# UWEC 2019-2020

## Greenhouse Gas Inventory

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**Data Collected by Honors 389: Taking the Measure of Sustainability**

# Introduction

In 2007, Chancellor Brian Levin-Stankevich signed the American College & University Presidents' Climate Commitment, establishing the goal of net zero campus carbon emissions by 2050. UW-Eau Claire has since been held to the standard of writing a greenhouse gas inventory annually to Second Nature reporting while working to uphold this pledge. This analysis documents our current carbon emissions so we can evaluate whether our current policies put us on a trajectory to meet our 2050 goal.

The analysis was carried out in Fall 2020 for the seventh time by honors students that enrolled in *Honors 389: Taking the Measure of Sustainability* and the eighth total inventory since 2008. Performing this analysis teaches students valuable skills they can use to perform similar analyzes. It also provides students, like those in the Student Office of Sustainability, important leadership experiences in conceiving, designing, and implementing environmental policy. These experiences provide students the skills they need to succeed wherever their career takes them. Another benefit is UW-Eau Claire has an opportunity to demonstrate environmental initiative and leadership. Converting our words into action reflects well on our reputation and is attractive to increasingly environmentally concerned students – both current and future Blugolds.

This report's structure follows the EPA's scope 1, 2, and 3 system[a] to classify emissions. Various emissions sources may be discussed under subject headings different than their designated scope. This was done to provide the easiest comparison between different emission sources, and this is noted whenever it occurs. This report also utilizes the idea of carbon dioxide equivalents ($CO_2e$)[b] to better understand our collective climate impact.

Superscripts refer to entries in the Appendix

# Scope 1 Emissions

Scope 1 emissions are any emissions coming directly from any sources owned or controlled by UWEC. Perhaps the most identifiable scope 1 emission comes from the steam plant smokestack. Speaking of the steam plant, 2019-2020 was the last academic year that the steam plant burned coal. This is highly significant as coal used at the steam plant releases roughly twice the CO2e relative to natural gas to produce the same amount of heat[c]. Another novel feature of this carbon footprint is that this was the first year the Barron County campus was included. Unfortunately, this report could not include data for Marshfield clinic. Future iterations should include Marshfield clinic, if possible, to provide a more inclusive footprint.

It is important to note that while emissions from refrigerant leaks are technically classified as a scope 1 emission, they are included under scope 3 for easier comparison. Table 1, below, organizes related scope 1 emissions and provides how much of a given raw resource UWEC used and the CO2e attributable from that use. For clarity, the campus pumps refer to the gas pumps used to fuel university-owned on-road vehicles, the Facilities trucksters, lawnmowers, and any other on-campus vehicles. Below table 1, figures A and B depict what percentage of total scope 1 emissions each emission source is.



Superscripts refer to entries in the Appendix

**Table 1: Scope One Usage and Emissions**

| Emission Source | Usage | CO2e (MT) |
|---|---|---|
| **Coal (MT)** | | |
| **Steam Plant[1]** | 2325 | 4,256 |
| **Natural Gas (MMBTU)** | | |
| **Steam Plant[1]** | 136,783 | 7,275 |
| **Barron County[2]** | 9,965 | 530 |
| **Haymarket[3]** | - | - |
| **Priory[3]** | 4,162 | 221 |
| **Pablo Center[3]** | 2,838 | 151 |
| **Aspenson Mogenson[3]** | 1,071 | 57 |
| **Campus Generators (Gallons)** | | |
| **Towers Generator (Diesel)[4]** | 160 | 1.7 |
| **Library Generator (Diesel)[4]** | 50.1 | 0.5 |
| **Campus Pumps (Gallons)** | | |
| **Diesel Pumps[4]** | 14,391 | 126 |
| **Unleaded Pumps[4]** | 7,851 | 81 |
| **Collective Scope 1 Emissions (MT)** | | |
| **12,880** | | |

Superscripts refer to entries in the Appendix

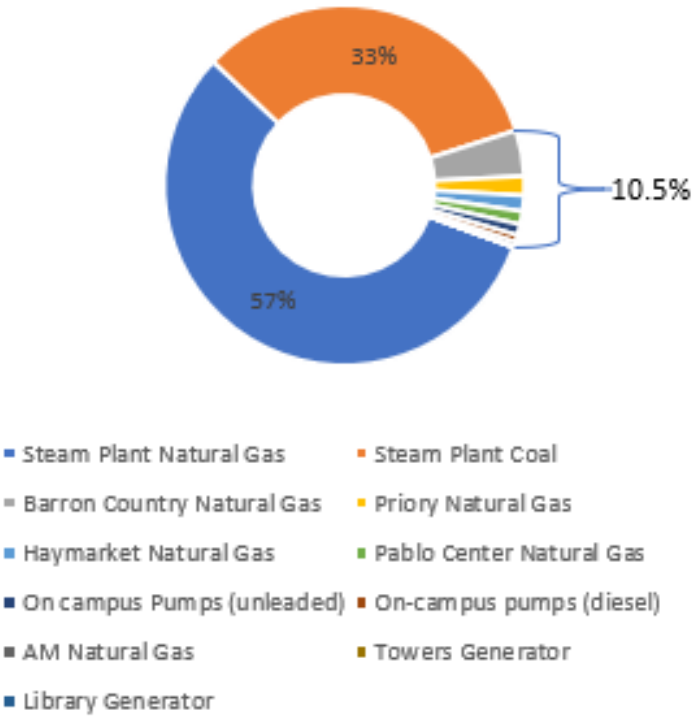



**Figure A: Scope 1 Emissions Broken Down by Percent**

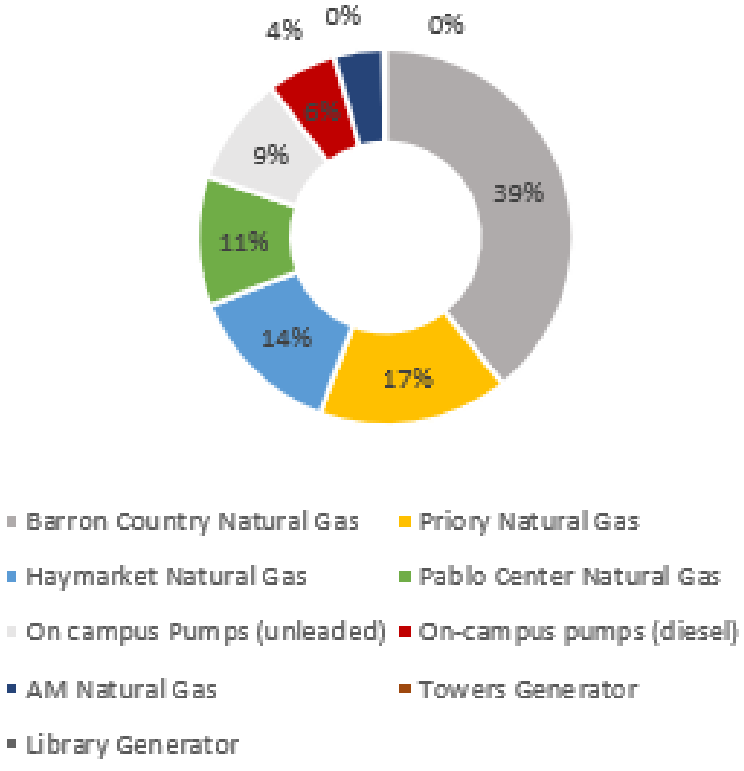



**Figure B: Detail of the 10.5% from Scope 1 Emissions**

The steam plant dominates scope 1 emissions with a combined 91% from the burning of coal and natural gas. This is unsurprising considering the steam plant provides heat for the entire campus population – and more square footage, while other heating emission sources serve a smaller population and area. Therefore, we have corrected for this by dividing the total heating emissions by the population the emissions are attributable to and by attributable square footage of buildings. Figure C and D represent these results visually.

Superscripts refer to entries in the Appendix

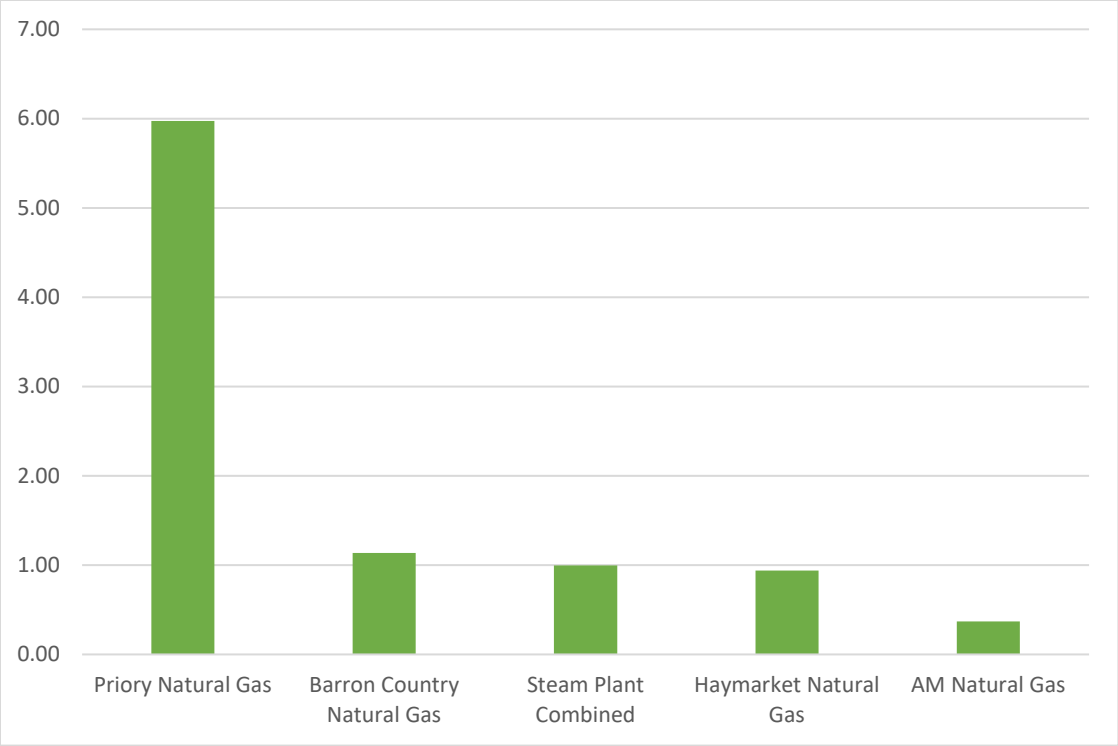



**Figure C: Scope 1 Heating Emissions Broken Down Per Attributable People**

**Figure D: *in-process***

While the steam plant is the largest emitter collectively, figure 3 shows that the steam plant emissions on a per person basis combined are comparable to Haymarket and less than Barron County, and, notably, the Priory. These statistics measure efficiency and higher $\frac{CO2e}{person}$ values represent lower efficiency. Therefore, this data suggests that Barron County, the Steam Plant, and Haymarket are similarly efficient at producing heat while the Priory is much worse. Further investigation is required to explain this trend.

**The total scope 1 emissions are 12,280 MT of CO2e.**

# Scope 2 Emissions

Superscripts refer to entries in the Appendix

Scope 2 emissions are any emissions resulting from purchased energy. For UWEC, this definition only applies to electricity. Currently, UWEC receives its electricity from Xcel Energy, who has pledged to produce 100% carbon neutral electricity by 2050. So, if this pledge is upheld, UWEC's scope 2 emissions should steadily decrease over the coming decades. This does not mean UWEC should sit back and wait, however, as steps can be taken to improve electrical efficiency to reduce total carbon emissions in the meanwhile.

Table 2 groups the electricity use and CO2e of the emissions of the residence halls and UWEC buildings for comparison to each other. Figure E and F then express the percent of residence hall and UWEC building emissions for each emission source.

**Table 2: Scope 2 Usage and Emissions**

| Emission Source | Usage (kWh) | CO2e (MT) |
|---|---|---|
| **Residence Halls** | | |
| **Towers (N+S)** | 1,336,569 | 720 |
| **Chancellors** | 947,324 | 391 |
| **Haymarket** | 715,074 | 295 |
| **Aspenson-Mogenson** | 454,024 | 187 |
| **Priory** | 389,760 | 161 |
| **The Suites** | 272,631 | 113 |
| **Oakridge** | 265,063 | 109 |
| **Sutherland** | 219,321 | 91 |
| **Governors** | 200,831 | 83 |

Superscripts refer to entries in the Appendix

| | | |
|---|---|---|
| **Murray** | 192,106 | 79 |
| **Bridgman** | 178,932 | 74 |
| **Katherine Thomas** | 169,403 | 70 |
| **Putnam** | 151,536 | 63 |
| **Horan** | 124,595 | 51 |
| **Cumulative Residence Halls** | **5,917,439** | **2611** |
| **UWEC Buildings** | | |
| **Library Whole Building*** | 2,352,091 | 971 |
| **Phillips (North and South)** | 2,103,571 | 868 |
| **Schneider** | 1,790,999 | 739 |
| **Haas+HSS** | 1,743,486 | 720 |
| **Davies** | 1,298,831 | 536 |
| **Centennial Hall** | 1,189,944 | 491 |
| **Heating Plant** | 948,576 | 392 |
| **McPhee** | 904,963 | 374 |
| **Hilltop** | 694,282 | 287 |
| **Schofield** | 619,038 | 256 |
| **Hibbard** | 564,656 | 233 |
| **Nursing Building** | 467,261 | 193 |
| **Zorn/Brewer** | 411,182 | 170 |
| **Crest Commons** | 396,455 | 164 |
| **Maintenance Building** | 904,963 | 159 |

Superscripts refer to entries in the Appendix

| | | |
|---|---|---|
| **Cumulative On-Campus Buildings** | **16,390,298** | **6,553** |
| **Other** | | |
| **Barron County** | 240,800 | 149 |
| **Pablo Center** | 300,270 | 124 |
| **Verizon Meter** | 110,529 | 46 |
| **Collective Scope 2** | | |
| **All scope 2 emission sources** | **22,548,537** | **9,189** |

* The Library scope 2 emissions include electricity use of the chilled water plant, which cools all lower campus during the summer months. Therefore, not all emissions can be attributed to library operations.

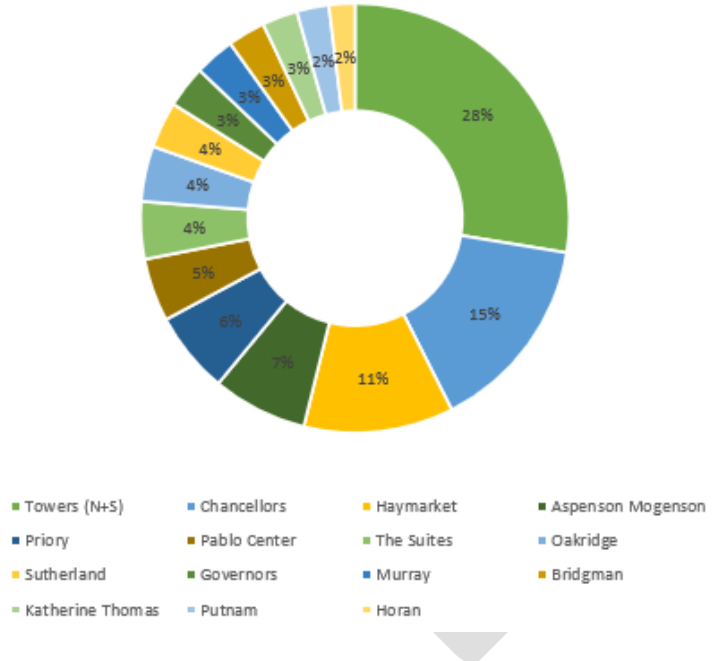



**Figure E: Percent of Residence Hall Emissions for Each Residence Hall**

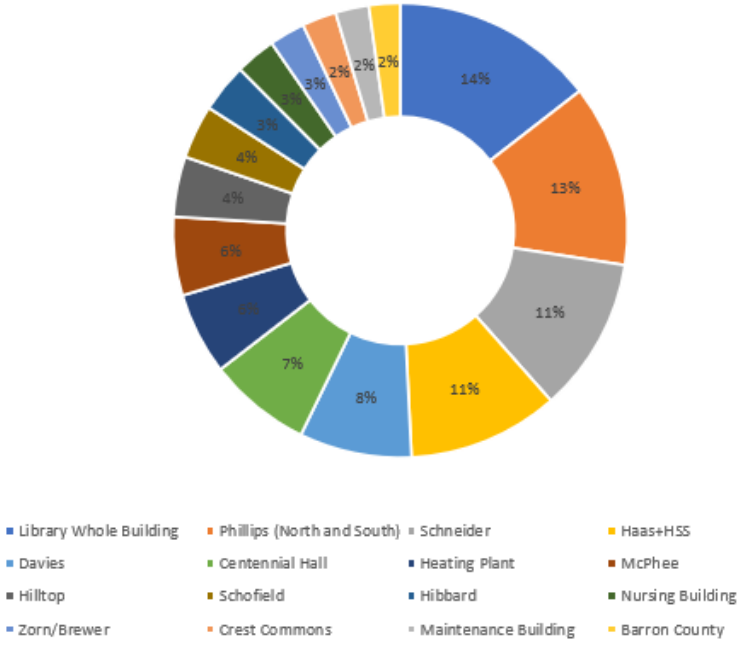
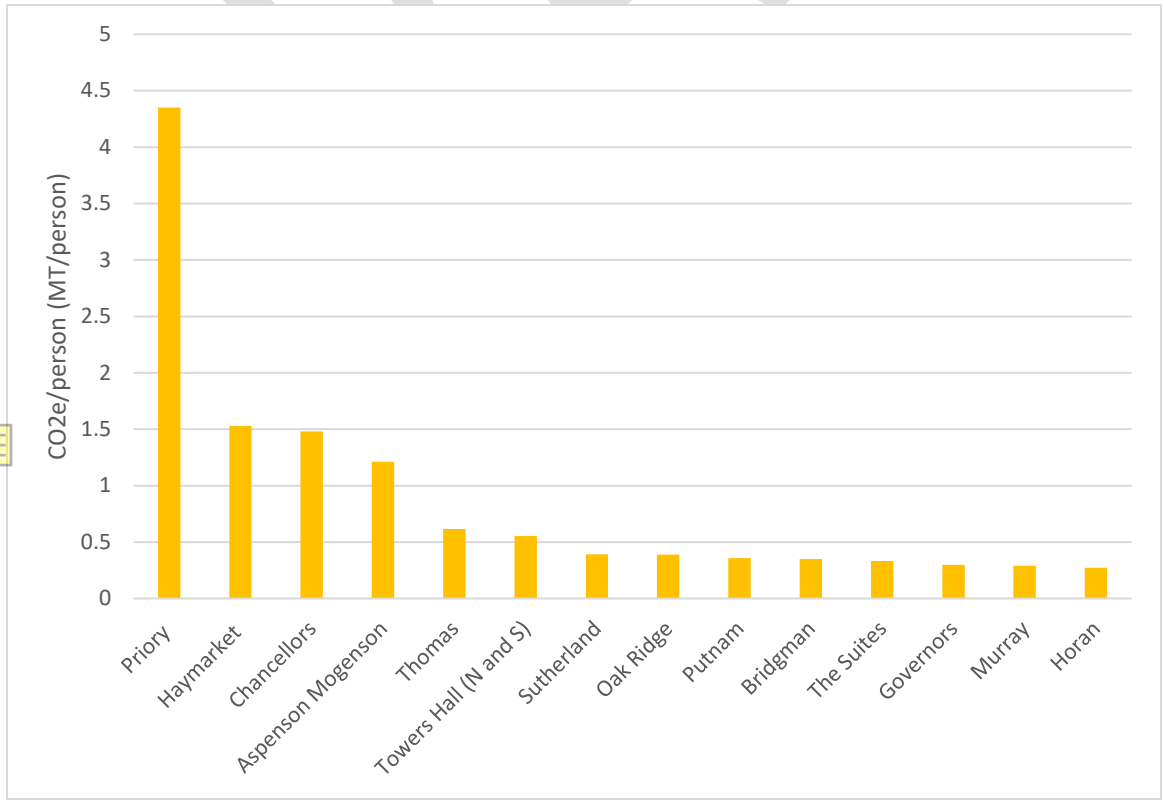



**Figure F: Percent of UWEC Building Emissions for Each UWEC Building + Barron County**

Superscripts refer to entries in the Appendix

No specific building stands out as having the highest emissions with the top four: McIntyre Library at 14%, Phillips at 13%, Schneider at 11%, and HSS + Haas at 11% being extremely close to each other. Due to the library also including the chilled water plant, the three largest offenders should really be Phillips at 13%, Schneider at 11%, and HSS + Haas at 11%. It is little surprise that Phillips has the highest admissions to the scientific equipment that runs all day every day. Nonetheless, Schneider comes close to rivalling emissions from Phillips. The causes behind Schneider being such a large emitter would have to be further investigated. It is difficult to assign how many people are responsible for the emissions for the various UWEC buildings so no breakdown by person was possible.

For the residence halls, it is not shocking that Towers makes up the largest share of scope 2 emissions, 28%, as it is the largest residence hall in both population and size. In contrast, Chancellors being at 15% and Haymarket being at 11% is higher than one might expect

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considering the number of people they have. This is reflected below in Figure G where the emissions are divided by the number of people the emissions are attributable to.

As noted, Chancellors and Haymarket having high emission relative to the population is depicted by them having the second and third highest $\frac{CO2e}{person}$. Aspenson Mogenson comes in a close fourth while the rest of the residence halls have similar emissions of $\frac{CO2e}{person}$. Just like in Scope 1, the Priory has the worst CO2e emissions relative to its population for Scope 2. Note that the priory also includes the children center.

**The total scope 2 emissions are 9,313 MT CO2e.**

# Scope 3: Non-Transportation

Scope 3 emissions consist of all emissions that do not fall under scope 1 or 2. Included in the table are CFC emissions and refrigerants leak that are technically classified as scope 1 emissions. Due to this very encompassing definition, scope 3 will be broken down into two sections: non-transportation scope 3 emissions and transportation scope 3 emissions.

The emissions from main campus dining which includes Hilltop, the dining venues in Davies, Einstein's, and the Cabin. This metric purely considers the CO2e as a result of food production. It does not include emissions from the stoves plus other appliances (these are accounted for in scope 1+2), the CO2e released from Sodexo transporting the food to UWEC, or the emissions from the transportations of UWEC dining employees. Also, Haymarket did not

have solid waste data available. If possible, these aspects should be included to make the footprint report more inclusive and therefore representative of UWEC's total emissions.

Wastewater is an emission source due to the microbial water treatment process that generates not only CO2 but also methane nitrous oxide as greenhouse gases. All UWEC facilities within the city of Eau Claire utilize the same wastewater treatment method while Barron County and the Priory treat their wastewater differently. Solid waste is an emission source due to anaerobic degradation within landfills for the 3 greenhouses gases under wastewater. Refrigerants leaks disproportionately contribute to total CO2e so it is beneficial to see that UWEC had no leaks this year.

The total emissions for each of the non-transportation categories is included in table 3 and represented visually in figure F. A zoom on the 8% in figure F is shown in figure G. These emissions are then broken down by attributable people in figure H. addition, it should be noted that not all foods are equal in terms of CO2e production. This idea is represented in figure I.



**Table 3: Scope Three Non-Transportation Usage and Emissions**

| Emission Source | Usage | CO2e (MT) |
|---|---|---|
| **Wastewater (Gallons)** | | |
| Main Campus[5] | 44,935,726 | 23.0 |
| Barron County[2] | 233,000 | 2.0 |
| Haymarket[3] | 2,173,091 | 1.0 |

Superscripts refer to entries in the Appendix

| | | |
|---|---|---|
| Aspensen-Mogenson[3] | 1,362,203 | 0.7 |
| Priory[3*] | 583,120 | 0.3 |
| Pablo Center[3] | 201,475 | 0.1 |
| **Solid waste (Short Tons)** | | |
| Main Campus[6] | 697.57 | 216 |
| Barron County | 32.2 | 10 |
| Haymarket[3] | - | - |
| Aspenson Mogenson[3] | 93 | 28.7 |
| Priory[3] | 20.6 | 6.38 |
| Pablo Center | 30.9 | 9.57 |
| **Miscellaneous (various units)** | | |
| Campus Food Services (kg of food)[7] | 265,794 | 696 |
| CFC Emissions (pounds) | 0 | 0 |
| Refrigerants Leaks (pounds) | 0 | 0 |
| **Collective Scope 3 Non-transportation Emissions (MT)** | | |
| **955** | | |

* The priory use accounts for both Priory residents and the Nature Center.

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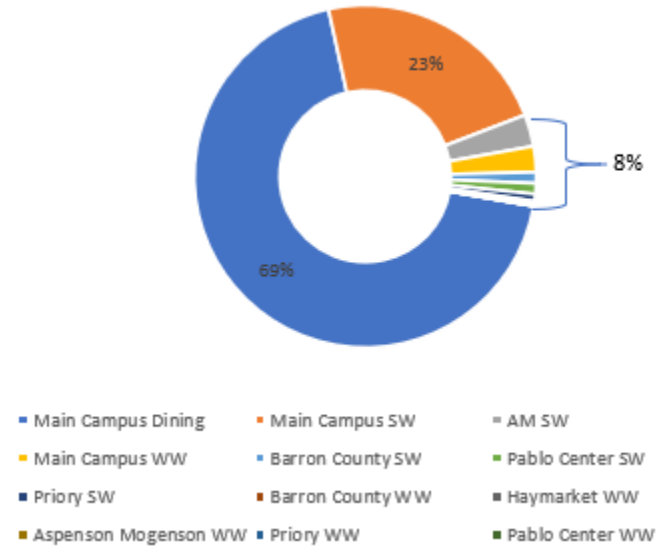


**Figure F: Scope 3 Non-Transportation Emissions by Percent**

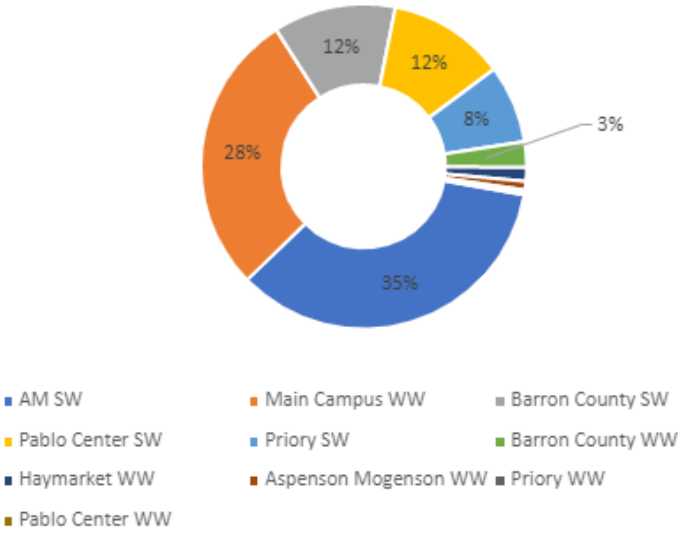


**Figure G: Zoom in on 8%**

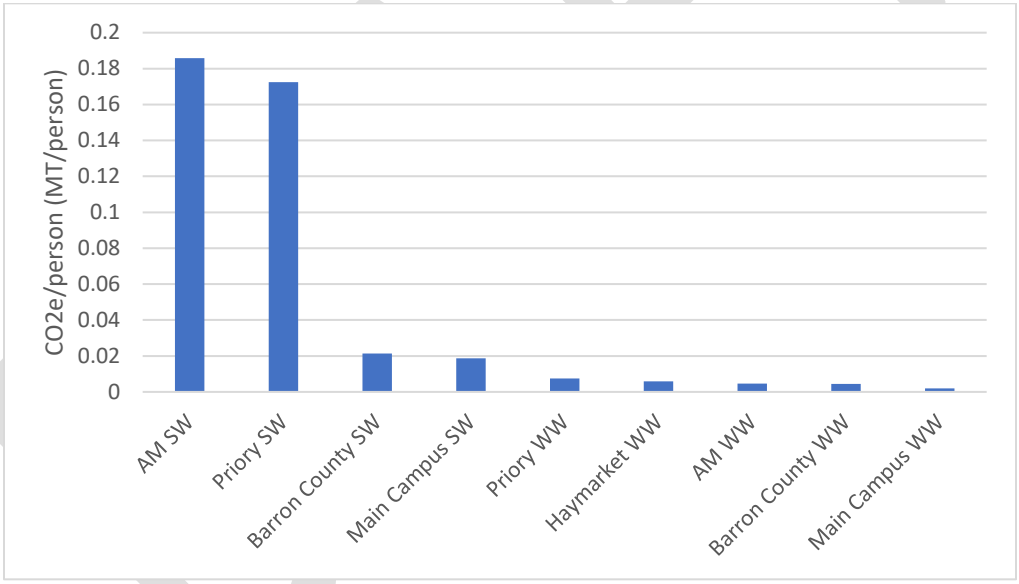


**Figure H: Scope Non-Transportation Emissions Broken Down by Attributable People.**

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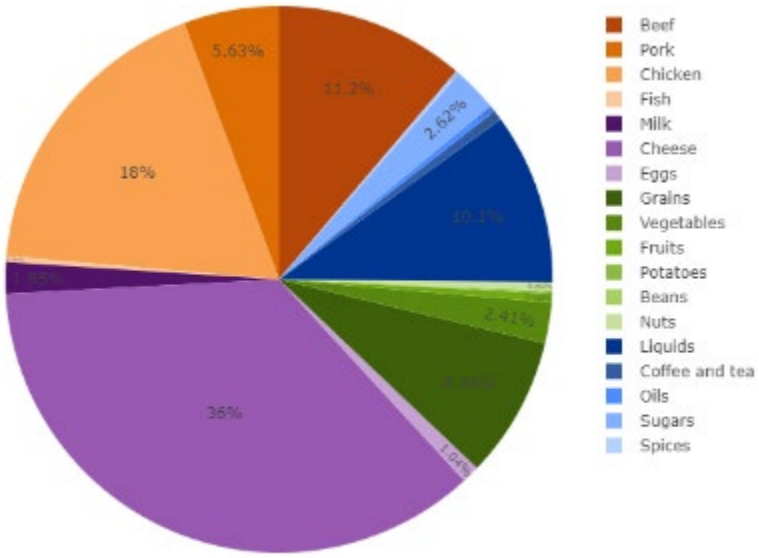


**Figure I: Dining Emissions Broken Down by Food Type**

Figure F shows that on-campus dining accounts for the majority, ~70%, of scope 3 non-transportation emissions despite only accounting for food production emissions. On campus waste is then the next largest emitter with 23% and the rest of the categories are relatively minor totaling up to 8%. Within these 8%, figure G shows that Aspenson Mogenson and main campus predominates with around 60% combined.

Figure H shows that the Aspenson Mogenson and the Priory, relative to their attributable population, are the largest offenders. Specifically, the two buildings are particularly poor with their solid waste emissions which is represented by those two bars being by far the largest.

Figure I shows that ~73% of food emission came from animal based products. This follows from the fact that animal-based products produce more CO2e relative to plant-based products. Eggs are suspected to be such a major contributor to total emissions, 36%, as Hilltop serves eggs every day for breakfast.

Superscripts refer to entries in the Appendix

**The total Scope 3 Non-Transportation emissions are 955 MT CO2e.**

# Scope 3: Transportation

The four main categories of scope 3 transportation emissions are university-sponsored travel, non-university sponsored travel, public commuting, and private commuting. The first three emissions sources are necessary to include as they either enrich the university experience, in the case of university and non-university sponsored travel or are necessary for university function in the case of public commuting. Private commuting, such as students driving home for a weekend, is the most contentious category to include within this greenhouse gas inventory. However, Honors 389 students made the executive decision to assign these emissions to UWEC based on previous precedent and the idea that these emissions also pertain to creating an enriching university experience.

The usage data for the first three emission sources is readily available and allows for easy determination of the emissions for this usage. A notable exception was Honors 389 students attempt to attain public commuting data from Tendercare. Despite having a contractual obligation to provide this data, Tendercare refused to do so in a quite uncourteous manner. Work should be done to ensure that all UWEC contractors both collect all necessary data to track their greenhouse gas emissions and are cooperative to share this data when requested.

Private commuting emissions were calculated using a survey sent out to students, faculty, staff, and administration. The survey is based on the work of Karen Mumford, current director of what was the Watershed Institute and soon to be… This survey requested information on private commuting during the 2019-2020 academic year. In total, 766 students, 195 faculty,

Superscripts refer to entries in the Appendix

and 215 staff/administrators responded to the survey. The responses for each population were almost entirely from main campus, although, the survey was also sent out to Barron County and Marshfield Clinic.

As the respondents do not make up 100% of their representative population and this greenhouse gas emissions wants to account for emissions from all people, the following analysis was performed. The survey results provided raw data on the total emissions attributable to the student, faculty, and staff/administration respondents. These total emissions could then be divided by the number of respondents from each population to obtain CO2e/student, CO2e/faculty, and CO2e/(staff+administration). These values were then assumed to be representative of the average emissions for these three populations. Doing so allows us to multiple these values by the total number of students, faculty, and staff+administration, respectively, to reach the total emissions for each population.

Table 4 contains the four scope 3 transportation emissions with the private commuting results broken down by student, faculty, and staff + administration. Figure J then breaks the total emissions down by percent. Figure K then zooms in on the 49% not from university sponsored air travel. Due to student, faculty, and staff administration populations not being the same size, Figure L then breaks down the emission per person for each population.



**Table 4: Scope Three Transportation Usage and Emissions**

| Emission Source | Usage | CO2e (MT) |
|---|---|---|
| **University Sponsored Travel (Gallons)** | | |

Superscripts refer to entries in the Appendix

| | | |
|---|---|---|
| Air Travel[15] | | 5,701 |
| Mile Reimbursement[15] | | 104 |
| Student Transit[15] | | 17 |
| Kobussen[16] | | 220 |
| **Non-University Sponsored Travel (Gallons)** | | |
| Study Abroad[17] | | 793 |
| **Public Commuting (Gallons)** | | |
| Eau-Claire Transit[18] | | 187 |
| Tendercare* | - | - |
| **Private Commuting (Gallons)** | | |
| Students | 308,814 | 2,746 |
| Faculty | 50,825 | 452 |
| Staff + Administration | 113,888 | 1,012 |
| **Collective Scope 3 Transportation (Gallons)** | | |
| **All Sources** | | **11,231** |

*Tendercare data not available for the reasons discussed earlier.

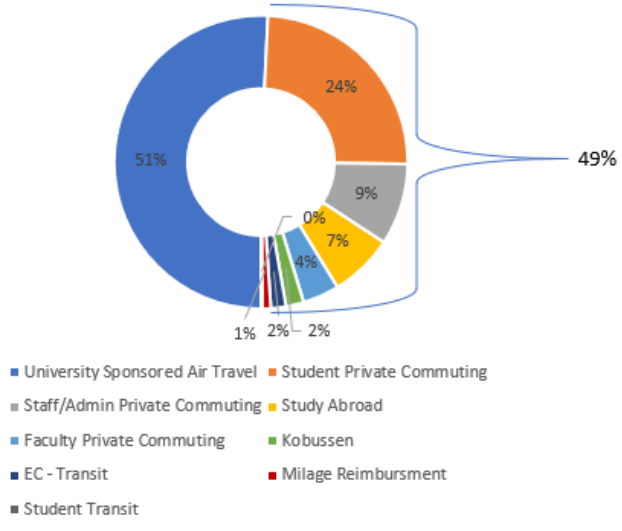


**Figure J: Scope 3 Transportation Emissions by Percent**

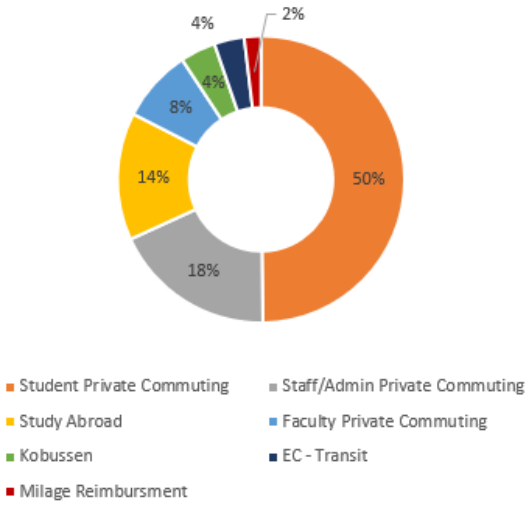


**Figure G: Zoom in on 8%**

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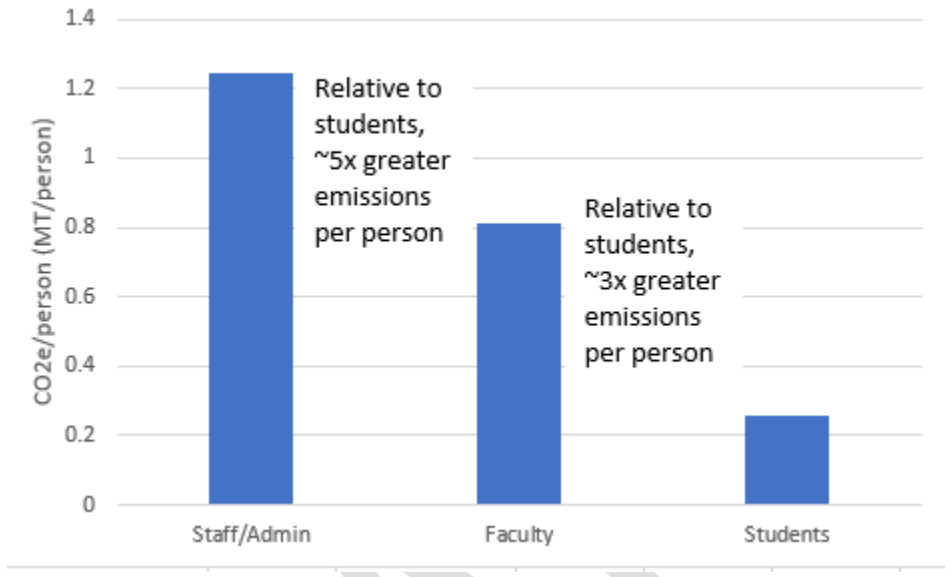


**Figure L: Private Commuting Emissions per Person**

The results of table 4 and figure J are unsurprising. University sponsored air travel makes up a bulk of emissions, 51%, due largely to the sheer number of miles to travel to other countries. A significant contributor to the university sponsored air travel emissions was the BMB trip to Australia. This trip alone accounts for ~40% of these emissions and helps to explain why this category had higher total emissions relative to previous years despite the decreased travel overall due to COVID-19. The second largest contributor is student private commuting which makes sense considering the number of students with vehicles here at UWEC.

What is perhaps more surprising is the results of figure L. Relative to students, staff + administration release about 5 times more CO2e per person while faculty released about 3 times more CO2e per person. This is likely due to the idea that more students walk, bike, and/or

carpool to classes every day and therefore have more minimal daily commuting emissions than staff + admin and faculty. Student emissions likely largely derive from trips home to see family which are far less frequent than daily commuting emissions.

**The total scope 3 transportation emissions are 11,231 MT of CO2e.**

# Renewable Energy Credits (RECs), Offsets, and Sequestrations.

These are the three ways that UWEC can achieve carbon neutrality without reaching zero carbon emissions. An offset is the general term for any practice that neutralizes CO2e emissions. Offsets have 11 criteria they must meet. An important note is that recycling is considered a carbon neutral practice and therefore does not contribute to offsets. Therefore, while being a sustainable practice we should continue, expansion of the recycling program on campus has no effect in achieving carbon neutrality.

RECs correspond to CO2e emissions saved from the renewable generation of electricity relative to traditional fossil fuel methods. A REC that UWEC currently has is a contract with Xcel energy where UWEC pays around $21,000/year to neutralize about 850 MT of CO2e.

Sequestrations refers to owned natural land that have been destinated as no-build areas. The plants on these lands directly remove CO2 from the air through photosynthesis. The natural land owned by UWEC does not count as an offset as it does not currently meet the criteria of additionality. This criteria states that additional work must be done to make an activity that lowers carbon emissions an official offset. As UWEC lands have not been designated as no-build zones, we cannot count the CO2 sequestered by these lands in our calculations. Regardless, this

numbers are still reported to show how much CO2e emissions we could remove from our carbon footprint by destinating our naturally owned lands as no-build zones.

**Table 4: Usage and CO2e Neutralization by RECs, Offsets, and Sequestrations**

| Neutralization Source | Usage | CO2e Neutralized (MT) |
|---|---|---|
| **Renewable Energy Credits (kWh)** | | |
| Solar Connect | 110,931 | 46 |
| Renewable Connect | 2,020,291 | 843 |
| **Offsets (Various Units)** | | |
| Davies Solar Array (MMBTU)[13] | 94 | 5 |
| McIntyre Library Solar Array (kWh)[13] | 18,981 | 8 |
| **Sequestrations (Acres)** | | |
| Natural Land Owned[14] | 2,914 | 7,300 |
| **Total CO2e Currently Neutralized (MT)** | **Potential CO2e Neutralized with Sequestrations (MT)** | |
| **901** | **8,201** | |

Natural land owned by UWEC would be the largest carbon neutralization with 7,300 MT CO2e neutralized. However, as this is not the currently the case, the largest contributor is our REC contract with Xcel at 843 MT CO2e. The solar connect REC, Davies Solar Array, and McIntrye Library Solar Array currently contribute minimally to carbon neutralization relatively.

As the Renewable Connect REC only allows to neutralize scope 2 emissions, let us see how much it would cost to neutralize all our scope 2 emissions through investing in the REC. To

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offset all the scope 2 emissions for 2019-2020 at the current contract price would cost **$234,992.** Therefore, assuming the university did nothing to reduce scope 2 emissions, offsetting just the scope 2 emissions for the 30 years until we reach our 2050 carbon neutrality goal would cost **$7,049,747.**

# Conclusions

Now that the CO2e that the university emits for each scope and the amount of CO2e the university offsets have been determined, the calculation of net CO2e emissions is possible. This is the most important statistic due to the university's 2050 pledge to have net zero CO2e emissions. The results from each previous section and the net CO2e is reported in table 5.

**Table 5: Summary of Results and Net CO2e**

| Emission Source | CO2e (MT) |
|---|---|
| **Emissions Additions** | |
| Scope 1 | 12,916 |
| Scope 2 | 9,189 |
| Scope 3 Non-Transportation | 955 |
| Scope 3 Transportation | ,231 |
| Total Carbon Emissions | ,291 |
| **Carbon Subtractions (Offsets)** | |
| Recs + Offsets | 901 |
| **Net CO2e Emissions (MT)** | |
| **33,390** | |

To understand what UWEC's net CO2e emissions being 33,390 MT means, Figure M puts this value in context of emissions compared to previous years. The line on the graph provides the overall trend in emissions

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since the first greenhouse gas inventory in 2008.

**Figure M: Net Carbon Emissions per Year**

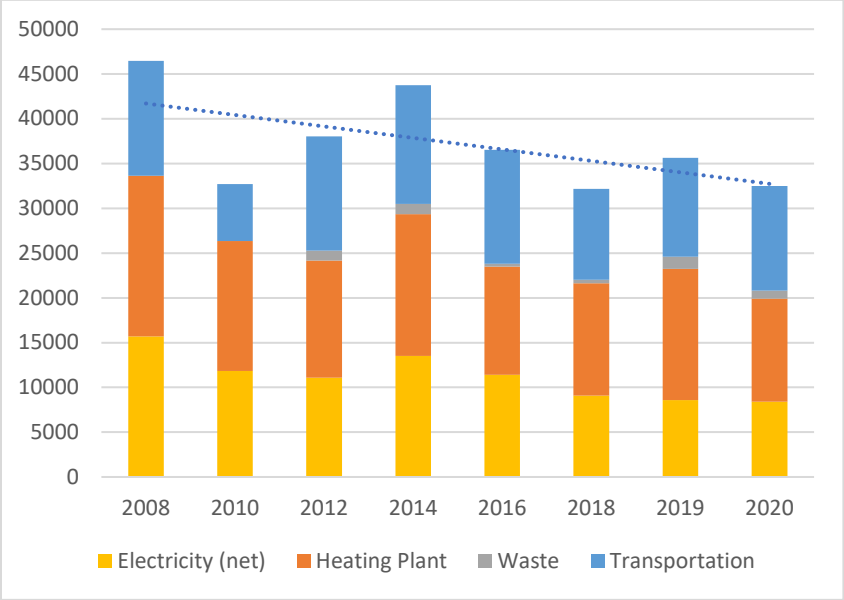



Figure M shows that despite UWEC's emissions not consistently decreasing every year, emissions have decreased as an overall trend. The trend is that net emissions since 2008 have decreased at an average rate of 1,164 MT CO2e per year. How does this compare to meeting our 2050 carbon neutrality pledge? Doing so would require the university to reduce carbon emissions by 1,113 MT CO2e every year. Without any other considerations, this is extremely promising. This would seem to depict that UWEC will reach the 2050 carbon neutrality goal as our average emissions decrease per year outpace the carbon emission reductions needed to meet the goal. These values **should not** be looked at in a vacuum without additional context, however.

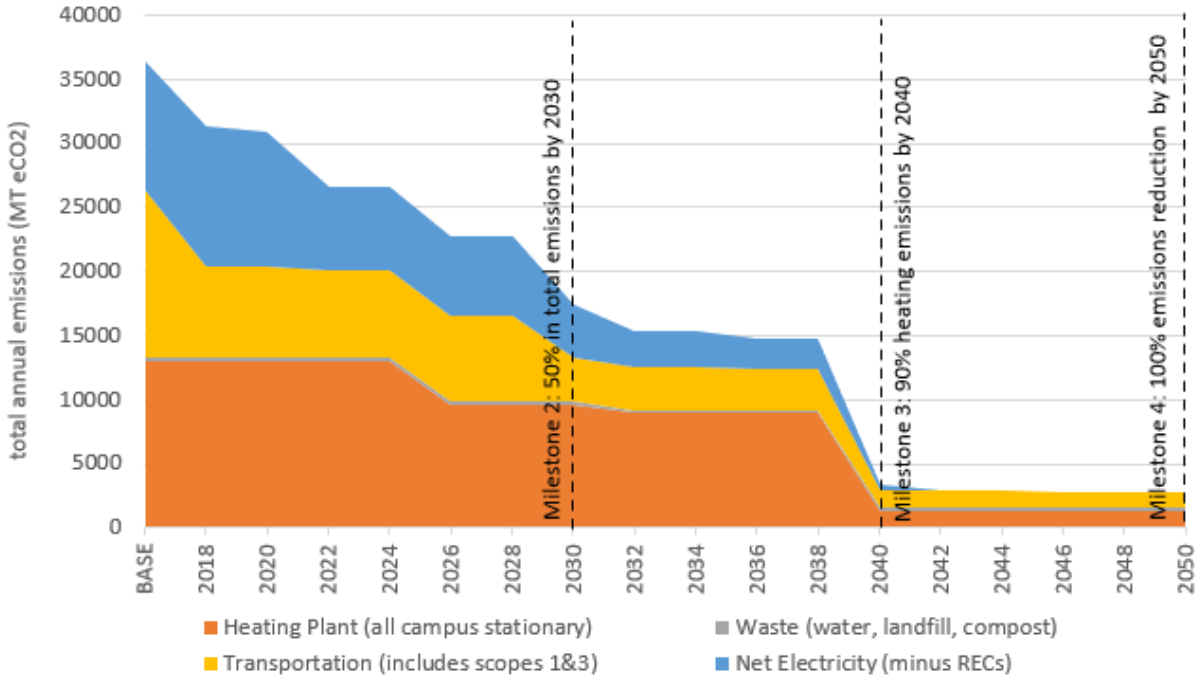
Maintaining the status quo will not allow UWEC to reach carbon neutrality by 2050. Consider the fact that consistently decreasing emissions each year will only become harder as UWEC gets closer to reaching carbon neutrality. For one, UWEC will presumably continue to expand, for example through the addition of Marshfield clinic, and these expansions will add

more emission sources that need to be accounted for. Secondly, regarding emission reductions, only so many ‘low hanging fruit’ exist. These are the reduction strategies that are the least resource intensive to implement relative to the number of emissions they reduce. Eventually, UWEC will have to climb further up the tree and invest in more costly strategies. These strategies will require permanently reducing our carbon emissions as the $7,049,747 cost to offset just the scope 2 emissions depicts the impracticality of reaching our goal given our current emission levels. While many different approaches exist to do so, an example approach is include below in Figure N to provide a more realistic model of the policy implementation needed to meet net zero carbon emissions.



Superscripts refer to entries in the Appendix

**Figure N: A Possible Emission Projection**




Meeting the 50% reduction in carbon emissions by 2030 as shown in Figure N would require a decrease of 1600 MT CO2e every year. Emission decreases come from large-scale policy implementation which explains the sudden decreases followed by periods of little change in net emissions. Note, this projection does not account for UWEC acquiring additional emissions sources.

As some final remarks, to aid in the creation of future greenhouse gases inventories, a main recommendation is the creation of central database where all the data necessary to perform a greenhouse gas inventory is stored. Those who create emissions attributable to UWEC would be responsible for recording and reporting the necessary data to this database. This is the main recommendation as most cumbersome aspect of the greenhouse gas inventory for Honors 389 students was reaching out to various entities to obtain the data needed for analysis. If the responsibility of reporting data were instead on these different entities, this would make the

Superscripts refer to entries in the Appendix

creation of this greenhouse gas inventory much less time consuming. A possible way to pursue this would be to write the responsibility of reporting pertinent data to the database into contracts as they come up for renewal. There would also need to be a system to hold all CO2e emitters accountable to these contracts. Freed from the responsibility of finding all relevant data, Honors 389 students could use this extra time to work on solutions to meet our 2050 carbon neutrality goal.



Superscripts refer to entries in the Appendix

# Appendix

## References


(a) "Greenhouse Gases at EPA." *EPA*, Environmental Protection Agency, 21 June 2018, www.epa.gov/greeningepa/greenhouse-gases-epa.

(b) Brander, Matthew. *Greenhouse Gases, CO2, CO2e, and Carbon: What Do All These Terms M*. ecometrica.com/assets/GHGs-CO2-CO2e-and-Carbon-What-Do-These-Mean-v2.1.pdf.

(c) The value is closer to 1.83 as calculated by the central campus team.


## Data Sources

1. Greg Falkenberg – Steam Plant Director
2. Tony Rongstad – Sustainability Manager
3. Grant Peikert – Project Coordinator for Commonweal
4. Anita Spahn – Maintenance and Central Stores
5. Allison Millis – Facilities
6. Bernie Waldoch – Facilities
7. Mark Thorton – Blugold Dining Operations Manager
8. Steven Seuferer – UWEC Travel Manager
9. Jackson Schmidtke – Center for International Education
10. Tom Wagener – Eau Claire Transit Manager
11. Brandon Birkenholz – Student Transit Assistant Director
12. Amanda Casey – Kobussen Management
13. Jay Hanson – Facilities
14. Kimera Way – UWEC Foundation
15. Shawn Seuferer - UW- Eau Claire Travel manager
16. Amanda Casey – Kobussen Contact
17. Jackson Schmidtke – CIE Contact
18. Tom Wagener – Eau Claire transit Manager



Superscripts refer to entries in the Appendix