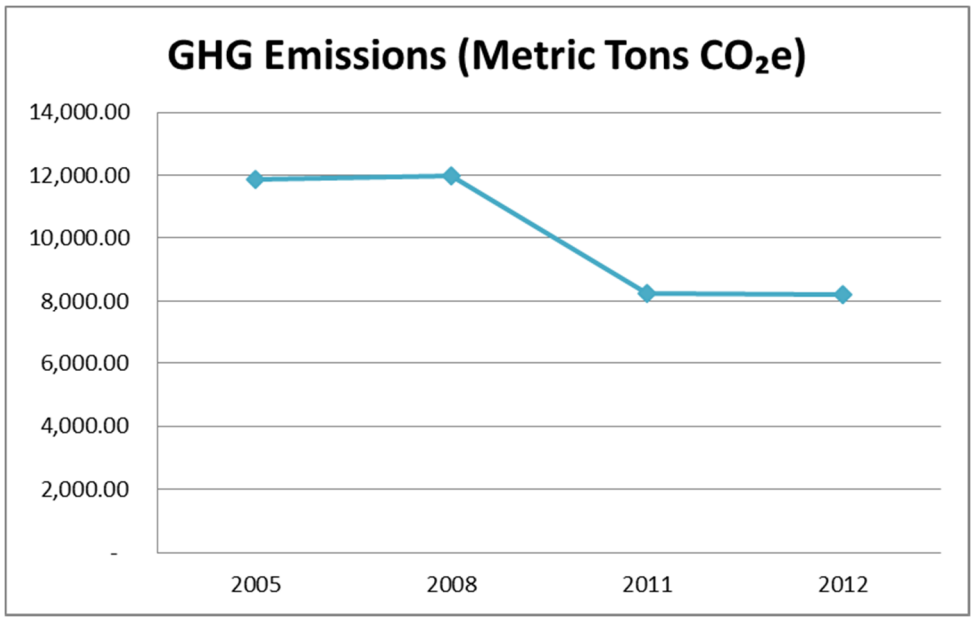
MONROE COUNTY
2013 Greenhouse Gas Emissions Inventory

As part of its ongoing efforts to be a leader in energy efficiency and sustainability, Monroe County has updated its greenhouse gas (GHG) emissions inventory, comparing its 2012 results to an original 2005 baseline. This inventory measures total energy consumption and GHG emissions in two categories: government operations and the community at large. Measuring emissions is an important component of managing the County's contributions to climate change and identifying where the greatest opportunities exist to reduce those impacts. This 2012 GHG Emissions Inventory serves as a significant milestone in documenting the County's progress toward sustainability and in determining next steps for targeting opportunities for continuous improvement.

PROGRESS SINCE 2005[1]

Since 2005, Monroe has demonstrated significant progress in reducing GHG emissions and has reduced emissions in all sectors of County operations. For government buildings and operations, emissions dropped by 31 percent, from 11,854 metric tons of carbon dioxide equivalent (CO_2e) in 2005 to 8,224 metric tons in 2012. This reduction is equivalent to the emissions from the electricity use in 499 homes.[2] This 31 percent reduction means the County has already exceeded the reduction targets established in its *Energy Efficiency and Conservation Strategy* of 2011 to reduce greenhouse gas emissions by 20 percent by 2020 as compared to the 2005 baseline.[3]

Figure 1: GHG Emissions from Monroe County Government Operations



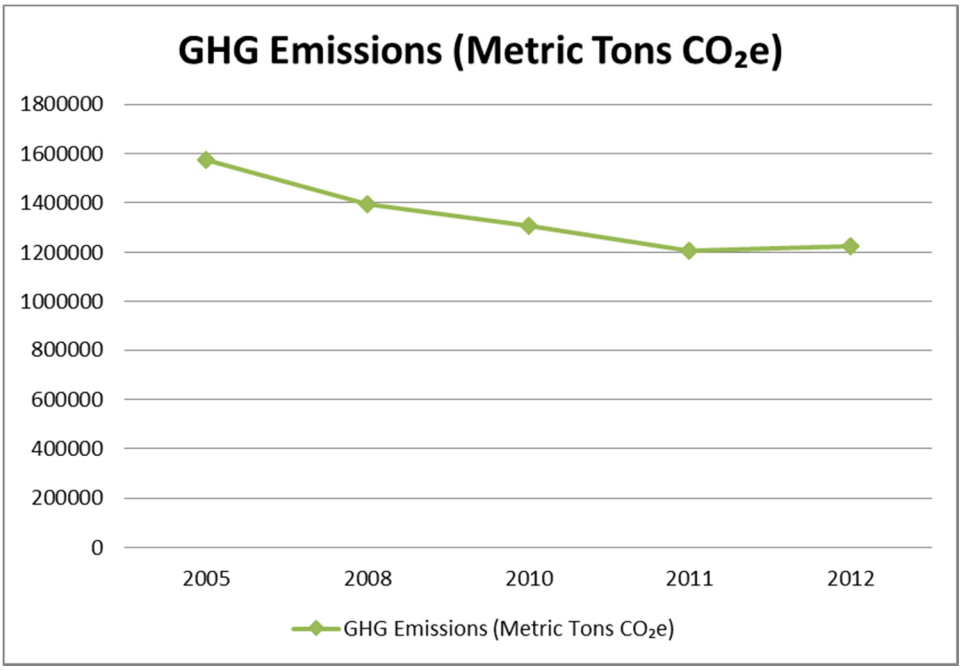
[1] The baseline GHG emissions numbers from 2005 have been revised for both municipal operations and community scale to reflect consistent methods and data sources and a fair comparison between 2005 and 2012 results.

[2] US EPA Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html

[3] Monroe County, Florida, *Energy Efficiency and Conservation Strategy.* 2011. http://fl-monroecounty.civicplus.com/DocumentCenter/View/4041

At the community scale, emissions decreased by 22 percent, from 1,572,770 metric tons of CO_2e in 2005 to 1,224,278 in 2012. Community emissions decreased in all sectors, and have surpassed the 20 percent reduction target. However, this reduction includes a one-time transition from municipal solid waste being entirely landfilled, to the majority being incinerated in a waste-to-energy facility, which provides significant and ongoing GHG reductions. While this reduction should be celebrated and is a reflection of effective waste management and climate action planning, it will be important to remember when setting future targets that it will be challenging to identify additional climate actions that will be able to reduce emissions at a similar magnitude.

Figure 2: GHG Emissions from Monroe County Community Activities



GOVERNMENT OPERATIONS

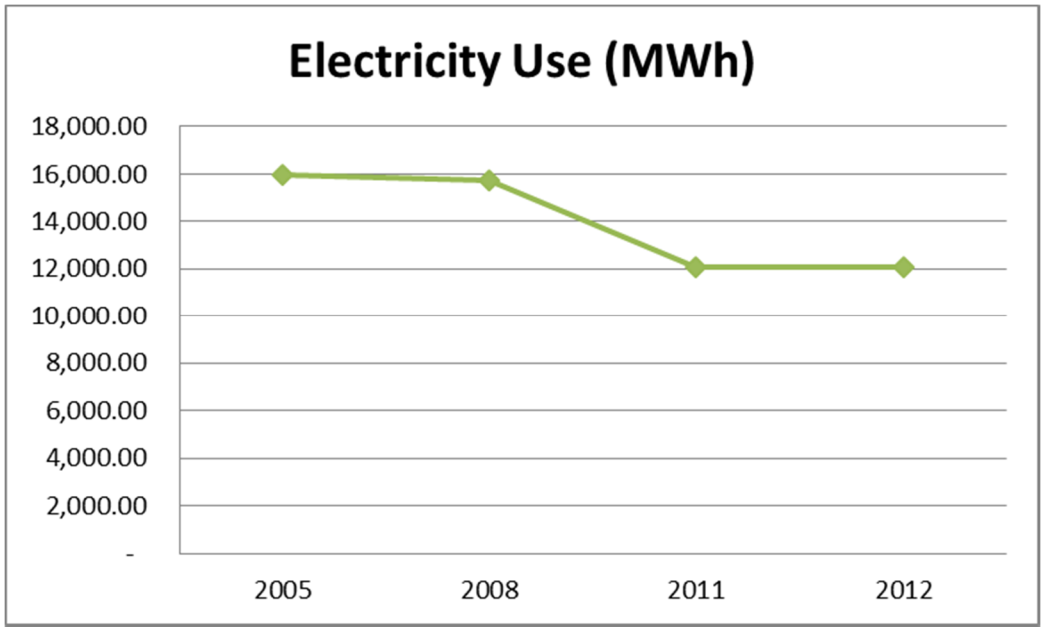
Monroe County's municipal operations were responsible for the emission of 8,224 metric tons of CO_2e in 2012, which is equivalent to the annual emissions created by providing energy to approximately 750 homes for one year. The breakdown of emissions by sector is listed in Table 1 below. Electricity used in buildings and facilities was responsible for the largest source of government GHG emissions (65%), followed by County fleet fuel use (20%). Given the contribution that these two sectors make to total GHG emissions, it is promising to see a reduction in both, with reductions in each category in excess of 25 percent. Also notable is a 60 percent reduction in energy usage from streetlights and traffic signals.

Table 1: Monroe County Government Operations Energy Use Summary

MONROE COUNTY OPERATIONS ENERGY USE SUMMARY						
	2005 (from EECS)			2012		
Scope 1	**gallons**	**Cost**	**MTCO2e**	**gallons**	**Cost**	**MTCO2e**
County Fleet and Equipment						
Mobile Emissions: Fuel Use (Gasoline)	166,692	$487,462	1,499	105,856	$322,862	936
Mobile Emissions: Fuel Use (Diesel)	74,132	$138,990	758	69,893	$274,679	718
Scope 1 total		$626,452	**2,257**		$597,541	**1,654**
Scope 2	**MWh**	**Cost**	**MTCO2e**	**MWh**	**Cost**	**MTCO2e**
Buildings and Facilities						
Buildings and Facilities Total	12,349	$1,497,583	7,421	9,791	$1,210,031	5,337
Streetlights and Traffic Lights						
Streetlights and Traffic Lights Total	1,369	$189,721	823	604	$136,499	329
Airport						
Airport Total	2,251	$285,499	1,353	1,657	$196,713	903
Scope 2 total	**15,969**	**$1,972,803**	**9,597**	**12,052**	**$1,543,243**	**6,570**
County Operations Total		**$2,599,255**	**11,854**		**$ 2,140,784**	**8,224**

Percentage reduction, 2005 to 2012:		
Electricity	**Cost**	**MTCO2e**
25%	18%	31%

Figure 3: Monroe County Government Operations Electricity Use



Energy Conservation Measures Pay Off

*A number of energy conservation measures implemented in early 2012 across several county buildings, including the Freeman Justice Center (*pictured here*), Lester Building, Historic Courthouse, Jefferson Browne Building, and Chiller Plant, have already provided significant savings. Together, the improvements have reduced energy usage at these facilities by 23 percent, leading to more than $70,000 in annual cost savings.*

Table 2: Monroe County Government Operations Energy Conservation Measures

ECM	Energy Savings (kWh)	Cost savings
Lighting	140,228	$17,473
Chilled water Plant	268,368	$33,163
Retro-commissioning-controls	304,431	$35,356
Motors-VFDs	34,598	$4,498
Bldg Envelope	5,391	$610
Total Estimated Savings(annual)	*753,016*	*$91,100*
Total actual savings year 1	714,902	$79,317
Total actual savings year 2	686,400	$71,313

COMMUNITY

The community inventory includes emissions generated by all residences and businesses within Monroe County, including government operations. The sources of these emissions are from electricity used in buildings, fuel from the transportation sector, and decomposition and incineration of solid waste generated within Monroe County. The total community-wide emissions from Monroe County in 2012 were 1,224,278 metric tons of CO2e. This is equivalent to the carbon sequestered by 1,003,507 acres of U.S. forests in one year[4]. In contrast, Monroe County itself has a land mass of approximately 629,120 acres. The breakdown of emissions by sector is provided in Table 2, with all categories showing emission reductions from 2005 to 2012. Electricity use was the largest share of emissions (57%), which makes it a target for future continued reduction.

Table 1: Monroe County Community Energy Use and GHG Emissions Summary

MONROE COUNTY COMMUNITY GHG EMISSIONS				
Scope 1	**2005**		**2012**	
Transportation	Fuel used (gal)	MTCO2e	Fuel used (gal)	MTCO2e
Mobile Emissions: Fuel Use (Diesel)		63,121.0	3,706,177.6	38,071.7
Mobile Emissions: Fuel Use (Gasoline)		581,014.0	47,803,594.0	422,602.9
Scope 1 total		**644,135.0**		**460,674.6**
Scope 2	Electricity used (kWh)	MTCO2e	Electricity used (kWh)	MTCO2e
Residential	707,992,535	425,442	692,025,831	377,239
Commercial	409,529,520	246,092	398,014,748	216,967
Industrial	206,342,975	123,994	200,036,902	109,045
Scope 2 total	**1,323,865,030**	**795,528**	**1,290,077,481**	**703,251**
Scope 3	Tons MSW	MTCO2e	Tons MSW	MTCO2e
MSW Landfilled	212,470	133,107	49,597	36,470
MSW Incinerated (WTE facility)	-	-	57,307	23,881
Biogenic (not included in total)		-		28,962
Scope 3 total	**212,470**	**133,107**	**106,904**	**60,352**
Community Total (MTCO2e)		**1,572,770**		**1,224,278**
% Change from Baseline				**22%**

[4] US EPA Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html

MOVING FORWARD

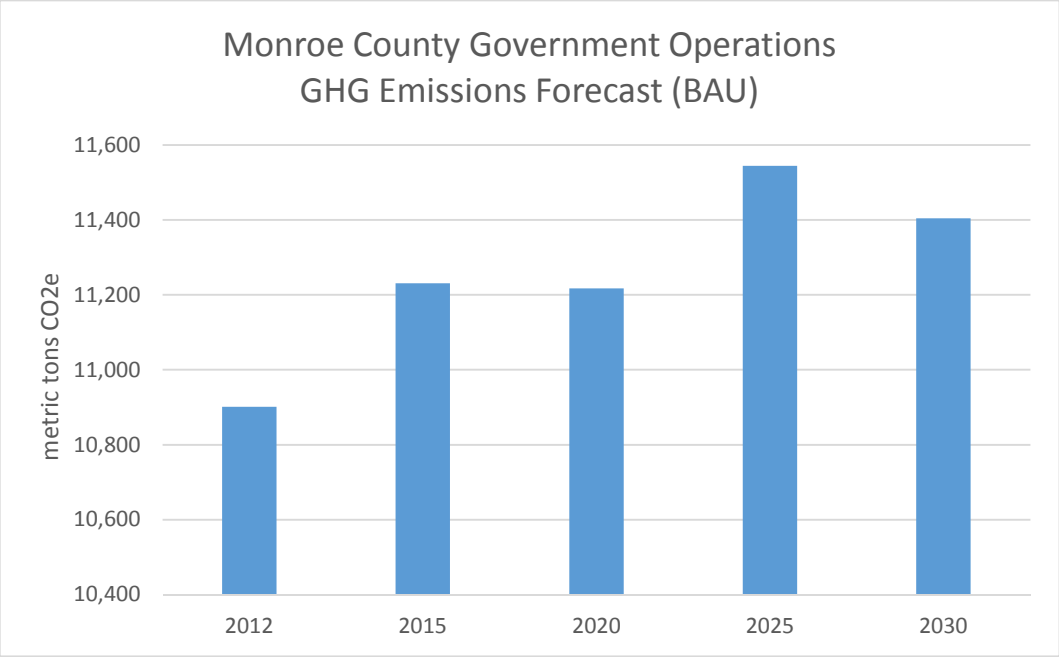
A new baseline

The preceding summary and analysis includes an "apples-to-apples" comparison of energy data and associated GHG emissions in order to best assess progress made by the County in achieving its reduction targets. However, it should be noted that, in recent years, the County has been able to work closely with its utilities, Keys Energy Services and Florida Keys Electric Cooperative, to maintain a more complete and accurate set of electricity data. Additionally, the County has begun utilizing the Facility Dude *UtilityTrac* system, which further supports maintenance of a comprehensive set of energy data. As of 2012, the County now has a more complete and comprehensive set of data from which to benchmark its energy reduction and climate action efforts. For this reason, it is recommended that this more complete baseline data be used moving forward for forecasting energy and emissions and for setting additional reduction targets. This new baseline is valuable for enabling a more precise analysis of Monroe County's energy usage and greenhouse gas emissions, ensuring consistency in data tracking and billing, and identifying additional opportunities for further reductions.

Future forecasts

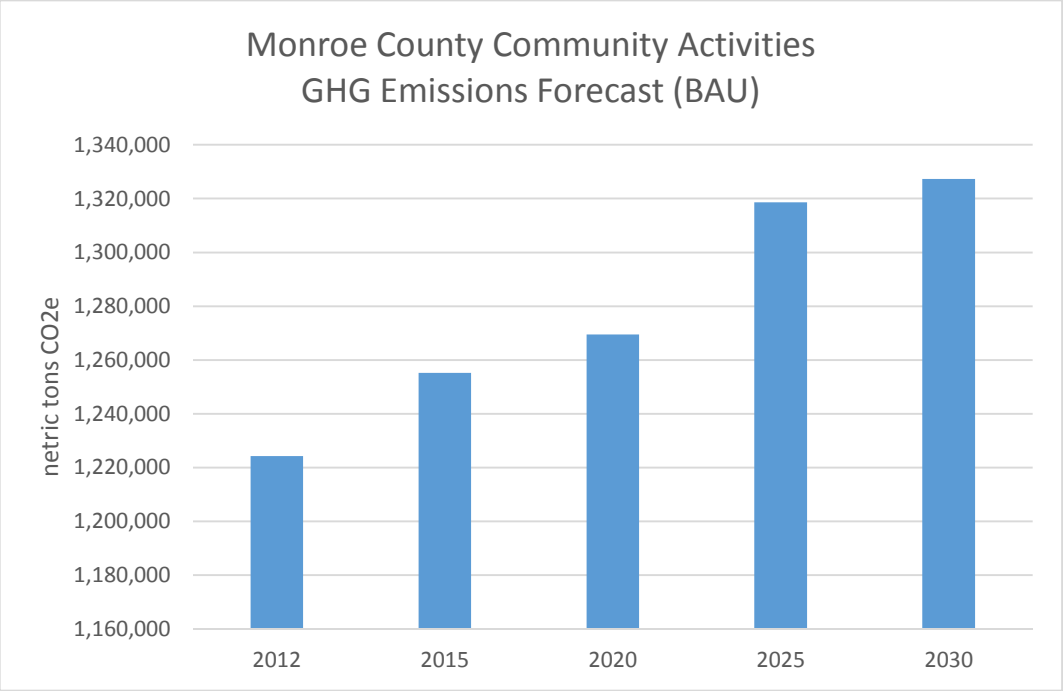
Along with a new baseline in 2012, new forecasts have been created. The forecast accounts for projected population changes and the adoption of the so-called Pavley rules (more stringent control of motor vehicle emissions to California standards). The results show a 4.6 percent total emissions increase by 2030 for County operations, and a total community emissions increase of 8.4 percent by 2030, compared to the 2012 baseline. The relatively modest increases could be due to projections that Monroe County's population may not grow as quickly as in other counties in Florida or the state in general, or may not grow at all.[5]

Figure 4: Total Monroe County Government Operations GHG Emissions Projections (BAU)



[5] Florida Office of Economic & Demographic Research. "Medium Projections of Florida Population by County, 2015-2040." http://edr.state.fl.us/Content/population-demographics/data/Medium_Projections.pdf

Figure 5: Total Monroe County Community GHG Emissions Projects (BAU)



New Targets

Lastly, a new baseline requires re-thinking the targets for future emission reductions, especially in light of Monroe County already exceeding its 20 percent reduction goals for both government operations and community-wide. In addition, these new targets allow the opportunity to update the assumptions used in the last set of targets and to adjust based on current information. Projected population growth, electricity grid fuel mixes, and the additional utility accounts should be reflected in new reduction targets. The assumptions and projections should also remain consistent with Monroe County's Comprehensive Plan, which forecasts to 2030.

Many climate action plans across the country call for an 80 percent reduction by 2050, compared to a 1990 baseline. While such targets are admirable, such a long-term target and various external variables beyond the County's control between now and then make this an abstract goal. It also requires back-casting the County's emissions to 1990 levels. As a result, it is recommended that the County establish an interim target for 2030, consistent with the timeframe of its latest Comprehensive Plan, for a 40 percent reduction by 2030 as compared to the 2012 baseline. This new target provides adequate time for significant changes, while remaining aggressive enough to maintain pressure for change and momentum for contributing to achieving the long-term goal of 80 percent global emissions reductions by 2050.

NEXT STEPS

The 2012 GHG emissions inventory demonstrates much progress toward the County's sustainability goals, with reductions in every category in both the municipal operations and community categories. Moving forward, Monroe County, like the rest of the state and country, will need to maintain and continue to improve efficiencies, even as the nation bounces back from the recent recession. In addition, some reduction strategies that have been effective in reducing emissions, such as the diversion of waste away from landfills to waste-to-energy plants, have already been implemented. This can make future large-scale reductions more challenging as such "low-hanging fruit" actions have already been implemented. Continued reductions will require creative and aggressive strategies that produce both economic and environmental benefits to the Florida Keys.

For municipal operations, the inventory update shows that buildings and facilities produce nearly 65 percent of the County's greenhouse gas emissions, which shows that targeting government buildings for efficiency upgrades will be an important opportunity for improvement. Transportation, at 20 percent of emissions, provides the next greatest area of potential improvement. Monroe County can claim success in its energy efficiency efforts to date, and should target other facilities that use large amounts of energy, such as the Gate Building, Marathon Government Center and Annex, and the airport terminals, for future energy efficiency improvements.

At the community scale, the largest contributor is also electricity usage, which shows that a significant opportunity for implementation of building energy efficiency programs and a shift to renewable sources of electricity. Of note is electricity usage of the commercial sector, which dropped significantly between 2008 and 2010, but has been climbing back toward pre-recession levels since 2010. Thus, energy efficiency efforts aimed toward the commercial sector may be especially effective in keeping emission levels down. Similarly, the large contribution of transportation sector to community emissions shows the potential for community-scale reductions if efforts are made to reduce vehicle miles traveled within Monroe County and to shift to alternative fuels.

Strategies that reduce energy use and GHG emissions within the transportation and residential sectors have the co-benefits of improving air quality, improving mobility, and enhancing community well-being. In addition, because the County's largest sources of emissions – buildings and transportation – mirror those of the larger community, the County should continue to lead by example by improving the energy efficiency of its buildings and facilities and improving the efficiency of its own municipal fleet to reduce its overall emissions while also playing a leadership role in shifting to clean, renewable sources of energy.

Monroe County Greenhouse Gas Inventory Update Methodology

Timeframe and Parameters

VHB conducted greenhouse gas (GHG) inventories for the calendar years 2011 and 2012. The County had conducted previous inventories for the calendar years 2005, 2008, and 2010. Where possible for consistency, our methods followed those of previous inventories.

An inventory was completed for both government operations and community-wide activities. The Government Operations inventory includes those emissions for which Monroe County government operations were responsible, while the Community inventory includes emissions that occurred within the County limits or as a result of activity within the County.

Community

The following sections detail the methods used to conduct the Community-level GHG inventory for Monroe County. For this inventory, GHG emissions that occurred within County limits or as a result of activity within the county (such as waste generation). Emissions from the United States Naval Air Station in Key West are excluded from this inventory. The U.S. Navy conducts its own inventories, and data from their operations are difficult to obtain.

Scope 1

Scope 1 includes any GHG emissions resulting directly from actions (usually stationary and mobile fuel combustion) within the boundaries of the location being inventoried. For Monroe County's community-scale inventory, this includes combustion of fossil fuels in vehicles and other internal combustion engines. Given the climate and location of the Florida Keys, sources such as fuel oil, natural gas, and propane were not considered to be a significant source of energy consumption and were thus excluded from this inventory, as in prior inventory years.

Transportation

The total amount of taxed fuel (both motor gasoline and diesel fuel) sold within the County was provided via the Florida Department of Revenue. This was provided for the fiscal years 2010-11, 2011-12 and 2012-13, but was broken down by month. Using the monthly data, the totals for the two calendar years were calculated. GHG emissions based on the burning of these fuels were then calculated based on the factors listed in Table 1 below.

To precisely calculate the amount of CH_4 and N_20 from vehicle combustion, the total vehicle miles traveled (VMT) and the make and model of each car is necessary. These data were unavailable; therefore, a ratio of CH_4 and N_20 emissions to the total CO_2 emissions was used to estimate these emissions. This ratio was based on data from the Inventory of US GHG Emissions and Sinks, 1990-2010. The factors used are listed in Table 1:

Table 1: Transportation Emissions Factors

CO_2 from diesel	10.21 kg / gal	Ratio of CO_2e from CH_4 to CO_2:	0.000993871 : 1
CO_2 from motor gasoline	8.78 kg / gal	Ratio of CO_2e from N_2O to CO_2:	0.013665728 : 1

As these calculations were based on the amount of *taxed* fuel sold within the County, they do not account for untaxed "red" diesel used in marine vessels, nor for fuel sold within the County limits but burned elsewhere (or vice versa). It was assumed that the fuel sold within the County would provide a close estimate of the total fuel used within the County's limits and, again, is consistent with prior inventory year methods.

Scope 2

Electricity

Electricity consumed within the County's borders is generated in multiple plants and provided to the County by two providers: Florida Keys Energy Cooperative (FKEC) and Keys Energy Services (KES). Data on electricity consumption was provided by both these providers for the years inventoried. The resulting CO_2, CH_4 and N_2O were calculated using the Environmental Protection Agency's Emissions & Generation Resource Integrated Database (eGRID) factors (9th edition, using 2010 data). While more detailed information on the emissions factors was available, eGRID factors were used in order to provide consistency with prior inventories.

These factors are shown in Table 2:

Table 2: Electricity Emissions Factors (eGRID)

Greenhouse Gas	Factor
CO_2	1,196 lbs. / MWh
CH_4	0.03891 lbs. / MWh
N_2O	0.01375 lbs. / MWh

The data provided by the utilities was combined into the following classes for reporting: Residential, Commercial and Industrial.

Scope 3:

Municipal Solid Waste

Data on total amounts of MSW, broken down by type of waste was provided by the Florida Department of Environmental Protection for both the calendar years surveyed. According to the County, their waste is sent entirely to a Waste-to-Energy (WTE) facility in Broward County, where it is then used as fuel for an electricity-generating incineration plant.

To calculate the amount of GHG emissions from this plant, the total amount of waste was separated into three categories. First, materials that would not be combusted, specifically metals and glass, were removed from the total. Then, the waste that was incinerated was divided into fossil-fuel based materials (plastics and tires) and biomass (plant-based products, such as papers, wood and food and yard waste). The emissions from combusting biomass are considered biogenic emissions, meaning that they would have broken down and released their carbon content into the atmosphere eventually had no human action taken place. Contrarily, the emissions from burning fossil fuel-based materials are anthropogenic, meaning that they would *not* have occurred without human activity.

Once separated by type, factors from the LGOP protocol were used to calculate the emissions from the incinerated waste. These are displayed in Table 3:

Table 3: Incineration Emissions Factors (LGOP)

Fossil fuel-derived materials	902.47 kg / short ton	CH_4 from incineration	0.032 kg / MMBTU
Biomass	1442.64 kg / short ton	N_2O from incineration	0.0042 kg / MMBTU

- MSW factor (fossil fuel) = 902.47 kg CO_2/short ton (LGOP, Table G.1)
- MSW factor (biomass*) = 1442.64 kg CO_2/short ton (LGOP, Table G.2)

*The wood and wood residual factor from LGOP was used for all biomass.

To calculate the CH4 and N2O produced from incinerating the waste, the following factors were used:

- CH4 factor = 0.032 kg CH4/MMBTU (source: Table G.3, Municipal Solid Waste factor, LGOP)
- N20 factor = 0.0042 kg N2O/MMBTU (source: Table G.3, Municipal Solid Waste Factor, LGOP)

Government Operations

The following sections detail the methods used to conduct the Government-level GHG inventory for Monroe County. For this inventory, GHG emissions generated by County facilities and equipment – including the airport, streetlights, and vehicles – were considered.

Scope 1

For Monroe County, Scope 1 emissions include those occurring as a result of combustion of fossil fuels in the County's vehicle and equipment fleet.

Transportation

The total amount of fuel consumed by County operations was provided by County officials. Using the fuel data, the totals for the two calendar years were calculated. GHG emissions based on the burning of these fuels were then calculated based on the factors listed in Table 1 below.

To precisely calculate the amount of CH_4 and N_20 from vehicle combustion, the total vehicle miles traveled (VMT) and the make and model of each car is necessary. These data were unavailable; therefore, a ratio of CH_4 and N_20 emissions to the total CO_2 emissions was used to estimate these emissions. This ratio was based on data from the Inventory of US GHG Emissions and Sinks, 1990-2010. The factors used are listed in Table 4:

Table 4: Transportation Emissions Factors

CO_2 from diesel	10.21 kg / gal	Ratio of CO_2e from CH_4 to CO_2:	0.000993871 : 1
CO_2 from motor gasoline	8.78 kg / gal	Ratio of CO_2e from N_2O to CO_2:	0.013665728 : 1

These calculations were based on the amount of fuel purchased by the County.

Scope 2

Electricity

Electricity consumed by County facilities and operations is generated in multiple plants and provided to the County by two providers: Florida Keys Energy Cooperative (FKEC) and Keys Energy Services (KES). Data on electricity consumption was provided by both these providers for the years inventoried. The resulting CO_2, CH_4 and N_2O were calculated using the Environmental Protection Agency's Emissions & Generation Resource Integrated Database (eGRID) factors (9^{th} edition, using 2010 data). Though utility-specific emissions factors were available from FKEC and KES, eGRID factors were used in order to provide consistency with prior inventories.

These factors are shown in Table 5:

Table 5: Electricity Emissions Factors (eGRID)

Greenhouse Gas	Factor
CO_2	1,196 lbs. / MWh
CH_4	0.03891 lbs. / MWh
N_2O	0.01375 lbs. / MWh

The data provided by the utilities was combined into the following classes for reporting and planning purposes: Airport, Buildings and Facilities, and Streetlights and Traffic Lights.

Forecast

Based on the updated 2012 baseline GHG emissions for both Government and Community activities, forecasts of expected emissions based on "business as usual" (BAU) circumstances were generated for 2015, 2020, 2025, and 2030. For consistency and comparability purposes, the emissions forecasting analysis was completed using similar scenarios and methods as the BAU forecasts completed for other Florida communities such as Boynton Beach, Lake Worth, and West Palm Beach.

Community

For the Community forecasts, each of the three Scope levels were adjusted, based on population projections, U.S. Energy Information Administration (EIA) electricity sales forecasts, and adoption of the so-called "Pavley Rules," which would have Florida adopt stricter California motor vehicle emission standards.

Scope 1

Monroe County's Scope 1 Community emissions, based on fuel used by motor vehicles, was adjusted based on two factors. First, the baseline fuel usage of 2012 was multiplied based on the population growth projections for the years 2015, 2020, 2025, and 2030. The projected population growth percentages were based on projections provided by Mayte Santamaria, assistant director of Monroe County's Department of Planning and Environmental Resources in May 2014. These adjusted fuel usage figures were then multiplied by the percentage of fuel savings expected under the Pavley Rules. The figures resulting from this two-step adjustment were entered as the Scope 1 forecast figures.

Scope 2

Monroe County's Scope 2 Community emissions, based on the electricity consumed in residential, commercial, and industrial categories, was adjusted in each category based on the EIA's projections of national electricity sales[1]. First, projected energy sales for residential, commercial, and industrial uses for 2012, 2015, 2020, 2025, and 2030 were obtained from the EIA, and the percentage changes in each of those years determined. The baseline 2012 figures for each of these three categories were then multiplied by the percentages projected by the EIA. The results from these three categories were added

[1] U.S. Energy Information Administration. Annual Energy Outlook 2014. Table A8. http://www.eia.gov/forecasts/aeo/pdf/tbla8.pdf

together for each year and entered as the projected Purchased Electricity for Monroe County. Next, the eGRID factor, which is a measure of the GHG emissions per kWh of electricity used, was determined using the national emission projections in the EIA's 2013 Annual Energy Outlook report,[2] which was the most recent year available. Emission projections for electric power for 2012, 2015, 2020, 2025, and 2030 were recorded and compared to find the percentage changes in electric power emissions between these years. The figures for Purchased Energy were then multiplied by the percentage changes of electric power emissions to determine the figures for Purchased Electricity with eGRID factor adjustment, which entered as the Scope 2 forecast figures.

Scope 3

Monroe County's Scope 3 Community emissions, based on the emissions from municipal solid waste disposed of via either landfill disposal or incineration, were adjusted in each category based on projected population increases for the years 2015, 2020, 2025, and 2030. The projected population growth percentages were based on projections provided by Mayte Santamaria, assistant director of Monroe County's Department of Planning and Environmental Resources in May 2014. The emission figures resulting from multiplication were entered as the Scope 3 forecast figures.

Total Community Emissions Forecasts

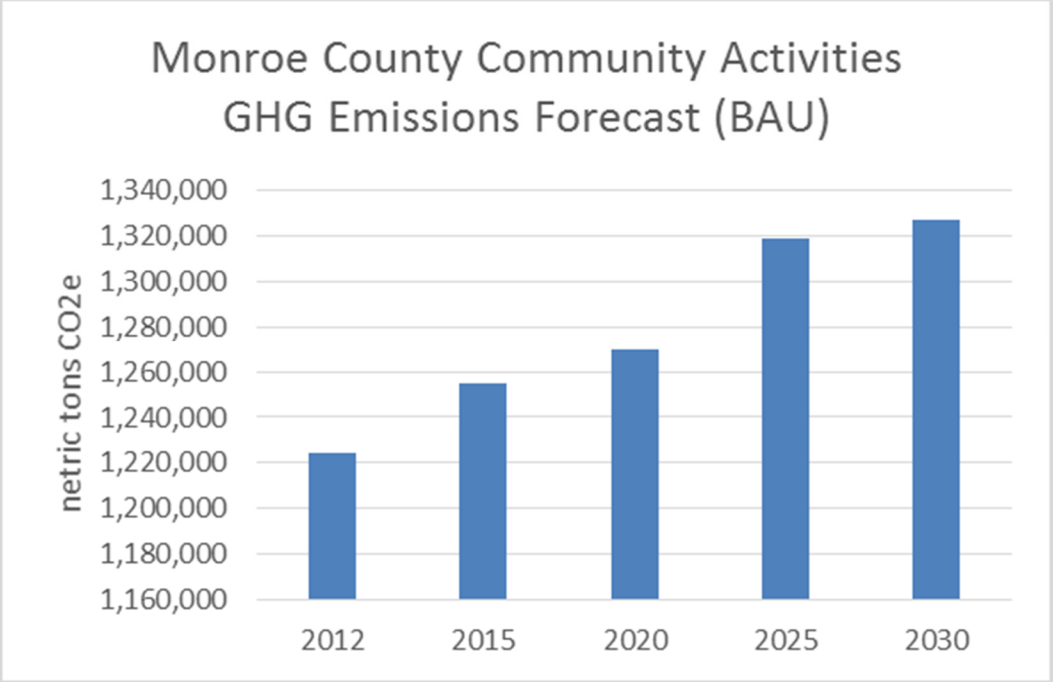
In each target year (years 2015, 2020, 2025, and 2030), the figures for Scope 1, 2, and 3 emissions were added together to obtain a total figure for each year. These totals were then compared to the 2012 baseline to obtain a projected percentage increase over time from the 2012 baseline. The results are as follows:

Table 4: Monroe County Community GHG Emissions Forecast

Total Community Emissions ($MTCO_2e$) BAU	**1,224,278**	**1,255,161**	**1,269,501**	**1,318,618**	**1,327,271**	**Population, Pavley projections, and EIA Sales Forecasts**
Percentage Change, from 2012		2.5%	3.7%	7.7%	8.4%	

[2] U.S. Energy Information Administration. Annual Energy Outlook, 2013, Energy-Related Carbon Dioxide Emissions by Sector and Source, United States. http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=4-AEO2014ER&table=17-AEO2014ER&region=1-0&cases=full2013-d102312a,ref2014er-d102413a

Figure 1: Monroe County Community GHG Emissions Forecast



Government

For the Government forecasts, both Scope 1 and 2 levels were adjusted based on population projections, and Scope 1 also adjusted based on the adoption of the so-called "Pavley Rules," which would have Florida adopt stricter California motor vehicle emission standards.

Scope 1

Monroe County's Scope 1 Government emissions, based on fuel used by motor vehicles and equipment owned and operated by the County government, was adjusted based on two factors. First, the baseline fuel usage of 2012 was multiplied based on the population growth projections for the years 2015, 2020, 2025, and 2030. The projected population growth percentages were based on projections provided by Mayte Santamaria, assistant director of Monroe County's Department of Planning and Environmental Resources in May 2014. These adjusted fuel usage figures were then multiplied by the percentage of fuel savings expected under the Pavley Rules. The figures resulting from this two-step adjustment were entered as the Scope 1 forecast figures.

Scope 2

Monroe County's Scope 2 Government emissions was based on the electricity consumed in government buildings and facilities, including its airports, streetlights, and traffic signals and adjusted based on projected population growth. The projected population growth percentages were based on projections provided by Mayte Santamaria, assistant director of Monroe County's Department of Planning and Environmental Resources in May 2014. The emission figures resulting from multiplication were entered

as the Scope 2 Purchased Electricity figures. Next, the eGRID factor, which is a measure of the GHG emissions per kWh of electricity used, was determined using the national emission projections in the EIA's 2013 Annual Energy Outlook report,[3] which was the most recent year available. Emission projections for electric power for 2012, 2015, 2020, 2025, and 2030 were recorded and compared to find the percentage changes in electric power emissions between these years. The figures for Purchased Energy were then multiplied by the percentage changes of electric power emissions to determine the figures for Purchased Electricity with eGRID factor adjustment, which entered as the Scope 2 forecast figures.

Total Government Emissions Forecasts

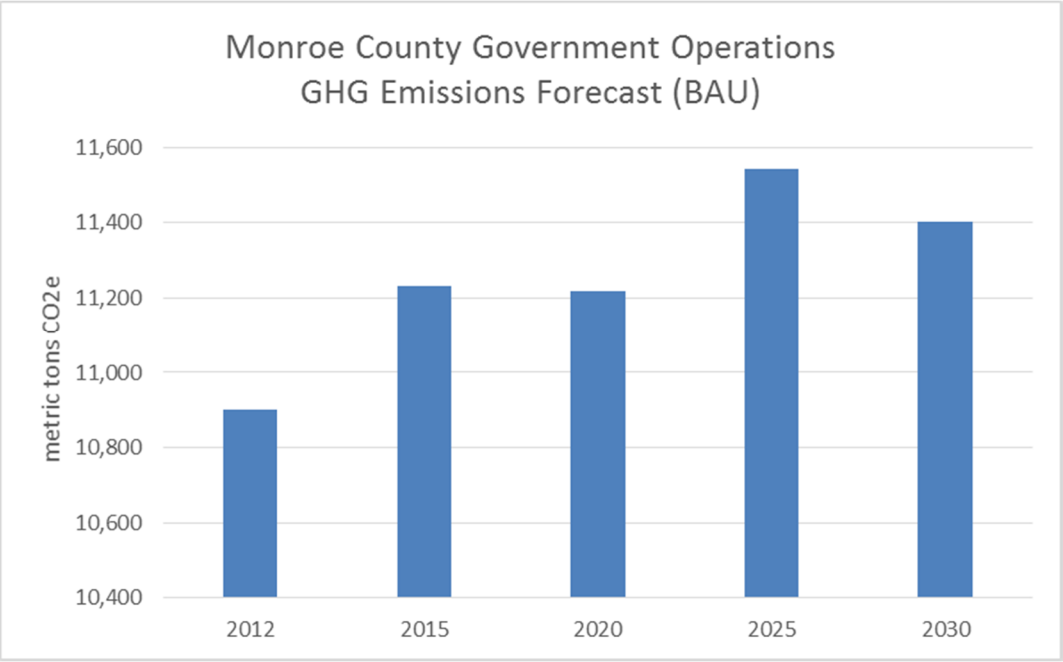
In each target year (years 2015, 2020, 2025, and 2030), the figures for Scope 1 and 2 emissions were adjusted based on the methods described above, and the total figures for Scopes 1 and 2 added together to obtain a total projected emissions for each year. These totals were then compared to the 2012 baseline to obtain a projected percentage increase over time from the 2012 baseline. The results are as follows:

[3] U.S. Energy Information Administration. Annual Energy Outlook, 2013, Energy-Related Carbon Dioxide Emissions by Sector and Source, United States. http://www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2014ER&subject=4-AEO2014ER&table=17-AEO2014ER&region=1-0&cases=full2013-d102312a,ref2014er-d102413a

Table 5: Monroe County Government GHG Emissions Forecast

Total County Operations Emissions ($MTCO_2e$) BAU	**10,902**	**11,231**	**11,217**	**11,544**	**11,404**	Population and Pavley projections
Percentage Change, from 2012		3.02%	2.89%	5.90%	4.61%	

Figure 2: Monroe County Government GHG Emissions Forecast



Data Sources and Contributors

Data utilized for this emissions inventory update came from a number of sources. The following individuals/entities were critical in providing the necessary data from previous inventory efforts as well as providing recently updated data.

- Alicia Betancourt, UF/IFAS/Monroe County Extension
- Rhonda Haag, Monroe County
- Kathleen Quinn, Monroe County
- Bob Stone, Monroe County
- Gricel Owen, Keys Energy Services
- Jack Wetzler, Keys Energy Services
- TJ Patterson, Florida Keys Electric Cooperative