OSCEOLA COUNTY, FL

Greenhouse Gas Emissions Inventory

2012

ACKNOWLEDGEMENTS

This publication has been financed in part by the Department of Energy's (DOE) Energy Efficiency and Conservation Block Grant (EECBG).

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INTRODUCTION

Osceola County, Florida (the County) serves as the south central boundary of the greater Central Florida County metropolitan area encompassing approximately 1,506 square miles. It is home to two incorporated jurisdictions including the Cities of Kissimmee and St. Cloud as well as a variety of unincorporated areas, some of which include Celebration, Poinciana, and Harmony. According to the 2010 U.S. Census, Osceola County's population was 268,685 in 2010, 55% higher than in 2000.

As the County continues to provide quality services and maintain a high standard of living for its constituents, local leaders are committed to finding ways to plan for and manage future growth in a way that is socially, economically, and environmentally sustainable. One way the County plans to do this is by implementing its Sustainability Action Plan (SAP) for the 2014-2019 calendar years. This plan outlines a series of goals, objectives, and actions the County will follow to encourage smart growth. One important element of the County's SAP deals with reducing energy consumption and greenhouse gas emissions through energy efficiency and conservation. The County believes that this can help to reduce operational expenses, buffer against rising energy prices, and mitigate the harmful impacts of climate change.

This report summarizes the results of the Greenhouse Gas Emissions Inventory (GHGI) conducted by County consultants. The GHGI analysis quantified Osceola County's emissions from its municipal operations in the year 2011. The information presented in this report was used by the County and its consultants to inform the development of strategic energy and emissions related goals, objectives, and actions found in the SAP. This GHGI report along with the SAP are considered living documents that will be updated periodically to monitor the County's progress at meeting the energy/ emissions reduction goals so that it can fulfill its commitment to smart growth.

Image Source: Bing Maps

GHGI BASICS

Performing a GHGI entails following a systematic process of quantifying emissions generated by an organization that contribute to climate change. This is done by quantifying energy used by an organization such as electricity, fuel, and natural gas and then applying emissions factors to determine the quantity of emissions associated with the use of that energy. The GHGI also quantifies other types of non-carbon fugitive emissions that contribute to the global warming process such as refrigerants used by an organization. The total sum of an organization's emissions is commonly referred to as a carbon footprint.

The GHGI is a valuable tool because it provides an enterprise-level perspective of energy use and expenditures across different functional departments of an organization. Gaining this perspective helps an organization identify areas of inefficiency so that actions can be taken to improve the way a building, piece of infrastructure, or other assets consume energy to reduce emissions. Once energy and emissions are quantified, the GHGI can also help an organization define its baseline. A baseline allows the performance of energy/ emission reduction initiatives to be measured over time.

EXPRESSING EMISSIONS

To interpret the results of a GHGI, it is important to understand how emission quantities are commonly expressed. Carbon dioxide (CO2) is one of six main greenhouse gases that contribute to global warming. The five other gases are: methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). Each gas has different properties which influence how well it traps heat. To account for this, each gas is assigned a global warming potential. Carbon dioxide's global warming potential is 1 and methane's global warming potential is 21. This means that methane traps heat 21 times more effectively than carbon dioxide making it a more potent greenhouse gas. Since most emissions are composed of multiple gases, industry standards provide calculations that normalize all quantities of gas to Metric Tons of Carbon Dioxide Equivalent (MTCO2e). By expressing emission quantities in MT CO2e, they can be compared to emissions from other entities with varying emission profiles.

Table 1: Global Warming Potentials of the six GHGs targeted by the Kyoto-Protocol.

Global Warming Potentials of Kyoto Gases	
Greenhouse Gas	**GWP**
Carbon Dioxide (CO2)	1
Methane (CH4)	21
Nitrous Oxide	310
HFC	12-11,300
PFC	6,500-9,200
Sulfur hexaflouride (SF6)	23,900

Source: IPCC, Second Assessment Report (1995)

GHGI SCOPING

Organizational Boundaries

Organizations consume energy and emit greenhouse gas emissions in different ways. The first step in conducting a greenhouse gas emissions inventory is to define its organizational boundary. The process of defining organizational boundaries identifies which sources of emissions will be included in the inventory and which sources will be excluded. There are a variety of ways to define organizational boundaries. Operational and financial control approaches are the two most common ways to do so. Following the operational approach, organizations quantify emissions from assets that they control and whose energy consumption they can influence. Following the financial control approach, organizations must quantify emissions that they have a majority financial stake in. The choice of which approach to use depends on reporting requirements and the unique structure of the organization.

Operational Boundaries

Once the organizational boundary is defined, the operational boundaries are established according to three different scopes of emissions as shown in the figure below. Scope 1 emissions are generated through the direct combustion of fuel, leaks of refrigerant, release of methane gas from landfills or generation of onsite electricity. Scope 1 emissions are referred to as "direct emissions" since emissions are generated onsite. Scope 2 emissions occur offsite and are generated by the purchase of energy, which includes electricity. Scope 3 emissions result from supply chain activities, consumer and post-consumer activities, waste, business travel, and employee commuting. It is mandatory to report Scope 1 and 2 emissions when conducting a GHGI. The reporting of Scope 3 emissions is voluntary.

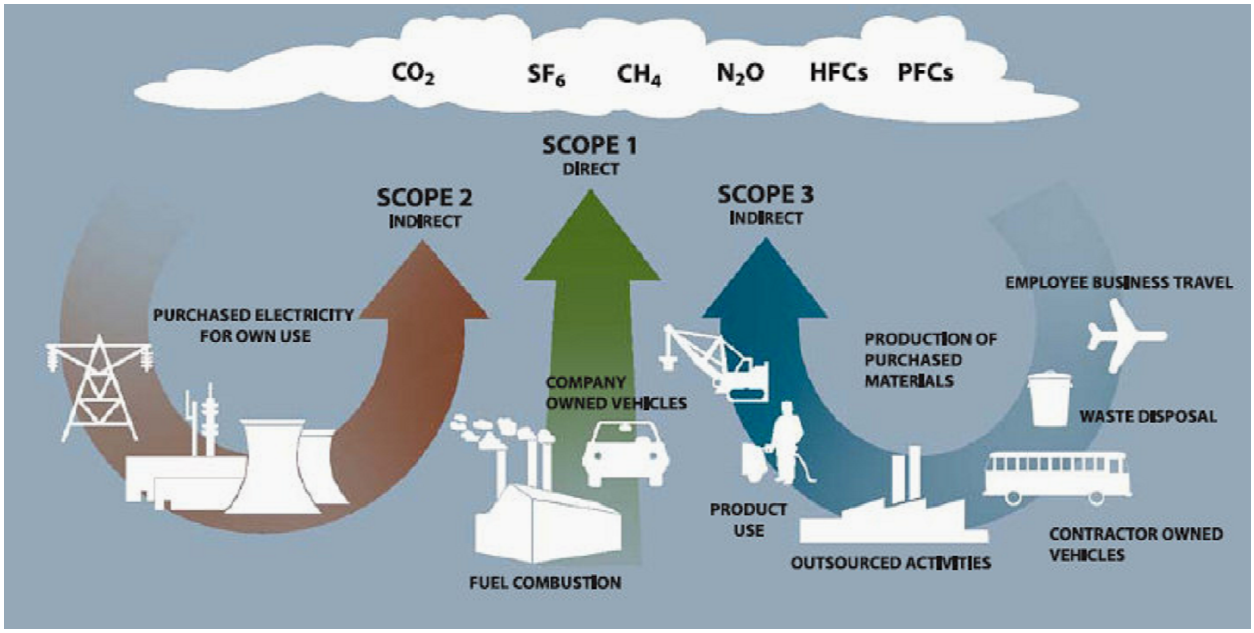


Diagram Source: WRI/WBCSD GHG Protocol *Corporate Accounting and Reporting Standard*

BASELINE YEAR

The first year an organization quantifies its greenhouse gas emissions is referred to as its baseline year. The baseline year is used as the “business as usual” operating standard by which the organization can benchmark future emissions reduction activities. The baseline year is important because it helps to inform reduction goals and is used as a measuring stick by which an organization can evaluate its carbon and energy reduction goals. The SAP developed its energy and emissions related goals and objectives using 2011 as Osceola County's baseline year.

USE OF THE INVENTORY

This inventory was created by Osceola County in order to set a baseline for future trend analyses and comparison to past emissions. Using this inventory as a greenhouse gas emissions baseline, the County can make informed policy decisions to reduce or mitigate emissions, and reduce overall energy costs. This is not a tool adequate for comparing the results of this inventory to those of other communities as these inventories are created uniquely for each community. Each community has different sources of emissions and utilizes different types of organizational boundaries making a direct comparison imperfect.

METHODOLOGY

The County used the Local Government Operations Protocol (LGOP) Version 1.1 (LGOP V1.1) published in May 2010. LGOP V1.1 was developed in partnership with the California Air Resources Board, the California Climate Action Registry, the Climate Registry and ICLEI for Local Governments for Sustainability. The decision to use LGOP was made primarily because the protocol is one of the most commonly used in the United States and within Florida. The organizational boundary for this inventory follows the operational control approach and the GHGI quantified Scope 1 and 2 emissions for County operations (Scope 3 emissions were not included in this inventory). Based on data availability the County established its baseline year to be calendar year 2011.

DATA COLLECTION & POINTS OF CONTACT

This section outlines the data collection process for each emissions source and provides point of contact information to facilitate future data collection efforts by the County. Please refer to the table below for contact information organized by scope and emission source.

Department/ Utility
Scope 1: Fuel and Natural Gas
General Fleet (Fuel)
Sheriff Department Fleet (Fuel)
TECO Peoples Gas (Natural Gas)
Building Maintenance Administration (Emergency Generator Fuel)
Scope 1: Landfill Emissons
Solid Waste Compliance
Scope 1: Refrigerants
Building Maintenance Administration
Sheriff Department Fleet
Scope 2: Electricity
Progress Energy
Peace River Electric Cooperative, Inc.
Kissimmee Utility Authority
Orlanda Utilities Commission

SCOPE 1 STATIONARY AND MOBILE FUEL COMBUSTION

The County's Scope 1 fuel emissions come from both stationary and mobile sources. Stationary emissions are attributed to diesel fuel consumed by miscellaneous equipment used to support County buildings such as emergency generators as well as motors used to operate water pumping equipment. Mobile fuel emissions are attributed to two unique departments within the County; general fleet and the Sheriff's department fleet. General fleet consists of vehicles used to conduct day to day county business that consume both diesel and unleaded fuel. General fleet also includes smaller equipment such as lawn mowers and other petroleum consuming machines. The Sheriff's fleet mainly consists of police cruisers used to conduct law enforcement activities. The County maintains its own fueling stations where fleet vehicles can fill up as needed and fuel consumption is tracked using a fuel management system. This system records individual fuel transactions gathering important information such as miles traveled and gallons of fuel consumed. The County's consultant contacted representatives from general fleet and the Sheriff's department fleet to gain access to fuel consumptive history for 2010 and 2011 calendar years. Data was provided to the County's consultant in different formats that included fuel used by vehicle or in aggregate form by department or asset category.

Image Source: West Orlando News Online

SCOPE 1 NATURAL GAS EMISSIONS

Greenhouse gas emissions are generated when natural gas is used for heating, hot water or cooking purposes. All of the County's emissions from natural gas combustion are attributable to one TECO People's Gas account serving the County's correctional facility. Data was provided by TECO People's Gas in Therm units for monthly usage in years 2010 and 2011.

SCOPE 1 LANDFILL EMISSIONS

The County's Scope 1 landfill emissions are generated by the anaerobic decomposition of waste. At the time this inventory was conducted the County owned and operated two landfills. The two landfills are the Southport Landfill located at 4400 Hunt Road in Kissimmee, FL and the Bass Road Landfill located at 750 South Bass Road in Kissimmee, FL. The Southport site was officially closed in July of 2011, but stopped collecting waste in August of 2004. It encompasses approximately 38.5 acres of land. The landfill is currently reporting emissions to the EPA and maintains an active gas flaring system that breaks down the methane emissions it generates into less potent carbon dioxide. The Bass Road site was officially closed in April of 2011 and stopped accepting waste in February of 2009. The landfill has Class I refuse cells encompassing approximately 50.3 acres and 28 acres of space dedicated to construction and demolition debris. The Class I refuse cell at Bass Road maintains a passive gas ventilation system and the construction and demolition cell maintains gas flaring systems. Emissions from the Bass Road and Southport landfills are included in the County's GHGI as Scope 1 emissions. There is also one privately owned and operated landfill in the County called J.E.D. Solid Waste Management Facility. The J.E.D. site is a Sanitary Class I landfill that maintains an active gas flaring system. This facility was not included in the inventory because the County does not have operational or financial control over it. County solid waste management staff provided the County's consultant with data on the tonnage of waste in-place as well as data on the landfill's flaring systems.

Bass Road Landfill (Source: Bing Maps)

SCOPE 1 REFRIGERANTS EMISSIONS

Refrigerants are used in cooling systems found in vehicles and buildings. When leaked to the atmosphere they act as a potent greenhouse gas. Refrigerant records are maintained by building and vehicle maintenance personnel as part of the refrigerant purchase schedule. These records were obtained from building facilities department, general fleet, and Sheriff Department fleet and used to calculate their greenhouse gas emission values.

SCOPE 2 ELECTRICITY EMISSIONS

The County's Scope 2 emissions are associated with the purchase of electricity used in buildings, infrastructure, street lights, and traffic lights. The County purchases electricity from a variety of different utility companies that include: 1) Kissimmee Utility Authority (KUA), 2) Progress Energy, 3) Orlando Utilities Commission (OUC), and 4) Peace River Electric Cooperative. Purchases are made by the County using different funding accounts assigned to different departments that include, but are not limited to, the Board of County Commissioners, Osceola Corrections Department, the Library System, the Health Department, and others. All County controlled operations were included in this analysis. Electricity purchased by the Osceola County School Board was not included in this inventory because the School Board is independent of the County. Additionally, electricity consumption of Municipal Service Taxing Units (MSTUs) and Municipal Service Benefit Units (MSBUs) was excluded for the same reason.

Electricity consumption records are maintained by various departments within the County. The records maintain data on the amount of dollars expended for electricity but not the kilowatt hours (kWh) of electricity being consumed. Therefore, the County's consultant had to collect electricity consumptive and billing history directly from each utility provider. Data was provided by each utility for calendar years 2010 and 2011 containing monthly records of bill amounts in dollars, bill dates, meter addresses, and electricity consumption in kWh. All of this information was combined to create one unified database for the County which was organized as required by the LGOP protocol.

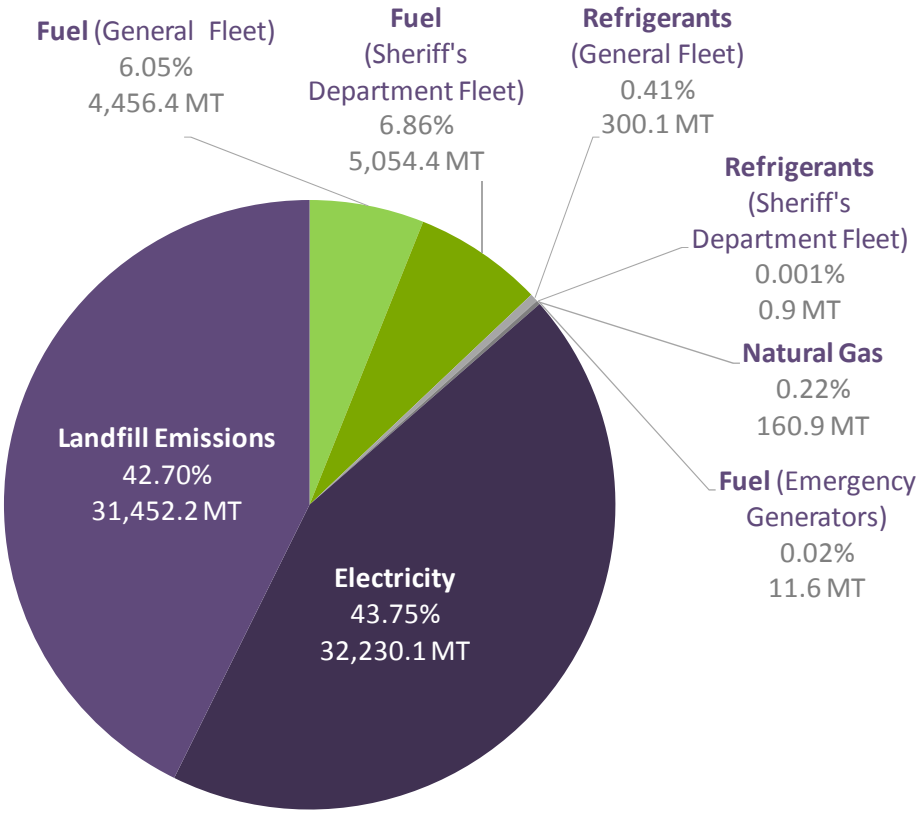
GHGI RESULTS

The County's total carbon footprint for 2011 was 73,666.6 MT CO2e. The largest source of emissions was electricity (Scope 2) at 43.75% and 32,230.1 MT CO2e, followed by landfill emissions (Scope 1) at 42.70% and 31,452.2 MT CO2e, fuel – Sheriff's Department (Scope 1) at 6.86% and 5,054.4 MT CO2e, fuel – General Fleet (Scope 1) at 6.05% and 4,456.4 MT CO2e, refrigerants - General Fleet (Scope 1) at 0.41% and 300.1 MT CO2e, natural gas (Scope 1) at 0.22% and 160.9MT CO2e, fuel - emergency generators (Scope 1) at 0.02% and 11.6 MT CO2e, and refrigerants - Sheriff's Department Fleet (Scope 1) at 0.001% and 0.9 MT CO2e.

73,666.6 MT CO2e

2011 Total GHG Emissions from Municipal Operations

Equivalent to: 1) Annual emissions of 14,445 passenger vehicles, or 2) 401 railcars worth of coal.[1]



[1] http://epa.gov/cleanenergy/energy-resources/calculator.html

ENERGY AND EMISSIONS DASHBOARD

The County consultant developed the energy and emissions dashboard which provides a detailed overview of how Scope 1 and Scope 2 emissions are distributed across County departments to provide information on energy use along with financial expenditures for each emissions scope. All energy values have been converted to Million Metric British Thermal Units (MMBTUs) as well as $MTCO_2e$ to allow for comparison. The category with the largest energy usage in the County is Administrative Facilities which is made up of 137 electricity accounts. Energy expenditures for the Administrative Facilities category totaled $2,185,351.54 in 2011. The second largest consumer of energy in the County was the Sheriff's Department Fleet, with expenditures of $1,821,442.00 for gasoline and diesel fuel purchases in 2011. Finally, the third largest energy consumer in the County is the General Fleet Department which spent $1,544,556.89 on gasoline, diesel, and bio-diesel in 2011. Refer to the table on the next page for a dashboard of the County's 2011 energy use and emissions.

Greenhouse Gas Emissions Inventory Dashboard

CATEGORY	Number of Accounts	Energy Type	Emissions Scope	Qty.	Unit	$	MMBTU	MT CO_2e
FACILITIES	1	Natural Gas	Scope 1	**30,161.6**	Therms	**$32,764.54**	**3,016.2**	**160.9**
Administrative Facilities	137	Electricity	Scope 2	**36,842,052.4**	kWh	**$2,185,351.54**	**125,710.3**	**19,746.7**
Public Venues and Spaces	14			**261,913.3**		**$34,520.51**	**893.7**	**140.4**
Libraries	5			**2,815,641.8**		**$152,938.65**	**9,607.4**	**1,509.1**
Parks and Recreation Facilities	31			**4,909,077.2**		**$680,938.98**	**16,750.5**	**2,631.2**
Storm Water Pumping	14			**1,735,510.4**		**$170,771.77**	**5,921.8**	**930.2**
Unidentified-Buildings/ Other	8			**2,788,713.6**		**$300,706.68**	**9,515.5**	**1,494.7**
LIGHTING								
Street Lights	11	Electricity	Scope 2	**513,547.6**	kWh	**$59,799.74**	**1,752.3**	**275.3**
Traffic Signals	93			**814,007.5**		**$111,667.71**	**2,777.5**	**436.3**
Other Outdoor Lighting	132			**2,107,441.1**		**$297,357.10**	**7,190.9**	**1,129.6**
Parking Lot Lighting	1			**24,260.8**		**$6,395.67**	**82.8**	**13.0**
UNIDENTIFIED ELECTRICITY ACCOUNTS	118	Electricity	Scope 2	**7,320,480.9**	kWh	**$798,508.74**	**24,978.5**	**3,923.7**
VEHICLE FLEET								
General Fleet		Gasoline	Scope 1	**129,008.7**	Gallons	**$421,481.29**	**16,030.7**	**1,144.9**
		Diesel		**324,879.1**		**$1,119,957.81**	**45,057.8**	**3,304.8**
		Bio-Diesel		**513.0**		**$2,221.27**	**66.7**	**4.9**
		Kerosene		**192.8**		**$896.52**	**26.0**	**1.9**
Sheriff Department Fleet		Gasoline		**569,548.0**		**$1,819,428.70**	**70,772.6**	**5,044.9**
		Diesel		**942.6**		**$2,013.62**	**130.7**	**9.6**
REFRIGERANTS								
General Fleet		N/A	Scope 1	**509.0**	Pounds	**$3,457.40**	N/A	**300.1**
Sheriff Department Fleet		N/A		**1.5**		N/A		**0.9**
EMERGENCY GENERATORS		Diesel	Scope 1	**1,150.8**		**$4,321.99**	**159.6**	**11.6**
LANDFILL		N/A	Scope 1	**N/A**	N/A	N/A	N/A	**31,452.2**
TOTAL:						**$8,205,500.24**	**340,441.5**	**73,666.6**

LARGEST ELECTRICITY USERS

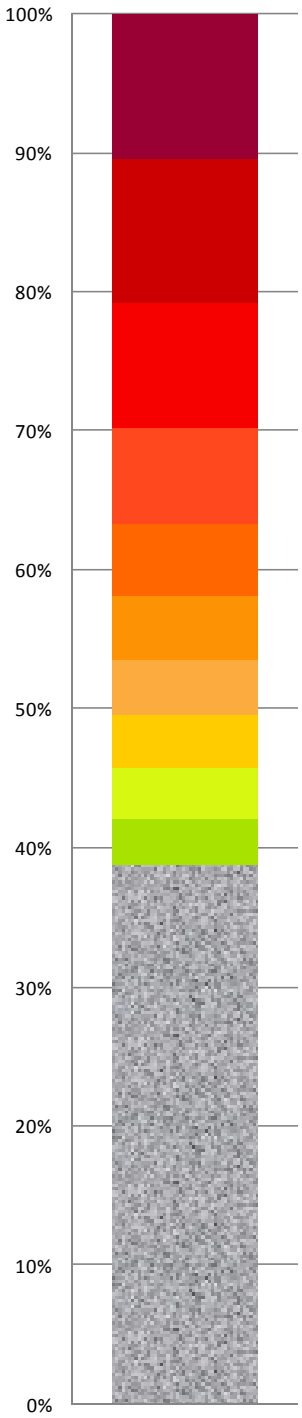
The largest consumers of electricity are excellent targets for future energy efficiency initiatives and improvements, as they have the potential to yield the highest returns in terms of cost savings and emissions reductions. As part of the GHGI, these users were identified and their consumption was compared against the electricity usage of all of County's facilities. The bar graph shows the top ten electricity consumers in 2011 which represent 61.2% of total 32,230.1 MT CO2e emissions from electricity usage.

Top 10 Electricity Consumers Represent:

61.2% of Emissions from Electricity Usage

26.8% of All of County's Emissions

	1	EMERGENCY OPERATIONS/ 911 COMMUNICATIONS CENTER (10.4%)
	2	OSCEOLA COUNTY GOVERNMENT CENTER - TAX COLLECTOR/ PROPERTY APPRAISER (10.3 %)
	3	SHERIFF ADMINISTRATION COMPLEX (9.1%)
	4	OSCEOLA COUNTY COURTHOUSE (7.0%)
	5	SHERIFFS FLEET MANAGEMENT CENTER (5.1%)
	6	CORRECTIONS FACILITY (4.6%)
	7	OSCEOLA HERITAGE PARK - ARENA (4.0%)
	8	CORRECTIONS FACILITY - MINIMUM SECURITY/WORK RELEASE (3.8%)
	9	OSCEOLA HERITAGE PARK - HVAC CHILLERS (3.6%)
	10	ST. CLOUD VETERAN'S MEMORIAL LIBRARY (3.3%)

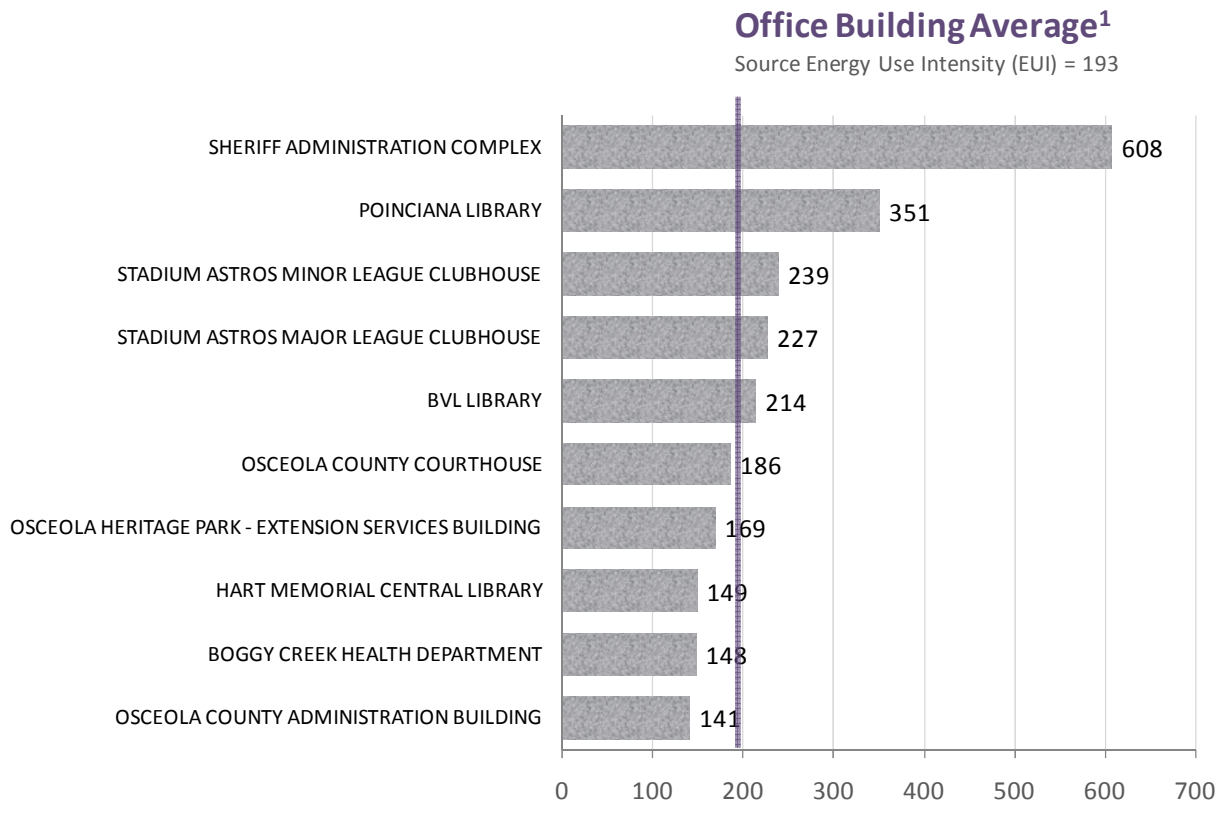


Graph: Top Users as Percentage of 2011 Electricity Consumption

FACILITY EFFICIENCY ANALYSIS

The amount of electricity a building consumes is affected by factors such as its size, intended function and efficiency. When looking at ways to reduce electricity usage, improving the efficiency of a building is a top target. Determining a building's efficiency allows a building manager to compare their facilities to other similar buildings and make cost effective decisions to reduce consumption. One of the most commonly used ways to gauge a building's efficiency is by calculating its energy use intensity (EUI) and comparing it against building category averages. The EUI adjusts for the effect or building size on its consumption, and by comparing it to building in the same category (e.g. hospitals to hospitals) the effect its intended function has on energy consumption is reduced.

An EUI was calculated for a select group of top electricity consumers in the County by dividing the total amount of energy consumed in a building in a year by its square footage (kBTU/ft^2). It was then adjusted to account for the losses of delivering electricity from the power generation source to the facility. This was done by multiplying the EUI by 3.34, the site to source conversion factor for electricity. To allow for comparison to the national EUI average of office buildings, facilities whose use type is similar to that of an office environment were analyzed. They are ranked below from most efficient (low EUI) to least efficient (high EUI):



[2] Office Building Average EUI Value: http://www.energystar.gov/index.cfm?fuseaction=buildingcontest.eui

COUNTY COMPARISON ANALYSIS

A rough comparison of Osceola County's emissions to a select group of Florida Counties was developed to provide an idea how the County compares. The reason this is considered a rough comparison is because a variety of factors exist that make an "apples to apples" comparison difficult. Factors such as the variety of services a County provides and the quality of those services stand in the way of making an accurate comparison. The comparison below then should be viewed in the context that every County and its emissions are unique. With that said, the comparison below provides four ratios for Lee, Hillsboro, Osceola and Sarasota Counties. The ratios express the amount of annual municipal emissions that are emitted per resident of that County. The lower the ratio the more efficient (or less emitting) the County's operations are per resident. In other words, these are the County's annual emissions for things such as police stations, public works vehicles, courthouses, and all other County operations/ facilities divided by the number of residents that reside within the County. Residents of Counties residing in incorporated areas (e.g. residents of the City of Kissimmee living within Osceola County) were excluded from this analysis.

Municipal GHG Emissions per Capita per Baseline Year
(MT CO_2e/ Individual/ Year)

	Lee County	Hillsboro County	Osceola County	Sarasota County
GHGI Baseline/ Population Year	2010	2009	2010	2005
Population	346,439	795,573	178,654	228,865
Scope 1 and 2 Emissions (MT CO_2e)	317,404	424,675	73,667	65,912
Differences from Osceola County	water delivery facilities, transit fleet, and waste to energy facility	power generation facility, and wastewater facilities	-	wastewater facilities

CONCLUSION

Data was collected on Osceola County's electricity, natural gas, fuel, and refrigerant use. Landfill data was collected to determine emissions attributable to the County's waste storage facilities. Using the Local Government Operating Protocol (LGOP) as guidance, the combined Scope 1 and 2 emissions were calculated to be 73,666.6 MT of CO_2e in year 2011. Emissions were attributed to the various County departments and facilities to determine the largest emitters and their share of total emissions.

The emissions associated with electricity use represent 43.75% of total emissions, followed by landfill emissions at 42.70%. The remaining 13.55% of emissions were the result of stationary and mobile fuel combustion and emissions resulting from the use of refrigerants and natural gas. The top 10 users of electricity represent 61% of all consumption in that category and 26.8% of overall emissions. The top three leading facility emitters were the Emergency Operations/ 911 Communications Center at 10.4% of total electricity emissions, Osceola County Government Center at 10.3%, and Sheriff Administration Complex at 9.1%. This information was used to inform the development of Osceola County's Sustainability Action Plan objectives for year 2014 - 2019.

Appendix A

Largest Electricity Consumers Map