**Saint John’s University**

**Collegeville, MN**

**2014 Greenhouse Gas**

**Emissions Inventory**

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**Report Issue Date: October 10, 2014**

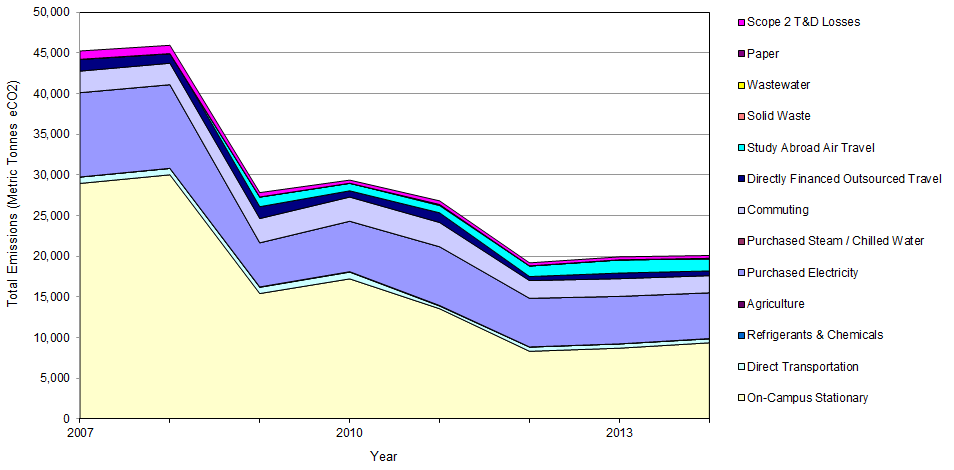
**Executive Summary**

The Office of Sustainability at Saint John’s University (SJU) has completed the greenhouse gas (GHG) emission inventory. Jacob Saffert, the sustainability fellow, was responsible for data collection. This report includes the methodology used to determine the footprint, emissions data for fiscal year 2014 (FY2014), and comparative analysis between current and past GHG inventory Data. The 2011 greenhouse gas inventory was the most recent inventory prior to this report, so data from that report is displayed for comparison when possible and applicable. When completing the FY2014 inventory, data from fiscal years 2012 and 2013 was collected whenever possible in order to increase the completeness of Saint John’s University’s greenhouse gas emission recordkeeping. Data from 2012 and 2013 can be found in the accompanying spreadsheet calculator.

The carbon footprint of Saint John’s University for fiscal year 2014 was 20,106.3 metric tons of CO2 equivalents (MT eCO2). This indicates a significant reduction in emissions since the completion of SJU’s previous GHG inventory from 2011, which reported total emissions of 28,525.1 MT eCO2. That equates to a reduction of 8,418.8 MT eCO2 in annual greenhouse gas emissions since fiscal year 2011.

Saint John’s University became a charter signatory of the American College and University Presidents’ Climate Commitment in 2007. By signing that agreement, the university pledged to take notable steps towards reducing the carbon impact of its operation. Specifically, the University pledged to reduce carbon emissions by 15 percent by 2015, 50 percent by 2030, and to be carbon neutral by 2035. The 2014 GHG inventory affirms that Saint John’s University is meeting and exceeding its emissions reduction goals. Emissions have been reduced by 25,839.8 MT eCO2, or 56.24 percent, since the 2008 inventory. Refer to Graph 1 on Page 3 for visual representation of Saint John’s University’s annual carbon emissions.

This decrease in emissions can largely be attributed to a switch in primary heating source from coal to natural gas. Coal was still burned in the on-campus cogeneration facility during part of fiscal year 2011. The university has since switched over to natural gas. Additionally, Saint John’s University has undertaken a number of energy retrofit and efficiency projects. More accurate methods for calculating emissions could be responsible for some of the reduction, as well. Since more accurate data exists, the sustainability staff does not need to rely so heavily on worst-case estimates any more to complete the inventory.

**Graph 1. Total Emissions (MT eCO2) 2007-2014 by Sector**

**Greenhouse Gas Emissions Inventory Methodology**

The GHG emissions inventory was conducted in accordance with the American College and University Presidents Climate Commitment (ACUPCC). The Saint John’s University sustainability staff selected the Clean Air-Cool Planet (CA-CP) calculation tool, version 7.0, supplemented by the World Resources Institute’s (WRI) Greenhouse Gas Protocol. The WRI GHG Protocol is the most widely accepted international standard for GHG accounting and is the basis of the CA-CP tool. The inventory of emissions included those arising from on-campus energy production, purchased electricity, heating and cooling, vehicle fleet operations, business travel (by air and personal vehicle), faculty and student commuting, solid waste management, refrigerants, fertilizer use, and wastewater treatment.

**Boundary and Data**

The boundary for the carbon footprint was set to include the SJU campus demographics (detailed in Table 1), the buildings and grounds of the campus related to University operations and activities located in Collegeville, MN. Saint John’s University’s 1,346,820 gross square feet of building space sits on 302 acres of land as of 2014. The FY2014 greenhouse gas inventory includes data related to carbon emissions originating from on-campus electricity and steam generation, purchased electricity, transportation, business and study abroad travel, employee and student commuting, wastewater treatment, refrigerants, fertilizer usage, solid waste management, and paper usage.

Certain pieces of data include both university use and use by non-university sources such as the Abbey, the Hill Museum and Manuscript Library, the Ecumenical Institute, etc. In order to calculate the percentage of emissions which are attributable to Saint John’s University only, the data was multiplied by 68.85%. That percentage represents the portion of the gross square footage of building space which is occupied by buildings which are used for university functions. Previous greenhouse gas inventories for Saint John’s University also relied on this type of quantification so the data can still be reasonably compared despite this approximation. The explanation of the calculation methodology for each section will make note if this technique was used for that data.

Additionally, some of the data provided to the Office of Sustainability included both College of Saint Benedict and Saint John’s University. If possible, SJU activities were separated from CSB activities. When it was not possible to separate the activities of the two universities, the emissions data was divided by two in order to represent the portion of the emissions which are roughly attributable to Saint John’s. Since CSB and SJU have very similar numbers for students and staff, this approximation technique is believed to be fairly accurate. The explanation of the calculation methodology for each section will make note if this technique was used for that data.

It should also be noted that the energy embedded in goods and products consumed during the regular course of doing business was not included in this analysis. The only exception to this is paper usage on campus. The capture and storage of carbon was also not included in this inventory beyond any capture and storage which was accounted for within the Clean Air-Cool Planet emissions calculator.

**Campus Demographics**

Data for Table 1 was provided by the Office of the Registrar and the Human Resources office.

**Table 1. Campus Demographics for 2014**

|  |  |  |
| --- | --- | --- |
| **Sector** | **Status** | **2014** |
| **Students** | Full-Time | 1859 |
|  | Part-Time | 74 |
|  | Full-time equivalent\* | 1896 |
| **Faculty** | Full time | 166 |
| **Staff** | Full time | 340 |

\* For calculating full-time equivalent students (FTE), two part-time students equal one full-time student.

**Carbon Footprint Timeframe**

SJU operates on a fiscal year that runs from July 1 through June 30. The greenhouse gas inventory report contains data for fiscal year 2014. The accompanying calculation spreadsheet also contains data for fiscal years 2012 and 2013, which was gathered at the same time as FY2014 data. The final inventory was completed on October 10th, 2014.

**Data Sources**

**Table 2.** **Sources of Data Used During 2014 GHG Inventory Completion**

|  |  |  |
| --- | --- | --- |
| Data Type | Data Provider | Data Source |
| Budget | Dick Adamson | Business Office |
| Students | Jane Stromme | Office of the Registrar 10th Day Reports |
| Faculty and Staff | Danielle Schmiesing | Human Resources |
| Building square footage | Jean Stottlemyer | Physical Plant Records |
| Campus Fleet | Richard Crawford | Abbey Business Office Records, Receipts |
| Refrigerants | David Schlumpberger | Receipts |
| Purchased Electricity | Tom Vogel | Physical Plant Records |
| On-Campus Electricity and Steam Production | Tom Vogel, Dan DeMars | Physical Plant Records, |
| Student Commuting | Jacob Saffert, Jean Lavigne | Past GHG Inventory |
| Employee Commuting | Danielle Schmiesing | Human Resources |
| Study Abroad Air Travel | Merry Hoppert, Katherine Kamakahi | Study Abroad Spreadsheet |
| Admission-Related Air Travel | Kay Richter | Admissions Spreadsheet |
| Fertilizer | SJU Grounds Department | Estimate/Receipts |
| Solid Waste | Todd Johnson | Waste Management Data |
| Wastewater | Paul Stock | WWTP Records |
| Paper Use | Laurie Birr, Mary Gouge | IT Services, SJU Duplication Center |

**Carbon Footprint Gases and Unit of Measure**

The carbon footprint is measured in metric tons of carbon dioxide equivalent (MT eCO2). A metric ton is 2,205 pounds. The carbon dioxide equivalent is the unit of multiple greenhouse gases emitted within the footprint boundary converted to standard terms by use of the Global Warming Potential (GWP).

The GWP is a measure of how much a gas contributes to global warming over a period of time (100 years) compared to carbon dioxide and allows comparison of the impact of the concentrations of GHGs to each other. Carbon dioxide has been assigned a GWP of 1 since it is the most prevalent GHG.

Although some GHGs may be present in the atmosphere in lesser quantities than carbon dioxide, they may have a longer lifespan in the atmosphere and may, in the long run, be much more detrimental. A higher GWP indicates that gas is a more potent GHG. Table 3 compares the GWP for the six major GHGs included in a carbon footprint.

**Table 3. Comparison of the Global Warming Potential (GWP) of the Six Greenhouse Gases**

|  |  |  |
| --- | --- | --- |
| **GHG** | **Symbol** | **GWP\*** |
| **Carbon Dioxide** | CO2 | 1 |
| **Methane** | CH4 | 25 |
| **Nitrous Oxide** | N2O | 296 |
| **Hydrofluorocarbons** | HFCs | 120-12,000 |
| **Perfluorocarbons** | PFCs | 5,700-11,900 |
| **Sulfur Hexafluoride** | SF6 | 22,200 |

**Emissions Inventory Details**

Greenhouse gas emissions at Saint John’s University totaled 20,106.3 MT eCO2 in fiscal year 2014. Table 4 provides a summary of campus emissions divided by source. Emissions data from fiscal year 2011, SJU’s most recent previously submitted GHG inventory, is available for comparison.

**Table 4. Greenhouse Gas Emissions (MT eCO2) by Category 2014 and 2011 (comparison)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **2014** | **% of Total** | **2011** | **% of Total** |
| **Co-Generation Steam** | 8,439.4 | 41.97 | 13,374.7 | 46.89 |
| **On-Campus Stationary\*** | 932.6 | 4.64 | 1708.9 | 5.99 |
| **Campus Fleet** | 484.7 | 2.41 | 319.7 | 1.12 |
| **Refrigerants** | 31.9 | 0.16 | 56.2 | 0.20 |
| **Fertilizer** | 6.1 | 0.03 | 14.0 | 0.05 |
| **Purchased Electricity** | 5,622.8 | 27.97 | 6,082.1 | 21.32 |
| **Faculty/Staff Commuting** | 1,789.3 | 8.90 | 2,703.7 | 9.48 |
| **Student Commuting** | 335.9 | 1.67 | 355.5 | 1.25 |
| **Directly Financed Travel** | 586.2 | 2.92 | 1,786.4 | 6.26 |
| **Study Abroad Air Travel** | 1,500.1 | 7.46 | 1,360.7 | 4.77 |
| **Solid Waste\*\*** | -13.0 | -0.06 | 113.4 | 0.40 |
| **Wastewater** | 19.1 | 0.10 | 18.0 | 0.06 |
| **T&D Losses** | 347.5 | 1.73 | 601.5 | 2.11 |
| **Paper Use**\*\*\* | 44.7 | 0.22 | N/A | N/A |
| **TOTAL** | **20,106.3** |  | **28,525.1** |  |

\*For 2014, these emissions come from natural gas and heating oil used for co-generation electricity. In 2011, coal was also used in the co-generation facility.

\*\*Much of the solid waste is incinerated to generate electricity which results in a credit to total emissions. Please refer to details below under the Solid Waste heading.

\*\*\*Paper Use was not calculated in the 2011 greenhouse gas inventory

**Table 5. Comparison of MT eCO2 by Demographics and Square Footage**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Category** | **Number of Units** | **MT eCO2 /Unit by Category** |
| **2014** | Number of Students | 1,896 | 10.61 |
|  | Number of Students, Faculty, Staff | 2,402 | 8.37 |
|  | Gross Building Square Footage | 1,346,820 | 0.015 |
| **2011** | Number of Students | 1,954.5 | 14.54 |
|  | Number of Students, Faculty, Staff | 2,377.5 | 12.00 |
|  | Gross Building Square Footage  Square Footage | 1,397,652.4 | 0.02 |

**Power Production and Consumption**

## Produced and Purchased Electricity

Saint John’s operates a cogeneration facility which produced all of the campus’ steam needs and 23.85 percent of the university’s electricity during fiscal year 2014. The data for steam and electricity generation provided in the table below is from this cogeneration facility. The cogeneration facility is currently operated on natural gas and #2 fuel oil. Saint John’s no longer burns any coal on campus, but it is shown in Table 9 to show the progress made since 2011. Table 9 includes data about fuels sources, steam and electricity generation, and purchased electricity.

The carbon emissions from purchased electricity from Xcel Energy were calculated using emission factors representing the power pool average for kilowatt hours consumed in the MROW eGrid sub-region. Saint John’s has been part of the MROW sub-region since 2006. Prior to 2006, Saint John’s drew power from the MAPP eGrid sub-region. The use of power pool average emission factors is a standard method incorporated into CA-CP, and is used by the WRI in their GHG Protocol and the U.S. Department of Energy in the 1605(b) Voluntary Reporting of Greenhouse Gas Emissions Program.

Data for coal is reported in short tons. Natural gas is reported in MMbtu in the spreadsheet calculator. The data for cogeneration steam production is recorded by the SJU power plant in pounds of steam. This figure must be converted into MMbtu in order to be entered into the CA-CP calculator. According to the Energy Star website, one pound of steam equals 1,194 Btu. To convert from Btu to MMBtu, the number is divided by 1,000,000.

The default emission factors for carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) from the WRI GHG Protocol Stationary Combustion spreadsheet are used to calculate GHG emissions from natural gas consumption. CH4 and N2O emissions are converted to carbon dioxide-equivalents using the global warming potentials provided by the Intergovernmental Panel on Climate Change’s Third Assessment Report (See Table 3 for more information).

The electricity and steam generated on campus, as well as the electricity purchased from Xcel Energy, is used by more entities than solely the university. For this reason, all of the data from the power plant has been multiplied by 68.85 percent in order to show the portion which is attributable to university functions.

**Table 6: Fuel Sources, Steam Production, and Generated and Purchased Electricity**

|  |  |  |
| --- | --- | --- |
|  | 2014 | 2011 |
| Coal (Short Tons) | 0 | 4,374 |
| Natural Gas (MMBtu) | 169,784 | 74,956 |
| Other Natural Gas (MMBtu)her | 0 | 7,385 |
| #2 Fuel Oil (Gallons) | 35,063 | 71 |
| Generated Steam (MMBtu) | 176,178 | 152,914 |
| Generated Electricity (kWh) | 2,512,906 | 1,944,521 |
| Purchased Electricity (kWh) | 8,024,013 | 10,308,453 |

## Transportation

Table 7 details the number of miles flown or driven and the number of gallons of fuel consumed by program.

**Table 7: Mileage and Gallons for Transportation in 2014 and 2011**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | 2014 | | 2011 | |
| Air Miles | Miles | Gallons | Miles | Gallons |
| Study Abroad Travel | 2,951,323 | --- | 1,752,660 | --- |
| Reimbursed Air miles | 618,829 | --- | 1,732,743 | --- |
| ABE trips | 53,700 | --- | 25,120 | --- |
| Admissions | |  | | --- | | 319,949 | | --- | 505,599 | --- |
| Vehicle Commuting | Miles | Gallons | Miles | Gallons |
| Faculty and Staff | 4,697,295 | --- | 6,994,728 | --- |
| Student Commuting | 892,284 | --- | 919,815 | --- |
| Busing | Miles | Gallons | Miles | Gallons |
| LINK | --- | 14,576+5282.5\* | 80,123 | 13,354 |
| Trobec’s | --- | --- | 13,221 | 2,204 |
| On-Campus Gas and Diesel | Miles | Gallons | Miles | Gallons |
| Gasoline | --- | 32,645 | --- | 18,253 |
| Diesel | --- | 3,559 | --- | 15,556 |

## Air Travel and Business Travel

The air miles from admissions were divided by two as half are attributed to the College of Saint Benedict. Staff travel miles were not divided by two as these miles solely account for Saint John’s staff. In a change from previous inventories, emissions from study abroad and Alternative Break Experience (ABE) trips were reported by gender allowing us to include only SJU students in this report. This increases our accuracy and also decreased emissions since the majority of ABE and study abroad trips are CSB students.

Personal miles for on campus vehicles are not included nor are the vehicle miles reimbursed by CSB. A protocol was initiated in 2008 requiring employees to write in the number of miles traveling by air and by car. A significant drop was seen in the number of miles reported by air travel in FY 2010 and rebounded in FY2011.

## Student and Employee Commuting

Commuting is broken up into two categories: employee and student commuting. Employee commuting miles were calculated using data from Human Resources. A list of SJU employees’ home zip codes was obtained. Using Google Maps, the driving distances between SJU’s zip code, 56321, and the employees’ zip code was calculated to the nearest 0.1 mile. The shortest route by travel time, not the shortest distance, was used in the calculation as this is the route which people would be most likely to take. Assumptions had to be made about how many trips were taken by each employee during the course of FY2014. It was assumed that full-time employees travel to and from campus five times per week and part-time employees travel to three times per week. Assuming that employees travel to campus all 52 weeks of the year, an upper limit estimate can be generated. This technique for estimating employee commuting does not take carpooling into consideration either, so actual commuting miles are likely lower than they are reported.

In terms of student commuting, there is nothing to indicate that student commuting behavior has changed since SJU’s 2011 GHG inventory. For this reason, data for commuted miles driven in the 2011 inventory was taken and used to calculate the average number of miles driven per full-time enrollment. FTE was calculated using a value of 1 for full-time SJU students and 0.5 for part-time students. The miles per FTE figure was then multiplied by the number of FTE in FY2014. This calculation maintains the same amount of driving per student, but adjusts commuting miles driven to account for changes in enrollment from year to year.

## LINK Busing

The LINK is the shuttle bus which transfers students between the campuses of the College of Saint Benedict and Saint John’s University. The LINK is currently the only bus service which is used by students for this purpose. In past years, additional buses were used from Trobec’s busing service. Trobec’s buses have not been used since CSB and SJU switched to a five day class schedule with staggered class times. The LINK buses use two fuels: diesel and liquid propane gas (LPG). According to the CSB Transportation Department, 29,152 gallons of diesel and 10,565 gallons of LPG. Because the LINK is used roughly equally by both CSB and SJU, these figures were divided by two. The portion of LINK bus fuel attributable to Saint John’s is 14,576 gallons of diesel and 5282.5 gallons of propane. To enter this data into the CA-CP calculator, propane had to be entered into the “Other” category. It also needed to be converted from gallons into MMBtu. To do this, the number of gallons was multiplied by 91,330 and then divided by 1,000,000. This conversion is based on data provided by the US Department of Energy stating that one gallon of propane equals 91,330 Btu.

## On-Campus Gasoline and Diesel

The gallons of gasoline and diesel used directly on Saint John’s campus, such as fuel for Life Safety vehicles, the grounds equipment, the power house, and other university-owned and operated vehicles is included in Table 7. The data provided to the Office of Sustainability pertaining to this fuel usage included both fuel used for university operations and for other entities which share space with the university. To separate the portion of fuel consumption which is attributable only to the university, the data was multiplied by 68.85 percent.

## Wastewater Treatment

**Table 8: Gallons of Wastewater Disposed 2014 and 2011**

|  |  |  |
| --- | --- | --- |
|  | 2014 (Gallons) | 2011 (Gallons) |
| **University** | **25,481,385** | **34,837,343** |
| Other | 11,528,615 | 14,042,657 |
| Total | 37,010,000 | 48,880,000 |

Wastewater generated on campus is processed by Saint John’s Wastewater Treatment Plant and is overseen by Paul Stock and Gary Jorgenson.

Table 8 outlines the estimated gallons of wastewater disposed. Wastewater treatment accounted for 19.1 MT eCO2 during FY2014. The total number of gallons of wastewater is multiplied by 68.85% as that is the amount of square footage which is attributed to St. John’s University. A potentially more accurate estimate could theoretically be derived based on people and guests. Since wastewater is a relatively minor component of the greenhouse gas inventory, however, an estimate based on square footage will suffice.

**Refrigerant Use**

**Table 9: Refrigerant Usage in 2014**

|  |  |  |
| --- | --- | --- |
|  | Pounds Used | GWP |
| R-410A | 15.31 | 1,725 |
| R-22 | 24.25 | 1,810 |
| Total | 39.56 | 1,777\* |

\* The global warming potential of 1,777 is a weighted average of the GWP for R-410A and R-22 for 2014. The CA-CP spreadsheet calculator only provides one space for "Other" in the Refrigerants category. Both of the refrigerants used at Saint John's in 2014 should be placed in this "Other" column, however. Due to this limitation of the calculator, an average GWP had to be calculated. The weighted average for 2014 came out to 1,777. In the calculator, a sum total of the weight in pounds of the chemicals used that year was entered into the "Other" column in the refrigerants section of the page titled "Input". On the spreadsheet page titled "EF\_Refrigerants", the weighted GWP value for each year was entered into the appropriate cell.

Refrigerants calculated for this report include the ones used by David Schlumpberger (HVAC Technician). SJU contracts with Central MN Refrigeration to maintain dinning service refrigerants. According to data provided by David Schlumpberger, 15.31 pounds R-410A and 24.25 pounds of R-22 were used during FY2014. Other refrigerants are not accounted for in this report. They contribute only a very small portion of the total emissions. Only the R-410A and R-22 are reflected in our emissions inventory for this year.

Although refrigerants contribute little to the emission total, one metric ton of R-22 has a global warming potential of 1,810 MT eCO2. This means that it is a much more potent greenhouse gas per pound than carbon. The calculated impact of refrigerant use on the carbon footprint was quite small compared to other sources of emissions, it is important to keep in mind that refrigerants are classified as hazardous waste and do pose a significant threat to the environment in very small quantities.

**Fertilizer Use**

**Table 10: Fertilizer Type and Nitrogen Content in 2014**

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Synthetic 13% N | Organic 7% N | MT eCO2 |
| 2014 | 9,000 | 4,000 | 6.1 |

The GHG nitrous oxide, N2O, is formed from fertilizer application through oxidation processes that convert a small portion of the nitrogen to small amounts of N2O. The SJU Grounds Department applies fertilizer on campus to maintain an aesthetically-pleasing landscape. Saint John’s used two fertilizers in 2014. One is a synthetic fertilizer with 13% nitrogen content and the other is an organic fertilizer with 7% nitrogen.

According to the Grounds Department, there was not a significant change in the quantity or nitrogen content of the fertilizers used in FY2012, 2013, or 2014. Thus, the same data was entered into the CA-CP spreadsheet calculator for each of those three years. As a side-note, when converting the estimated tons into pounds, the number of pounds was multiplied by 2000. An estimate was given of "4-5 tons" for synthetic fertilizer usage, however. That equals 8,000 to 10,000 pounds. A mid-point of 9000 pounds was entered into the spreadsheet.

It should also be noted that the synthetic fertilizer contains no phosphorus. It was not considered in this inventory because it does not contribute to global warming. Phosphorus has a notable environmental impact, however, especially on water quality.

Fertilizer use is a minor contributor to the total emissions, accounting for just 6.1 MT eCO2 in 2014. For reference, fertilizer use accounted for 14 MT eCO2 in the 2011 inventory, more than twice as much as in this inventory. The reduction in emissions from fertilizer use on campus primarily comes from a reduction in the nitrogen content in the fertilizers which are used.

**Solid Waste Management**

**Table 11: Solid Waste, Landfill, and Incineration Data for 2014**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Monthly Waste in Tons | Yearly Waste in Tons | Incinerated Tons  (Refuse-Derived Fuel) | Landfill with CH4  Capture and Electricity | MT eCO2 |
| 2014 | 72.41 | 868.92 | 434.46 | 434.46 | -13.0\* |

\*Because electricity is generated from this waste through methane capture and incineration, Saint John’s actually receives a credit to total emissions. In FY2014, this credit equaled 13.0 MT eCO2 from the elimination of 521.4 kg of methane.

Solid waste refers to garbage accumulated on campus. According to Todd Johnson, territory manager for Waste Management, Saint John's generates an estimated 72.41 tons of trash each month. Since waste is not weighed when it leaves SJU, that estimate is based on a worst-case scenario in which each dumpster taken off of campus was completely filled with the tons per dumpster estimate used by Waste Management for commercial trash collection. It was estimated that SJU creates 72.41 tons of trash monthly during FY2014. Using this monthly estimate, it can be approximated that Saint John’s generated 868.92 tons of waste in fiscal year 2014. This worst-case estimate was used for FY2012 and FY2013 since the waste from those years was not weighed upon being picked up from campus either.

The waste taken from Saint John's goes to one of two locations. About half of the waste will go to the Pope and Douglas counties’ incineration facility in Alexandria, MN. On the CA-CP GHG calculator spreadsheet, this facility falls under "Incinerated Waste", "Refuse Derived Fuel (RDF)." The other half of the waste from SJU goes to the Elk River Landfill in Elk River, MN. This landfill recovers methane gas (CH4) and burns it to generate electricity. 10-15% of homes in Elk River are powered by the combustion of these gases. Since about half of the waste at SJU goes to each facility, it is estimated that 434.46 tons of waste was taken to both facilities during FY2014.

**Paper Use**

**Table 12: Paper Use in Pounds for 2014**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Res. Hall and Quad Labs | | SJU Duplicating Center | Total Weight | MT eCO2 |
| 2014 | 4,250 | 32,500 | | 36,750 | 50.2 |

The data for paper usage was given in number of cases used. Each case contains 10 reams of 500 sheets. A ream of paper weighs approximated five pounds, so the number of cases was multiplied by 50 pounds.

It is important to note that this is an estimation of paper usage on campus, not an exact figure. Data for paper usage at SJU is difficult to gather because of how many different entities use paper. Many of those entities provide their own paper, so there is no single source which has the total number of sheets used. IT Services provided data on how much paper is used in the labs in the Quad building and residence halls. The Duplicating Center provided data on how much paper was used in fiscal year 2014 in the duplicating center, library, prep school, and several offices on campus. The prep school should not be included in this greenhouse gas inventory, but there is not a good way to remove that data.

Furthermore, these figures do not account for all paper usage on campus. The various offices and departments all provide their own paper and records of that may or may not exist within each department. Additionally, some students have their own printers in their residences. They provide their own paper as well.

Although the data above does not provide the complete picture, it is still worth noting in the greenhouse gas inventory. Paper use accounted for 44.7 MT eCO2, or 0.22 percent of total emissions, in fiscal year 2014.