



Water & Energy Efficiency

Water and energy are vital to all communities and are intricately linked in terms of generation and supply. We can seek and develop new resources to increase supplies, but the simplest and cheapest way to secure a sustainable future is by decreasing demand through efficiency and conservation. As we use less water, we use less energy, and vice versa. Some strategies are simple: using more efficient light bulbs, programmable thermostats and low-flow plumbing fixtures. We can also introduce smart energy systems that allow for more effective monitoring and control of an entire office building. We can even pursue alternative and renewable sources, such as solar energy. What's most important is that, as a growing community, we simply use less. This nearly always leads to more money in our pockets. It's the essence of common sense.

Goals

- **Use less water and energy**

Reduce per capita non-renewable energy use to 20 percent below 2007 baseline by 2015. Reduce water consumption by 1.5 million gallons per day. Reduce government electricity use by 20 percent from 2007 to 2014 in accordance with Board of County Commissioners legislation



WATER & ENERGY EFFICIENCY

“The Block Grants are a major investment in energy solutions that will strengthen America’s economy and create jobs at the local level. The funding will be used for the cheapest, cleanest, and most reliable energy technologies we have—energy efficiency and conservation—which can be deployed immediately. The grants also empower local communities to make strategic investments to meet the nation’s long-term clean energy and climate goals.”

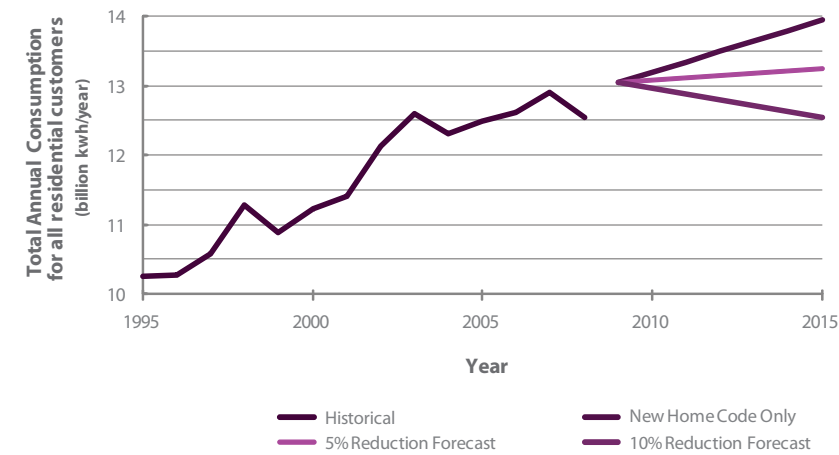
- U.S. Secretary of Energy Steven Chu

Strengths & Accomplishments...Opportunities & Actions

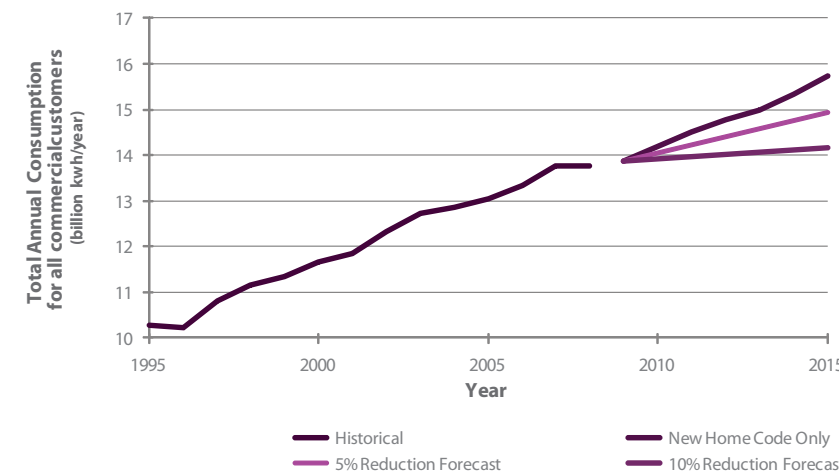
The water and energy connection

Energy and water are related in just about every imaginable way, from the production of electricity and potable water, to the lights and water in our homes that we too often take for granted. The water-supply industry uses large amounts of energy to transport, treat and deliver water. On the flip side, vast quantities of water are required for all stages of energy production, from extraction, to processing and refining, to transportation, to power generation itself. Understanding this relationship highlights the importance of conserving water and practicing energy efficiency. For every kilowatt saved, water is also saved. For every gallon of water not used, energy demand is reduced. Investments in and incentives for energy and water conservation must be high priorities, and progress in one area will be reflected in the other.

Miami-Dade County Residential Consumption Projections



Miami-Dade County Commercial Consumption Projections



Efficiency versus conservation

It is important to note the difference between efficiency and conservation. Efficiency is getting the most productivity out of each usable unit of energy or water. In contrast, conservation normally refers to actions taken by consumers to reduce their resource use (i.e. turning off the lights when leaving a room, or turning off water while brushing teeth). The promotion of efficiency aims to reduce the amount of kilowatt-hours or gallons needed to satisfy a consumer’s demand for end-uses such as cooling and hot-water heating; in other words, to get more out of each unit consumed. Consumers generally need to make upfront investments, such as more expensive, higher efficiency appliances and products, such as low-flow faucets, windows and insulation.

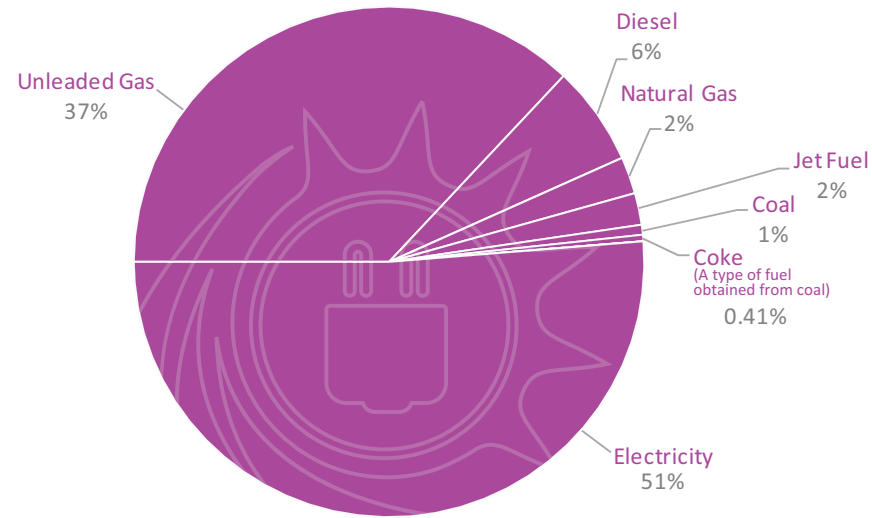
Improving the energy performance of our buildings can have important impacts on our electricity consumption. As illustrated by the graphs, exceeding code requirements has the potential to change the trajectory of our growth trends.

The benefits of becoming more energy efficient

Uninterrupted access to reliable energy is critical to operating the buildings, equipment and vehicles that we depend upon every day. Sustaining our current lifestyle, absent a critical and deliberate effort to increase efficiency and use alternative sources, will only become more challenging due to economic costs, geo-political instability, and the changes in natural environment (i.e. climate change, air pollution, natural resources extraction). These costs have long-term ramifications for the quality of life we want to maintain and pass along to future generations.

On average, electricity accounts for 75 percent of the cost of producing municipal water, primarily for capturing, treating, distributing, and using the water. After the water is used, more energy is required to treat the wastewater.

Miami-Dade County Community Fuel Emissions by Type (2005)



Our current energy supplies – nearly 90 percent of which go toward transportation and electricity generation – are unsustainable in numerous ways. Environmentally, the extraction, transport and combustion of fossil fuels can hazardously impact human health and natural ecosystems. Our community does not have local supplies of oil, natural gas and coal, requiring the added expense, environmental impact and geo-political implications involved with importing those fuels from other states and countries. Nuclear energy, despite its smaller emissions footprint, consumes vast quantities of water, and creates the long-term challenges associated with disposing of contaminated waste. The key then, to meeting sustainability goals related to climate change, is to work collaboratively to reduce dependence on these supplies.

We are using less water

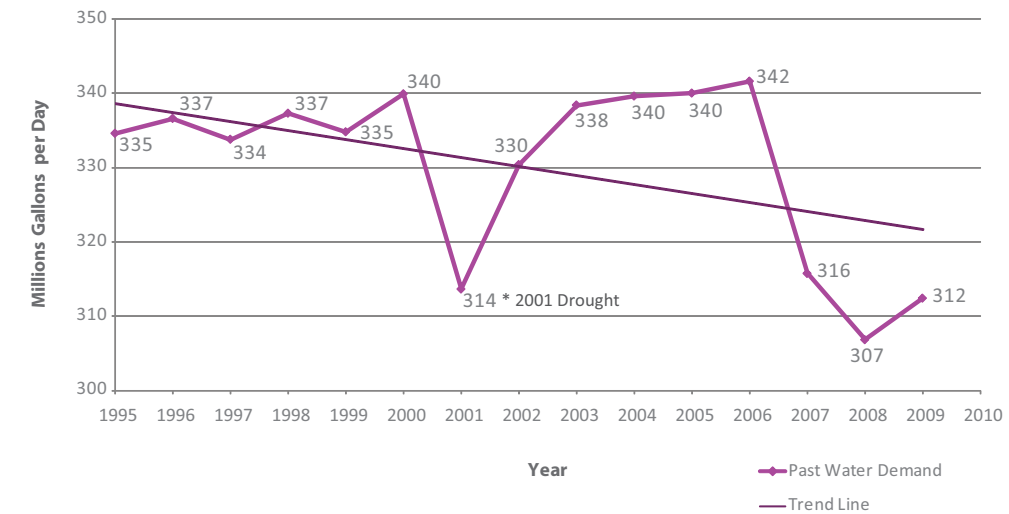
Developing efficient practices and using water wisely is paramount to preventing future water shortages and protecting water quality. Efficient water use ensures the sustainability of the Biscayne aquifer to meet future demand. Our strong water conservation efforts have been successful, helping us reduce and defer infrastructure costs and meet future water demands without causing harm to our water resources and surrounding natural systems.



For Miami-Dade County, conservation has proven to be the most economically feasible water management approach. Our per-capita use in 2009 was 139.6 gallons of water per day, down from 158 gallons four years prior. In 2009, the County produced an average of 312.5 million gallons per day (MGD) and served a population of more than 2.2 million customers.

Miami-Dade has excellent drinking water quality, and its protection is addressed in the *Our Environment* goal area of *GreenPrint*.

Historical Community-wide Average Water Use



In 2006 the Miami-Dade Board of County Commissioners adopted the Miami-Dade Water Use Efficiency Plan. Since then, Miami-Dade residents have responded to the call to be more efficient in their water use, contributing to a drop in consumption of over 28 million gallons per day. It is important that Miami-Dade County residents continue this trend in order to sustain the Biscayne aquifer water supply.

Leveraging funding opportunities

In 2009, Miami-Dade County was awarded a \$12.5 million federal grant through the U.S. Department of Energy's Energy Efficiency and Conservation Block Grant program (EECBG). The program, initially funded under the American Recovery and Reinvestment Act, has provided \$3.2 billion in funding to more than 2,300 cities, counties, states, and Indian tribes nationwide to assist in improving energy efficiency, reducing energy use and fossil-fuel emissions, and creating green jobs locally. It has also empowered local communities to make strategic investments to meet the nation's long-term goals for energy independence and leadership on climate change.

The award of EECBG funds has enabled the County to jump start energy efficiency projects that otherwise would not have been implemented. Thirteen grant-funded activities, which include a mix of energy-management projects, citizen outreach and education opportunities, sub-grants, pilot/demonstration programs, construction projects, and incentive programs, are being implemented across eight County departments. This mix of projects showcase and demonstrate the additional energy-efficient projects the County can undertake.

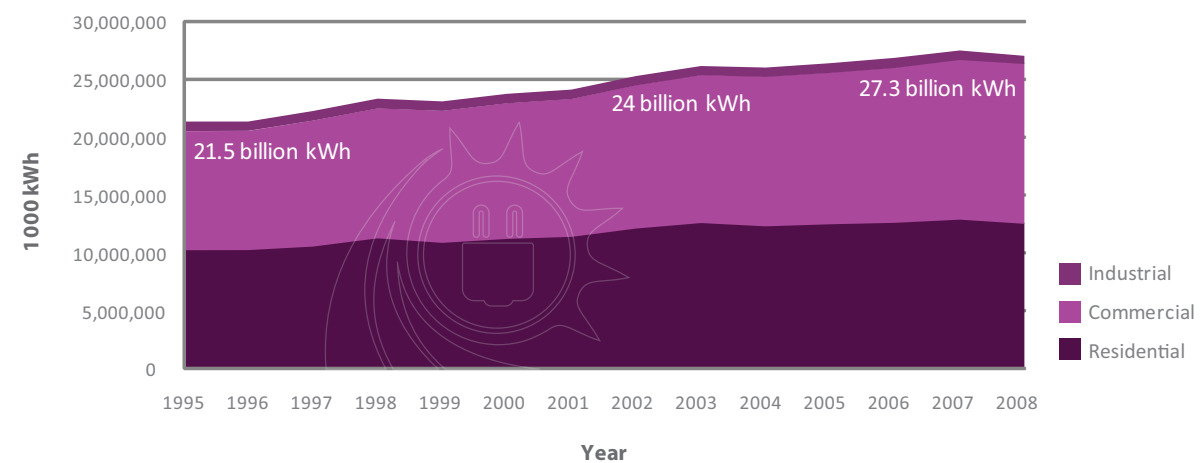
Those activities complement the County's integrated Energy Efficiency Conservation Strategy which aims to:

- Improve our ability to manage and reduce energy use across our government operations
- Enable, demonstrate, and evaluate the performance of energy-efficiency and renewable-energy retrofits of facilities and other energy-consuming government assets
- Provide targeted community-wide financial assistance and industry-based financial incentives for energy efficiency and renewable energy
- Target behavior change community-wide for energy conservation

The Office of Sustainability is managing the EECBG program over its three-year term. Specific activities include:

1. Enterprise-wide and facility-based energy management systems upgrade and coordination at the Stephen P. Clark Government Center and Gerstein Justice Building.
2. Community-wide energy efficiency campaign aimed at achieving long-term behavior changes to reduce energy. Elements include, but are not limited to, energy workshops, light bulb exchange program, and an energy savings challenge for businesses and residents.
3. Grants to Green Nonprofits (G2GN) Program which offers grants to local nonprofit and faith-based organizations to perform energy audits and energy-efficient building retrofits, replacements and upgrades.
4. Development of sustainable capital improvement procedures and guidelines to ensure that the County's capital improvement process maximizes energy conservation for new construction and building renovations.
5. Methane sequestration from the South Dade Landfill combined with digester gases to power water and sewer operations at the South District Wastewater Treatment Plant.
6. Energy efficient and sustainable buildings evaluation of building/zoning codes and permitting processes to identify recommended changes to remove energy-efficient and climate change obstacles to land use and development.
7. Cool roof retrofit project at Homestead Library which replaces the existing roof with a high-reflective Cool Roof system.
8. Daylight harvesting demonstration which sets programmable lighting controls tied into daylight coming in from outside at the Naranja and Kendale Lakes libraries.
9. Pilot desktop virtualization project which replaces nearly 1,800 personal computer workstations with more energy-efficient virtual desktops utilizing "thin client" technologies to reduce power consumption and environmental waste.
10. Energy-efficient lighting on "Green Roadway" demonstration to promote people-friendly movement by including high-efficiency lights, and pedestrian-friendly access while reducing energy use and air pollution.
11. Solar power systems demonstration which installs solar panels on the roofs of recreational buildings at the Country Village, Martin Luther King, Jr. Memorial and Westwind Lakes parks.
12. Energy-efficiency revolving loans will be offered to all Miami-Dade businesses to perform energy audits and energy-efficient building retrofits, replacements and upgrades.
13. Sustainable technologies demonstration to identify and test equipment, technologies and services that can enhance building sustainability at existing County facilities.

Total Electricity Consumption of Miami-Dade County 1995-2008



Source: Florida Power & Light, 2009

The following strategies reflect the common-sense pairing of water and energy. They are designed to conserve and improve efficiency through innovative approaches.

Strategies

- Reduce energy and water consumption through increasing efficiency
- Improve energy planning through public-private partnerships
- Continue water and energy efficiency and conservation campaigns
- Expand alternative fuel (bio-diesel/waste-based bio-diesel) and renewable energy industries
- Be government leaders in energy, fuel and water efficiency



Miami-Dade County policy requires all County-owned building projects, both new construction and renovation, to be certified at the LEED (Leadership in Energy and Environmental Design) Silver level. Pictured above: the General Services Administration Trade Shops were designed to meet rigorous standards for energy and water efficiency.

“Our most promising energy resource lies not in some new fuel or yet-to-be-invented technology, but rather in the potential to reduce demand through improvements in energy efficiency.”

-Center for Housing Policy

Per Capita Electricity Consumption of Miami-Dade County 2000-2007

Year	Electric Consumption				Total Miami Dade County Electric Customers	Residential Customers	County Population
	Annual Countywide Consumption (Thousands kwh)	Annual Residential Consumption (Thousands kwh)	Average Annual Residential Consumption (kwh)	Per Capita Residential (kwh)			
2000	23,951,899	11,234,637	14,242	4,986	896,736	788,839	2,253,362
2001	24,328,587	11,411,103	14,285	4,992	908,597	798,815	2,285,869
2002	25,512,650	12,122,334	14,975	5,242	920,563	809,506	2,312,478
2003	26,379,216	12,593,363	15,298	5,368	936,083	823,210	2,345,932
2004	26,251,400	12,311,664	14,739	5,173	951,090	835,301	2,379,818
2005	26,637,264	12,494,972	14,727	5,159	966,906	848,446	2,422,075
2006	27,092,059	12,614,845	14,684	5,176	979,084	859,113	2,437,022
2007	27,733,222	12,889,040	14,715	5,223	998,204	875,901	2,467,583

Source: Florida Power & Light; Miami-Dade County, Department of Planning and Zoning, 2008

Electricity use is closely linked to population growth, however the rate of increase in Miami-Dade County's electricity use is outpacing that of its population. To determine how efficiently electricity is being used, we can look at per capita electricity consumption. While the growth rates should correlate, the per capita use should ideally remain stable or decrease as efficiency standards and awareness improves. Despite this, between 2000 and 2007, per capita electricity use has increased, in large part, due to increased square footage, demand for air conditioning, as well as popularity of technology such as large screen televisions and digital video recorders, which now account for more electricity use in the U.S. than refrigerators. The GreenPrint goal is to reduce electricity consumption per capita by 20 percent.

The water and energy efficiency initiatives include both new and existing approaches to accomplishing our strategies and stimulating advances in commercial, private and government arenas. They truly reflect a community approach with a focus on public-private partnerships for implementation. As such, this goal area beneficially overlaps the Vibrant Economy goal area.

Water & Energy Efficiency Initiatives

1. Reduce energy and water consumption through increasing efficiency

- Continue to implement the Water Use Efficiency Plan and the Non-Revenue Water Loss Plan initiatives to meet established reduction targets
- Incentivize energy efficient development prioritizing walkable, transit-oriented areas
- Implement EECBG projects
- Promote and create innovative financing for energy efficiency

2. Improve energy planning through public-private partnerships

- Create a Miami-Dade Energy Alliance with a diverse group of stakeholders to implement sustainable energy and building management system retrofits and practices that conserve energy, natural resources, and provide reinvestment savings

3. Continue water and energy efficiency and conservation campaigns

- Continue to implement current campaigns and pursue additional funding

4. Expand alternative fuel (bio-diesel/waste-based bio-diesel) and renewable energy industries

- Explore partnerships with large public and private landowners/entities to implement alternative fuel/energy parks and incentivize public and private use
- Incentivize local and sustainable alternative energy/fuel industries, and enact legislation to remove obstacles and stimulate the industry

5. Be government leaders in energy, fuel and water efficiency

- Develop and implement a government energy efficiency master plan
- Continue to implement Energy Star Portfolio Manager Benchmarking of County facilities
- Develop incentives for County employees to save energy through the Idea Machine
- Create a countywide energy reinvestment fund to capture savings from energy efficiency projects and reinvest in new energy efficiency projects, making the EECBG program financially sustainable
- Retrofit government facilities according to water efficiency audit recommendations
- Continue fuel reduction and monitoring programs such as Chicago Climate Exchange
- Continue to transition fleet to hybrid electric vehicles
- Continue to purchase hybrid-hydraulic diesel garbage trucks
- Create a process to purchase biodiesel that complies with Environmental Protection Agency's biodiesel protocol which requires a minimum 50 percent GHG lifecycle reduction
- Develop a process that facilitates delivery of diesel fuel to Miami International Airport from Port Everglades through existing aviation fuel pipeline



In September 2010, Miami-Dade County acquired the first of what is to become a fleet of six hybrid hydraulic diesel waste collection vehicles.