supply comes from the Carl J. Eckhardt Combined Heating and Power Complex and produced 268,287 pounds of CO2 equivalent emissions. Of the total 235,815 ton-hours of cool water used for air conditioning in EPS, the Jackson School used 55%, producing 88,224 pounds CO2 emissions. Steam use totaled 211 million pounds (MLBS), with the Jackson School again being responsible for 55% of the total, which produced 1.56 pounds of CO2. For water and wastewater, EPS consumed 95 and 29 thousand gallons (k-gals) respectively. The Jackson School was responsible for 76% of total consumption resulting in 9.51 pounds of CO2 stemming from water use and 15.15 pounds stemming from wastewater. EPS Scope 1 and Scope 3 building emissions totaled 356,536 pounds of CO2 equivalent in FY2016.

JGB Building Emissions - JGB, the main building for the Jackson School is includes many classrooms, offices, labs, a café and a library used by the Jackson school faculty and students. JGB produced a total of 1,891,935 pounds of CO2 from its electricity consumption which is 70% of the total consumption for the building. The Jackson School is responsible for less than half (46%) of the total chilled water that the building uses which produced 328,647 pounds of greenhouse gasses. The JGB consumed 1914 MLBS of steam (half of the total building consumption) producing only .00025 lbs of CO2. Total Scope 1 emissions for JGB equals 2,220,581 pounds of CO2 equivalent. Scope 3 consumption (domestic water and waste water) resulted in 778 pounds of CO2 equivalent gases. Collectively Scope 1 and Scope 3 for JGB add up to 2,221,359 pounds of greenhouse gas emissions, six times more than EPS.

Transportation Totals - Travel refers to school sponsored travel for both students and faculty. Travel emissions include flying, driving, and those derived from hotel stays. For FY2016, the Jackson School emitted 1,905,476 pounds (953 tons) of greenhouse gases. The Jackson School owns and operates 12 vehicles. Fleet emissions comprised a total of 99,319 pounds (49 tons) of CO2 equivalent in FY2016.

Conclusions - The total Jackson School carbon footprint for both buildings, travel, and the vehicle fleet is 4,582,690 pounds (2,291 US tons) of greenhouse gas emissions.

Surprising is that while the Jackson School has similar number of students as the School of Architecture (approx. 650) and fewer buildings, it has a much higher energy consumption. These totals exclude those generated by research facilities housed in the J.J.Pickle research center. Furthermore, it is surprising to see in many cases that the Jackson School is responsible for less than half of the actual consumption that the building use (for example only 46% of the chilled water in JGB). Although the majority of energy usage occurs in labs and classrooms, I believe reductions in CO2 emissions can be achieved through the reduction of energy usage in common spaces, such as stairways, hallways and elevators.

This greenhouse gas inventory was developed as part of the Carbon Roadshow, a Green Fee-funded project housed in the Center for Sustainable Development.

For more information on the project and for resources to help you conduct your own inventory, visit the Carbon Roadshow website here: http://soa.utexas.edu/work/carbon-roadshow.