



OBG | There's a way

August 28, 2018

Mr. Craig M. Ross

Associate Director of Residential Life
State University of New York College at Brockport
350 New Campus Drive
Brockport, New York

RE: Greenhouse Gas Inventory

FILE: 12145/65989

Dear **Mr. Ross**:

O'Brien & Gere (OBG) is pleased to provide the State University of New York (SUNY) College at Brockport (Brockport) with this greenhouse gas (GHG) inventory. This letter report and the enclosed information were prepared in accordance with the scope of services outlined in our April 25, 2017 Work Authorization with the Dormitory Authority State of New York and the Scope of Work provided in Brockport's May 16, 2017 REV Campus Challenge application.

BACKGROUND

SUNY, as a New York State (NYS) Agency, is subject to NYS Executive Order 88 (EO 88) to reduce energy use 20% by 2020, and NYS Executive Order 166 (EO 166) to reduce absolute GHG emissions by 40% by 2030 and 80% by 2050. Brockport is actively evaluating energy efficiency and sustainability measures across the campus. In 2017, Brockport became a member of the REV Campus Challenge. Brockport submitted its REV Campus Challenge application on May 16, 2017 and retained OBG to complete the GHG inventory for the campus, as described in the Scope of Work provided in the application. It is noted that Brockport is not a signatory of the Climate Leadership Commitments (formerly the American College & University Presidents' Climate Commitment).

In accordance with the task descriptions provided in Item IV.1. of the REV Campus Challenge application, the following sections of this report describe the methodologies used to compile the data required by the *Clean Air Cool Planet's Campus Carbon Calculator (Version 9.1)* (Calculator) to complete the GHG inventory, along with a discussion of the inventory results.

DATA COMPILATION

OBG attended a project kickoff meeting at the Brockport campus on June 6, 2017. The purpose of this meeting was to review the GHG emission sources with campus personnel and discuss the data that was required to complete the GHG inventory. The review of GHG emission sources was conducted within the context of the requirements for use of the Calculator to complete the GHG inventory. For the purpose of aligning the GHG inventory with Brockport's EO 88 goal and in support of the future development of the Energy Roadmap for the campus, State Fiscal Year (SFY) 2011 was selected as the baseline year for the GHG inventory.



Following the kickoff meeting, a Brockport student intern assisted OBG with compiling the list of data required, contacting the appropriate campus personnel to request the data, and follow up gathering and compilation of the required data. Scope 1 emission sources included in the Calculator are on-campus cogeneration, other stationary sources, mobile sources, fugitive emissions from refrigerants and chemicals and agriculture sources. Scope 3 emission sources include purchased electricity and steam. Scope 3 emission sources include faculty/staff and student commuting, directly financed air travel, other directly financed travel, solid waste, and wastewater.

Data was provided by Brockport for the following GHG emission sources:

- Scope 1 Emission Sources
 - » Stationary sources (*e.g.*, on-campus boilers)
 - » Mobile sources (*e.g.*, campus vehicle fleet including light trucks, heavy trucks, other non-passenger mobile sources)
- Scope 2 Emission Sources
 - » Purchased electricity
- Scope 3 Emission Sources
 - » Faculty/staff commuting
 - » Student commuting

Brockport indicated that no campus buildings or associated gross square footage (GSF) should be excluded as part of the GHG inventory. Brockport provided the campus GSF for campus fiscal year 2010-2011 through campus fiscal year 2015-2016. It is noted that these GSF include the on-campus buildings as well as the MetroCenter and the Rochester Educational Opportunity Center (REOC). OBG also reviewed with Brockport the campus GSF for SFY2011-SFY2016 provided in New York Energy Manager (NYEM), which is the reporting system used to compile the data required to estimate energy use intensity (EUI) for EO 88. In accordance with January 2018 discussions between Eric Mazzone of SUNY System Administration and OBG, Mr. Mazzone advised OBG to use the GSFs provided in NYEM as inputs to the Calculator and for estimating GHG emissions intensities for the years included in the GHG inventory. However, after further discussions during the review stage of Brockport's Draft Energy Roadmap (June 2018), Brockport investigated and provided revised GSF data that represents the campus GSF and should be used to estimate EUI. With the exception of SFY 2015-2016, this data is similar (*i.e.*, a difference of less than 1%) to the GSF data provided in NYEM. The GSF for SFY 2015-2016 provided in NYEM is 8% higher than that provided by Brockport for that year and, according to Brockport does not represent that buildings on the campus. Brockport has indicated that it will work with SUNY System Administration to update the NYEM GSF data with the correct data for SFY 2010-2011 through SFY2016-2017.

The following paragraphs provide discussion of the methodologies that were used to compile the required data for the aforementioned GHG emission sources. The inputs to the Calculator and the assumptions that served as the basis for completion of the Scope 1, 2 and 3 GHG emission estimates were reviewed with Brockport during the draft GHG inventory review meeting with OBG on November 2, 2017. It is noted that, in accordance with guidance provided by Second Nature, the entity that oversees the voluntary Climate Leadership Commitments, the Scope 1 and 2 GHG emission sources that are required to be included in the GHG inventory are the following: stationary sources, mobile sources and purchased electricity and steam. Therefore, GHG emissions for refrigerants and chemical use, which are typically small in comparison to other campus GHG emission sources, were not included as part of this inventory. Second Nature guidance also indicates that Scope 3 emission sources that are required to be included in the inventory are the following: faculty/staff and student commuting and directly financed air travel. Therefore, GHG emissions from other directly financed travel and solid waste were not included as part of this inventory. Brockport is currently evaluating the availability of data required to estimate the GHG emissions from directly financed air travel as part of future GHG inventory updates.



SCOPE 1 EMISSION SOURCES

The data compiled for the Scope 1 GHG emission sources is summarized below:

1. **Boilers:** Brockport provided annual natural gas consumption data for the boilers that serve the campus buildings. OBG also obtained annual natural gas consumption data for Brockport from EnergyCap, the system used to manage the compilation of energy consumption for the SUNY system, and for NYEM. Since the data provided in NYEM is used to estimate the EO 88 source energy use intensity (EUI) each year, this data was selected for use as inputs to the Calculator.
2. **Mobile sources:** Brockport provided gasoline and diesel consumption for mobile sources for SFY2011 through SFY2016.

SCOPE 2 EMISSION SOURCES

The Scope 2 GHG emission sources operated at the campus include purchased electricity. Brockport provided the annual purchased electricity consumption for the campus buildings for SFY2011 through SFY2016. OBG also obtained annual purchased electricity consumption data for Brockport from EnergyCap and NYEM. Since the data from NYEM is used to estimate the EO 88 source EUI each year, this data was selected for use as inputs to the Calculator.

SCOPE 3 EMISSION SOURCES

Brockport provided the following data for SFY2011 through SFY2016:

- The number of faculty/staff and student parking permits
- The zip codes associated with the faculty/staff and student parking permits
- The number of students living on on-campus dorms/housing

The faculty/staff and student commuting miles were estimated based on the following assumptions:

- Each member of the faculty and staff makes an average of 5 one-way trips per week to the campus
- Faculty and staff travel to campus 8.5 months, or 34 weeks, per year
- The average distance for each one-way trip for each member of the faculty or staff is 13 miles. This distance was estimated based on an evaluation of the zip code data provided for the issued parking permits for faculty/staff.
- 100% of the faculty/staff commute via personal automobile.

Brockport has indicated that students who commute to the campus use personal automobile, carpool, ride bikes, and walk. Brockport provided the number of parking permits that were issued for each zip code from which students commute using personal automobiles. The total commuting miles for student commuting via personal automobile and carpooling were estimated based on the following assumptions, which were reviewed with Brockport during the aforementioned November 2, 2017 meeting:

- The number of students that commute was assumed to be the difference between the total number of students and the number of students living in on-campus dorms.
- 67% of the students that commute do so via personal automobile
- 32% of the students who commute do so via bicycle and walking
- 1% of the students who commute do so via carpool
- Students who commute via personal automobile make an average of 5 one-way trips to the campus per week

- Students who commute travel to campus for 36 weeks per year.
- The average distance per one-way trip for students who commute via personal automobile or public bus is 20 miles. This distance was estimated by dividing the total, combined one-way distance for 80% of the students who have parking permits.

GHG INVENTORY RESULTS

ABSOLUTE GHG EMISSIONS

Table 1 provides the GHG emissions, in units of metric tons of carbon dioxide equivalent (MTCO_{2e}), which were estimated by the Calculator for SFY2011 through SFY2016 for the Brockport campus. As shown in this table, the total absolute GHG emissions for Brockport have decreased by approximately 7.2% from SFY2011 baseline emissions. As shown in Figure 1, the SFY2016 GHG emissions resulting from the operation of stationary combustion sources represent 41% of the total campus-wide emissions. The GHG emissions resulting from consumption of purchased electricity represent 28% of the total campus-wide emissions. The GHG emissions resulting from student commuting represent 16% of the total campus-wide emissions.

The GHG emissions from Scope 1 stationary combustion have decreased by approximately 11.3% since the baseline year. The GHG emissions from Scope 2 purchased electricity have decreased by approximately 8.3% since the baseline year. It is noted that the purchased electricity consumption increased 22% from SFY2011 to SFY2016. This increase is likely due to the Special Events and Recreation Center (SERC) and the Smith Building laboratory, both energy-intensive buildings, coming online around SFY2014. Therefore, the decrease in absolute GHG emissions from purchased electricity consumption can be attributed to a 25% decrease in the United States Environmental Protection Agency's eGRID emission factor, as provided in the Calculator.

GHG EMISSIONS INTENSITY

Figure 2 provides a graphical representation of the estimated GHG emission intensity in units of MTCO_{2e} per thousand gross square foot (MTCO_{2e}/1000GSF). Figure 3 provides a summary of the absolute GHG emissions for SFY2011 through SFY2016, along with a depiction of the GSF for this same period. In general, the GHG emissions from the Scope 1, Scope 2 and Scope 3 emission sources at Brockport have decreased, while the GSF for Brockport has increased, since SFY2011. As shown in Figure 2, the resulting GHG emission intensity has decreased since SFY2011.

EO 88 SOURCE EUI

Figure 4 provides a graphical representation of the EO 88 source EUI for Brockport for SFY2011 through SFY2017. This figure was developed using the EUIs obtained from NYEM. As shown in this figure, Brockport has increased its EUI by approximately 4% since the EO 88 baseline year. Figure 5, which was also developed using source EUIs obtained from NYEM, provides a graphical comparison of the change in EUI since SFY2011 for Brockport and other comparable SUNY campuses. As shown in this figure, Brockport's increase in EUI since the baseline year is less than some SUNY campuses, but greater than other SUNY campuses who have had a decrease in EUI since the baseline year.

EO 166 GHG EMISSIONS

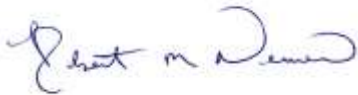
EO 166 was issued by the NYS Governor's office on June 1, 2017 and calls for a reduction in absolute GHG emissions of 40% by 2030 and 80% by 2050. In the first quarter of 2018, the NYS Governor's office requested that Scope 1 GHG emissions from stationary and mobile source combustion and Scope 2 GHG emissions from purchased electricity consumption be estimated for calendar years 2012-2015. For the purpose of aligning this GHG inventory report with Brockport's EO 88 goal (which is SFY-based, not calendar year) and in support of developing the Energy Roadmap for the campus, GHG emissions were estimated on a SFY basis, rather than a calendar-year basis.

SUNY Central developed and submitted the required GHG emissions estimates for the SUNY campuses for EO 166. The guidance provided by the New York State Energy Research Development Authority (NYSERDA) for EO 166 includes GHG emission factors for estimating the required Scope 1 and Scope 2 GHG calendar year emissions. The EO 166 emission factors for purchased electricity for 2014 and 2015 are lower than the emission factors provided in the Calculator for those years. Therefore, the SFY absolute GHG emissions presented in Table 1 of this report provide a relative representation of the applicable calendar year GHG emissions (Scopes 1 and 2) calculated using the EO 166 emission factors.

Through recent discussions with New York Power Authority (NYPA), OBG understands that NYS may be transitioning its tracking and reporting structure from EO 88 to EO 166 over the 2019-2020 period. Therefore, OBG recommends that, prior to completing the next campus GHG inventory update, Brockport confirm with NYPA as to the desired basis for estimating annual GHG emissions (*i.e.*, SFY or calendar year).

We appreciate providing GHG estimating services for Brockport. Should you have questions regarding this letter or the enclosed information, please do not hesitate to contact Tricia D'Agostino at (315) 956-6774, Tricia.D'Agostino@obg.com or me at (315) 956-6321, Rob.Neimeier@obg.com.

Very truly yours,
O'BRIEN & GERE ENGINEERS, INC.



Robert M. Neimeier
Senior Project Manager

Attachments: Table 1 – Summary of GHG Emissions
Figure 1 – SFY2016 GHG Emission Source Contributions
Figure 2 – GHG Emission Intensity
Figure 3 – Absolute GHG Emissions and Gross Square Footage
Figure 4 – EO 88 Source EUI
Figure 5 – EO 88 Source EUI Change (% of Baseline) for Brockport and other SUNY Campuses

cc: Tricia M. D'Agostino, PE – OBG



Tables

Table 1 - Summary of GHG Emissions

SUNY Brockport

Brockport, New York

	SFY2011	SFY2012	SFY2013	SFY2014	SFY2015	SFY2016	
GHG Emission Source	(MTCO ₂ e)	(MTCO ₂ e)	(MTCO ₂ e)	(MTCO ₂ e)	(MTCO ₂ e)	(MTCO ₂ e)	% Change ^(a)
Scope 1							
Total Stationary Source Combustion	9,853	8,161	9,147	10,781	11,035	8,739	-11.3
Mobile Source Combustion	387	394	441	439	418	427	10.1
Total Scope 1	10,240	8,555	9,588	11,220	11,452	9,166	-10.5
Scope 2							
Purchased Electricity	6,486	4,864	5,475	5,930	5,967	5,946	-8.3
Total Scope 2	6,486	4,864	5,475	5,930	5,967	5,946	-8.3
Scope 3							
Total Commuting	6,410	6,311	6,253	6,297	6,400	6,358	-0.8
<i>Faculty/staff commuting</i>	1,061	1,059	1,083	1,074	1,098	1,064	0.3
<i>Student commuting</i>	5,350	5,252	5,171	5,223	5,302	5,295	-1.0
Total Scope 3	6,410	6,311	6,253	6,297	6,400	6,358	-0.8
Total (Scope 1, 2 and 3)	23,137	19,730	21,317	23,446	23,819	21,471	-7.2

Notes:

(a) Represents change in GHG emissions from SFY2011 to FY2016.

(b) GHG emissions estimates were obtained from the *University of New Hampshire's Campus Carbon Calculator, Version 9.1*.





Figures

Figure 1 - SFY2016 GHG Emission Source Contributions

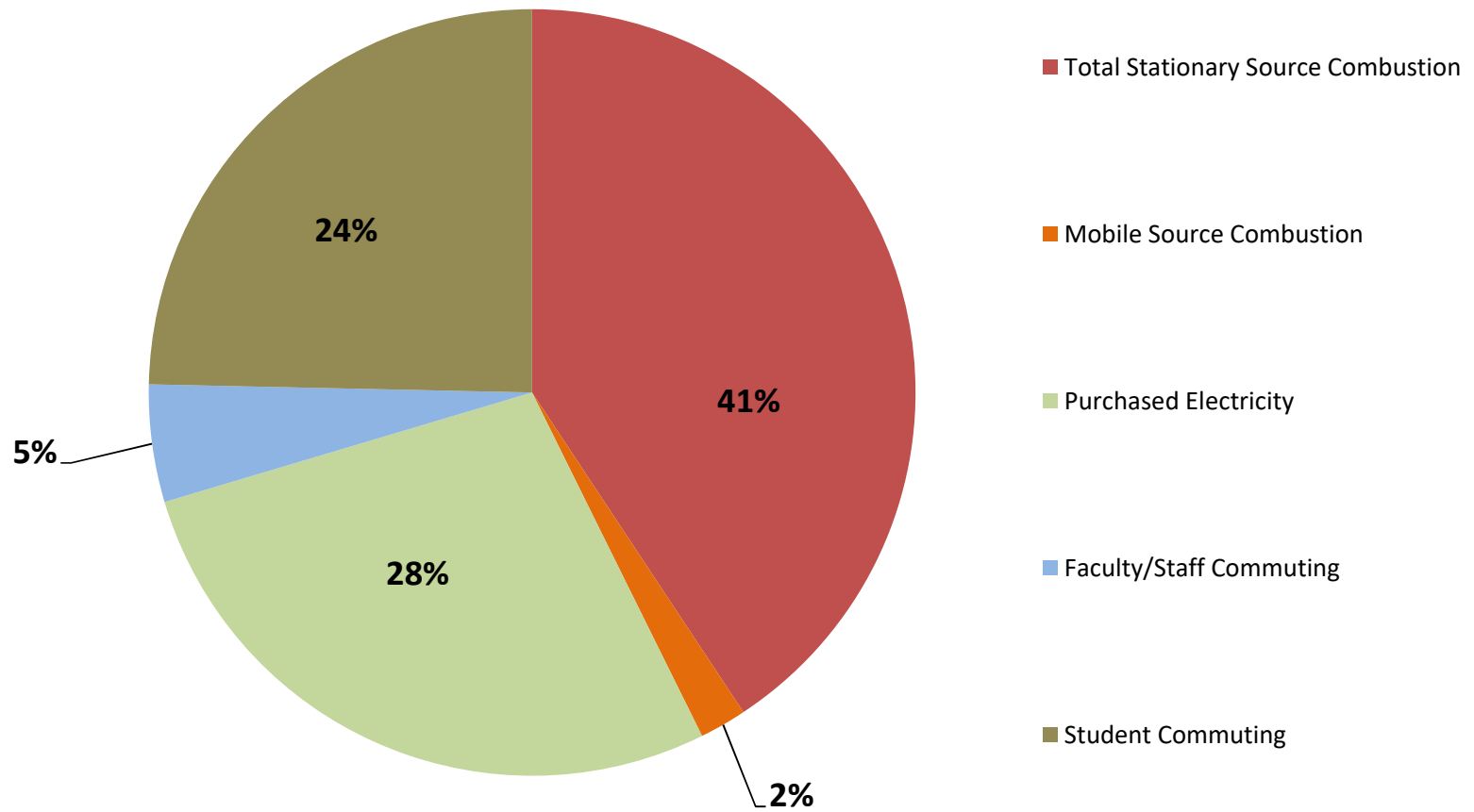
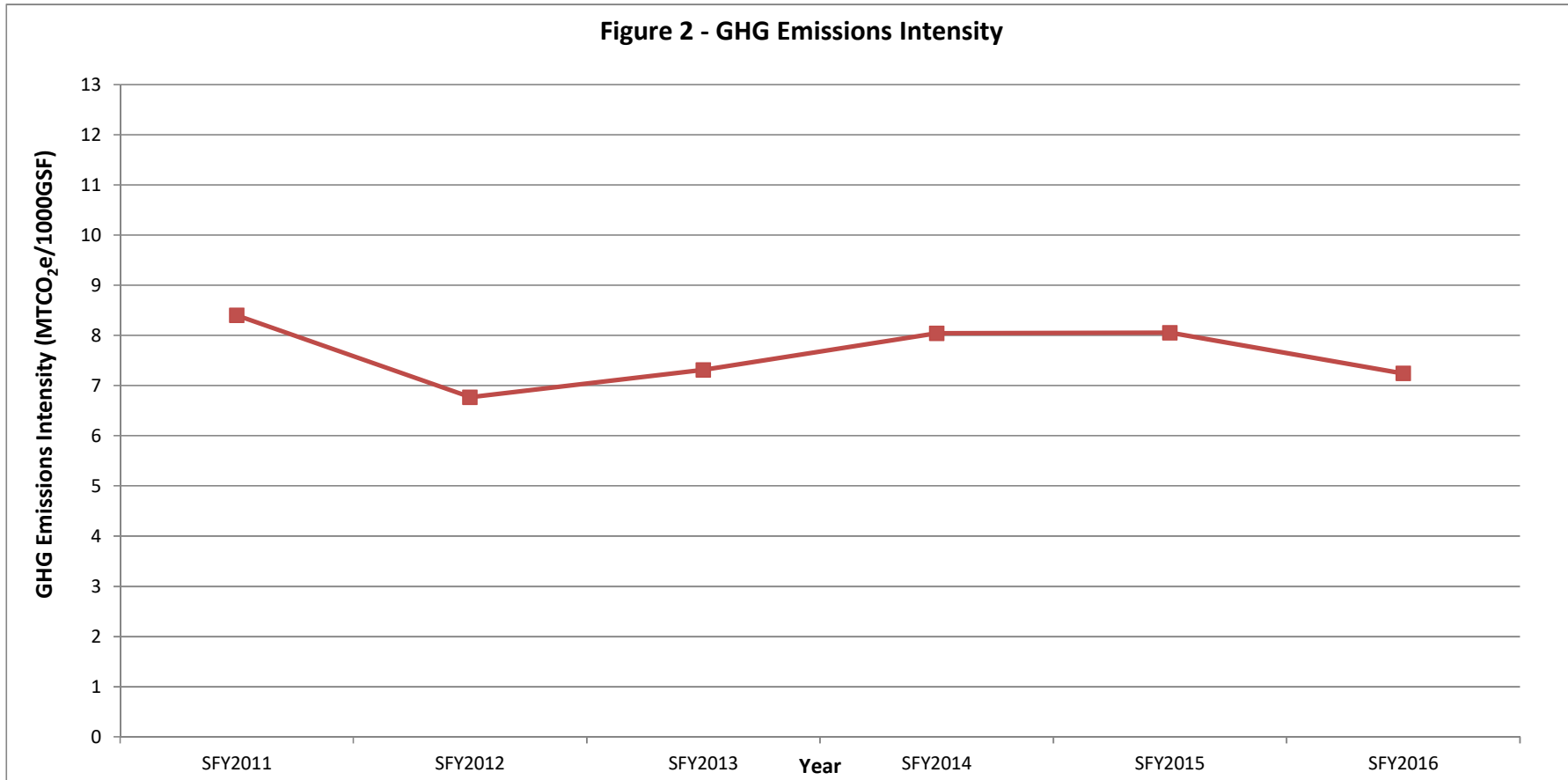




Figure 2 - GHG Emissions Intensity



Notes:

(a) Greenhouse gas (GHG) emission intensities were estimated based on GHG emissions obtained from *University of New Hampshire's Campus Carbon Calculator, Version 9.1* and gross square footage obtained from New York Energy Manager.



Figure 3 - Absolute GHG Emissions and Gross Square Footage

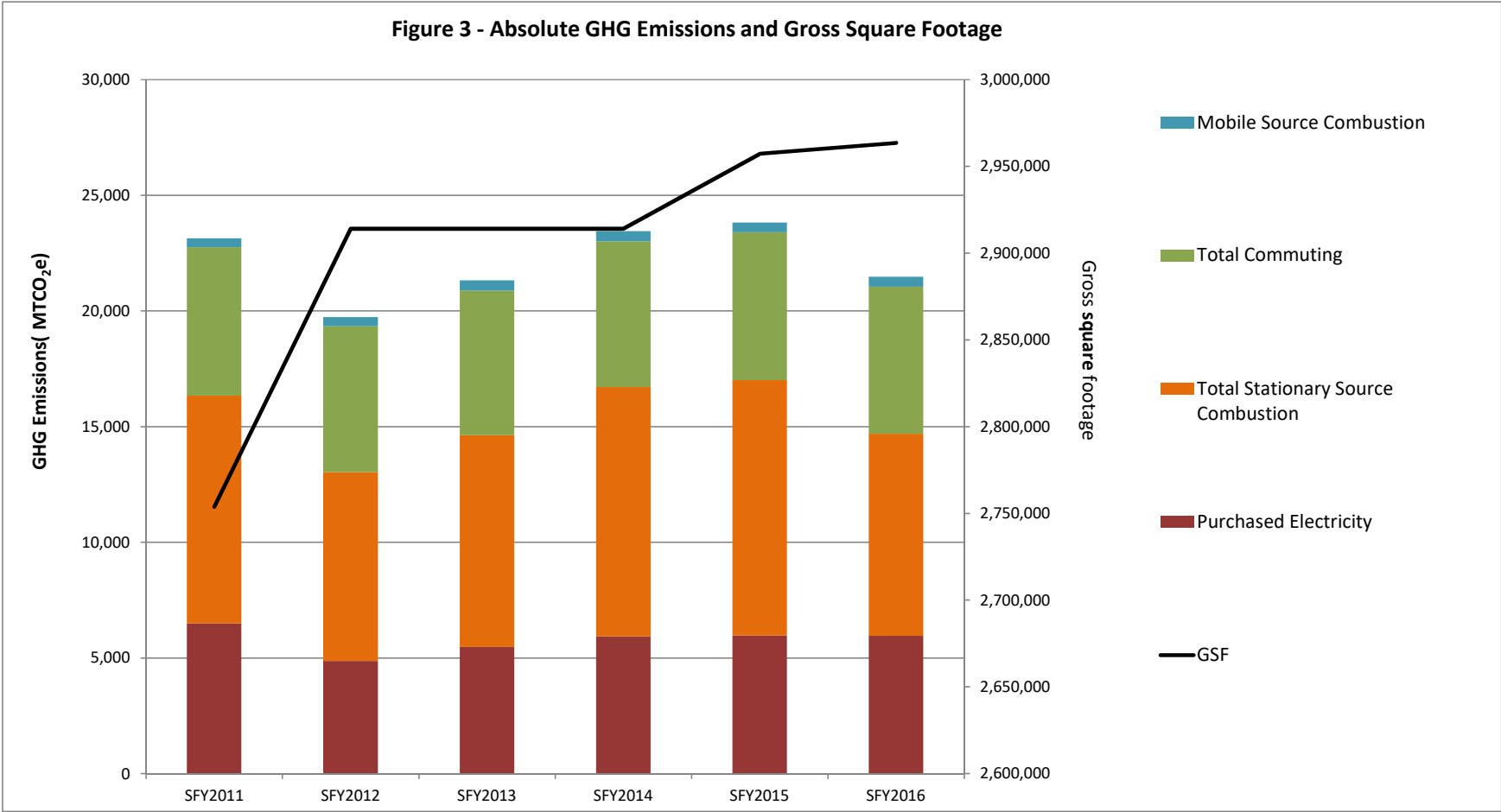


Figure 4 - EO 88 Source EUI

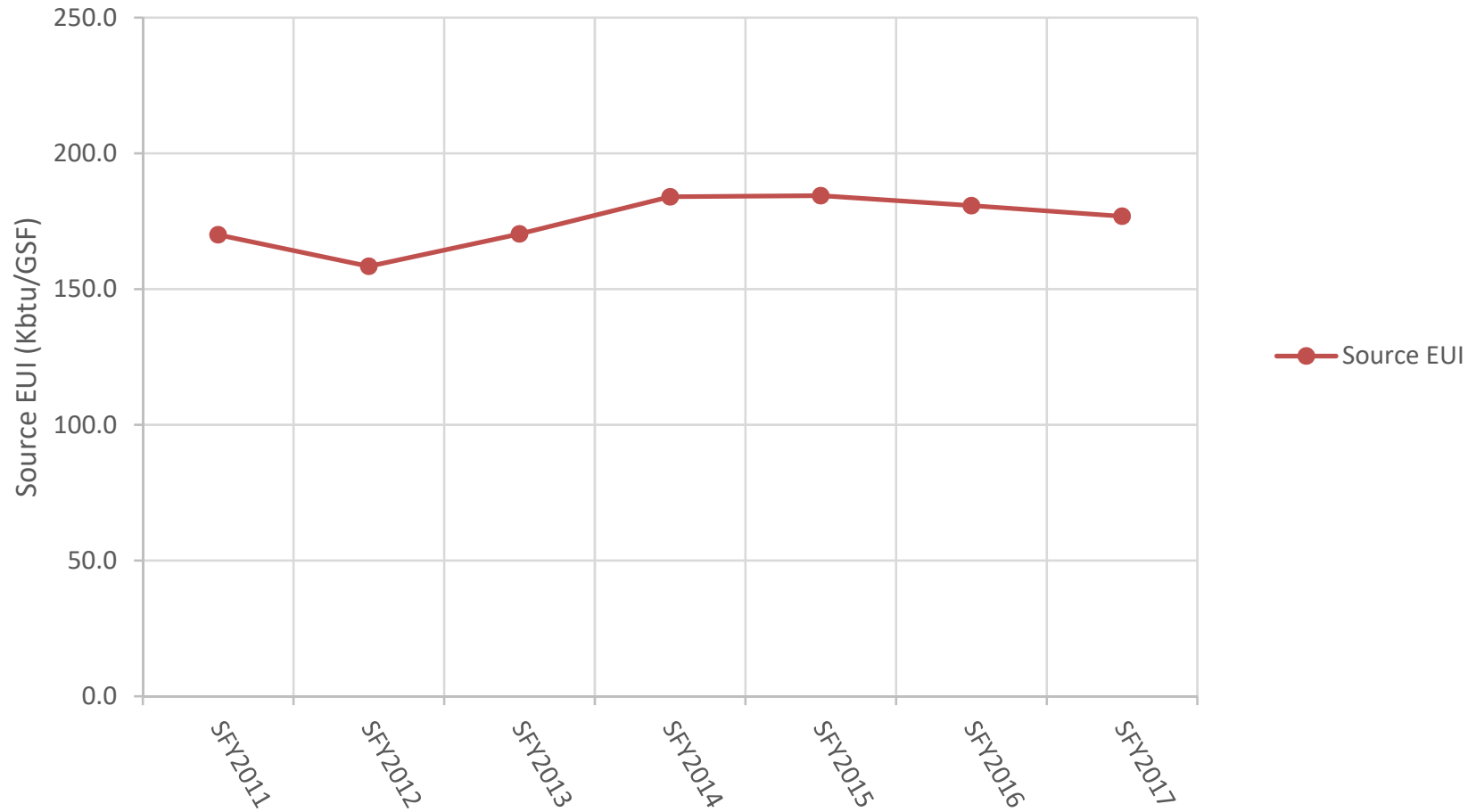
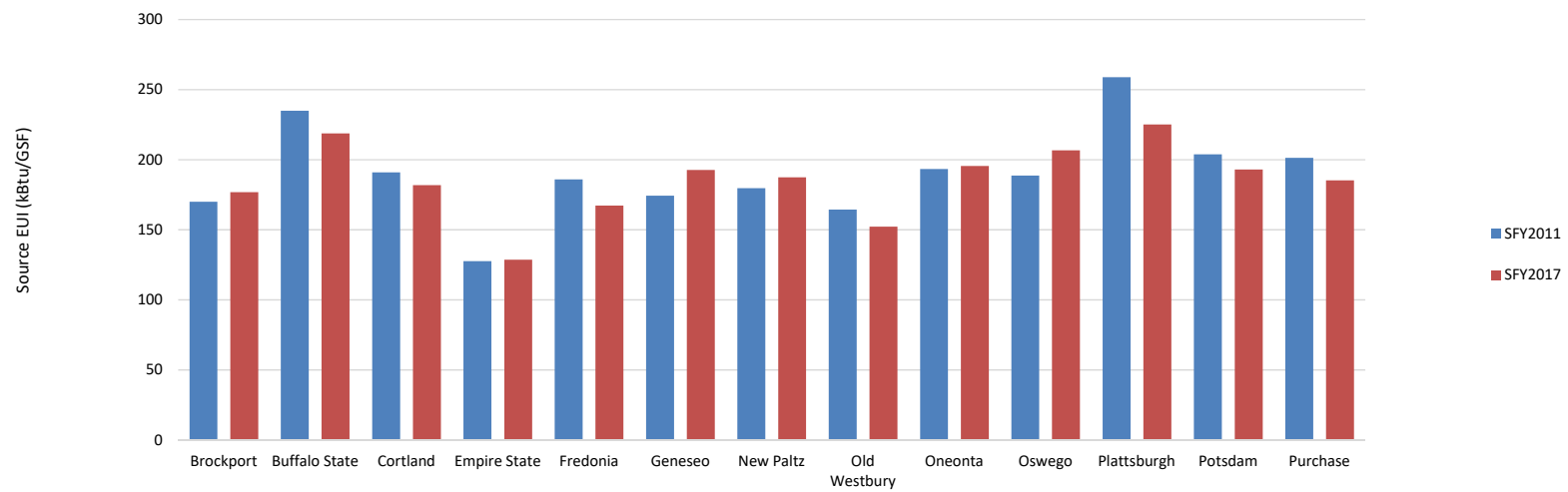


Figure 5 - EO 88 Source EUI Change (% of Baseline) for Brockport and other SUNY Campuses



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