

JACKSON COMMUNITY COLLEGE



GREENHOUSE GAS EMISSIONS REPORT

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I. Introduction

The Intergovernmental Panel on Climate Change (IPCC) in their 4th assessment report published in 2007 stated that, “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level” and “most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG (green-house gas) concentrations.”¹

In 2007, Jackson Community College (JCC) President Dan Phelan signed the American College and University Presidents Climate Commitment (ACUPCC). The mission of the ACUPCC is to “address global warming by garnering institutional commitments to neutralize greenhouse gas emissions, and to accelerate the research and educational efforts of higher education to equip society to re-stabilize the earth’s climate.”

The requirements of the ACUPCC are as follows:

- Completing an emissions inventory
- Within two years, setting a target date and interim milestones for becoming climate neutral.
- Taking immediate steps to reduce greenhouse gas emissions by choosing from a list of short-term actions.
- Integrating sustainability into the curriculum and making it part of the educational experience.
- Making the action plan, inventory and progress reports publicly available.²

President Phelan’s signing of ACUPCC demonstrates JCC’s commitment to reducing their impact on the environment, specifically by eliminating green house gas (GHG) emissions which contribute to global warming. The following GHG emissions inventory was prepared in order to meet the first requirement of the ACUPCC.

Methodology

There is no universally recognized standard for collecting and reporting carbon emissions. The ACUPCC recommends using the Clean Air - Cool Planet (CA-CP) Carbon calculator to perform the computations necessary for the emissions inventory, therefore, JCC chose to use the CA-CP Calculator.

CA-CP Campus Carbon Calculator

Clean Air- Cool Planet Campus Carbon Calculator™ Version 6.1 was used to measure campus emissions. This calculator was chosen because it appears to be the most commonly used tool for the other signatories of the ACUPCC and, it comes at no cost to the college.

¹ http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

² <http://www.presidentsclimatecommitment.org/html/about.php>

Additional features to the campus carbon calculator includes new Projection and Solutions Modules that that can be used to evaluate, both fiscally and environmentally, short- and long-term carbon management solutions. This feature was not utilized for this report but it will likely be explored in the future as JCC begins to implement a carbon strategy.

The Campus Carbon Calculator™ is the leading tool for assessing campus greenhouse gas emissions. Currently in use at more than 1200 campuses across the country, the Calculator has already helped schools of all sizes and types, and in all regions to tackle global warming. The Calculator is the “tool of record” for most of the 600 signatories to the American Colleges and University Presidents Climate Commitment, a voluntary agreement to move toward campus “climate neutrality.”³

Data Sources

A variety of sources at the college were used for collecting the data required to complete the emissions report. Specifically, past electricity and natural gas utility bills were the most informative, but also the most time-consuming source for the inventory. The Financial Services, Institutional Research, Vice President’s Office, and Facilities departments were exceptionally helpful throughout the data gathering phase of the inventory.

External sources of information were helpful when was requested. Emmons Waste Services, Consumers Energy, and surveys sent out to faculty, staff, and students make up the majority of information used in the inventory.

Additionally, when data was unavailable, estimates were substituted into the calculator for historical years to allow for trend analysis. Aside from the commuter survey and flight data, where actual numbers were considered unattainable, no estimates were used for the 2007-2008 year.

Metrics

Fiscal Year Equated Students

The population of students at Jackson Community College is calculated using the Fiscal Year Equated Students. To calculate FYES, the total student contact hours for the fiscal year divided by the number of contact hours for an equivalent full-time student (496 semester contact hours) are grouped by student level. FYES is used among Michigan community colleges to provide comparative enrollment data. FYES is not the same as the individual amount of students who attend full-time or part-time.

Metric Tons Carbon Dioxide equivalent (MT eCO₂)

Several gases that contribute to global warming and these gases contribute to varying degrees. For the purpose of having a standard measure, the global warming potential (GWP) of a gas is often referenced in its CO₂ equivalency. See the following table for the GWP of some common gases.

³ CA-CP Calculator website <http://www.cleanair-coolplanet.org/toolkit/inv-calculator.php>

Global Warming Potential of Gases and their Atmospheric Lifetime

Greenhouse Gas	Lifetime (years)	Global Warming Potential (100-yr)
Carbon Dioxide CO ₂	N/A	1
Methane CH ₄	12	21
Nitrous Oxide N ₂ O	114	310
Sulfur Hexafluoride SF ₆	3200	23,900

Source: IPCC, *Changes in Atmospheric Constituents and in Radiative Forcing* pg 212

Scope of the Emissions Inventory

The scope of this carbon emissions inventory only included the college’s main campus in Jackson, MI. It would have been more comprehensive of a study to include our two satellite campuses however, considering the main campus includes 92% of the of the colleges footprint, we believe we have captured the majority of the college’s carbon emissions.

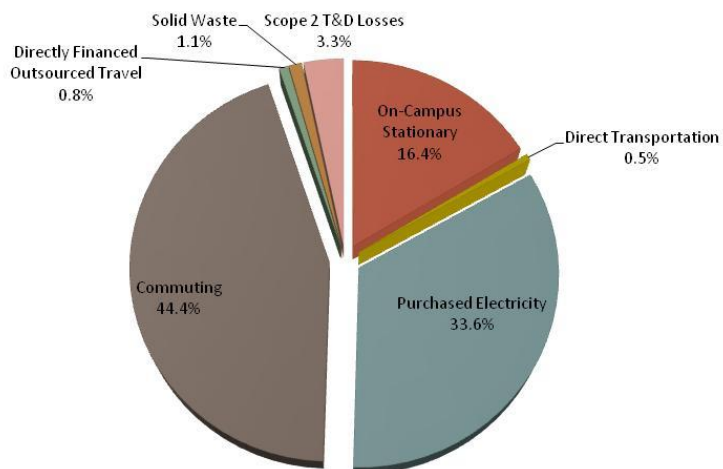
II. JCC Emissions Sources and 2007-2008 Data

On-Campus Stationary Combustion

The ACUPCC considers stationary combustion “the burning of fuels to produce electricity, steam, heat, or power using equipment in a fixed location such as boilers, burners, heaters, furnaces, incinerators, kilns, ovens, dryers, and engines.”⁴ JCC primarily uses natural gas on the campus to heat and cool their buildings as well as for food preparation. The data for this source was accumulated by gathering past Consumers Energy bills for natural gas.

For the 2007-2008 school-year, JCC used 50,197 MMBtu of natural gas or **2,655.9 MT eCO₂**.

JCC Total Emissions by Activity (Percentage) 2007-2008



Mobile Combustion (Direct Transportation)

⁴ <http://acupcc.aashe.org/instructions-ghg-report.php#emissionsinventory>

JCC owns and operates a fleet of vehicles used for business and operational purposes. The gasoline and diesel fuel burned by these vehicles is considered mobile combustion. In order to fuel these vehicles JCC has an on-site refueling station that is filled by Corrigan Oil Company. The amount of fuel used was calculated by accumulating past receipts located in the Financial Services department.

For the 2007-2008 school-year JCC used 7,465 gallons of gasoline and 1,830 gallons of diesel. This is equal to **85.0 MT eCO₂**.

Purchased Electricity

Electricity at Jackson Community College is purchased from Consumers Energy for lighting, some heating, operating major and minor appliances, and numerous other electrical needs. The majority of the data for Consumers Energy was found through the Financial Services department. The data, consisting of every month for the past five years, was manually entered into a spreadsheet to calculate the yearly kilowatt-hours of electricity used.

The region that JCC occupies primarily uses coal, nuclear, natural gas, and limited amounts of renewable energy for its fuel mix. The CA-CP calculator uses a fuel mix average for the state of Michigan. For 2007-2008, JCC used 8,769,484 kWh which is equal to **5,452.48 MT eCO₂**.

Commuting

Emissions from commuting was the most difficult to estimate because of the complexity of the data attainment process. Several unsuccessful attempts were made at gathering the data before a survey was finally agreed upon and sent out to the students, faculty, and staff.

Heavily shortened results of the survey are as follows:

Commuting Habits

Population	Estimated Miles	Fuel Consumption*
Student – Car	14,567,718	632,553.98
Student – Bus	281,006.05	7,083.48
Faculty/Staff – Car	4,160,597.89	167,550.73

* For car, gallons gasoline
For bus, diesel

The fuel consumption above equates to 1,495.2 MT eCO₂ for faculty and staff commuting and 5,716.4 MT eCO₂ for student commuting. Total commuting emissions for JCC are **7,211.6 MT eCO₂**. The commuting category represents 44.4% of the college’s total emissions, the most emissions by any category.

Directly Financed Air Travel

Directly Financed Air Travel refers to any, and all, flights JCC employees take on behalf of the college. This category can include travel for business meetings and conferences paid by, or reimbursed through, the college.

The data was calculated by searching for flights paid by the college on the college's credit card statements. The statements note the outgoing and incoming airport codes. The codes were then entered into the website <http://www.webflyer.com/travel/milemarker/> to determine the distance between airports.

It has been determined that JCC flew approximately 155,316.88 miles during the 2007-2008 school-year. This is equal to **123.8 MT eCO₂**.

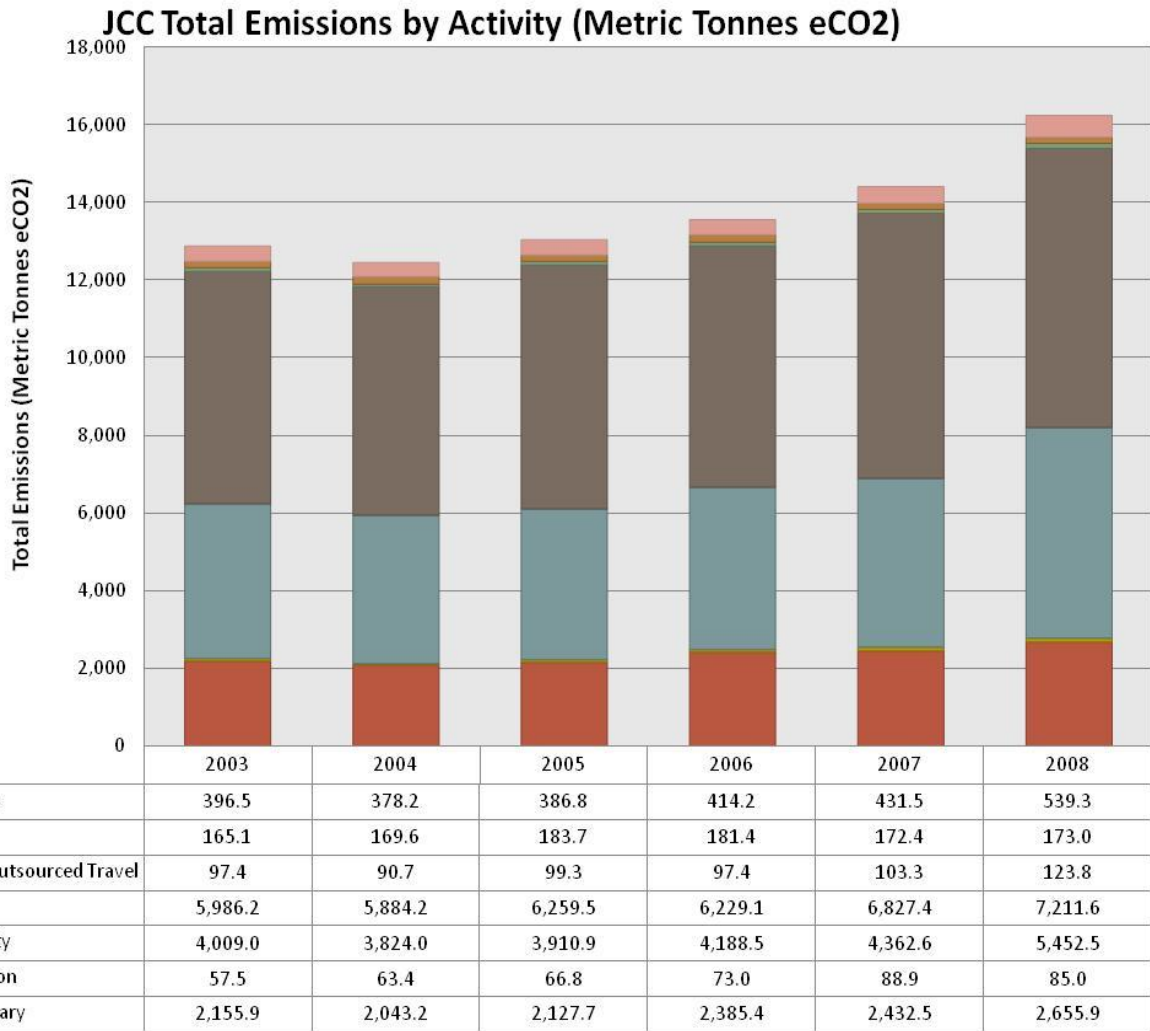
Solid Waste

Solid Waste figures were provided by Emmons Service Inc., JCC's local waste service provider. The waste that Emmons takes away is placed in a landfill with no CH₄ recovery. For the 2007-2008 school-year JCC sent 159.59 short tons of solid waste to the landfill. This equates to **173.0 MT eCO₂**.

Scope 2 T&D Losses

T & D losses are transmission and distribution losses associated with the purchased electricity. The eCO₂ was calculated automatically by the CA-CP calculator using the purchased electricity already entered into the calculator. The emissions associated with Scope 2 T&D losses are **539.3 MT eCO₂**.

Trends



*Please note 2003 = 2002-2003 school year, etc.

III. Reporting

Scope 1, 2, and 3 Emissions

Scope 1 Emissions are GHG emissions that result from sources owned or controlled by Jackson Community College.⁵

Scope 2 Emissions are indirect GHG emissions that are a consequence of activities that take place within the organizational boundaries of JCC, but the actual emissions occur at sources owned or controlled by another entity.⁶

⁵ ibid

⁶ ibid

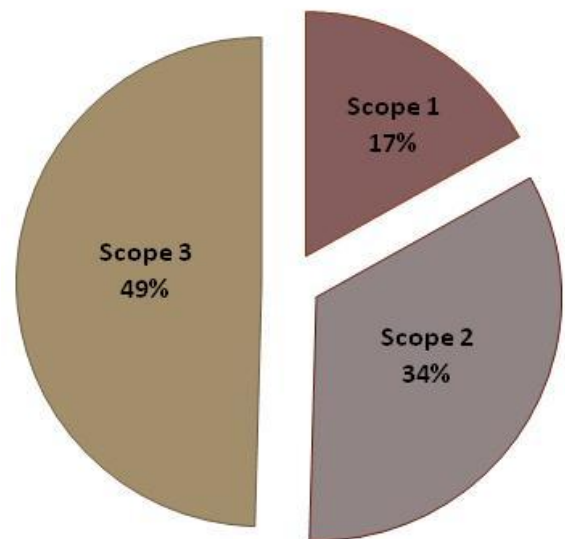
Scope 3 Emissions consist of all indirect emissions not covered in Scope 2.⁷ Examples include commuting, air travel, and solid waste.

Scope 1	Scope 2	Scope 3
<ul style="list-style-type: none"> • Stationary Combustion • Mobile Combustion • Process Emissions • Fugitive Emissions 	<ul style="list-style-type: none"> • Purchased Electricity • Purchased Heating • Purchased Cooling • Purchased Steam 	<ul style="list-style-type: none"> • Commuting • Air Travel • Solid Waste

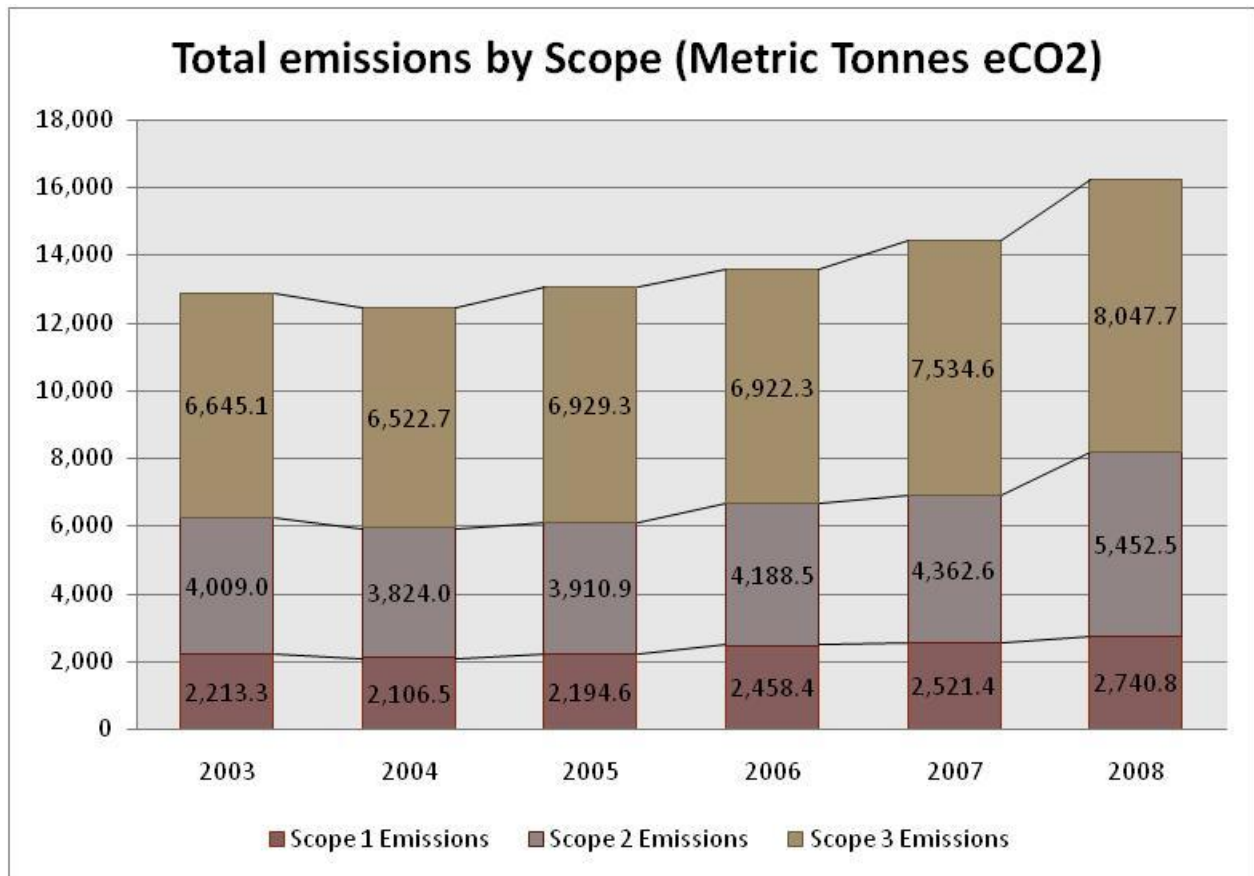
JCC 2007-2008 Emissions by Source and Scope

Emissions Source	MT CO2
On-Campus Stationary	2,655.85
Direct Transportation	84.98
Scope 1 Total	2,740.83
Purchased Electricity	5,452.48
Scope 2 Total	5,452.48
Commuting	7211.6
Directly Financed Outsourced Travel	123.76
Solid Waste	173.04
Scope 2 T&D Losses	539.26
Scope 3 Total	8047.66
Total Emissions	16,240.97

Total emissions by Scope (Percentage) 2007-2008



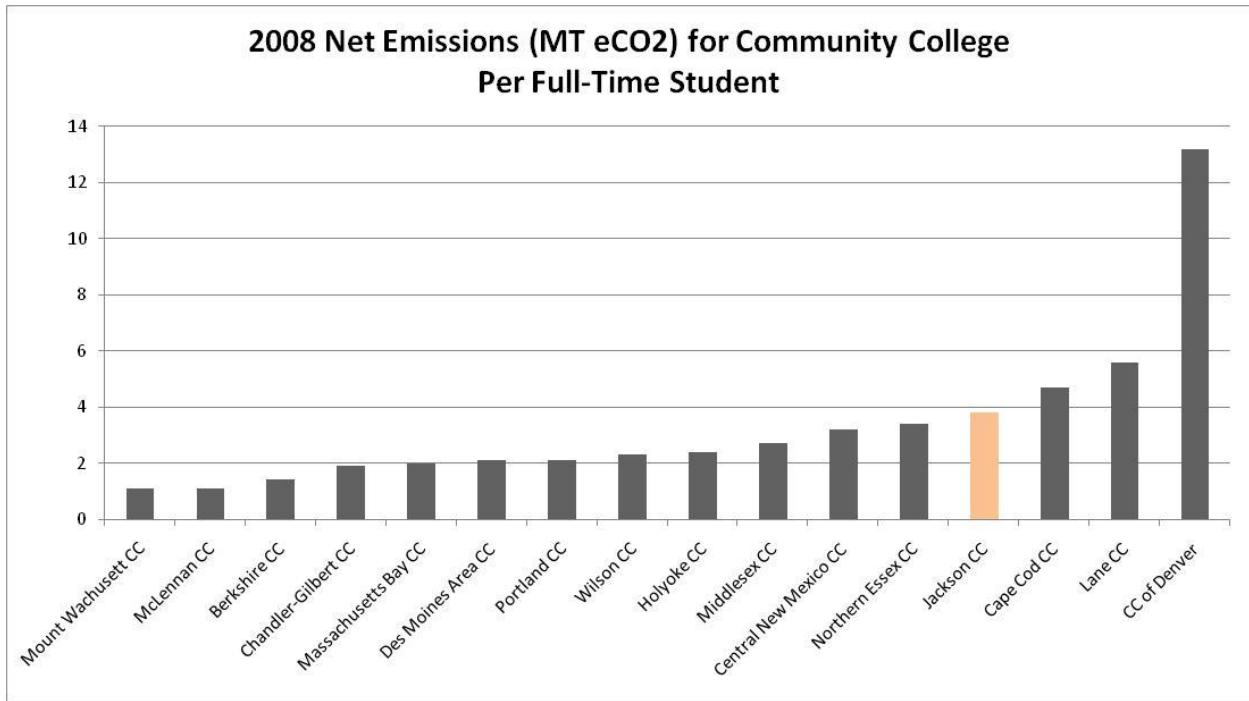
⁷ Ibid



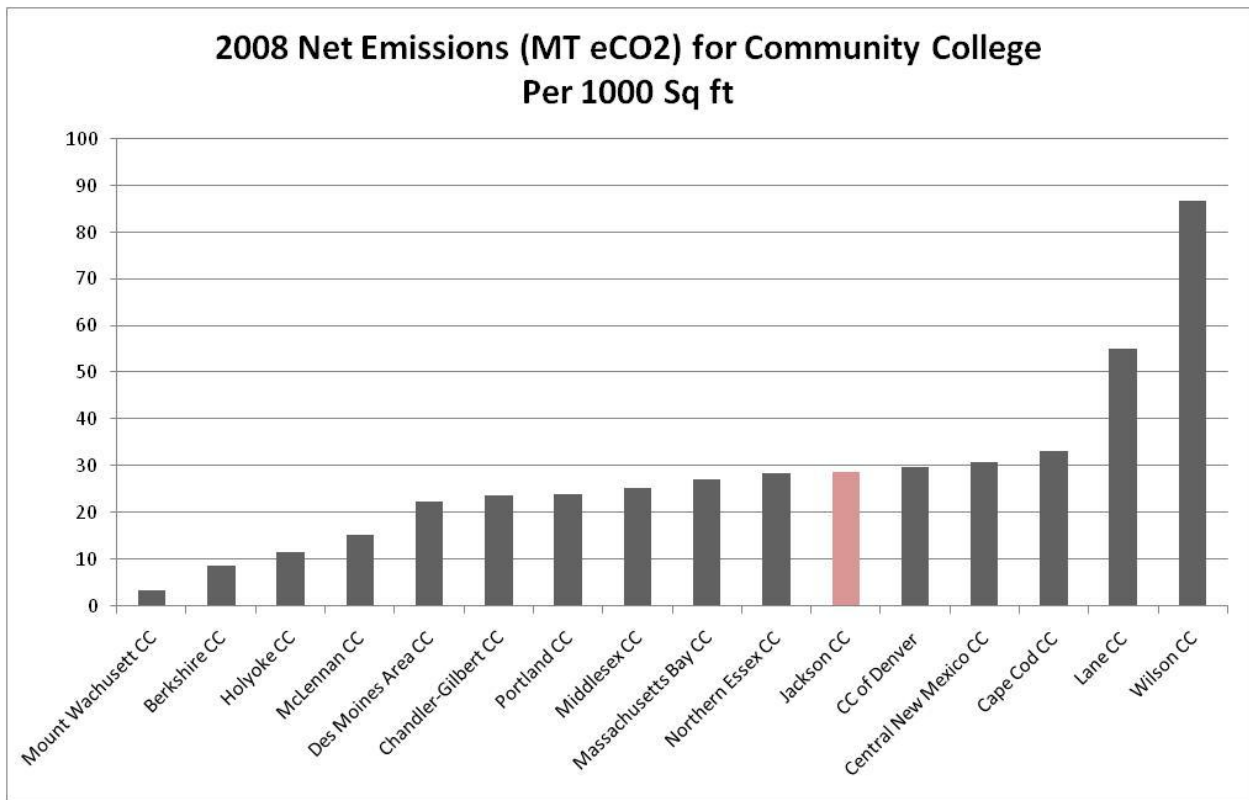
Source: JCC Carbon Calculator

ACUPCC Community College Comparison

When comparing Jackson Community College’s data to other community colleges it must be noted that collecting data for carbon emissions is a constantly changing process. The final data for a given college’s inventory may vary significantly depending on the calculator, the scope of the data, and the precision of the person or team conducting the inventory.



Source: ACUPCC



Source: ACUPCC

IV. Conclusions

Recommendations

1. *An improved infrastructure for collecting data is needed for a more accurate carbon calculation.*
It is my recommendation that more staff-time be allocated to the continuing collection of GHG data. Ongoing collection will reduce the time needed to assemble the data at the end of the year. More staff-time allocated to the data collection should also increase the accuracy and range of future carbon reports.
2. *Future reports should include JCC satellite campuses.*
More staff-time would be essential to including additional campuses; therefore, the inclusion of these campuses in the calculations would be contingent on recommendation number one above. Including additional campuses is important because JCC operates an aviation flight center which would likely create added carbon emissions per student.
3. *Examine carbon management software options to better implement a carbon management strategy.*
This may involve utilizing the Projections and Solutions Modules of the CA-CP Campus Carbon Calculator or another software. Carbon Management software will help JCC focus their finances toward projects that will achieve the most carbon reduction per dollar spent.

Additional Information

The CA-CP excel file titled JCC Carbon Calculator that this paper references can be found on the ACUPCC website.