

c. Streetlights

Research for the GHG inventory showed that all City traffic signals were replaced with energy efficient LED's by 2007⁵. Recent work on a GHG inventory for the City of Sarasota²¹ showed an 80% reduction in kWh usage by implementing a similar project. Currently street lighting (including regular streetlights, traffic signals and miscellaneous signage) accounts for 5% of City emissions (1,100 metric tons CO₂e), using 2,019,046 kWh in 2006 at a cost of \$696,115.00⁵.

High efficiency replacements for traditional streetlights are commercially available but they are more expensive at approximately \$75.00 per fixture as opposed to \$30.00 - \$35.00 for traditional metal halide (MH) bulbs²². But high efficiency bulbs last longer and may require less maintenance. Past uncertainties with light output and spread have slowed change outs.

i) Twelfth Avenue Pilot

The City was chosen as a beneficiary of twelve donated bulbs which were installed in a trial project on 12th Avenue South. Lighting consultants state that "each of the 60 watt lamp ballast combinations have an input power consumption of only 67.3 watts, replacing the 100 watt standard MH lamps which have an input power consumption of 120 watts resulting in an energy reduction of 44%. The energy reduction comes at no loss of light output, as both the standard 70 watt MH lamp and the 60w CosmoPolis lamp both are rated at 6200 "mean" lumens. Additionally, the CosmoPolis lamp has a rated average life of 20,000 hours, compared to 15,000 hours for the standard lamp, resulting in additional, labor cost savings due to decreased lamp replacement"²³.

Prior to the pilot, electricity use for FPL account number 373629054 totaled 13,793 kWh at an annual cost (2006) of \$1,738.42⁵. As installation date was November 2008 a full year's costs are not yet available but project managers documented a savings of 3744 kWh (\$308.43) in the five months following installation (comparing current to previous year's electricity bills) from this initial effort⁷. This alone equates to a savings of 1.97 metric tons CO₂e. Extrapolating these numbers suggest that over the course of a year the City will save 8985.6 kWh, **\$740 and 5 metric tons CO₂e** (0.02% of the total carbon footprint).



While there are issues associated with light pollution, providing a safe and aesthetically pleasing downtown is a priority for the City.



Twelve CosmoPolis bulbs installed in a pilot program at 12th Ave. South have already halved electric bills.



All City of Naples traffic lights have been changed to efficient LED's.



In addition to saving on electric bills, the City is exploring grant opportunities for streetlight retrofits.

ii) Fifth Avenue South Lighting Re-design project

The proposed redesign and replacement of street lighting in the downtown Naples area is complete, now pending funding²⁴. Initial design specifications included traditional metal halide lamps due to uncertainties with LED light quality, spacing requirements and glare. The project entails replacement of approximately 125 bulbs and addition of 110, in addition to new fixtures (addressing poor illumination issues in the area) and architectural details²⁵.

Project designers estimate that the existing area contains 125 bulbs. Using traditional 126 watt metal halide bulbs (as specified) would cost:

$126 * 12 \text{ hrs} / 1000 * 365 = 551 \text{ kWh/year}$ or \$60 per bulb, \$7576.25 for the replacement project, 36 metric tons CO₂e.

For CosmoPolis bulbs rated at 68 watts:

$68 * 12 \text{ hrs} / 1000 * 365 = 297 \text{ kWh/year}$ per bulb or \$32 per bulb, \$4,083.75, 20 metric tons CO₂e for 125

An annual savings of \$3492.50 (\$291/month) which approximates the 50% reduction in FPL bills observed in the pilot project, and 16 MT CO₂e. Considering relative installation costs gives a payback period of:

$125 * \$35 = \$4,375$ for metal halide bulbs

$125 * \$75 = \$9,375$ CosmoPolis bulbs.

Considering the monthly savings is \$291 but a \$5,000 greater installation cost, gives a payback period of $5000 / 291 = 17$ months.

Including the additional 110 bulbs the re-design project entails (for aesthetic and safety reasons) is an additional energy and GHG cost. 110 additional metal halide bulbs would cost \$3850 to install, \$6667 per year to operate and result in 32 tons metric tons CO₂e. CosmoPolis bulbs would cost \$8250 to install, \$3593 to operate and result in 17 metric tons CO₂e. Payback would occur in $\$8250 - \$3850 = \$4400 / \$291 = 15$ months. Costs do not include any redesign that would be entailed with the new bulb specifications.

As this project has not been funded, the savings summary is based only on the replacement 125 bulbs. With the relatively short payback periods and longer bulb life, switching to high efficiency bulbs for existing and future street-lighting needs, is a recommendation of the Energy Savings Task Force.

Estimated savings: \$3,492.50, 16 metric tons CO₂e

Action items: Re-design 5th Avenue project with energy efficient bulbs

d. Fleet

Fuel use for the past four years for the City's fleet of approximately 500 vehicles was provided by Equipment Services²⁶ and is illustrated in Figure 4.

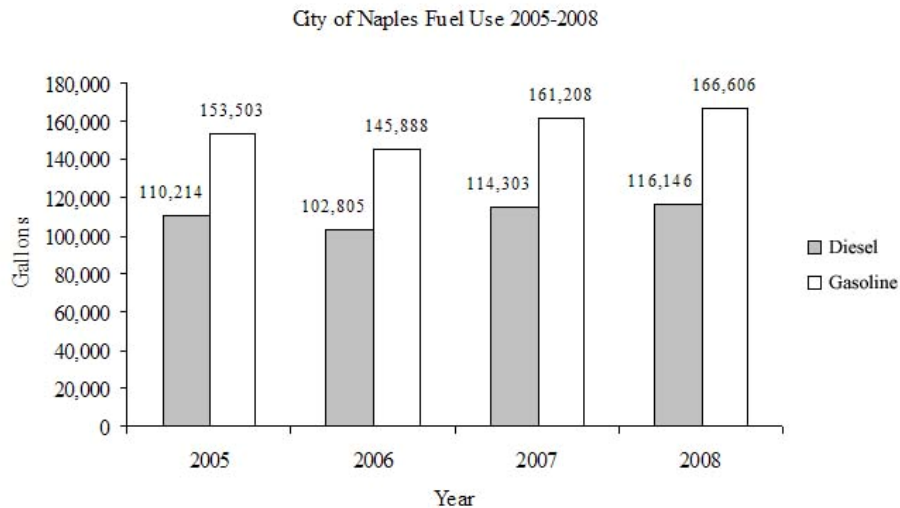


Figure 4: City of Naples Fuel Use

While proportionally (based on the small geographic area of the City of Naples), fleet emissions were not as significant as other sectors, (around 1,687 metric tons for 7% of the total emissions)⁵, financial reasons lend weight to a focus on fleet management. Staff are keenly aware of the effect global oil prices have on their operating budgets²⁶.

To reduce emissions in the transportation sector, strategies include reducing miles traveled, optimizing vehicle efficiency and switching to less GHG intensive fuels. Alternative fuel use is not being explored at this time.

Policies that have been implemented to address fuel use in vehicles include;

i) Vehicle Reductions

On directive from the City Manager, Fleet Management staff were required to retire or eliminate 10% of the City's inventory. 23 vehicles were removed from service²⁶.

ii) Idling Policy

A three minute no-idling policy was introduced in 2008²⁷, although; to date insufficient data is available to gauge the effectiveness of this measure. It is difficult to enforce an off-site policy such as this and it is possible that vehicles are kept in motion rather than stationary to avoid having to turn the engine off. Should fuel costs continue to rise, or

spike again around \$4.00 gallon as in the summer of 2008, City leaders may look into additional ways to enforce or monitor this policy.

iii) Driver Education

Complementing the awareness raising planned as part of this Energy Savings Effort, a special section on driving efficiency will be prepared for staff training purposes, stressing the importance of slow steady acceleration and braking, proper maintenance and tire inflation. Also planned is a tire pressure check day where City employees can come to Fleet Management for a free tire inspection of their personal vehicles.

iv) Preventative Maintenance

Equipment Services will continue the task of maintaining City vehicles for optimal performance, including tire pressure checks, regular tune-ups and filter changes.

v) Fleet Management

Selecting the smallest vehicle necessary for a given task can, if effectively managed, have a significant cumulative effect on fuel usage. While this is common sense, some numerical comparisons for consideration:

A staff member drives an average of 5 miles per work day (1250 VMT) in a City vehicle. In a large pick-up, with a fuel efficiency of around 15 mpg, this would use 83 gallons in a year (approximately \$170.00) $(1250/15 * 2)$. If half of those trips could have been undertaken in (for example) a sub-compact car at 30 mpg, fuel use comes down to $(625/15 + 625/30) = 61$ gallons (\$122). If gasoline prices again get close to the \$4.00/gallon observed in 2008, the savings get closer to \$200.

It is recommended that the Energy Savings Task Force further explore the logistics of fleet management and the potential for inter-departmental vehicle sharing as a means to reduce the use of large SUV's and trucks for their non-essential driving needs.

Estimated savings: enacting all recommendations for an estimated 5% reduction in fuel use saves \$26,766.9 and 130 metric tons CO₂e

Action items: strengthen policy guidance on fuel conservation



The City's vehicle fleet includes heavy duty trash pick-up trucks.



A custom designed Ranger for residential pick-up has helped reduce fuel use.



Police vehicles are often used round-the-clock. For safety reasons it is not always practical to turn the engine off at traffic stops.



Compressed natural gas is an option for future consideration as a fleet fuel source.

e. Waste

While not a direct energy consumer, waste contributes to GHG emissions and energy costs both through decomposition at landfill and haulage. The inventory work assessed estimated tons sent to landfill from City facilities. Recycled materials were not included. Overall, waste is small contributor to the City's emissions at 2.6 % (607 metric tons)⁵ however there are a number of relatively low cost endeavors that can be implemented to reduce waste production and increase recycling. Note that the State of Florida has established a goal of a 75% recycling rate by 2020²⁸, although the reality of that becoming part of the statutes is still being discussed. In 2006, the Collier County recycling rate was 33%²⁹. The City has taken steps to promote community-wide waste reduction, including implementation of mandatory commercial recycling. Several focus areas to effect waste reductions from City government facilities are described;

i) Office Waste Management

A City-wide memorandum (January 29th, 2009) was distributed to encourage all staff to minimize waste production and maximize recycling efforts. Staff are encouraged to have only a recycling receptacle at or close to their desks. Mixed trash receptacles will be provided in common areas so that recyclables are not disposed of in the regular trash for reasons of convenience. As a target goal, a reduction in 5% of government generated waste would amount to approximately 251 tons less trash (an estimated 5,029 tons were sent to landfill from City facilities in 2006). At \$48.62 per ton disposal fees this would save \$12,226 in landfill charges as well as 30 metric tons CO₂e. Government waste quantities were estimated from dumpster sizes so we consider this to be a likely over-estimation as dumpsters are rarely full. However, we frequently forget that disposing of trash costs money and all efforts to reduce waste should be promoted.

ii) Construction Materials Recycling

Several disparate departments routinely collect materials from job sites which may have commercial value such as copper, steel and aluminum. With no common receptacle and sometimes very small amounts, there was no incentive to store these materials until such time as quantities allowed sale. As part of this work effort, a location has been determined, at the Public Works location that will act as a City-wide receptacle for recyclable construction



The City's Solid Waste Division and truck depot is located on Riverside Drive. Computer software may be available soon to further optimize routes and fuel use.



Recycled materials are trucked to Fort Myers. Recycling is mandatory for commercial properties in the City of Naples.



Recycling is great but zero-waste is better. Much of our waste is shipped to developing countries.



Less paper equals more trees!

materials. It is considered that at least \$200 per year could be generated from selling the materials.

iii) Water bottles

A contract to provide City labeled water bottles has not been renewed to minimize waste production and energy use. Staff are encouraged to limit their personal use of disposable small bottles.

iv) Printing

The average office worker uses 10,000 sheets per year of office paper, which is the energy equivalent of 80 Watts of electricity used during work hours, or 160 kWh/year. At half a cent per sheet, it is \$50 per person per year. Significant cost-effective opportunities exist to reduce this²⁹. A City wide guidance document on double sided printing was distributed in January, 2009. All departments are required to utilize the duplex capacity wherever possible. Bulky City Council packets have been printed double sided for some time¹⁵, new efforts will be implemented to reduce ink costs; staff are asked to provide copies of powerpoint slide presentations in outline view only, eliminating the need for large spatial coverage by background inks. Additionally, letter head graphics will be color on the front page only and all other black and white.

Continued and expanded efforts towards paperless utility billing should also be prioritized.

A 10% reduction in paper use could save \$750 (considering that 150 staff use 10,000 sheets per year each) and $(150 * 160\text{kWh} * 10\%) = 2400 \text{ kWh}$ or 1.3 metric tons CO₂e.

Estimated savings (all waste): \$14,676.00, 31.3 metric tons CO₂e

Action items: provide written policy guidance on City waste management with targets

f. Water

Proportionally, the water-sewer sector was the greatest source of GHG emissions for the study year⁵. This category includes all power utilized in collection, treatment and delivery of wastewater and potable water to all City of Naples customers, a good proportion of whom are outside City limits (note that per ICLEI guidance⁶, operationally the City is responsible therefore the emissions count towards the City's number). The high number also reflects the energy intensive sludge treatment methodology currently utilized at the City's waste water treatment facility⁵. So, while the emissions proportion may be artificially inflated, it is still important to focus on water conservation efforts for cost and environmental reasons. The City has also allocated \$17 million for a water use permit from the South Florida Water Management District to accommodate anticipated demand³⁰. Enacting effective conservation measures may allow the City to hold off on this expansion and save money. Within City facilities, a number of proposed water conservation measures are described:

i) Water Conservation Fixtures

Renovations and additions at Fleischmann Park facilities will include low flow bathroom fixtures. Additionally, toilets in the Community Services building have been replaced with low flow fixtures. Two waterless urinals were donated to the City free of charge and will be installed at the Naples Pier public bathrooms¹⁶.

ii) Weather station and computerization of irrigation sites

The Parks and Parkways Division received a grant from the Big Cypress Basin to computerize 20 separate irrigation sites and better control watering schedules and amounts. A state-of-the-art weather station will be tied to the monitoring system³¹. The system has not been installed at the time of writing so savings cannot be estimated.

iii) HVAC Upgrades

Please see page 12 for estimates related to HVAC retrofits.



One of the striking findings that came from the City's GHG inventory, was the high price of water in energy terms.



In addition to energy costs on-site, trucking of treated sludge is a further and substantial use of fuel.



Naples is renowned for its attractive roadsides, but in Florida we use 60% (or more) of our potable water for irrigation.



The importance of conserving every drop cannot be exaggerated.

iv) Gasification

The City of Naples supports efforts by outside contractors (MaxWest Environmental Systems Ltd.) to build and operate a regional waste-to-energy gasification system in Collier County. In light of the high energy costs associated with current sludge treatment at the City and haulage costs to truck treated sludge to a disposal facility, this technology could reduce GHG emissions and energy use dramatically from the City's budget³².

Estimated savings: per gallon related GHG emissions have not be calculated and as most items are pending installation, savings are not estimated.

Action items: document installation of water conservation fixtures and HVAC upgrades, continue to work with Collier County on regional solutions.

g. General

This section describes non-inventory sector related endeavors that the City will undertake to further reduce energy use. While GHG reductions are difficult to estimate precisely from these projects, they will incrementally contribute towards reducing energy use at work and at home (for City employees) and otherwise contribute towards making City activities more sustainable.

i) Employee education and training

Employee education and training at the City of Naples is conducted in many different formats; from City-wide sessions, (such as harassment and discrimination training) over multiple sessions and many days, to specific topic training (such as public records requests and payroll processing) for small groups of employees. Individual and small group sessions are also conducted on topics such as skills improvement, computer skills and software usage³³.

Drawing from the experience of HR staff who plan and conduct staff training, it is considered that the most cost-effective (in terms of time, materials and staff costs) approach to include energy efficiency training, will be to add to training on other topics, such as City policies. An additional 30 minutes will be added to those sessions to cover the new material. It is estimated that over 90% of employees can be trained using this method.

Written material will be prepared by staff and consultants and include an overview of the City's energy costs and GHG emissions, explanation of the policy changes (including no-idling, recycling and climate control) and background on the many individual actions that cumulatively can have a significant positive impact. It is hoped that through a personal and explanatory introduction to the work, staff will feel more ownership and understanding of the plan. It will be an opportunity to stress that by working together, the City can adapt to the current economic downturn and save jobs as well as maintain and improve service.

ii) Performance appraisals

Performance appraisals follow a cycle which, for most employees, begins October 1 of each year and ends September 30 of the following year to coincide with the fiscal year. The plan consists of several performance factors which are predefined characteristics that are the same for all non-supervisory employees. These include, but are not limited to; job knowledge, quality of work, attitude and



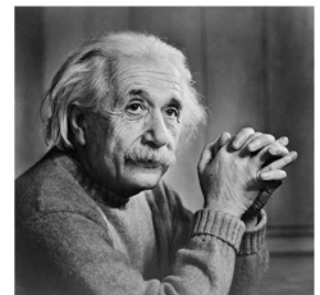
Regular training is mandatory for all staff on various City policies and procedures.



Environmental and energy savings topics will be included beginning fiscal year 2009/2010.



Innovation will be encouraged.....



Brilliance will be recognized!

Including a performance factor related to energy conservation must be carefully implemented so as to ensure it benefits the employee's ratings if they do well, but will not harm them if they do not focus on it (unless they intentionally waste resources). Therefore, supervisors will be instructed to only use the unsatisfactory rating if an employee intentionally does things to go against the goal of the initiatives, such as purposely wasting supplies and energy³³. By providing a means for recognition of energy savings efforts, staff will be further encouraged to participate in these endeavors. It will also allow incorporation of the many good ideas and suggestions of employees, a hugely valuable resource to the City of Naples. These changes to performance appraisals will be incorporated for fiscal year 2009/2010.

The City's Intranet site is an internal website for city employees. It provides links to a wide variety of information and programs and access to the City's main database utility, H.T.E. Employees can also clock in and out from their computer using a link on this site. Therefore, most employees who use a City computer also use the Intranet site on a regular basis, about 270 out of 480 employees. It is usually set as the home page of Microsoft Internet Explorer, so anytime an employee goes to open a webpage, they usually see the Intranet page first. In addition to the standard links on this page, there are three areas that are frequently changed or updated to reflect current information³³.

