

# **Energy Planning in the Twenty-First Century A Guide for Florida Communities**



**By  
Treasure Coast Regional Planning Council  
Energy Task Force**

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Cover Photograph: *Photovoltaic test facility located at the Florida Power and Light Company Martin Plant site. Photograph courtesy of Florida Power and Light Company.*



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## FOREWORD

Energy planning issues are of concern to Florida communities for four main reasons: 1) the cost of doing business; 2) environmental impacts, 3) energy security, and 4) climate change. The purpose of this energy planning guide is to enhance awareness of energy issues, promote good energy planning, reduce reliance on fossil fuels, increase energy efficiency and conservation, and promote the use of renewable energy. Even though most energy policies are controlled by state and federal regulations, the energy use choices made by individuals and planning decisions made by local governments can have a great influence on energy usage. The principles included in this guide are designed to result in a cleaner environment, more sustainable communities, and a higher quality of life.

This energy planning guide is intended to be used for planning purposes only. All statements contained in this document, including the goals, strategies, and policies, are advisory. The goals, strategies, and policies will be implemented only to the extent that financial resources are available from local revenue sources, legislative appropriations, grants or appropriations of any other public or private entities. This guide does not create regulatory authority or authorize the adoption of agency rules, criteria, or standards not otherwise authorized by law.

The goals, strategies, and policies contained in this guide shall be reasonably applied where they are economically and environmentally feasible, shall not be contrary to the public interest, and shall be consistent with the protection of private property rights. This energy guide is not intended to be a mandate or dictum to the state, region, local governments, utilities, private industries, or citizens.

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# Energy

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## A. Trends and Conditions

### Introduction

Energy planning was not considered a priority issue when the State of Florida directed each regional planning council to prepare a strategic regional policy plans in the 1990's. The Strategic Regional Policy Plan is required to include major sections containing goals and policies addressing affordable housing, economic development, education, emergency preparedness, natural resources, and transportation (Section 186.507, Florida Statutes), but energy was left out of the required sections. However, Treasure Coast Regional Planning Council has long recognized the importance of energy planning issues. In late 1997, Council established an energy task force to improve its effectiveness in dealing with energy issues. In 2000, the task force developed the first edition of this energy planning guide. Due to recent concerns related to energy and climate change issues, Council established a new energy committee in 2007 to prepare this update to the energy planning guide.

In past years, Council did not have great success in promoting energy planning at the state level. Council has repeatedly urged the state to develop programs to reduce the reliance on fossil fuels, increase conservation activities, and increase the reliance on photovoltaic systems to produce electricity. Council has also recommended that the regulatory framework be modified to make more conservation programs possible, and encouraged the state to provide incentives to the power producers to earn a profit on investments in new conservation programs.

Recently, the state has showed signs of embracing an energy policy that aligns favorably with Council's recommendations. This is in part due to Florida's new strategies to address global climate change, which were unveiled by Governor Charlie Crist at the Florida Summit on Global Climate Change in July 2007. In October 2008, the Governor's Action Team on Energy & Climate Change adopted *Florida's Energy & Climate Change Action Plan*. In January 2009, the Florida Public Service Commission submitted a *Draft Renewable Portfolio Standard Rule* to the Florida Legislature (Florida Public Service Commission 2009). Although the rule was not passed in the 2009 legislative session, it is clear the state is making progress toward a more sustainable future.

Council continues to hope that this energy planning guide will be helpful in promoting sustainable energy planning at all levels of government. The energy planning guide should be particularly useful in assisting local governments and citizens in becoming more energy efficient. This energy planning guide may also serve as a model for other regional planning councils and local governments.

Much of the information contained in this energy planning guide was originally derived from *A Report on Energy Issues* prepared by the Governor's Commission for a Sustainable South Florida (1998). The guide also contains information taken from the *Regional Energy Policy Plan* (Treasure Coast Regional Planning Council 1979) and the *Strategic Regional Policy Plan* (Treasure Coast Regional Planning Council 1995). This update to the energy planning guide also draws heavily on *Florida's Energy Plan* (Florida Department of Environmental Protection 2006) and Florida's Energy & Climate Change Action Plan (Governor's Action Team on Energy & Climate Change 2008).

## **Florida Energy Profile**

The following overview of Florida's energy resources was obtained from the U.S. Department of Energy, Energy Information Administration website ([www.eia.doe.gov](http://www.eia.doe.gov)).

### ***Resources and Consumption***

Florida has minor oil and gas reserves and few other energy resources. However, geologists believe that large deposits of oil and gas may be found in the federally administered Outer Continental Shelf off Florida's western coast. Congressional and Presidential moratoria prohibiting energy development in most of the Outer Continental Shelf were lifted in 2008, but a separate Act banning energy development within 100-125 miles of Florida remains in effect until 2022.

Although Florida has few renewable energy resources, researchers are looking for ways to produce ethanol using citrus peel waste from Florida's juice-processing industry. A planned facility in Hendry County is expected to produce 4 million gallons per year of ethanol from citrus waste; the facility would be the first ethanol plant in the world to use that feedstock. The plant, which would be located near the center of the State's sugar cane industry, is planning to experiment with sugar cane feedstock as well.

Due to its large population, Florida's total energy consumption is among the highest in the country. However, due to relatively low energy use by the industrial sector, per capita energy consumption is among the lowest in the country. Florida's transportation and residential sectors lead State energy demand.

### ***Petroleum***

Most of Florida's minor crude oil production comes from fields in the northwestern Panhandle, but the State also produces some crude oil from smaller fields in the south. Although companies have explored for oil and gas in the Federal Outer Continental Shelf south of Panama City, exploration activity has been dormant since 1995, when a litigation settlement returned 73 oil and gas leases in this area to the Federal Government. Florida has no oil refineries and relies on petroleum products delivered by tanker and barge to marine terminals near the State's major coastal cities. Due in part to Florida's tourist industry, demand for petroleum-based transportation fuels (motor gasoline and jet

fuel) is among the highest in the United States. Traffic at the international airports in Miami and Orlando is among the heaviest in the country.

### ***Natural Gas***

Florida receives most of its natural gas supply from the Gulf Coast Region via two major interstate pipelines: the Florida Gas Transmission line, which runs from Texas through the Florida Panhandle to Miami, and the Gulfstream pipeline, an underwater link from Mississippi and Alabama to central Florida. With the completion of the Cypress Pipeline in May 2007, the Jacksonville area has also begun receiving supplies from the liquefied natural gas import terminal at Elba Island, Georgia. Florida's natural gas consumption is high and has grown rapidly in recent years, due primarily to increasing demand from the electric power sector, which dominates State natural gas use. To help meet Florida's growing demand for natural gas, companies have proposed building new liquefied natural gas import terminals in the Federal waters off Florida's Atlantic and Gulf coasts and on the nearby islands of the Bahamas that would be connected via underwater pipeline to Florida's existing natural gas pipeline system.

### ***Coal, Electricity, and Renewable Resources***

Electricity generation in Florida is among the highest in the United States. Natural gas and coal are the leading fuels for electricity production, typically accounting for about 40 percent and 30 percent of net generation, respectively. Nuclear and petroleum-fired power plants account for much of the remaining electricity production within the State. Florida has more petroleum-fired electricity generation than any other State. Florida also is a leading producer of electricity from municipal solid waste and landfill gas, although generation from those sources contributes only minimally to the electricity grid. There are no coal mines in Florida and coal-fired power plants rely on supplies delivered by railroad and barge, mostly from Kentucky, Illinois, and West Virginia.

Florida's per capita residential electricity demand is among the highest in the country, due in part to high air-conditioning use during the hot summer months and the widespread use of electricity for home heating during the winter months. Despite high demand from the residential and commercial sectors, total per capita electricity consumption in Florida is not high, because industrial electricity use is relatively low. About nine-tenths of Florida households use electricity as their main energy source for home heating.

While the State does not have a renewable portfolio standard, Florida did adopt energy standards that require major facility projects in the State to be constructed to high energy efficiency standards in order to reduce energy use. In addition, utilities in Florida are required to disclose their fuel sources and adopt net metering to credit customers' utility bills for electricity they provide to the grid from renewable sources.



## **Energy and Climate Change**

In recent years there has been a growing consensus among leading scientists that global climate change is among the most significant problems facing the world today. Recent reports have concluded that climate change is being influenced by human activities. In particular, the extensive combustion of fossil fuels, industrial processes, and land use changes such as deforestation over the past several hundred years have caused a dramatic increase in atmospheric greenhouse gasses, including carbon dioxide, nitrous oxide, and methane. The increase in greenhouse gas emissions has been linked to an increase in the average temperature at the earth's surface. The consequences of global climate change include several direct impacts, such as an increase in air and water temperatures, sea level projected to rise about 18 inches over the next 50 years, changes in precipitation levels, and possible changes in the frequency and intensity of tropical storms. These changes are also predicted to impact various sectors of Florida's economy and environment, such as health; agriculture; forestry; water resources; marine ecosystems and industries; coastal resources and tourism; and flora, fauna and natural systems.

The effect of global climate change is of particular concern to the coastal residents of Florida because of the low land elevations, projections of rising sea levels, and possible increase in tropical storm events. To protect the quality of life in southeastern Florida, local governments and the region as a whole must take action to address the issues of energy and climate change. The region needs to be successful in implementing coordinated strategies for mitigation to reduce greenhouse gas emissions through: 1) increasing reliance on renewable resources for generation of electricity, 2) increasing energy efficiency, energy conservation, and demand-side management programs, 3) increasing reliance on public transit, emerging vehicle technologies, and advanced biofuels; and 4) changing local and regional land use patterns to create sustainable communities. The region also needs to develop coordinated strategies for adaptation to protect public infrastructure, property, water resources, and natural communities from rising seas (Governor's Action Team on Energy & Climate Change 2008).

## **Renewable Energy Potential**

In August 2008, the Florida Public Service Commission, in cooperation with the Governor's Energy Office and the Lawrence Berkeley National Laboratory, contracted with Navigant Consulting to perform an assessment of renewable energy resources that are currently operating in Florida and could potentially be developed in Florida through the year 2020 (Navigant Consulting, Inc. 2008; Florida Public Service Commission 2009). Navigant Consulting: 1) quantified existing renewable resources in Florida; 2) projected through 2020 future renewable development under varying economic and policy scenarios; and 3) conducted a screening analysis of renewable energy sources compared to utility resources with similar operating characteristics.

In order to project future renewable energy development, Navigant Consulting identified ten key drivers that could impact the renewable energy market. Scenarios of potential renewable development were analyzed around the five key drivers with the highest

potential impacts and the most uncertainty. These drivers are: 1) fossil fuel prices, 2) cost of carbon under greenhouse gas emissions policies, 3) federal and state renewable energy tax credits and other incentives, 4) the availability and cost of debt and equity, and 5) the rate cap established for the purchase of renewable energy credits. According to Navigant Consulting, the purpose of the additional revenue stream to the renewable energy resource is to make up any difference between the cost of the renewable facility and the comparable utility generation facility in order to insure an adequate return on investment for the renewable developer.

Navigant Consulting created three scenarios for potential renewable energy development in which the five key drivers were used. These key drivers were varied under three scenarios to determine the impact on the development of renewable energy by 2020. These scenarios are summarized as:

- Unfavorable – low fossil fuel prices, 1 percent rate cap, no extension of current government renewable incentives, tight financial markets, and carbon pricing of \$10/ton by 2020;
- Mid-favorable – mid range fossil fuel prices, 2 percent rate cap, partial extension of government renewable incentives, moderate financial markets, and carbon pricing of \$30/ton by 2020; and
- Favorable - high fossil fuel prices, 5 percent rate cap, government renewable incentives extended through 2020, widely available debt and equity, carbon pricing of \$50/ton by 2020.

Navigant Consulting concluded the following:

- Under the unfavorable scenario for renewable development, renewable energy in Florida could be 5 percent of investor-owned utility retail sales by 2020;
- Under the mid-favorable scenario for renewable development, renewable energy in Florida could be 11 percent of investor-owned utility retail sales by 2020; and
- Under the most favorable scenario for renewable development, renewable energy in Florida could be 24 percent of investor-owned utility retail sales by 2020.

Navigant Consulting found that renewable energy development would be expected to develop more extensively under a scenario with high fossil fuel prices, a 5 percent rate cap on renewable energy credits, government incentives extended through 2020, and widely available debt and equity at lower cost. Also, the Florida renewable energy resources with the most achievable potential under the economic and policy scenarios are: 1) ground mounted solar photovoltaic; 2) biomass – direct combustion; 3) biomass – waste to energy; and 4) waste heat from sulfuric acid conversion processes (Florida Public Service Commission 2009).

## Renewable Portfolio Standard

During the 2008 Regular Session, the Florida Legislature passed a law requiring the Florida Public Service Commission to adopt rules to establish a renewable portfolio standard, in consultation with the Florida Department of Environmental Protection and the Florida Energy and Climate Commission. The renewable portfolio standard rule would require each investor-owned electric utility to supply a percentage of retail electricity sales from renewable energy resources located in Florida. The Florida Public Service Commission was required to submit a draft rule to the Legislature by February 1, 2009.

In January 2009, the Florida Public Service Commission voted to submit to the Legislature a draft renewable portfolio standard rule featuring a market-based approach to compliance, with an aggressive standard of 20 percent renewable energy by 2020 (Florida Public Service Commission 2009). The draft renewable portfolio standard rule also features ratepayer protections, including a 2 percent rate cap with close oversight by the Florida Public Service Commission of the costs of compliance. The Florida Public Service Commission's draft renewable portfolio standard rule balances the legislative intent to protect existing renewable resources, promote the development of new renewable resources, and protect the environment, while minimizing the costs of power for consumers. The rule sets aggressive, mandatory standards for Florida's investor-owned electric utilities that must be met with Florida renewable energy resources. To protect ratepayers from undue rate increases, the rule caps incremental compliance costs at 2 percent of each investor-owned electric utilities annual retail revenues. The rule also provides the necessary proceedings and reporting requirements for the Florida Public Service Commission to closely monitor both the development of the renewable market and its associated costs and requires Florida Public Service Commission review at least once every 3 years. The key components of the draft rule and the major provisions of the rule are discussed below:

*Renewable Portfolio Standards* – The Florida Public Service Commission recommends an aggressive renewable portfolio standard that requires each investor-owned electric utility to achieve 20 percent renewable energy by 2020. This aggressive standard is intended to protect existing renewables, and spur new renewable developers to enter the Florida market by establishing a long-term dedicated market for renewable energy in the state.

*Renewable Portfolio Standard Percentage and Timing* - Section 25-17.400(3), Florida Administrative Code, of the draft rule establishes the following standards of the prior year's retail sales for each investor-owned electric utility to be provided by Florida renewable energy resources: 7 percent by January 1, 2013; 12 percent by January 1, 2016; 18 percent by January 1, 2019; and 20 percent by January 1, 2021.

*Eligible Resources* – Only Florida renewable energy resources as defined in Section 366.92(2), Florida Statutes, are eligible for compliance with the renewable portfolio standard. The draft rule casts a wide net to include in-state renewable resources of all

capacity sizes, which are owned by utilities, non-utility generators, and customers. Small renewable systems (2 megawatts or less) are eligible as long as these systems do not receive monetary incentives through a utilities energy efficiency program pursuant to the Florida Energy Efficiency and Conservation Act (Sections 366.80-.82, Florida Statutes).

*Compliance Mechanism* – The draft rule establishes a compliance mechanism that requires each investor-owned electric utility to produce or purchase sufficient renewable energy credits to meet the renewable portfolio standard. A renewable energy credit is a tradable financial instrument that represents the renewable attributes associated with one megawatt-hour (1,000 kilowatt-hours) of renewable energy. Utilities may comply with the renewable portfolio standard using renewable energy credits associated with the energy produced by self-built renewable facilities, or may purchase renewable energy credits from other utilities, non-utility renewable generators, or customer-owned renewables. The draft rule establishes a renewable energy credit market to facilitate both a short-term spot market and long-term negotiated contracts for renewable energy credits from all in-state renewable facilities.

*Rate Cap* - Incremental renewable portfolio standard compliance costs, above the cost which a utility would otherwise pay for capacity or energy, would be limited to a 2 percent rate cap. The rate cap would be based on each investor-owned electric utilities total annual revenue from retail sales of electricity.

*Frequency of Review* – In order to fully balance the interests of encouraging renewables while protecting ratepayers, the renewable portfolio standard rule contains a process for Florida Public Service Commission review at least every 3 years or as conditions warrant. This process for review will also allow the Florida Public Service Commission to amend the rule in the event that a new provision of state or federal law supplants or conflicts with the rule.

*Mandatory Standards* – The draft rule establishes mandatory standards to be met by each investor-owned electric utility. These standards will be enforced with penalties, to be paid by the stockholders, of up to 50 basis points on an investor-owned electric utilities authorized return on equity if an investor-owned electric utility does not meet the standards and is not excused from compliance. The rule provides the conditions under which an investor-owned electric utility may be excused for non-compliance, as required by statute. These conditions include insufficient supply of Florida renewable energy resources or prohibitive cost.

*Rewards and Penalties* – To encourage compliance, the draft rule includes provisions that allow the Florida Public Service Commission to assess penalties to an investor-owned electric utility that does not fully comply with the renewable portfolio standard. The Florida Public Service Commission may assess a penalty, to be paid by stockholders, of up to 50 basis points of an investor-owned electric utilities authorized return on equity. As required by statute, however, the draft rule provides that the Florida Public Service Commission may excuse the investor-owned electric utility from compliance if sufficient renewable energy credits are not available, or if compliance is cost prohibitive. Investor-

owned electric utilities are encouraged to build renewable facilities due to the opportunity to earn a return on their investment and recover reasonable and prudent costs through a dedicated cost recovery clause.

*Encouragement of Solar and Wind* – The draft rule includes a requirement for solar and wind whereby a minimum of 25 percent of the renewable portfolio standard must be provided by these resources. Section 366.92(3)(b)3, Florida Statutes, authorizes the Florida Public Service Commission to provide added weight to solar and wind in its draft rule. Providing a requirement of the renewable portfolio standard for these zero-greenhouse gas emission renewables will meet the legislative intent to improve environmental conditions. In addition, a requirement for these currently higher-cost resources may encourage their development and put downward pressure on the cost of solar and wind over time. To further encourage solar and wind resources, 1.5 percent of annual investor-owned electric utility revenues are allocated for solar and wind for the incremental costs of complying with the renewable portfolio standard, with the remaining 0.5 percent for all other Florida renewable energy resources, for a total rate cap of 2 percent.

*Renewable Request for Proposal Requirements* – The draft rule requires each investor-owned electric utility to issue a request for proposals for renewable resources every 2 years. The request for proposals framework would utilize a market-based approach to encourage renewable developers to participate in the Florida market. Also, the renewable request for proposals will provide the investor-owned electric utility and the Florida Public Service Commission with needed information to evaluate the cost-effectiveness and need for a utility self-build renewable option.

*Cost Recovery* – Section 25-17.400(7), Florida Administrative Code, of the draft rule establishes a dedicated cost recovery clause for reasonable and prudent costs associated with renewables. These costs include the costs associated with: 1) the purchase of renewable energy credits, 2) administrative costs of the renewable energy credit market, 3) investor-owned electric utility-owned Florida renewable facilities, and 4) renewable purchased power contracts. Investor-owned electric utilities are required to identify the incremental costs of compliance with the renewable portfolio standard as a separate line item on customer bills.

*Florida Renewable Energy Credit Market* – Draft Rule 25-17.410, Florida Administrative Code, provides for Florida Public Service Commission oversight of the establishment of the renewable energy credit market. The investor-owned electric utilities would issue an request for proposals for an independent third-party administrator, select an administrator, and petition the Florida Public Service Commission for approval. Upon approval of the administrator, the investor-owned electric utilities would submit the proposed structure and governance of the renewable energy credit market for Florida Public Service Commission approval. The draft rule lists the entities eligible to produce renewable energy credits, and provides for the use of renewable energy credits. Finally, the rule cites the Florida Public Service Commission's dispute resolution processes.

*Reporting Requirements for Municipal and Cooperative Electric Utilities* – Draft Rule 25-17.420, Florida Administrative Code, specifies the annual reporting requirements for the municipal and rural electric cooperative utilities. The information in these reports will facilitate the Florida Public Service Commission’s efforts to track municipal and cooperative policies regarding renewable energy and energy efficiency, as well as identify any associated increase in statewide renewable resources in Florida.

The Florida Public Service Commission’s Draft Renewable Portfolio Standard Rule was not acted upon by the Florida Legislature in the 2009 session. According to statistics provided by the U.S. Department of Energy, Energy Information Administration, 33 states plus the District of Columbia have adopted some form of a renewable portfolio standard. Florida is one of the 17 states that still have not adopted a renewable portfolio standard. In order to provide a mechanism to expand the use of renewable energy in Florida, it is important to encourage the Florida Legislature to adopt a renewable portfolio standard during the 2010 legislative session.

## **B. Important Issues**

### **Energy Planning**

Many energy-related issues that affect the region are controlled by state and federal policies. For example, the energy goals and objectives of the State of Florida are codified in the *State Comprehensive Plan* (Section 187.201(11), Florida Statutes; see Appendix 4 for an extensive list of Florida Statutes related to energy). Prior to the formation of the Florida Energy & Climate Commission, the Florida Energy Office, housed within the Florida Department of Environmental Protection, was the State's primary center for energy policy. In addition to developing and implementing Florida's energy plan, the Florida Energy Office coordinated all federal energy programs delegated to the state, including energy supply, demand, conservation and allocation. The Office also helped develop and implement the 2006 Florida Energy Act, focusing on advancing the development of clean energy sources, energy conservation and efficiency. The 2008 Energy and Economic Development Legislation (House Bill 7135), passed by the 2008 Florida Legislature transferred the Florida Energy Office to the Executive Office of the Governor, within the Florida Energy & Climate Commission.

Many other organizations and departments are also responsible for energy-related matters in Florida. The Florida Public Service Commission, an entity of the Legislature, and the Florida Solar Energy Center, part of the State University System, have significant energy-related duties. A range of other agencies such as the Florida Department of Community Affairs, Florida Department of Environmental Protection, Department of Management Services, and the Department of Transportation, deal with energy concerns that impact Florida's energy status and future. Enterprise Florida, a public/private entity, also has been assigned energy-related functions.

While many public sector entities are involved with energy concerns, their efforts are sometimes fragmented. Furthermore, many energy-related issues also may be viewed as regional and local issues. At the local level, energy consumption concerns are typically affected by local ordinances and other community-based policies that are not directly aimed at addressing energy issues. Land use regulations, building codes, and transportation policies are examples of decisions that affect energy consumption at the local level. In years past, Florida's regional planning councils coordinated energy planning and policy matters involving area local governments. However, no such coordination function exists at this time. A key issue is that the regional planning councils have not been authorized to include an energy element in their strategic regional policy plans. Furthermore, local governments are not required to adopt an energy element in their comprehensive plans. These oversights should be corrected in order for the state to be more effective in improving energy efficiency and conservation, reducing reliance on fossil fuels, and increasing reliance on renewable resources.

This planning guide focuses on three main strategies under Goal 1, coordinated energy planning. These strategies include: Strategy 1.1, develop regional programs promoting public awareness, education, and coordination of energy issues; Strategy 1.2, support

efforts by local governments to become more energy efficient and self sustaining; and Strategy 1.3, support incentives by local, state and federal governments to promote energy efficiency and conservation and the use of renewable energy resources. Implementation of the policies within these strategies will enhance the coordination of energy planning in the region.

## **Power Plants**

The review of applications for electric power plants in the region is governed by the Florida Electrical Power Plant Siting Act (Sections 403.501 – 403.539, Florida Statutes). An applicant, such as Florida Power and Light Company or the Florida Municipal Power Agency, is required to prepare and submit a Site Certification Application to the Florida Department of Environmental Protection. It is the responsibility of Florida Department of Environmental Protection to coordinate the review of the application. Regional planning councils and local governments are required to provide their comments on power plant applications to Florida Department of Environmental Protection. Council's reports on site certification applications are to contain recommendations that address the impact upon the public of the proposed electrical power plant, based on the degree to which the power plant is consistent with the applicable provisions of the Strategic Regional Policy Plan adopted pursuant to Chapter 186, Florida Statutes and other matters within its jurisdiction.

Major regional issues related to power plant siting include: impacts to adjacent communities, impacts to natural resources, maintaining fuel diversity, the region's reliance on fossil fuels, increasing reliance on renewable resources, protection of water quality and quantity, and ensuring that older less efficient and more polluting facilities are upgraded prior to developing new facilities in the region. Many of these issues are addressed in various sections of the Strategic Regional Policy Plan. This planning guide focuses on two main strategies under Goal 2, reduced impacts from power generating facilities. These strategies include: Strategy 2.1, support reduced reliance on fossil fuels, decentralized generation of electricity, and increased energy independence; and Strategy 2.2, support retrofitting older power plants and energy infrastructure. Implementation of the policies within these strategies, along with implementation of other policies in the Strategic Regional Policy Plan, will help to reduce the impacts of power generating facilities in the region.

## **Electric Power Lines**

The Florida Electric Transmission Line Siting Act (Sections 403.52 – 403.5365, Florida Statutes) is the state's centralized process for licensing electrical transmission lines that are 230 kilovolts or larger; cross a county line; and are 15 miles or longer. An applicant, such as Florida Power and Light Company is required to prepare and submit an application for certification to Florida Department of Environmental Protection. It is Florida Department of Environmental Protection's responsibility to coordinate the review of the application. Regional planning councils and local governments are required to provide their comments on the applications to Florida Department of Environmental



Protection. Similar to power plant applications, Council's reports on certification applications are to contain recommendations that address the project's impact upon the public based on the degree to which it is consistent with the Strategic Regional Policy Plan, and other matters within the jurisdiction of the regional planning council.

Major regional issues related to siting electric power lines include: impacts to adjacent communities, intrusions into the countryside, impacts to wetlands and other natural resources, and concern about the health and safety effects from electric and magnetic fields. Florida Department of Environmental Protection is responsible for regulating electric and magnetic fields. Land ownership also can be a concern. The electric utilities typically offer to buy land necessary for a transmission line at fair market value. Certification does empower the electric utility with the right of eminent domain.

This planning guide focuses on two main strategies under Goal 3, reduced impacts from electric power lines. Strategy 3.1 is to support efforts to reduce impacts of power lines. These efforts include: encouraging the burial of new power lines in urban areas when possible; encourage new power lines to be sited along existing linear corridors rather than disrupting new routes across the countryside; encouraging new power lines to be sited in a way that minimizes impacts to existing land uses; and encouraging new power lines to be sited around rather than through existing conservation areas and other natural upland and wetland communities. Policy 3.1.6 encourages local governments to work with the electric utilities to identify preferred routes for future power lines in their communities.

Strategy 3.2 is to support upgrading older less efficient power lines. Included within this strategy is to support research and development of new higher capacity more energy efficient infrastructure, such as superconductors; and to support the development and use of smart grids, which are electrical networks supplying electricity from suppliers to consumers using digital technology to communicate with appliances. Florida Power and Light Company has initiated the Energy Smart Florida project, which is a program to install smart grid technology in southern Florida. This program will bring greater energy savings, cost reductions, and increased reliability when it expands into the region in the future.

## **Energy Efficiency and Conservation**

Energy efficiency is the percentage of total energy input in a system that does useful work and is not converted into low-quality usually useless heat, and energy conservation is the reduction or elimination of unnecessary energy use and waste. The potential exists to save a tremendous amount of energy through the development of efficiency and conservation programs for local governments, school systems, and private businesses. In many cases, energy efficiency and use is not being monitored at these facilities. For example, simple changes in the types of light bulbs used, and the schedule for turning lights on and off can have a significant affect on energy savings. Also, dressing appropriately for the current weather conditions can reduce the level of air conditioning used in homes and offices.

The efficient use of air conditioners is another way that energy savings can be achieved. To prevent wasting energy, it may be possible to avoid cooling rooms or sections of buildings that do not require air conditioning. Also, the air conditioner thermostat can be adjusted to meet the needs based on the daily pattern of use by the occupants of the building. The use of appropriate computerized energy management systems may be the best way to regulate air conditioning for optimal use and energy savings.

The key for commercial, governmental, industrial, and institutional offices to become more energy efficient is through the development of comprehensive energy efficiency and conservation plans. To improve energy efficiency, each major office should consider appointing an energy manager with the responsibility of overseeing implementation of energy conservation activities at the office. The implementation of such a program could result in significant energy savings as well as reduce the cost of doing business.

Within the region, both Florida Power and Light Company and the Florida Municipal Planning Agency offer numerous energy conservation programs that are described in their ten year site plans (Florida Power and Light Company 2009, Florida Municipal Planning Agency 2009). These programs include audits for residential, commercial, and industrial users; installation of more energy efficient insulation, lighting, and appliances such as air conditioners; and a variety of other activities that are designed to reduce the demand for electricity. These programs are part of what is characterized as demand-side management. These power providers benefit from demand-side management programs because they are designed to reduce the demand for electricity during peak hours or shift the demand to non-peak hours. This ultimately reduces the need for the power providers to construct new power plants just to provide enough electricity to serve peak hours of demand.

Demand-side management programs offered by the power providers have resulted in significant energy savings. However, within the regulatory framework established by the state, only those conservation programs found to be cost-effective can be implemented. The regulatory framework may be modified to encourage more conservation programs. The state can possibly promote additional conservation programs by providing incentives to the power producers to earn a profit on investments in new conservation programs that are currently not available. In so doing, additional energy conservation may be achieved. Another alternative would be for the state to allow the utilities to make a profit on their conservation investments. The utility would be able to purchase energy efficiency from its customers just like it buys energy from a power plant. The utilities profit return would be related to the amount of energy saved, rather than to the amount of money invested. This would allow the utility to earn a higher profit, and provide an incentive to choose effective conservation measures over investments in new generating facilities.

The Florida Efficiency and Conservation Act (Sections 366.80 – 366.82, Florida Statutes), requires the Florida Public Service Commission to review and approve cost-effective utility conservation or demand-side management programs, and to set conservation goals for Florida investor-owned utilities. The Florida Energy and Climate Commission is now required to be a party in the Florida Public Service Commission

proceedings to adopt conservation goals, and file comments on the proposed goals. The regional planning councils and other interested parties should monitor the Florida Public Service Commission's 5-year review of the conservation goals of utilities and participate in this review process when feasible.

This planning guide focuses on three main strategies under Goal 4, energy efficiency and conservation. These strategies include: Strategy 4.1, support the development of energy conservation programs; Strategy 4.2, support incentive programs to increase energy conservation; and Strategy 4.3, monitor the Florida Public Service Commission's review of utility energy efficiency and conservation goals and programs. Implementation of the policies within these strategies will help to increase energy efficiency and conservation in the region.

### **Renewable Energy Resources**

The Florida Solar Energy Center has been researching, testing and evaluating solar and renewable energy technologies since 1975. Two solar technologies, photovoltaics and solar water heating, offer great promise for displacing conventional fuels and preserving a cleaner environment in Florida. Photovoltaic systems convert sunlight directly into electricity in a very simple, elegant and reliable process. Worldwide demand for photovoltaic technology is increasing rapidly, with most manufacturers at full capacity. The primary applications of the technology are in the developing world and remote areas not served by conventional electric grids. Photovoltaic systems are cost-effective for these applications. Although photovoltaic generated electricity is still more expensive than conventionally generated electricity in Florida, costs are dropping as new production capacity is added.

For many years, a major barrier to installing a photovoltaic system was the ability to interconnect to an existing electric utility grid. However, in 2008 the Florida Public Service Commission adopted a rule addressing net metering and expedited interconnection standards for photovoltaic and other renewable systems. The net metering rule is intended to promote the development and interconnection of customer-owned renewable generation, and minimize costs for customers attempting to interconnect to their utility. It encourages the development of renewable generation by: 1) expanding the size of eligible systems from 10 kW to 2 MW; 2) expanding the type of eligible systems from solely photovoltaic to all renewable technologies; 3) expediting the interconnection of customer-owned renewable generation; and 4) allowing customers to offset consumption through net metering.

Solar water heating systems have long been considered to be cost-effective to many consumers in Florida and throughout the world. This technology is supported by a strong, knowledgeable industry, the Florida Solar Energy Industries Association. Applications of solar water heating include single and multi-family residences, hotels, light commercial, swimming pools, and spas. Water heating is the second largest user of building energy (next to air conditioning) in the state. For typical homeowners, a solar water heater may represent the most energy efficient appliance they can purchase. Solar water heating

systems are cost-effective now, and can reduce the consumption of depletable resources, help preserve the environment, and should be strongly encouraged through incentive programs such as revolving loan funds, reduced-interest loans, flexible payback options, tax credits, and reduced permit fees.

In addition to solar energy, other forms of renewable energy are currently cost effective and should be supported in order to reduce reliance on fossil fuels. This includes the use of waste heat recovery in commercial and industrial facilities to maximize opportunities for cogeneration; the use of resource recovery systems to meet future energy demands; establishing waste recovery and recycling programs to reduce total energy use and demand on natural resources; and the use of solid waste and biomass fuels for new regional electric generation facilities. Furthermore, efforts should be supported to recover and use methane from landfills and wastewater treatment facilities that would otherwise be lost or wasted. For example, the City of West Palm Beach currently operates a large regional wastewater treatment plant that utilizes aerobic digestion, which produces carbon dioxide. The City is considering changing to an anaerobic process, which produces methane gas. These types of wastewater treatment facilities often flare-off the methane gas, which is wasted energy and is harmful to the atmosphere. Utilization of the methane gas produced as a byproduct of the anaerobic treatment of wastewater can be a cost-effective alternative.

This planning guide focuses on five main strategies under Goal 5, greater use of solar and other renewable energy resources. These strategies include: Strategy 5.1, support the use of solar and other renewable energy resources in new and existing developments; Strategy 5.2, coordinate with local governments to encourage the use of solar and other renewable energy resources; Strategy 5.3, support state and federal incentives and initiatives to promote the use of solar and other renewable energy resources; Strategy 5.4, support public education about solar energy and other renewable energy resources; and Strategy 5.5, support the use of renewable energy sources. Implementation of the policies within these strategies will help to further the goal of greater use of solar and other renewable energy resources in the region.

### **Sustainable Communities**

Since World War II, our growing cities and metropolitan areas, instead of becoming more compact, have sprawled across the countryside. There has been increasing concern that sprawl is upsetting the ecology, sapping the vitality of large and small cities alike, and consuming farmland at a high rate. Today, there is new urgency for containing sprawl. Sprawl has become one of America's notorious energy drains. It wastes energy by making mass transit too expensive and impractical in many urban areas. It stretches commuting distances and makes commuters excessively reliant on the most energy-burning form of transportation, the private automobile. It leaves unused much of the capacity of schools, hospitals, fire stations, and other urban infrastructure that still has to be maintained. It requires the duplication of this same infrastructure outside the city. In the private sector, it hastens the decay of existing commercial centers and fosters new ones far from where people live and work.

Compact urban forms of development are 30 percent more energy-efficient in the long-term than existing sprawling development patterns. To halt the massive expenditures of energy caused by sprawl, future growth should be directed into the inventory of empty or sparsely settled land within existing communities. This does not mean halting growth; rather, it means directing growth to the right places. No-growth strategies are not the answer because they result in a scarcity of affordable housing and increased unemployment.

Local school districts can take a leading role in promoting sustainable communities. There is a need for school districts to become directly involved in planning their facilities for community-wide energy efficiency. New schools should be constructed in locations so that walking and bicycling by children and youth can be safely accomplished. Schools should not be built as islands where only motor vehicles and busses can access the facilities.

The collection of plans contained in *Blueprints for a Better Future: Building Plans and Urban Design Principles for Towns, Cities, & Villages in South Florida* (Florida Department of Community Affairs and Treasure Coast Regional Planning Council 1999) begins to provide building solutions for infilling our existing towns and cities and establishing new towns. Publications such as the Strategic Regional Policy Plan and *Best Development Practices* (Ewing 1995) describe how Florida's communities, streets, and buildings can be designed to become more energy-efficient through the selection of proper orientations and materials. Also, the *Florida Planning Toolbox* (Center for Urban and Environmental Solutions 2008) is an excellent source of tools to promote sustainable communities.

The City of Gainesville stands out for having one of the most progressive and comprehensive programs in Florida to reduce the production of carbon dioxide and promote sustainable communities. The City has adopted four key strategies to improve energy and water efficiency; improve efficiency of power generation; increase use of renewable and domestic fuels to generate electricity; and improve transportation and land use initiatives. One of the key components of the City's energy efficiency programs has been to provide substantial financial incentives to encourage customers to use natural gas for water heating, space heating and clothes drying. The direct use of natural gas for these activities is twice as efficient as electricity when the losses involved in converting fuel to electricity are considered. Another strategy is that Gainesville has the first municipal utility in North America to offer a "feed-in-tariff" solar power incentive plan to promote solar energy production. The success of this new program, which was recently started in 2009, should be closely monitored for use as a model for other communities in Florida.

The ultimate goal of a sustainable community is to become a net-zero energy community, a community that produces equal to or more energy on average annually, than the energy it consumes from fossil fuels sources. A net-zero energy community requires many elements of design, including consideration of alignment of streets for optimal breezes, proper orientation of buildings to maximize solar capture, integral rooftop photovoltaic

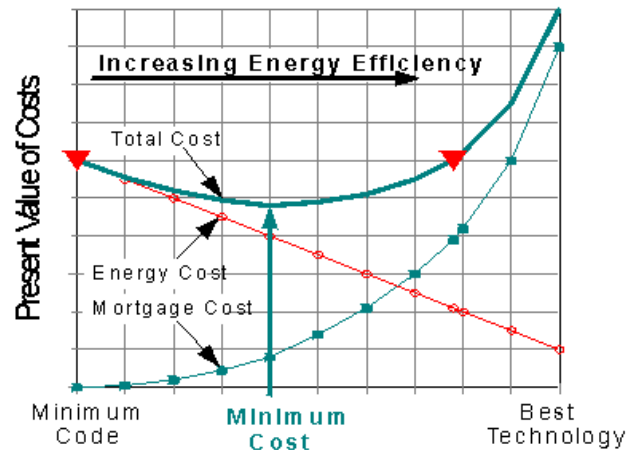
systems, use of energy efficient building materials, and integration of transportation, landscaping, and infrastructure strategies. New developments in the region are encouraged to consider the challenges and benefits of a net-zero energy philosophy early in the design-phase of the project.

This planning guide focuses on six main strategies under Goal 6, sustainable communities. These strategies include: Strategy 6.1, preserve natural areas, discourage suburban sprawl, and encourage urban infill; Strategy 6.2, protect existing agricultural areas as integral components of sustainable communities; Strategy 6.3, support the development of cities, towns, and villages that maximize energy efficiency and sustainability; Strategy 6.4, support infill and retrofitting existing communities to become more energy efficient; Strategy 6.5, support programs that reduce greenhouse gas emissions and promote clean air; and Strategy 6.6, support programs to reduce the harmful environmental and health effects of sulfur dioxide, nitrogen oxides, mercury, lead, and other emissions that are a result of burning fossil fuels. Implementation of the policies within these strategies will help to further the goal of achieving sustainable communities in the region.

## **Buildings**

The design and construction of both residential and commercial buildings are regulated in Florida by the “Energy Efficiency Code for Building Construction,” which is produced by the Building Codes and Standards Office of the Florida Department of Community Affairs. The latest update to the Energy Efficiency Code for Building Construction in 2007 included a number of features that will cut the energy consumption of new houses by 20 percent in 2010, and by 50 percent in 2019. According to a state sponsored analysis, the 2007 Florida energy code is already 4 percent more stringent than the International Code Council’s model International Energy Conservation Code. Notwithstanding this fact, minimum compliance with Florida’s Energy Code still leaves considerable energy efficiency and monetary savings available for building owners to achieve at their discretion. For example, most homes, new or existing, can be substantially improved and return money to their owner from day one. The chart below illustrates how these savings occur, even in “code-compliant” homes.

As you improve the efficiency of a new home, the present value of its mortgage cost increases – more and more rapidly as you approach the best available technology. Simultaneously, however, energy cost decreases, and there is a point at which their sum (the total cost) is minimized (marked on the horizontal axis and with an arrow to the Total Cost curve on the chart). It is worth noting that the cost of owning the minimum code home is greater than the cost of owning a more energy efficient home until the point indicated by the large triangle on the total cost curve is reached. Thus, substantial improvements in efficiency are typically cost-effective.



This example illustrates the chief operating principles of Home Energy Rating Systems and Energy Efficient Mortgages, both of which are key elements of the U.S. Energy Policy Act of 1992. The Florida Building Energy Efficiency Ratings Act of 1993 (Section 553.990, Florida Statutes) gave Florida residents the mechanism by which to measure these potential energy savings and to take advantage of these economic principles in the marketplace. The statute indicates: “It is in the interest of the state to encourage the consideration of the energy-efficiency rating system in the market so as to provide market rewards for energy-efficient buildings and to those persons or companies designing, building, or selling energy-efficient buildings.”

The Florida rating system that has resulted from this statute provides the methods and procedures to be used in establishing the relative energy efficiency of buildings. Furthermore, the Act requires that the rating system be uniform across the state, and that it be consistent with national rating system guidelines. As a result, the playing field is leveled and both consumers and the marketplace can have full confidence that Florida’s energy ratings are equally consistent and comparable everywhere. As intended by the Act, Florida’s rating system provides the methods and means to establish a marketplace *value* for energy efficiency. It does this by providing the necessary engineering and analysis tools to comprehensively establish the economic benefits of building energy efficiency in the financial market.

In addition to the Energy Efficiency Code for Building Construction in Florida, there are a number of excellent programs that provide mechanisms to improve energy efficiency in new and existing buildings. Some of these major programs are described below.

*Florida Green Building Coalition Programs.* The Florida Green Building Coalition offers the following programs: 1) Green Commercial Building Standard to encourage owners of smaller-sized commercial projects, less than 30,000 square feet, to adopt green and sustainable strategies during the design and construction of their project and to receive recognition for their efforts; 2) Green Hi-Rise Residential Standard to encourage owners

of high-rise residential projects to adopt green and sustainable strategies; 3) Green Home Standards to provide a green designation to new or existing homes; 4) Green Development Standard for land development; and 5) Green Local Government Standard to designate Green Cities and Green Counties for outstanding environmental stewardship.

*Florida Power and Light Company BuildSmart Program.* BuildSmart is a new home certification program offered throughout Florida Power and Light Company's territory to assist in building homes that achieve a higher level of energy efficiency than required by the building code. BuildSmart homes save up to 30 percent on energy bills, compared to homes that simply comply with the Florida building code. Florida Power and Light Company's energy experts partner with the home builder to plan, inspect and test the new home's energy-using systems. Florida Power and Light Company services include information and personal advice on efficiency options as well as inspection of the home's air conditioning duct system and efficiency upgrades.

*U.S. Department of Energy Building America Program.* Building America is an industry-driven research program designed to accelerate the development and adoption of advanced building energy technologies in new and existing homes. Building America works with the residential building industry to develop and implement innovative building energy systems. The innovations save builders and homeowners millions of dollars in construction and energy costs. This cost-shared partnership program has the following goals: reduce average whole-house energy use by 30–90 percent and reduce construction time and waste; improve indoor air quality and comfort; integrate clean onsite power systems leading to net-zero energy homes; and increase the energy efficiency of existing homes by 20–30 percent.

*U.S. Environmental Protection Agency Energy Star Program.* This is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy to help save money and protect the environment through energy efficient products and practices. The program provides a rating to electronic products, homes, and buildings indicating they meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and U.S. Department of Energy.

*U.S. Green Building Council Leadership in Energy and Environmental Design Program.* Leadership in Energy and Environmental Design is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across several metrics, including: energy savings, water efficiency, carbon dioxide emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. The Leadership in Energy and Environmental Design program provides commercial and residential building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. The Leadership in Energy and Environmental Design for Neighborhood Development extends the benefits of Leadership in Energy and Environmental Design certification beyond the building footprint into the neighborhood.



This planning guide focuses on three main strategies under Goal 7, energy efficient buildings. These strategies include: Strategy 7.1, support programs that will lead to more energy efficient building designs; Strategy 7.2, support enforcement, enhancement, and updating of the Florida Energy Efficiency Code for Building Construction; and Strategy 7.3, support programs to make existing buildings more energy efficient. Implementation of the policies within these strategies will help to further the goal of achieving energy efficient buildings in the region.

## **Transportation Systems**

The Florida economy is extraordinarily dependent on on-road vehicles to get workers to their place of employment, to get goods to market, and to move tourists in and around the state. The overview of transportation issues by the Governor's Action Team on Energy & Climate Change (2008) indicates that the transportation sector is the second largest contributor to Florida's gross greenhouse gas emissions. In 2005, the sector accounted for 36 percent of Florida's gross greenhouse gas emissions. Analysis of gross greenhouse gas emissions by source indicates that on-road gasoline vehicles account for the largest share of transportation emissions, which was about 65 percent in 2005. On-road diesel vehicles accounted for about 15 percent of emissions, and marine vessels accounted for about 12 percent of emissions. Air travel, rail and other sources produced the remaining emissions.

Because of Florida's population and economic growth, and an increase in the total vehicle miles traveled, on-road gasoline consumption grew by 44 percent between 1990 and 2005. During that same time period, on-road diesel use rose by 88 percent, which suggests rapid growth in freight movement within and across state boundaries. In the absence of a significant increase in vehicle fuel economy, on-road gasoline and diesel emissions are expected to grow at historical rates through 2025. Total transportation emissions are expected to grow by 64 percent between 2005 and 2025.

Greenhouse gas emissions in Florida can be reduced by improving vehicle fuel efficiency, substituting gasoline and diesel with lower emission fuels, and reducing to vehicle miles traveled. The U. S. Energy Independence and Security Act of 2007 contains a provision to increase the corporate average fuel economy of light-duty vehicles to 35 miles per gallon by 2020. Increases in vehicle fuel economy resulting from this Act will lead to reduced carbon dioxide emissions from on-road vehicles.

Alternative transportation energies include: electric and hybrid-electric, liquefied petroleum gas, natural gas, biomass derived diesel substitutes (biodiesel), and hydrogen. Much research has been done on these alternative energies and vehicles of one type or another are available from a large number of manufacturers. Many alternative fuel vehicles are already in use in Florida through assistance from the Department of Energy's Clean Cities Program. This program supports public-private partnerships that deploy alternative fuel vehicles and build supporting alternative fuel infrastructure. Electric vehicle recharging facilities and alternative fuel refill sites have been slowly increasing within the state.

One way to reduce vehicle miles traveled and the amount of energy used for transportation is to support the development and use of public transportation systems. A challenge is to design systems that avoid the problems of many systems. For example, possible reasons people do not use existing mass transit systems include: 1) inappropriate routing that slows arrival time; 2) perceived crime on public transit; and 3) rain, heat, and humidity at bus stops or while walking between facilities. Design features should be incorporated into future mass transit systems to promote increased ridership.

Another way to reduce vehicle miles traveled and the energy used in transportation systems is to minimize the need to travel. This can be accomplished by businesses and governmental agencies through the use of video-conferencing and telecommuting. In addition, reduced motor vehicle use can be accomplished by the development of pedestrian and bicycle friendly systems in new road projects or during rework of existing roads. Incentives should be provided to workers using mass transit, bicycle, or walking to work. This might include vouchers to pay for trips on mass transit, or providing special benefits to employees who use alternative modes of transportation.

The timing of lights in highway traffic signal systems can also affect energy efficiency. Running engines waste millions of barrels of fuel each day while vehicles are stopped at traffic lights. This also causes high levels of vehicle emissions. Public funds should focus on timing of lights in order to move traffic more efficiently. Also, alternatives to traffic lights can keep traffic moving. Such alternatives include installation of traffic circles and round-a-bouts, instead of signalization.

This planning guide focuses on four main strategies under Goal 8, energy efficient transportation systems. These strategies include: Strategy 8.1, support the development and use of public transportation systems; Strategy 8.2, support the use of alternative fuel vehicles; Strategy 8.3, support programs that reduce the use of fuel and the amount of vehicle emissions; and Strategy 8.4, support programs to maximize pedestrian and bicycle traffic. Implementation of the policies within these strategies will help to further the goal of achieving energy efficient transportation systems in the region.

## **Regional Economy**

Emerging technologies associated with renewable resources and energy efficient products, such as photovoltaic systems and alternative fuels, provide an opportunity for the region to diversify its economy and capitalize on the industry changes required to address global climate change issues. Within the region, the *Comprehensive Economic Development Strategy 2007-2012* (Treasure Coast Regional Planning Council 2007) serves as a framework of ideas and a broad-based program of action to help the region achieve long-term economic sustainability and regional competitiveness. In the most recent assessment, the region's fastest growing industries were concentrated in the services and hospitality and tourism sectors of the economy. The life sciences industry is also flourishing in the region. The time has come for the renewable energy industry to become a leader as an emerging cluster that drives the local economy.

The Florida Solar Energy Center has an ongoing program to provide international training and technical assistance to promote the use of renewable resources. The goal is to encourage foreign governments to purchase renewable products, such as photovoltaic and solar water heating systems. This program has a great potential for Caribbean and South American countries. The presence of two ports in the region, the Port of Fort Pierce, and the Port of Palm Beach, makes the Treasure Coast Region a desirable location for export of renewable products. The area could benefit from this program by attracting manufactures of photovoltaic and solar water heating systems to the region. Attracting a major photovoltaic manufacturing facility, as well as other renewable resources industries should be a major goal for the region.

This planning guide focuses on two main strategies under Goal 9, a new regional economy based on renewable resources: Strategy 9.1, support programs to attract companies that produce renewable resource and energy efficient products; and Strategy 9.2, support development of an energy education and technology center and job placement program in the region. Implementation of the policies within these strategies will help to further the goal of achieving a new regional economy based on renewable resources.

## C. Goals, Strategies and Policies

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### Goal 1

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#### Coordinated Energy Planning

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##### Indicators:

- *Number of regional programs and events addressing energy issues*
- *Number of local governments that adopt an energy section and related policies in their comprehensive plan*
- *Number of incentives adopted by local, state and federal governments to promote renewable energy resources*
- *Number of school districts that adopt energy conservation programs*

**Strategy 1.1:** Develop regional programs promoting public awareness, education, and coordination of energy issues.

**Policy 1.1.1:** Encourage the interest and participation of citizens and local governments in the development and implementation of energy policies and programs in the region.

**Policy 1.1.2:** Provide for energy education and the public dissemination of information on energy and its social, economic and environmental implications. Coordinate with all interested parties to ensure that balanced, accurate information is provided to the public.

**Policy 1.1.3:** Encourage the Cooperative Extension Service in each county to continue developing and providing programs to reach out to the community, and provide education on energy efficiency and environmental sustainability.

**Strategy 1.2:** Support efforts by local governments to become more energy efficient and self sustaining.

**Policy 1.2.1:** Assist local governments in developing an energy section and related policies for their local comprehensive plans. The energy section may be included in an energy element, sustainability element, or may be a component of any other element in the comprehensive plan.

**Policy 1.2.2:** Encourage local governments to participate in activities and campaigns to reduce greenhouse gas emissions that contribute to global warming and air pollution.

**Policy 1.2.3:** Sponsor periodic workshops to inform government officials and the public of the costs and benefits associated with various energy efficiency and conservation techniques, equipment, and materials.

**Strategy 1.3:** Support incentives by local, state and federal governments to promote energy efficiency and conservation and the use of renewable energy resources.

**Policy 1.3.1:** Encourage local, state and federal governments to provide financial incentives, such as revolving loan funds, reduced-interest loans, flexible payback options, tax credits and reduced permit fees, to promote energy efficiency and conservation and the use of renewable energy resources.

**Policy 1.3.2:** Explore the feasibility of a system that applies surcharges to products that do not meet strict standards for energy efficiency. The funds collected from the surcharge could be used to encourage the use of energy efficient products.

**Policy 1.3.3:** Promote streamlining of state and federal regulations and developing an expedited permitting process to encourage the use of renewable energy resources.

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## Goal 2

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### Reduced Impacts from Power Generating Facilities

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*Indicators:*

- *Number of new power generating facilities incorporating renewable resources*
- *Megawatts of renewable energy produced in the region*
- *Number of existing power generating facilities modified to meet current clean air standards*
- *Number of Customer participating in utility direct load control programs*

**Strategy 2.1:** Support reduced reliance on fossil fuels, decentralized generation of electricity, and increased energy independence.

**Policy 2.1.1:** Encourage the development of power generating facilities that rely on renewable energy sources, such as ethanol, cellulosic ethanol, biobutanol, biodiesel, biomass, biogas, hydrogen fuel cells, ocean energy, hydrogen, solar, hydro, wind, or geothermal.

**Policy 2.1.2:** Promote the development of decentralized generation facilities that rely on renewable energy resources.

**Policy 2.1.3:** Encourage the state legislature and Florida Public Service Commission to enact the necessary legislation, rules and procedures to allow the electric utilities in the State of Florida to install, own, and operate photovoltaic units on the rooftops of private and public buildings.

**Policy 2.1.4:** Encourage the state legislature and Florida Public Service Commission to enact the necessary legislation, rules and procedures that would allow Florida's power companies to meet the state's renewable portfolio standards established as a result of the Governor's Executive Order 07-127.

**Policy 2.1.5:** Encourage the state legislature and Florida Public Service Commission to enact the necessary legislation, rules and procedures to amend the regulatory framework to provide financial incentives for the power providers and customers to rely to a greater extent on solar energy and other renewable energy resources.

**Policy 2.1.6:** Encourage a balanced mix of renewable, nuclear, and fossil fuel energy sources that will contribute to the stability of the region's economy with minimal degradation of the region's environmental resources.

**Strategy 2.2:** Support retrofitting older power plants and energy infrastructure.

**Policy 2.2.1:** Encourage retrofitting, repowering, retiring, or decommissioning existing power plants that do not meet current clean air standards.

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## Goal 3

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### Reduced Impacts from Electric Power Lines

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***Indicators:***

- *Number of miles of electric power lines buried*
- *Number of miles of new higher capacity energy efficient power lines*

**Strategy 3.1:** Support efforts to reduce impacts of power lines.

**Policy 3.1.1:** Encourage the burial of new power lines in urban areas.

**Policy 3.1.2:** Encourage new power lines to be sited along existing linear corridors.

**Policy 3.1.3:** Encourage new power lines to be sited in a way that minimizes impacts to existing land uses.

**Policy 3.1.4:** Encourage new power lines to be sited around rather than through existing conservation areas and other natural upland and wetland communities.

**Policy 3.1.5:** Encourage new power lines and substations to be sited in a way that protects the public health and welfare.

**Policy 3.1.6:** Encourage local governments to work with the electric utilities to identify preferred routes for future power lines in their communities.

**Strategy 3.2:** Support upgrading older less efficient power lines.

**Policy 3.2.1:** Encourage replacement of older, less efficient power lines with new higher capacity, more energy efficient infrastructure.

**Policy 3.2.2:** Support the development and use of smart grids.

**Policy 3.2.3:** Support research and development of new transmission technology, such as superconductors.



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## Goal 4

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### Energy Efficiency and Conservation

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#### ***Indicators:***

- *Number of local governments that have energy efficiency and conservation plans*
- *Number of private businesses that adopt energy efficiency and conservation plans*
- *Number of school systems that adopt energy efficiency and conservation plans*

**Strategy 4.1:** Support the development of energy conservation programs.

**Policy 4.1.1:** Provide local governments, school systems, and private businesses with model energy efficiency and conservation programs and request that they be adopted and implemented.

**Policy 4.1.2:** Encourage all commercial, governmental, industrial, and institutional offices to appoint an energy manager with the responsibility of overseeing implementation of energy efficiency and conservation activities at the office.

**Policy 4.1.3:** Encourage all government employees to dress appropriately for the current weather conditions in order to reduce the level of air conditioning necessary in the work place.

**Policy 4.1.4:** Promote the use of smart meters and other forms of computerized energy management designed to conserve energy and allow manual override when appropriate.

**Policy 4.1.5:** Encourage participation in state and federal energy efficiency and renewable energy programs.

**Policy 4.1.6:** Encourage expansion of waste reduction, reusing, and recycling programs to reduce total energy use and demand on natural resources.

**Strategy 4.2:** Support incentive programs to increase energy conservation.

**Policy 4.2.1:** Work with local governments to offer a reduction in property taxes based on the investment of energy efficient improvements in the property.

**Policy 4.2.2:** Encourage the Florida Public Service Commission to provide incentives to the power producers to make more conservation programs possible.

**Strategy 4.3:** Monitor the Florida Public Service Commission's review of utility energy efficiency and conservation goals and programs.

**Policy 4.3.1:** Encourage participation in the Florida Public Service Commission's review of utility energy efficiency and conservation goals.

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## Goal 5

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### Greater Use of Solar and Other Renewable Energy Resources

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#### ***Indicators:***

- *Number of solar water heating systems in operation*
- *Number of solar pool heating systems in operation*
- *Number of photovoltaic systems interconnected to the electric grid*
- *Amount of energy produced from renewable sources*

**Strategy 5.1:** Support the use of solar and other renewable energy resources in new and existing developments.

**Policy 5.1.1:** Assist developers in incorporating solar design and other renewable technologies in new developments.

**Policy 5.1.2:** Design new street layouts that allow energy-efficient building orientation to capture prevailing breezes and to control solar exposure.

**Policy 5.1.3:** Promote the design of energy efficient buildings through: a) proper siting according to solar orientation; b) design of passive architectural systems; c) site designs that provide shade to buildings; d) use of sustainable building materials; and e) use of solar thermal and photovoltaic systems.

**Policy 5.1.4:** Support the design of a net-zero energy community that relies on renewable sources and can be used as a model for the Region and State of Florida.

**Strategy 5.2:** Coordinate with local governments to encourage the use of solar and other renewable energy resources.

**Policy 5.2.1:** Encourage flexibility in zoning regulations that provide for: a) setback requirements that allow building orientation to make the best use of prevailing breezes and solar radiation; and b) energy conservation through the use of outdoor clotheslines, vegetable gardens, compost bins, and other reasonable practices consistent with Section 163.04, Florida Statutes.

**Policy 5.2.2:** Promote revisions to zoning regulations that protect access to direct solar radiation and remove restrictions which hinder the use of solar devices, or provide variances to allow solar devices where otherwise prohibited by height, setback, or accessory structure restrictions consistent with Section 163.04, Florida Statutes.

**Policy 5.2.3:** Encourage local governments to streamline procedures and provide an expedited permitting process for installing renewable energy systems.

**Policy 5.2.4:** Encourage local governments to retrofit public buildings with solar and other renewable energy systems.

**Policy 5.2.5:** Distribute the latest information on solar and other renewable energy systems to local governments.

**Strategy 5.3:** Support state and federal incentives and initiatives to promote the use of solar and other renewable energy resources.

**Policy 5.3.1:** Encourage state and federal legislators to explore the feasibility of developing incentives, such as revolving loan funds, reduced-interest loans, flexible payback options, tax credits and reduced permit fees, to promote the use of solar and other renewable energy systems.

**Strategy 5.4:** Support public education about solar energy and other renewable energy resources.

**Policy 5.4.1:** Distribute educational materials on solar and other renewable energy resources to local governments, developers, and the public.

**Policy 5.4.2:** Maintain an updated list of businesses and contractors in the Region that specialize in selling, installing, and maintaining solar and other renewable energy systems.

**Policy 5.4.3:** Conduct periodic workshops promoting the use of solar and other renewable energy resources.

**Strategy 5.5:** Support the use of renewable energy sources.

**Policy 5.5.1:** Encourage new industry to be sited near sources of waste heat to maximize opportunities for cogeneration.

**Policy 5.5.2:** Encourage waste heat recovery in commercial and industrial facilities.

**Policy 5.5.3:** Disseminate information promoting the use of solar and other renewable energy resources.

**Policy 5.5.4:** Encourage companies that produce renewable resource and energy efficient products, such as photovoltaic systems and solar water heaters, to establish manufacturing facilities in the region.

**Policy 5.5.5:** Promote the use of resource recovery systems to meet future energy demands.

**Policy 5.5.6:** Establish waste recovery and recycling programs to reduce total energy use and demand on natural resources.

**Policy 5.5.7:** Promote the recovery and use of methane from landfills and wastewater treatment facilities.

**Policy 5.5.8:** Encourage, support and facilitate collaboration on planning new regional electric generation facilities relying on solid waste and biomass fuels.

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## Goal 6

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### Sustainable Communities

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#### ***Indicators:***

- *Number of acres of natural areas protected*
- *Number of housing units approved inside versus outside the urban service boundary*
- *Number of existing housing units retrofitted to become more energy efficient*
- *Emission levels of greenhouse gases*
- *Number of net-zero energy communities*

**Strategy 6.1:** Preserve natural areas, discourage suburban sprawl, and encourage urban infill.

**Policy 6.1.1:** Develop a framework of incentives and programs for the preservation of environmentally significant natural systems. Such incentives and programs include: tax abatement or incentives, conservation easements, transfer of development rights, purchase of development rights and acquisition.

**Policy 6.1.2:** Preserve and manage complete natural systems as a network of connected nature preserves.

**Policy 6.1.3:** Encourage clustering and transfer of development rights to new and existing cities, towns and villages.

**Policy 6.1.4:** Promote infill, and densification of and investment in established cities, towns and villages.

**Policy 6.1.5:** Locate infrastructure investments in areas designated as existing or future cities, towns and villages.

**Strategy 6.2:** Protect existing agricultural areas as integral components of sustainable communities.

**Policy 6.2.1:** Encourage local governments to identify the agricultural areas most important to sustainable communities and provide incentives for the protection of these agricultural areas.

**Policy 6.2.2:** Encourage the use of conservation easements and other new tools to protect existing agricultural land and the integrity of the landscape.

**Policy 6.2.3:** Encourage local-based agriculture to supply fresh food for consumption by local residents as a way to avoid the use of fuel to transport food from distant locations.

**Strategy 6.3:** Support the development of cities, towns, and villages that maximize energy efficiency and sustainability.

**Policy 6.3.1:** Research and promote the types of land use patterns and development techniques which will reduce the total fossil fuel energy required to build and maintain urban land uses.

**Policy 6.3.2:** Assist local governments in reviewing and modifying local development regulations, in order to increase energy efficiency by promoting mixed use development patterns and locating new development where infrastructure already exists.

**Policy 6.3.3:** Site new housing in close proximity to employment and public services so as to reduce non-housing costs, such as transportation which are directly dependent on housing choice.

**Policy 6.3.4:** Favor forms of development and redevelopment that maximize public transportation alternatives, minimize the use of the collector and arterial roadway network, and reduce the total amount of daily vehicle miles traveled.

**Policy 6.3.5:** Plan and design new development and redevelopment to provide complementary interconnections for pedestrians and public transportation within and between residential areas, schools, employment and retail centers, recreational areas and other public facilities.

**Policy 6.3.6:** Create sustainable neighborhoods and communities by providing a balanced, well planned mix of land uses and building types in a compact design.

**Policy 6.3.7:** Minimize street widths to reduce energy requirements for construction and maintenance, as well as to reduce heat gain.

**Policy 6.3.8:** In areas where trees will not interfere with existing power lines, plant native shade trees along streets and sidewalks to prevent the pavement from heating and to encourage pedestrian traffic.

**Policy 6.3.9:** Encourage the use of drought-tolerant native vegetation to shade walls and windows, parking lots, and streets, thereby reducing air conditioning energy demands.

**Policy 6.3.10:** Require analysis of energy use by large scale developments to determine if more energy efficient systems can be utilized.

**Strategy 6.4:** Support infill and retrofitting existing communities to become more energy efficient.

**Policy 6.4.1:** Increase public investment and assistance to foster infill, redevelopment, and energy efficient design in existing urban areas.

**Policy 6.4.2:** Create incentives to encourage private reinvestment in existing urban areas.

**Policy 6.4.3:** Work with local governments and private citizens to prepare redevelopment and revitalization master plans for areas with an identified need.

**Strategy 6.5:** Support programs that reduce greenhouse gas emissions and promote clean air.

**Policy 6.5.1:** Recommend that local governments participate in activities and campaigns to slow the earth's warming trend and to improve air quality and urban livability.

**Policy 6.5.2:** Increase public awareness about campaigns to clean up polluting power plants.

**Policy 6.5.3:** Generate involvement in activities and programs to achieve compliance with federal mandates that govern air quality and promote energy and economic security.

**Policy 6.5.4:** Promote public participation in local utility energy efficiency programs.

**Strategy 6.6:** Support programs to reduce the harmful environmental and health effects of sulfur dioxide, nitrogen oxides, mercury, lead, and other emissions that are a result of burning fossil fuels.

**Policy 6.6.1:** Encourage the State of Florida to study or participate in studies of the environmental and health effects of the various emissions from power plants and motor vehicles.

**Policy 6.6.2:** Promote the development of a plan to minimize the harmful environmental and health effects of greenhouse gas emissions.



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## Goal 7

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### Energy Efficient Buildings

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#### ***Indicators:***

- *Number of buildings certified in the U.S. Environmental Protection Agency Energy Star program*
- *Number of new homes certified in the Florida Power and Light BuildSmart program*
- *Number of Leadership in Energy and Environmental Design certified buildings*
- *Number of Florida Green Building Coalition certified buildings*
- *Number of net-zero energy buildings*

**Strategy 7.1:** Support programs that will lead to more energy efficient building designs.

**Policy 7.1.1:** Promote awareness of and participation in the U.S. Environmental Protection Agency Energy Star program and the Florida Power & Light Company BuildSmart program, as well as other energy efficiency and conservation programs offered by the U.S. Department of Energy, State of Florida, and electric utilities.

**Policy 7.1.2:** Encourage participation in green building rating systems, such as Leadership in Energy and Environmental Design or Florida Green Building Coalition programs for new and existing buildings.

**Policy 7.1.3:** Provide educational materials on energy efficient design principles, including: 1) proper siting according to solar orientation; 2) design of passive architectural systems; 3) site designs that provide shade to walls and windows; 4) use of sustainable building materials; 5) use of solar mechanical systems and other on-site renewable energy strategies, 6) strategies to increase energy performance, and 7) building commissioning.

**Policy 7.1.4:** Encourage that all new public and private buildings be inspected during construction and certified by a building commissioning agent to ensure that all energy related systems are installed and function properly.

**Policy 7.1.5:** Consider adding electric vehicle charging bus ways in all new construction.

**Policy 7.1.6:** Encourage the use of location and energy efficient mortgages.

**Strategy 7.2:** Support enforcement, enhancement, and updating of the Florida Energy Efficiency Code for Building Construction.

**Policy 7.2.1:** Apply the state mandated energy code to all new construction, including state and federal government buildings.

**Policy 7.2.2:** Establish workshops for training building and zoning officials, review boards, and builders, in methods of energy performance calculations necessary to implement adopted code.

**Strategy 7.3:** Support programs to make existing buildings more energy efficient.

**Policy 7.3.1:** Promote weatherization and retrofit programs, such as those that add solar water heating systems, weather-stripping, insulation, and upgrade appliance efficiency. Refer to *Leadership in Energy and Environmental Design for Homes Rating System* (U.S. Green Building Council 2008) for an extensive list of ways to make buildings more energy efficient.

**Policy 7.3.2:** Encourage local governments to adopt an ordinance that requires landscaping for energy conservation. The ordinance should focus on providing trees in the proper locations to provide shade to reduce the need for air conditioning.

**Policy 7.3.3:** Encourage the use of recycled and recyclable products and energy efficient building materials and techniques.

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## Goal 8

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### Energy Efficient Transportation Systems

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#### Indicators:

- *Number of local governments that adopt pedestrian and bicycle plans*
- *Number of alternative modes of transportation available*
- *Number of private vehicle miles per capita traveled*
- *Gallons of gasoline used per capita in the Region*
- *Number of commuter rail passengers*

**Strategy 8.1:** Support the development and use of public transportation systems.

**Policy 8.1.1:** Establish public transportation systems in high-density areas, designated public transportation corridors, and central business districts.

**Policy 8.1.2:** Provide incentives for use of high-occupancy vehicles and alternative modes of transportation (e.g., car pools, van pools, buses, bicycles, etc.).

**Policy 8.1.3:** Work with local governments to increase land use densities around commuter rail stations and at strategic locations along designated public transportation corridors.

**Policy 8.1.4:** Promote the development and redevelopment of downtowns at strategic locations along designated public transportation corridors.

**Policy 8.1.5:** Plan and design new development and redevelopment to provide complementary interconnections for pedestrians and public transportation within and between residential areas, schools, employment and retail centers, recreational areas and other public facilities.

**Policy 8.1.6:** Site new buildings so they are convenient and accessible to public transportation facilities.

**Policy 8.1.7:** Promote non-automotive travel through the provision of convenient interconnections between modes, such as park and ride facilities and public transit stops at inter-city bus and train stations.

**Policy 8.1.8:** Encourage the use of renewable fuels in public transportation systems.

**Strategy 8.2:** Support the use of alternative fuel vehicles.

**Policy 8.2.1:** Encourage local governments, private industries, and individuals, to utilize alternative fuel vehicles and to develop alternative fueling infrastructure.

**Policy 8.2.2:** Promote participation by local governments and private industries in the US Department of Energy Clean Cities program in accordance with the Energy Policy Act of 1992.

**Strategy 8.3:** Support programs that reduce the use of fuel and the amount of vehicle emissions.

**Policy 8.3.1:** Ensure that intersections and traffic signal sequences are designed to minimize idle time for vehicles.

**Policy 8.3.2:** Encourage greater coordination between the Florida Department of Transportation and local governments in providing improvements to highway and street systems, such as the use of synchronized traffic signals, demand-activated signals, exclusive turn lanes, round-a-bouts, and other traffic-calming techniques to reduce disruptions to the smooth flow of traffic.

**Policy 8.3.3:** Require patterns of development and redevelopment that maximize public transportation alternatives, minimize the use of collector and arterial roadways, and reduce the total amount of daily vehicle miles traveled.

**Policy 8.3.4:** Encourage public agencies and private businesses to promote car pooling and van pooling through incentives such as priority parking areas, exclusive car pool/high occupancy vehicle lanes, provision of vehicles and support facilities, and insurance discounts.

**Policy 8.3.5:** Encourage public agencies and private businesses to promote the use of video-conferencing and telecommuting to reduce the number of vehicles on the highway.

**Policy 8.3.6:** Support efforts to require sports utility vehicles to meet passenger car standards for fuel efficiency and emissions.

**Policy 8.3.7:** Support efforts to require diesel fuel vehicles to meet stricter standards for emissions.

**Policy 8.3.8:** Support efforts to reduce the amount of sulfur in gasoline.

**Policy 8.3.9:** Encourage greater use of plug-in hybrid and electric vehicles.

**Strategy 8.4:** Support programs to maximize pedestrian and bicycle traffic.

**Policy 8.4.1:** Work with local governments and private developers to design and develop a network of sidewalks and bicycle paths that will result in safe, convenient links between home, work, shopping, recreation, and schools.

**Policy 8.4.2:** Provide incentives to non-automotive travel such as sheltered bus stops, bicycle locking facilities at major destinations, shaded pathways, and protected crossings.

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## Goal 9

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### A New Regional Economy Based on Renewable Resources

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#### Indicators:

- *Number of companies establishing manufacturing facilities in the region to produce renewable resource and energy efficient products*
- *Establishment of an energy education and technology center in the region*

**Strategy 9.1:** Support programs to attract companies that produce renewable resource and energy efficient products.

**Policy 9.1.1:** Encourage companies that produce renewable resource and energy efficient products, such as photovoltaic systems and solar water heaters, to establish manufacturing facilities in the region.

**Policy 9.1.2:** Identify locations for and encourage the development of renewable energy industry cluster in the region.

**Policy 9.1.3:** Encourage and support renewable energy industry cluster research and development activities.

**Policy 9.1.4:** Encourage and support new financing methodologies to promote the renewable energy industry and greater use of renewable energy in the region.

**Policy 9.1.5:** Research, develop, and disseminate information that will facilitate a new regional economy based on renewable resources.

**Policy 9.1.6:** Establish a coordinating council including landowners, growers, refiners, and distributors to facilitate the cellulosic ethanol production in the region.

**Strategy 9.2:** Support development of an energy education and technology center and job placement program in the region.

**Policy 9.2.1:** Coordinate with the Florida Solar Energy Center, electric utilities, power providers, colleges and universities to establish and maintain an energy education and technology center and job placement program in the region.

**Policy 9.2.2:** Promote participation by local governments, private industries, school districts and other educational facilities in establishing an

energy education and technology center and job placement program in the region.

**Policy 9.2.3:** Promote energy education and awareness by the school districts and other educational facilities in course work and curriculum for students, workforce training programs, and programs to conserve energy in the schools.

## APPENDIX 1

### Glossary of Energy Terms

**Alternative Fuels**--Alternative fuels, for transportation applications, include the following: methanol; denatured ethanol, and other alcohols; fuel mixtures containing 85 percent or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels -- natural gas; liquefied petroleum gas (propane); hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological materials (biofuels such as soy diesel fuel); electricity (including electricity from solar energy).

**Alternative Fuel Vehicle (AFV)**--A vehicle that is powered by fuels other than current forms of petroleum or diesel oil.

**Bagasse**--Residue generated by crushing sugarcane that is used as a feedstock in electric power plants.

**Barrel of Oil Equivalent**--The numerical value of the energy contained in a standard barrel of oil. This unit is commonly used for measuring energy production for consumption. 5,800,000 Btu = 1 standard 42 gallon barrel of oil.

**Biofuels**--Liquid fuels and blending components produced from biomass feedstocks, used primarily for transportation.

**Biomass**--Organic non-fossil material of biological origin constituting a renewable energy source.

**British Thermal Unit (Btu)**--The energy required to raise the temperature of one pound of water by one degree Fahrenheit.

**Bundled utility service (electric)**--A means of operation whereby energy, transmission, and distribution services, as well as ancillary and retail services, are provided by one entity.

**Carbon dioxide (CO<sub>2</sub>)**--A colorless, odorless, non-poisonous gas that is a normal part of Earth's atmosphere. Carbon dioxide is a product of fossil-fuel combustion as well as other processes. It is considered a greenhouse gas as it traps heat (infrared energy) radiated by the Earth into the atmosphere and thereby contributes to the potential for global warming.

**Carbon Sequestration**--The fixation of atmospheric carbon dioxide in a carbon sink through biological or physical processes.

**Carbon sink**--A reservoir that absorbs or takes up released carbon from another part of the carbon cycle. The four sinks, which are regions of the Earth within which carbon behaves in a systematic manner, are the atmosphere, terrestrial biosphere (usually including freshwater systems), oceans, and sediments (including fossil fuels).



**Clean Cities Coalition**--A voluntary program initiated by the United States Department of Energy to accelerate and expand the use of alternative fuel vehicles (AFV) in communities throughout the country and to provide refueling and maintenance facilities for their operation.

**Climate change**--A term used to refer to all forms of climatic inconsistency, but especially to significant change from one prevailing climatic condition to another. In some cases, "climate change" has been used synonymously with the term "global warming"; scientists, however, tend to use the term in a wider sense inclusive of natural changes in climate, including climatic cooling.

**Climate disruption**--The elements of climate change that are attributed to human actions.

**Cogeneration**--The generation of two forms of useful energy in a single energy conversion process. For example, a turbine may produce both mechanical energy for an electric generator and heat for a building.

**Combined cycle**--An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

**Combined cycle unit**--An electric generating unit that consists of one or more combustion turbines and one or more boilers with a portion of the required energy input to the boiler(s) provided by the exhaust gas of the combustion turbine(s).

**Crude Oil**--A mixture of hydrocarbons that exists in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

**Decentralized Generation**--A method of generating electricity from multiple small energy sources very near to where the electricity is actually used; also known as distributed generation.

**Demand-side management (DSM)**--The planning, implementation, and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the timing and level of electricity demand.

**Deregulation**--A proposed policy reform to reduce government intervention of the energy industry based on the rationale that such reform will allow a greater number of energy producers and suppliers to compete in the market and that increased competition results in efficient energy production and protects consumers.

**Distributed Generation**--A term for power generation facilities that are placed at or near the site where the energy is used.

**Distribution**--The conveyance of power from the substation to the customer.

**Distribution Line or System**--Powerlines under 69 kilovolts that convey electricity from the substation to the customer.

**Eco-industrial Parks**--Industrial parks which seek to co-locate industries which can benefit from the synergies of proximity by: utilizing the waste streams of one to serve as feedstock for another; providing excess steam or energy; increasing efficiency in materials, water, and energy use; reducing waste generation and providing for innovation and technology development.

**Efficiency**--The useful output of any system divided by the total input.

**Energy**--Capacity to work by performing mechanical, physical, or electrical tasks or to cause a heat transfer between two objects at different temperatures.

**Energy Alternatives**--Sources of energy such as fossil fuels (coal, petroleum, and natural gas), nuclear, biomass, hydrogen, geothermal, solar, and wind.

**Energy Conservation**--Reduction or elimination of unnecessary energy use and waste.

**Energy Efficiency**--Percentage of the total energy input that does useful work and is not converted into low-quality usually useless heat in an energy conversion system or process.

**Energy Efficient Mortgages**--Mortgage loans that take into account the cost-savings resulting from energy-efficient devices or structures built into a residential building in calculating the total mortgage amount, monthly payments, and interest. Usually a more energy-efficient mortgage means a borrower qualifying for higher than the normal amount.

**Energy Information Administration (EIA)**--An independent agency within the U.S. Department of Energy that develops surveys, collects energy data, and does analytical and modeling analyses of energy issues. The Agency must satisfy the requests of Congress, other elements within the Department of Energy, Federal Energy Regulatory Commission, the Executive Branch, its own independent needs, and assist the general public, or other interest groups, without taking a policy position.

**Externalities**--Benefits or costs, generated as a byproduct of an economic activity, that do not accrue to the parties involved in the activity. Environmental externalities are benefits or costs that manifest themselves through changes in the physical or biological environment.

**Final Energy**--A form of energy that is used directly by consumers (e.g., electricity).

**Fossil Fuels**--An energy source formed in the Earth's crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas.

**Fuel Cell**--A device that produces electricity from a chemical reaction such as between hydrogen and oxygen.

**Generator capacity**--The maximum output, commonly expressed in megawatts, that generating equipment can supply to system load, adjusted for ambient conditions.

**Generator nameplate capacity**--The maximum rated output of a generator under specific conditions designated by the manufacturer. Generator nameplate capacity is usually indicated in units of kilovolt-amperes and in kilowatts on a nameplate physically attached to the generator.

**Geothermal energy**--Hot water or steam extracted from geothermal reservoirs in the earth's crust. Water or steam extracted from geothermal reservoirs can be used for geothermal heat pumps, water heating, or electricity generation.

**Gigawatt (GW)**--One billion watts or one thousand megawatts.

**Gigawatthour (GWh)**--One billion watthours.

**Global warming**--An increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is today most often used to refer to the warming some scientists predict will occur as a result of increased anthropogenic emissions of greenhouse gases.

**Greenhouse effect**--The result of water vapor, carbon dioxide, and other atmospheric gases trapping radiant (infrared) energy, thereby keeping the earth's surface warmer than it would otherwise be. Greenhouse gases within the lower levels of the atmosphere trap this radiation, which would otherwise escape into space, and subsequent re-radiation of some of this energy back to the Earth maintains higher surface temperatures than would occur if the gases were absent.

**Greenhouse gases**--Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

**Grid**--The layout of an electrical distribution system.

**Heat pump**--Heating and/or cooling equipment that, during the heating season, draws heat into a building from outside and, during the cooling season, ejects heat from the building to the outside. Heat pumps are vapor-compression refrigeration systems whose indoor/outdoor coils are used reversibly as condensers or evaporators, depending on the need for heating or cooling.

**Hydrogen Energy Technology**--Any technology that is used to generate, store, distribute, or use hydrogen in a sustainable energy system.

**Interconnection**--A connection or link between power systems that enable them to draw on each other's reserve capacity in time of need. Interconnection between a photovoltaic energy system and the local electric grid is required for operation of grid-connected photovoltaic systems.

**Investor-owned utility (IOU)**--A privately-owned electric utility whose stock is publicly traded. It is rate regulated and authorized to achieve an allowed rate of return.

**Kilowatt (kW)**--One thousand watts.

**Kilowatthour (kWh)**--A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 Btu.

**Landfill gas**--Gas that is generated by decomposition of organic material at landfill disposal sites. The average composition of landfill gas is approximately 50 percent methane and 50 percent carbon dioxide and water vapor by volume. The methane in landfill gas may be vented, flared, combusted to generate electricity or useful thermal energy on-site, or injected into a pipeline for combustion off-site.

**Linear Corridor**--A landscape feature characterized by and an existing facility, such as a road, railroad, canal, or transmission line.

**Mass Transit**--Buses, trains, trolleys, and other forms of transportation that carry large numbers of people.

**Megawatt (MW)**--One million watts of electricity.

**Megawatthour (MWh)**--One thousand kilowatt-hours or 1 million watt-hours.

**Methane**--A colorless, flammable, odorless hydrocarbon gas (CH<sub>4</sub>) which is the major component of natural gas. It is also an important source of hydrogen in various industrial processes. Methane is a greenhouse gas.

**Natural Gas**--The gaseous component of petroleum. It is primarily methane (CH<sub>4</sub>) and is commonly used as a household and industrial fuel. It is also the least environmentally damaging of all fossil fuels. Many consider it to be a transition fuel.

**Net Metering**--A metering system that measures the difference between the energy that is generated on-site and the energy that is consumed on-site. Net metering is used when a generator of electricity wishes to sell excess energy to a centralized grid.

**Net-Zero Energy Building**--A building with zero net energy consumption and zero carbon emissions annually.

**Net-Zero Energy Community**--A community designed to consume no more energy than what is produced by the community annually.

**Ocean energy systems**--Energy conversion technologies that harness the energy in tides, waves, and thermal gradients in the oceans.

**Petroleum**--A generic term applied to oil and oil products in all forms such as crude oil, lease condensate, unfinished oils, and petroleum products.

**Photovoltaic (PV) Cell**--A device that converts the energy in light directly to electric energy.

**Primary Fuels**--Conventional fuels such as petroleum, coal, and nuclear that can be used continuously. They can sustain the boiler sufficiently for the production of electricity.

**Renewable Energy**--Form of energy that theoretically can last indefinitely without reducing the available supply because it is replaced through natural processes, or because it is essentially inexhaustible. Examples of renewable sources include ethanol, cellulosic ethanol, biobutanol, biodiesel, biomass, biogas, hydrogen fuel cells, ocean energy, hydrogen, solar, hydro, wind, or geothermal.

**Renewable Energy Credit (REC)**--A tradable financial instrument that represents the renewable attributes associated with one megawatt-hour (1,000 kilowatt-hours) of renewable energy.

**Renewable Energy Dividend (RED)**--A policy mechanism that provides a fixed contract to producers of renewable energy. The contracts allow the producer the ability to borrow against a guaranteed payment from their utility company. The contracts include long-term agreed upon prices that the utility company will pay the producers for the energy it buys. Renewable energy dividends are also known as Feed-in-Tariffs.

**Renewable Portfolio Standard (RPS)**--A policy or regulation that requires that a certain amount or percentage of electricity is produced from renewable energy sources, such as wind, solar, biomass, and geothermal. It ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or specific geographic area.

**Repowering**--Process whereby an existing power generating facility is modified to increase the output capacity and increase its generating efficiency.

**Restructuring**--The process of replacing a monopoly system of electric utilities with competing sellers, allowing individual retail customers to choose their electricity supplier but still receive delivery over the power lines of the local utility. It includes the reconfiguration of the vertically-integrated electric utility.

**Service Drop**--The power lines between a utilities power pole/transformer and a customer's point of connection/meter.

**Smart Grid**--An electrical network supplying electricity from suppliers to consumers using digital technology to control appliances at consumer's homes to save energy, reduce cost and increase reliability and transparency.

**Smart Meter**--An electrical meter that identifies consumption in more detail than a conventional meter and has the potential to communicate that information to the local utility for monitoring and billing purposes.

**Solar thermal collector**--A device designed to receive solar radiation and convert it to thermal energy. Normally, a solar thermal collector includes a frame, glazing, and an absorber, together with appropriate insulation. The heat collected by the solar collector may be used immediately or stored for later use. Solar collectors are used for space heating; domestic hot water heating; and heating swimming pools, hot tubs, or spas.

**Superconductor**--A substance that conducts an electric current with zero resistance.

**Sustainability**--The state of having met the needs of the present without endangering the ability of future generations to be able to meet their own needs.

**Sustainable Energy System**--Any energy system that supports the objective of moving residents and businesses towards cleaner, safer, more reliable, more efficient, domestically produced, and ultimately renewable or inexhaustible fuels and associated energy technologies.

**Transmission**--The transfer of power from the generation site to the substation.

**Transmission Line on System**--Powerlines at or above 69 kilovolts that transfer electricity from the generation site to the substation or end user in the case of an industry.

**Vehicle miles traveled (VMT)**--The number of miles traveled nationally by vehicles for a period of 1 year. Vehicle miles traveled is either calculated using two odometer readings or, for vehicles with less than two odometer readings, inputted using a regression estimate.

**Vented/Flared**--Gas that is disposed of by releasing (venting) or burning (flaring).

**Waste heat recovery**--Any conservation system whereby some space heating or water heating is done by actively capturing byproduct heat that would otherwise be ejected into the environment. In commercial buildings, sources of water- heat recovery include refrigeration/air-conditioner compressors, manufacturing or other processes, data processing centers, lighting fixtures, ventilation exhaust air, and the occupants themselves.

**Waste-to-Energy**-- the process of creating energy in the form of electricity or heat from the incineration of a waste source.

**Watt (W)**--The unit of electrical power equal to one ampere under a pressure of one volt. A Watt is equal to 1/746 horsepower.

**Watt-hour (Wh)**--The electrical energy unit of measure equal to one watt of power supplied to, or taken from, an electric circuit steadily for one hour.

## APPENDIX 2 ENERGY INFORMATION SOURCES

Organization	Website	Telephone
American Coalition for Ethanol	www.ethanol.org	605-334-3381
American Council for an Energy-Efficient Economy	www.aceee.org	202 507-4000
American Solar Energy Society	www.ases.org	303-443-3130
American Wind Energy Association	www.awea.org	202-383-2500
Biomass Thermal Energy Council	www.biomassthermal.org	202-596-3974
Broward County	www.broward.org/climatechange	954-831-4000
Center for Climate Strategies	www.climatestrategies.us	202-540-9121
Chicago Climate Exchange	www.chicagoclimatex.com	312-554-3350
DSIRE - Database of State Incentives for Renewables & Efficiency	www.dsireusa.org	N/A
Energy Recovery Council	www.wte.org	202-467-6240
Federal Energy Regulatory Commission	www.ferc.gov	866-208-3372
Florida Atlantic University Center for Urban & Environmental Solutions	www.cuesfau.org/toolbox	954-762-5255
Florida Department of Community Affairs	www.dca.state.fl.us	850-488-8466
Florida Department of Environmental Protection	www.dep.state.fl.us/climatechange	850-245-2118
Florida Earth Foundation	www.floridaearth.org	561-686-3688
Florida Energy & Climate Commission	www.myfloridaclimate.com	850-487-3800
Florida Gas Transmission Company, LLC	www.panhandleenergy.com	713-989-2035
Florida Green Building Coalition	www.floridagreenbuilding.org	850-894-3422
Florida Municipal Power Agency	www.fmpa.com	407-355-7767
Florida Power and Light Company	www.fpl.com	561-694-4000
Florida Public Service Commission	www.psc.state.fl.us	800-342-3552
Florida Alliance for Renewable Energy	www.floridaallianceforrenewableenergy.org	888-501-3273
Florida Solar Energy Center	www.fsec.ucf.edu	321-638-1000
Florida Solar Energy Industries Association	www.flaseia.org	800-426-5899
Gulfstream Natural Gas System L.L.C.	www.gulfstreamgas.com	941-723-7100
ICLEI-Local Governments for Sustainability	www.iclei.org	647-728-4308
Interstate Renewable Energy Council	www.irecusa.org	518-458-6059
Lawrence Berkeley National Laboratory - Environmental Energy Technologies Division	www.eetd.lbl.gov	510-486-6784
National Building Museum	www.nbm.org	202-272-2448
National Renewable Energy Laboratory	www.nrel.gov	202-488-2200
New Buildings Institute	www.newbuildings.org	509-493-4468
Residential Energy Services Network	www.natresnet.org	760-806-3448
Southern Alliance for Clean Energy	www.cleanenergy.org	865-637-6055
U. S. Green Building Council	www.usgbc.org	800-795-1747
U.S. Department of Energy	www.energy.gov	202-586-5000
U.S. Department of Energy - Energy Efficiency & Renewable Energy	www.eere.energy.gov	877-337-3463
U.S. Department of Energy - Energy Information Administration	www.eia.doe.gov	202-586-8800
U.S. Environmental Protection Agency - Clean Energy	www.epa.gov/rdee	877-337-3463
University of Florida - Institute of Food & Agricultural Sciences	www.ifas.ufl.edu	352-392-1971



## APPENDIX 3 Florida Energy Statistics

The following statistics were taken from the web site of the U.S. Department of Energy, Energy Information Administration ([www.eia.doe.gov/](http://www.eia.doe.gov/)).

### A. Primary Energy Consumed in Florida, 2007.

Coal	720.8	Trillion Btu
Natural Gas	950.3	Trillion Btu
Petroleum	1,983.5	Trillion Btu
Nuclear Electric Power	307.2	Trillion Btu
Hydroelectric Power	1.5	Trillion Btu
Biomass Wood and Waste	162.6	Trillion Btu
Geothermal, Solar, Photovoltaic, and Wind	38.9	Trillion Btu
Net Interstate Flow of Electricity	437.2	Trillion Btu
Other	0.0	Trillion Btu
Total	4,601.9	Trillion Btu

### B. Petroleum Consumed in Florida, 2007.

Motor Gasoline	208.7	Million Barrels
Distillate Fuel	55.9	Million Barrels
Liquefied Petroleum Gases	6.3	Million Barrels
Jet Fuel	31.2	Million Barrels
Residual Fuel Oil	38.8	Million Barrels
Other	20.5	Million Barrels
Total	361.3	Million Barrels

### C. Energy Consumption by Sector in Florida, 2007.

Residential	1,339,504	Billion Btu
Commercial	1,089,180	Billion Btu
Industrial	558,887	Billion Btu
Transportation	1,614,301	Billion Btu
Total	4,601,872	Billion Btu

**D. Residential Use of Energy in Florida, 2007.**

Natural Gas	16.3	Trillion Btu
Petroleum	14.2	Trillion Btu
Biomass Wood and Waste	2.2	Trillion Btu
Geothermal	4.6	Trillion Btu
Solar and Photovoltaic	33.0	Trillion Btu
Retail Electricity Sales	402.0	Trillion Btu
Electrical System Energy Losses*	867.3	Trillion Btu
Total	1,339.5	Trillion Btu

\* The amount of energy lost during generation, transmission, and distribution of electricity.

**E. Commercial Use of Energy in Florida, 2007.**

Natural Gas	55.2	Trillion Btu
Petroleum	19.7	Trillion Btu
Biomass Wood and Waste	0.9	Trillion Btu
Geothermal	1.3	Trillion Btu
Solar and Photovoltaic	0.0	Trillion Btu
Retail Electricity Sales	320.5	Trillion Btu
Electrical System Energy Losses*	691.5	Trillion Btu
Total	1089.2	Trillion Btu

\* The amount of energy lost during generation, transmission, and distribution of electricity.

**F. Industrial Use of Energy in Florida, 2007.**

Coal	27.9	Trillion Btu
Natural Gas	73.2	Trillion Btu
Petroleum	142.8	Trillion Btu
Biomass Wood and Waste	107.7	Trillion Btu
Geothermal	0.0	Trillion Btu
Solar and Photovoltaic	0.0	Trillion Btu
Retail Electricity Sales	65.7	Trillion Btu
Electrical System Energy Losses*	141.6	Trillion Btu
Total	558.9	Trillion Btu

\* The amount of energy lost during generation, transmission, and distribution of electricity.

### **G. Transportation Use of Energy in Florida, 2007.**

Natural Gas*	11.2	Trillion Btu
Petroleum	1,602.1	Trillion Btu
Fuel Ethanol	9.1	Trillion Btu
Retail Electricity Sales	0.3	Trillion Btu
Electrical System Energy Losses**	0.7	Trillion Btu
Total	1,614.3	Trillion Btu

\*Consumed in the operation of pipelines, primarily in compressors, and as vehicle fuel.

\*\*The amount of energy lost during generation, transmission, and distribution of electricity.

### **H. Net Electricity Generation in Florida, July 2009.**

Petroleum-fired	725	Thousand MWh
Natural Gas-fired	11,981	Thousand MWh
Coal-fired	5,217	Thousand MWh
Nuclear	2,594	Thousand MWh
Renewables	375	Thousand MWh
Total*	21,461	Thousand MWh

\*May also include net imports of electricity generated from nonrenewable energy sources.

### **I. Electricity Prices in Florida, July 2009.**

Residential	12.34	Cents/kWh
Commercial	10.70	Cents/kWh
Industrial	9.36	Cents/kWh

## APPENDIX 4

### Florida Statutes Related to Energy

Chapter/Section	Subject
74.051	Hearings related to electric facilities
110.171	Telecommuting
163.04	Energy devices based on renewable resources
163.3177	Energy efficient land use patterns
163.3208	Substation approval process
163.3209	Electric transmission and distribution line right-of-way maintenance
186.007	Energy and global climate change
186.0201	Electric substation planning
187.201(11)	Energy; State Comprehensive Plan
196.012	Energy definitions
196.175	Renewable energy source exemption
206.43	Blended and unblended gasoline
211 Part I	Tax on production of oil and gas
212.08	Ethanol; Florida Energy and Climate Change Commission
220.191	Capital improvement tax credits
220.192	Transferring tax credits
220.193	Renewable energy production credit
255.249	Telecommuting
255.251	Creating the Florida Energy Conservation and Sustainability Act
255.252	Green buildings
255.253	Energy conservation for buildings
255.254	Evaluating the life-cycle costs for state buildings
255.255	Sustainable building ratings
255.257	Energy management plan; buildings occupied by state agencies
255.258	Shared financing of energy conservation in state-owned buildings
286.29	Florida climate-friendly preferred products list
287.063	Useful life of equipment
287.064	Energy conservation equipment
287.16	Fuel usage
288.041	Solar energy industry
288.1089	Alternative renewable energy
316.0741	Energy-efficient vehicles
337.401	Electric transmission lines
339.175	Long-range transportation plan
350	Florida Public Service Commission
361	Public Utilities: Special Powers
366	Public Utilities
377	Energy Resources
380.23	Federal consistency of permits and licenses for electric power plants
403 Part II	Electrical Power Plant and Transmission Line Siting
403 Part VIII	Natural Gas Transmission Pipeline Siting
409.508	Low-income home energy assistance program.
489.145	Energy efficiency contracting
526 Part I	Sale of liquid Fuels
553 Part IV	Florida Building Code
553 Part V	Thermal Efficiency Standards
553 Part VI	Energy Conservation Standards
553 Part VIII	Building Energy-Efficiency Rating System
704.07	Solar easements
1004.648	Florida Energy Systems Consortium

## **APPENDIX 5**

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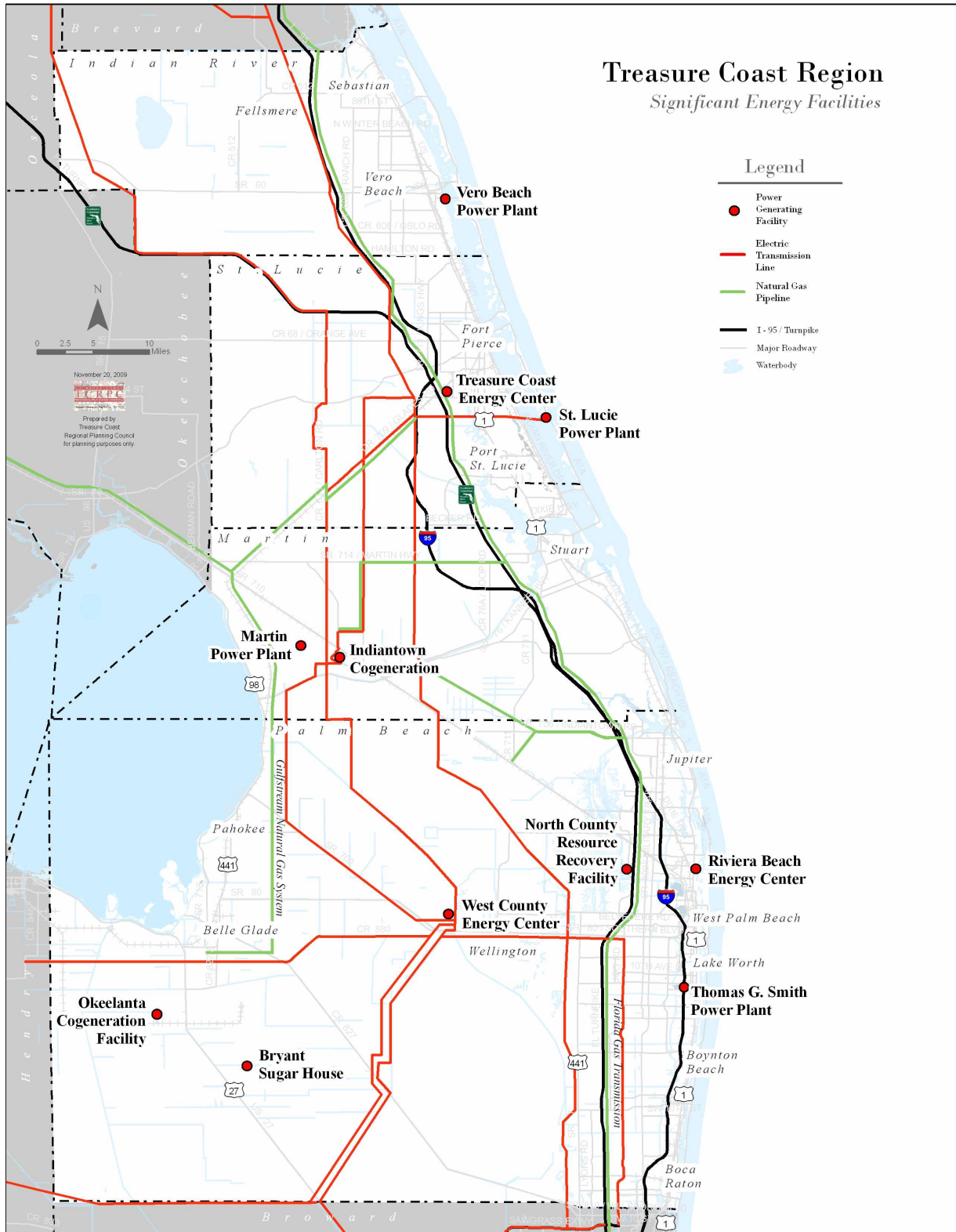
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# APPENDIX □

## Map of Significant Energy Resources and Facilities





# TREASURE COAST REGIONAL PLANNING COUNCIL

## STAFF

<i>Employee</i>	<i>Title</i>
Kathryn Boer	Emergency Programs Coordinator
Marlene Brunot	Regional Planner/ICR Coordinator
Michael J. Busha	Executive Director
Kim DeLaney	Growth Management Coordinator
Anthea Gianniotis	Urban Design/Town Planner
Sandy Gippert	Accounting Manager
Elizabeth Gulick	Administrative Supervisor
Wynsum Hatton	Planning Technician
Stephanie Heidt	Administrative Coordinator
Terry L. Hess	Deputy Director
Diane Hodel	Studio Administrative Assistant
Dana Little	Urban Design Director
Peter G. Merritt	Regional Ecologist
Penny Myszkowski	Receptionist
Gregory Vaday	Economic Development Coordinator
Joan Young	Accounting Clerk

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