A REPORT ON ENERGY ISSUES

by

THE GOVERNOR'S COMMISSION
FOR A SUSTAINABLE SOUTH FLORIDA

DECEMBER 1997

The Governor's Commission for a

Sustainable South Florida

December 9, 1997

The Honorable Lawton Chiles
Governor, State of Florida
The Capitol, Room 1501
Tallahassee, FL 32399-0001

Dear Governor Chiles:

It is my privilege to present to you the Report on Energy Issues, prepared by the Energy Advisory Committee of the Governor's Commission for a Sustainable South Florida. This report is the culmination of eighteen months of diligent work, and contains recommendations which, if implemented, will move South Florida toward a more sustainable energy future.

The Commission's Initial Report of October 1, 1995 contained 110 recommendations intended to move South Florida toward a sustainable future, but it did not specifically address energy issues. The Initial Report recognized this deficiency and stated that energy production and consumption would be addressed in future deliberations of the Commission. As a result, the Energy Advisory Committee was created in the Spring of 1996. The Committee was comprised of representatives from the public sector, the private sector, academic institutions, and non-profit organizations, and was admirably chaired by Carol Rist and co-chaired by Rock Salt. The South Florida Regional Planning Council provided invaluable staff support. The Committee's mission was to recommend a vision, goals, strategies, actions, and measures to ensure a sustainable energy future for South Florida and its communities.

The wide variety of representation on the Energy Advisory Committee provided a broad base of knowledge on how to deal with complex, and often controversial, energy issues. As you might imagine, not everyone agreed on solutions to the problems being addressed. Nonetheless, consensus was reached on all but three of the recommendations; those three pertaining to the Public Service Commission's role in encouraging clean renewable fuels, incentives for alternative fuels, and preparing Florida for deregulation of utilities.

The vast scope and complexity of these issues presented a challenge to the Quality Communities Committee, one of two primary

1550 MADRUGA AVENUE – SUITE 220 • CORAL GABLES, FLORIDA 33146 • (305) 669-6973 S/C 430-6973 FAX (305) 669-697

committees of the Governor's Commission. The Committee received the Energy Report from the Energy Advisory Committee for review in the Fall of 1997. The Quality Communities Committee, chaired by Jim Murley, worked together with members of the Energy Advisory Committee to refine the language in those non-consensus items of the report, and unanimously approved its revised product. The Quality Communities Committee presented the amended report to the full Commission for adoption in December 1997. I am pleased to relate that the Commission, with only one member dissent, adopted the Energy Report on December 3, 1997.

The Commission understands that for this Report to move South Florida and the entire state toward a more sustainable future, the many agencies and stakeholders involved must see the benefits provided to them and the local communities. Your support will greatly enhance the acceptance of this Energy Report. The Governor's Commission is prepared to assist in the implementation of this Report, and will aid you or the agencies involved in any way deemed appropriate.

On behalf of the Governor's Commission for a Sustainable South Florida, I thank you for the interest you have shown in ensuring a sustainable future for South Florida.

Sincerely

Richard A. Pettigrew
Chairman

cc: Lt. Governor MacKay
GCSSF Members
Members of the Florida Cabinet
Honorable Daniel Webster, Speaker,
Florida House of Representatives
Honorable Toni Jennings, President, Florida Senate
Susan F. Clark, Chair, and members, Public Service Commission
State Senator Richard Dantzler, Gubernatorial Candidate
State Representative Keith Arnold, Gubernatorial Candidate
Mr. Jeb Bush, Gubernatorial Candidate

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INTRODUCTION

A Global Predicament

There is mounting international concern and scientific evidence that our planet is currently on an unsustainable course:

- Even if they last for decades, our fossil fuel resources are finite and will disappear;
- Our economies are almost totally dependent on fossil and nuclear fuels;
- Worldwide economic development and increasing population is driving further energy demand; and,
- Our environment is being severely damaged by our current patterns of energy use.

"The overwhelming balance of evidence and scientific opinion is that it is no longer a theory but now a fact that global warming is real,"[1] President Clinton pronounced to the American people as recently as July 24, 1997.

Florida's Predicament

The Energy Advisory Committee of the *Governor's Commission for a Sustainable South Florida* began its work by asking: What are the energy issues we should be concerned about today? In identifying these issues, the Committee found that global concerns for social, environmental and economic degradation are compounded in Florida by the following factors:

- We have extremely limited commercially-viable fossil fuel resources;
- Because we are almost totally dependent on outside sources for our fuel supplies, we will face ongoing and potentially increasing security concerns;
- Expected population and tourism growth threaten to push the state to the limits of its carrying capacity; and,
- The potential impacts of global warming on our state are staggering – it will not only affect Florida with more frequent and more dangerous storms, but rising sea levels will contaminate our fresh water aquifer, and we face the very real possibility that we will be among the first places on the planet to literally lose ground.

[1] Associated Press, White House Symposium on global warming, July 24, 1997.

Economic Opportunities

While our energy challenges are real and growing, significant developments have occurred in the past decade to position us to meet the challenges of developing a sustainable world, both for today and for the future.

In "Beyond Greening: Strategies For A Sustainable World"[2], Stuart Hart reports that "the more we learn about the challenges of sustainability, the clearer it is that we are poised at the threshold of an historic moment in which many of the world's industries may be transformed.... The achievement of sustainability will mean billions of dollars in products, services and technologies that barely exist today.... Over the next decade or so, sustainable development will constitute one of the biggest opportunities in the history of commerce."

Perhaps the most important message overall that the Energy Advisory Committee has to convey is this: the tremendous potential for economic growth presents an exciting opportunity for Florida to become a world leader in the development of sustainability technologies, *while of necessity* developing our path to a sustainable future. Within our state we have all of the assets at our fingertips – including cutting edge research and development of new technologies using solar and other renewable resources – we simply must ensure that our future and the opportunities are not lost through our poor planning and/or inaction.

Strategic Foresight

Two years ago Texas became "the first state with the foresight to produce a strategic plan for systematic integration of renewable energy and energy-efficiency practices into energy development, production and use."[3]

Concerned about their energy future, representatives from state government, sustainable energy industries, utilities, consumer groups, and environmental interests developed a strategic plan for a sustainable energy future for one of our country's oil and gas giants.

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[2] *Harvard Business Review*, January 1997

[3] *Texas Energy For a New Century*, The Texas Sustainable Energy Development Council

Texas is facing a declining fossil fuel supply. It has also experienced economic growth that has shifted the state from energy independence to being a net importer of energy from foreign suppliers. As stated in *Texas Energy For a New Century*, the Texas Sustainable Energy Development Council offers a practical plan "for securing energy independence by reducing our state's growing reliance on outside energy resources."

If Texas is worried about its sustainable energy future, it is all the more certain that Florida's needs are critical. It is high time we develop and implement a sustainable energy plan for our state.

Florida's Energy Future

Sustainable development is a path of continuous improvement towards the future we all want. Energy issues are a critical component of sustainable development, and responsible planning to move us toward a more sustainable pathway is vital – without a strategic plan, poor energy choices pose a dramatic threat to the future of our economy, environment, and quality of life. On our current path, Florida is not energy sustainable.

The *Recommendations* of this report are a start on the path to a sustainable energy future for Florida. They are not all encompassing, but they do indicate that fundamental changes in the way we think about energy must be made now to get us to that future. Florida's sustainable energy future must be built on the following foundations:

1. **Energy Planning:** We need a comprehensive state sustainable energy plan, and a timetable for its implementation.
2. **Pollution Prevention:** Our planning must be based on the use of clean energy resources and technologies.
3. **Improving Efficiencies:** We must improve energy efficiencies, both in power generation and transportation (the largest users of energy) and by our ever-growing number of consumers.
4. **Developing Clean, Sustainable Technologies:** Solar energy is the one clean, renewable resource Florida has in abundance. We must innovate and build the technologies needed to convert its power into forms we can readily use. In the development of these technologies, Florida has the unique potential to

develop a niche and become a world leader while creating a new high-tech industrial economy.

5. Barriers & Incentives: Existing government policies relating to energy use should be revisited for applicability, implementation, and enforcement. Barriers to sustainable energy technologies and their use must be removed. Incentives must be provided for the development and use of sustainable energy technologies and energy efficiency measures.
6. Transition Strategies: Natural gas is a relatively benign fossil fuel and should be regarded as a bridging fuel on the path towards clean technologies and energy sustainability.
7. Government As A Consumer: Government must lead by example in the application of sustainable technologies within its own infrastructure and operations.

Summary

A sustainable energy plan will further our state's economic growth and environmental and societal improvement.

We have the power of choice to make changes that redirect our resources on a sustainable path, while creating the biggest opportunity in our state's economic history. A new high-tech industrial base will employ many thousands of Floridians in sustainable infrastructure development, and add major new revenue sources to the state's economy.

The reasons are compelling; we must act now.

RECOMMENDATIONS

POLICY

Policies affecting Florida, as in any state, are set forth through varied means. From state statutes, federal laws, and state and local regulations to Executive Orders of the Governor, Cabinet Resolutions and decisions of the courts, each represents the articulation of governmental policies. Decisions of agency administrators can also constitute policies, albeit in a less formal sense, whether on budget priorities, program emphasis, agency philosophy or other matters of state importance. Such policies play a major role in shaping the future of the state with regard to energy concerns.

Energy-related policies embodied in statutes and administrative rules of Florida exist in several forms. Some express the philosophy and intentions of policy makers through broadly stated provisions, while others set forth specific mandates. Energy goals and objectives are codified in the State Comprehensive Plan. Energy priorities are established via the state budget.

Energy use in Florida is also affected by policies that do not directly deal with energy concerns. For instance, transportation and land use policies may result in energy intensive or energy efficient development patterns, depending upon how they are implemented.

Development of Florida's energy policy framework began in the 1970s, largely in response to "energy crises" resulting from the nation's heavy dependence on imported oil. Policy put into law in the late 1970s and the early 1980s provides a strong foundation in support of sustainable energy choices, including conservation and renewable energy resources, particularly solar power. Other provisions of the Florida Statutes adopted over subsequent years favor the efficient use of energy resources, bringing alternative energy technologies on-line, and achieving sustainability for our state. At the same time, the potentially beneficial impacts of these policies have been curtailed through half-hearted implementation and the absence of accountability measures. Federal policies, particularly in the area of finance and taxation, have also had a counter-productive effect.

Adequate authority exists under Florida policy to address most of the state's energy needs. While additional policy direction could be helpful, what is most needed is leadership in charting a specific plan to guide Florida's energy choices and implementing it.

In addition, several new policy concerns require timely action:

- Emerging competition in the electric utility industry

  A nationwide trend, supported by federal policy, is leading to substantial restructuring of the utility industry. States currently have discretion in how to address related concerns, and it is important to assure that any competition model that may be considered in Florida provides for sustainability. No competition model should be implemented in Florida unless it provides for sustainability.

- The future of the State's energy program

  For the past 11 years, funding for the Florida Energy Office (FEO) has come from non-state sources (primarily oil overcharge funds that states receive for energy conservation uses). These funds have been used to support a broad range of energy-related activities, including various programs underway in South Florida important to sustainability. The allotment of these oil overcharge dollars is scheduled to end this year. Without additional funding, and an effective state energy plan for the future, many of the state's energy program initiatives will be discontinued and the ability of the Department of Community Affairs (DCA), or other public entities, to effectively address the state's energy needs will be seriously threatened.

- Global climate change initiatives

  The issue of "global warming" is one of growing concern, and debate, at the national and international levels. Any shift in climate could have significant impacts on Florida.

- Federal goals for alternative fuels and clean vehicles

  The Energy Policy Act and the Clean Air Act have established national goals, and in some cases, mandates, for conversion of fleets to low-emission, more efficient vehicles and alternative transportation fuels. The Florida effort to achieve these goals has been coordinated by the FEO and fleet conversions have been funded with non-recurring monies from oil overcharge funds. These programs will not continue without additional funding.

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. No such coordination function exists at this time.

Clearly, the manner in which each state addresses energy issues from a policy perspective – including resource availability, cost, environmental impacts, etc. – is inextricably linked to the wellbeing of that state and of the nation. Although a national energy policy is extremely important, and the current policy encompasses sustainability issues, it cannot address the local differences among the fifty states.

Energy policies in effect at the national level and in Florida are summarized in the Appendix. Key policy-related needs are identified in this section, for both the South Florida region and the state as a whole. Five major areas have been targeted, where timely action is needed, to address known problems and to capitalize on existing and emerging opportunities. They include: the need for a strong state energy program; the role of electric utility policy; achieving sustainability through the transportation sector; the built environment; and planning and permitting. Of particular concern for Florida from a policy perspective are the two primary uses of our energy resources: transportation and electric power generation, where policy action is required to guide Florida to more sustainable energy choices.

RECOMMENDATIONS

State Vision

Florida's response to the energy crisis of the 1970s was to pass significant legislation to reduce energy consumption, with state government leading by example. In the intervening two decades, attention to energy has been eclipsed by other issues and state leadership in energy policy has languished and become fragmented. To successfully address the issues essential to Florida's energy sustainability, a refocus on energy policy, based on an assessment of existing legislation and the development of a state energy plan, is required. Implementing sound policies that are currently on the books is an essential first step, coupled with ensuring that Florida has a strong state energy program.

Broad responsibilities for state energy matters has historically rested with the Florida Energy Office. That office, previously an arm of the Governor's Office, resides in the Department of Community Affairs. The Public Service Commission (an entity of the Legislature) and the Florida Solar Energy Center (part of the State University System) also have significant energy-related duties. A range of other agencies deal with energy concerns in some capacity (Department of Environmental Protection, Department of Management Services, Department of Transportation, etc.) or otherwise impact Florida's energy status and future. Enterprise Florida, as a public/private entity, has also recently been assigned energy-related functions. While many public sector entities are involved with energy concerns, related functions, programs and activities are fragmented. In addition, there exists no state energy plan to define what Florida wants for its energy future and to guide the efforts of all concerned to achieve identified goals.

1. Florida should have a state energy plan and strategy that:
   a) Ensures that energy-related programs and activities of governmental agencies are targeted and coordinated, and that implementing agencies are accountable for achieving results in areas as they are assigned;
   b) Calls on state agencies to address energy concerns in their agency strategic plans and encourages local governments to include energy elements in their local comprehensive plans;
   c) Fully implements existing policies that are designed to achieve sustainable energy systems;
   d) Periodically evaluates other state and federal policies that significantly affect energy use in Florida and identifies new opportunities to achieve sustainability goals;

e) Supports the Insurance Commissioner's efforts to link global warming, environment, energy and sustainability concerns with the financial interests of the insurance industry;

f) Recognizes the following guiding principles in the development and implementation of the state energy plan and strategy:

i. Assuming a "systems approach" in addressing energy efficiency and conservation goals, including the consideration of total energy expenditures, impacts and costs;

ii. Attaining a viable renewable energy sector as an essential component of Florida's sustainable future;

iii. Ensuring that essential energy services are accessible and affordable to low-income populations;

iv. Taking full advantage of opportunities for reducing consumption, eliminating waste and achieving efficiency in the use of our energy resources, and providing for the timely transition to renewable energy;

v. Supporting market-based approaches, governmental policies, consumer awareness and other appropriate measures to facilitate increased energy efficiency and renewable resource use;

vi. Preventing and/or reducing pollution resulting from the use of energy to protect human health and the integrity of natural systems;

vii. Expanding and capitalizing on efficiency and renewable technologies as a primary component of the region's economic base in order to take advantage of economic development and national/international trade opportunities;

viii. Providing incentives for and removing barriers to sustainable energy technologies;

ix. Recognizing the value of Florida's current energy industries by ensuring a reasonable and responsible transition to new technologies and regulatory conditions;

x. Recognizing the fact that substantial fossil fuels will be required to create a sustainable energy economy (in the manufacture of new energy systems, revamping of infrastructure, etc.), and the importance of natural gas as a transition fuel in the move to fully integrate renewable energy resources;

xi. Calling on government to lead by example in sustainable energy practices;

xii. Providing for broad-based education of the public, stakeholders, decision-makers, and the media, recognizing the need to start the process early and to effectuate behavioral shifts to more sustainable patterns through enhanced consumer awareness;

xiii. Developing an indigenous, clean, renewable, energy resource industry to transition Florida away from our current heavy reliance on imported energy resources;

xiv. Motivating performance to achieve sustainable energy goals not merely to meet minimum standards;

xv. Providing for consideration of a full range of costs and benefits in selecting energy options; and

xvi. Giving people a broader range of sustainable energy choices.

2. Florida should establish an entity to develop a consensus-based state energy plan and a comprehensive energy strategy founded upon a broad-based vision of a sustainable energy future for the state.

Action Steps:

a) The Governor should issue an executive order establishing this entity and setting forth its specific charge.

   i. The entity should include high-level representatives from key executive agencies (e.g., Department of Community Affairs, Department of Environmental Protection, Department of Management Services, Department of Transportation), the Public Service Commission, and the Legislature.

   ii. Stakeholders, including from the private sector and public interest organizations, should be included in this initiative, whether as part of the entity or via the entity actively seeking their input and participation.

   iii. As part of developing the state energy plan and strategy, the entity should work to identify viable funding alternatives and implementation approaches for the future of the state's energy program.

b) The Secretary of the Department of Community Affairs, in coordination with the Governor's Office, should develop a proposed implementation plan for such entity.

3. The State should adequately fund its priority energy program needs.

Action Steps:

a) The Governor's Office and the Department of Community Affairs (DCA) should work to secure adequate funding resources to achieve the state's energy policy goals and strategies, by:

i. Initiating an aggressive effort to solicit Federal funding support to assure that Florida gets its fair share of available resources;

ii. Identifying and promoting other viable funding sources, both public and private;

iii. Actively seeking the allocation of general revenue or other appropriate state revenues, to cover the shortfall where funding is not available from other means, to fund ongoing priority programs in light of the decline in traditional funding sources.

b) DCA and the Governor should prepare the Department's budget request for FY 1998-99 in accordance with these steps and the state's energy needs.

Utility Policy

Utility energy policy is pivotal to sustainability because the electricity generated by Florida's utilities accounts for almost half of the energy Florida consumes, and because decisions on power plant fuel choices and operations have a substantial effect on the health and welfare of Florida's citizens. Florida has a solid policy foundation in place to secure efficient and clean energy resources. More determined and creative implementation of those policies will help transition our current mix of energy resources to meet future needs with a greater contribution of efficiency and sustainable energy systems.

Florida must also prepare for the transition to a more competitive electric industry. A significant national debate is underway at the state and federal level concerning competition in the generation of electricity. Congress is now considering legislation that would set deadlines for states to act and may include standards for state action. Many other states in the U. S. are examining these issues and exploring alternatives. Florida's options for the future provision of energy services need to be timely and rationally considered by all interested parties using objective decision-making criteria and principles that embody the public interest. Further, Florida's future regulatory framework must not discriminate against sustainable energy alternatives.

The following recommendations focus on making customer energy use more efficient and utility generation choices more sustainable. Recommended changes to the existing incentives and barriers are offered to allow sustainable technologies to compete during these transitional times.

4. Florida should create incentives for utility investments in sustainable energy systems.

Action Step:

The Public Service Commission (PSC) should strengthen its regulatory framework to support efficiency and clean renewables by:

i. Providing economic incentives to those utilities that promote efficiency and discourage waste;

ii. Encouraging electric utilities to share in the profits from energy savings due to energy efficiency measures under state utility regulations and assure that such measures are included in a deregulated market scenario;

iii. Strengthening and clarifying its policy that allows generators below 100kw to run their meters backward to buy or sell only net power (net metering);

iv. Developing an energy resource acquisition plan that increases the development and deployment of sustainable energy systems, such as by establishing a percentage of new resource acquisition to be solar, a systems benefit charge, or creating a statewide fund for renewables development (The Energy Advisory Committee understands that this approach may result in higher short-term costs in order to attain long-term benefits.); and

v. Creating standard power purchase contracts and interconnection requirements for environmentally benign renewable providers that avoid barriers of typical power purchase contracts.

vi. Assuring the selection of least-cost alternatives to create a level playing field for demand-side management (such as by implementing integrated resource planning).

5. Florida should remove disincentives that inhibit utility investments in sustainable energy systems.

Action Steps:

a) To further implement the Florida Energy Efficiency and Conservation Act, the PSC should strengthen its regulatory framework to support efficiency and clean renewables by, at a minimum:

   i. Encouraging utilities to develop energy resource acquisition plans that create a level playing-field for sustainable energy choices, including those that customers can implement (demand-side management) and centralized power generation options (supply-side resources);

   ii. Expanding the use of regulatory models that remove the connection between utility revenues and increasing sales;

   iii. Providing for a balanced consideration of cost effectiveness of conservation programs, including environmental costs and benefits.

b) The Department of Environmental Protection should strengthen its regulatory framework to support efficiency and clean renewables by providing economic incentives, such as emission credits, for utility generators to upgrade their facilities to use sustainable energy choices, when a net environmental improvement results so long as grandfathered power plants are not exempted from meeting new source performance air quality standards set by the Clean Air Act.

c) The Department of Environmental Protection should strengthen its regulatory framework to support efficiency and clean renewables by developing appropriate methodologies to quantify the environmental costs and benefits of energy resource supply and/or demand-side options and the PSC should utilize this analysis in energy procurement review proceedings.

6. Florida should establish, facilitate, and support voluntary utility initiatives that promote sustainable energy systems.

Action Steps:

a) Florida's utilities should establish voluntary initiatives that promote sustainable energy systems such as by:
   i. Actively participating in the U. S. Department of Energy's National Utility Photovoltaic Group collaborative;
   ii. Sponsoring high-profile demonstration projects for sustainable energy technologies and services;
   iii. Identifying and instituting policies to ensure that low-income populations receive an equitable portion of utility demand-side management (DSM) program services (such as Florida Power Corporation's low-income DSM pilot program);
   iv. Investing in efficiency measures which cost less than generation; and
   v. Undertaking "green pricing" programs for clean renewables on a statewide basis and encourage customers to participate in those programs.

b) The Public Service Commission, the Department of Environmental Protection, the Florida Energy Office, and non-governmental organizations should encourage utilities to undertake such voluntary initiatives and support and recognize utilities that do.

7. Florida should prepare for emerging competition in the electric industry.

Action Steps:

a) The Governor, in consultation with the Legislature and the PSC, should convene a high-level multi-stakeholder group to consider the future of electric industry deregulation and restructuring and its impact in Florida. The analysis should assess alternatives, impacts, and opportunities, and include the development of principles to guide any restructuring that may occur in Florida.

b) The Governor should pass the recommendations of the multi-stakeholder group on to the entity established in *Recommendation 2.*

Transportation

Florida's rapid growth in recent decades has driven transportation policy and largely determined the investment in infrastructure, which is based almost solely on the private automobile. This dependency on a transportation monoculture has produced an energy-intensive transportation sector heavily dependent on imported petroleum and has created threats to our air quality. Florida must lessen its petroleum dependency and provide additional, less energy-intensive transportation options to all its citizens and to its tourists. Conversion of commercial fleet vehicles to operate on alternative fuels provides near-term opportunities for local government and businesses to achieve this objective. In addition, commercial deployment of these fuels will create opportunities for development of sustainable renewable fuels and energy systems for use by the transportation sector.

The Governor's Commission for a Sustainable South Florida, in its October 1995 *Initial Report*, made a series of recommendations that, if implemented, will ensure that the transportation sector contributes to the sustainability of South Florida (see Appendix* for Recommendations #54-57 and #59-60, complete with action steps).

54. Local governments, working with FDOT and DCA, developers, regional planning councils, and metropolitan planning organizations, should increase investment in public transportation within urban areas and design and manage the transportation system to promote desired compact urban growth patterns.

55. State, regional, and local agencies should promote the use of pricing mechanisms that promote public transportation and the efficient provision and use of public facilities.

56. The 1996 Legislature should authorize the creation of regional transportation funding authorities that, once created, would have access to new dedicated sources of capital and operating funds to support their activities.

57. Aggressively attack and resolve the transportation crisis facing Southeast Florida.

59. Local governments should increase clustering of employment centers to enhance transit and pedestrian opportunities.

60. The DCA and regional planning councils should promote the use of urban design principles which reduce neighborhood crime, demonstrate defensible space, reduce vehicle trips, and encourage pedestrian activity and the use of public transit.

The recommendations specifically target policies to increase investments in public transportation, manage our transportation systems, and promote compact urban development patterns. The

* available upon request

Energy Advisory Committee reaffirms these recommendations given their beneficial effect on energy concerns, and recommends the following additional measures.

8. Florida should continue to incent real estate development and redevelopment that reduces auto dependence through land planning.

Action Step:

The Department of Community Affairs should encourage local governments to:

a) Develop high-density, mixed-use, pedestrian-oriented communities;
b) Develop multi-modal transportation plans;
c) Develop performance-based impact fee structures;
d) Use PLACE^{3}S and PLAN IT GIS-based planning tools;
e) Include a Transit Element in local government comprehensive plans.

9. Florida should undertake a plan to transition the car and truck lease and rental fleet operations in the state from petroleum-based fuels to alternative fuels.

Action Steps:

a) The Legislature should consider revising the motor vehicle license tax structure to provide incentives for all commercial vehicle businesses, including car and truck lease and rental companies to convert a portion of their fleets to alternative fuels.
b) The Department of Management Services should evaluate the eligibility requirements for contracts with the state to facilitate greater use of alternative fuel vehicles.

10. Florida should maximize the use of existing transportation facilities and services as a priority over new construction.

Action Steps:

a) The Florida Department of Transportation should continue its policy to limit the number of lanes for roads on the state highway system.
b) Each local government should designate a dedicated source of funding for its public transit.

c) Local governments, Metropolitan Planning Organizations (MPOs), and the Florida Department of Transportation (FDOT) should increase the accommodations for bicyclists and pedestrians.

d) FDOT, MPOs, transportation/expressway authorities, and local governments should implement transportation system management (TSM) technologies (strategies to increase system efficiencies, such as synchronized traffic signals, etc.) and transportation demand management (TDM) strategies (measures to reduce system demand, such as carpooling, etc.).

e) Local governments, with the assistance of FDOT, should ensure that the operations and facilities of public transit systems are customer-friendly in order to enhance ridership (i.e., bicycle racks, storage for shopping carts, baby strollers, luggage, etc.).

11. Florida should provide incentives to reduce vehicle energy consumption and emissions.

Action Steps:

a) The Legislature should consider tax credits and other graduated incentives for the following:

i. Businesses and individuals which purchase and operate energy efficient and alternative fuel vehicles certified to meet low, ultra-low, or near zero emissions.

ii. Rental car companies and other equipment rental businesses which purchase and maximize the use of efficient vehicles/watercraft that are certified to meet low, ultra-low, or near-zero emissions, with graduated incentives tied to operating hours;

iii. On-road and off-road vehicles and equipment (especially those powered by medium-duty and heavy-duty engines) and their associated fueling infrastructure which are certified to meet low, ultra-low, or near-zero emissions;

iv. Development of low, ultra-low, or near-zero emission vehicle fueling infrastructure;

v. Conversion of public and private mass transit fleets (van pool, bus, and rail) to operate on non-petroleum fuels with engines qualified for low, ultra-low, or near zero emissions.

b) FDOT, MPOs, local governments, ports, airports and transportation commodity providers (freight carriers, shippers, etc.) should encourage energy efficient intermodal transport of commodities.

12. Florida should adopt and implement sustainable energy policies that address transportation planning and air quality on a regional basis.

Action Steps:

a) Metropolitan Planning Organizations (MPOs), the Florida Department of Transportation (FDOT) and local governments should encourage traffic control measures to attain and improve upon ambient air quality standards.

b) MPOs, FDOT and local governments should ensure that MPOs plans and programs conform to the requirements of the Clean Air Act.

c) The Department of Environmental Protection (DEP), FDOT, the local air quality and transportation planning agencies, regional planning councils, and other appropriate agencies, should develop and implement strategies to limit and, where possible, eliminate air pollutant emissions from stationary and mobile sources to achieve net benefits.

d) DEP should work with the regional planning councils to develop and implement a voluntary, incentive-based, mobile and stationary-source emission-reduction credit-trading program for the South Florida airshed.

e) DEP, working cooperatively with federal and other state agencies, should continue to support the Florida Atmospheric Mercury Study, the National Marine Estuarine Program, and the National Oceanic and Atmospheric Administration Marine Sanctuary Program, and seek additional funding for research on the deposition and effect on water quality of other heavy metals and nutrients, and of the effects of ozone and fine particulate matter on plant life and ecosystems.

f) Applicable local governments, with assistance from FDOT, should provide for transportation planning to be done at the regional level by a regional transportation authority. This is related to Recommendation #56, of *The Governor's Commission for a Sustainable South Florida October 1995 Initial Report*, that calls for the creation of a regional transportation funding authority to be authorized by legislation.

The Built Environment

There is no question that there is a direct relationship between our patterns of growth/development and energy consumption. Human habitat patterns that are dispersed cost more energy to construct and maintain than more compact configurations. Not only is more energy required to build and service dispersed patterns, more energy is required to maintain the lifestyles of the people and their activities. American cities and towns account for over 80 percent of national energy use. Land planning and urban design affect about 70 percent of that, or 56 percent of the nation's total energy use[4]. Over the last 50 years, the built environment in South Florida has transitioned from a rural land-use pattern to an urban land-use pattern. As the Governor's Commission for a Sustainable South Florida indicated, South Florida cannot sustain this trend.

The challenge of sustainability in the built environment lies in designing and planning for patterns of human habitat and activities that can be sustained with minimal use of energy and resources, and that provide for a healthful lifestyle. Accepting the challenge means changing our standards of practice for new development to include designing, planning and constructing Florida's built environment so that it enhances the natural environment instead of degrading it. The barriers to achieve these goals are institutional, economic, and cultural.

Florida continues to be a national leader in the area of building codes and standards relying on its performance-based Energy Efficiency Code for Building Construction for both design flexibility and energy savings in new and substantially renovated buildings. The Code has formed an invaluable link between cutting edge research and implementing criteria which can immediately begin accruing energy savings.

Further energy savings in the built environment are projected to come from the use of market mechanisms and by providing objective information to home buyers and their financiers which encourage energy efficiency as one of the key components in building and selling property. Such approaches are critical factors in financing energy efficient improvements and obtaining more favorable mortgage conditions for energy efficient housing. Appliances installed in buildings can account for additional savings where higher levels of efficiency are required. Florida supports federal efforts in appliance efficiency improvements and has the ability to identify and regulate appliances where warranted.

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[4] Anderson, W., et al, *Urban Form, Energy, and the Environment: A Review of Issues, Evidence, and Analytical*

13. The existing built environment should be improved and upgraded according to principles of energy sustainability through renovation and best practices in operations and management. New development should be planned and designed to be sustainable in Florida's climate.

Action Steps:

a) The Department of Community Affairs (DCA) and the mortgage industry should actively promote energy-efficient mortgages and seek opportunities to create and support financing incentives to promote sustainable energy features and healthy buildings.

b) Permitting agencies should provide, within DCA's Sustainable Communities program, incentives and priority approval for net efficiency improvements to existing buildings where infrastructure exists and site disturbances and corresponding mitigation has already occurred.

c) DCA should develop plans to assist local governments in implementing and enacting land use zoning and building ordinances that emphasize sustainable energy systems (e.g., energy-efficient mortgages, fee waivers, revenue neutral programs).

d) DCA should develop plans to assist local governments in adopting local construction codes that ensure energy efficient development practices by emphasizing sustainable design alternatives, construction approaches and materials, and landscaping practices.

e) The Department of Management Services and local governments should facilitate performance-based contracting for energy efficiency and renewable energy improvements in public buildings.

f) DCA, working with local governments, should establish a certification program to guide lending institutions in providing low-interest loans for homeowners and businesses to upgrade to more energy efficient equipment, appliances, and other facility and site improvements. This program would be patterned after the U. S. Department of Energy's Energy Star program that is in place for new construction.

Approaches, McMaster University, Hamilton, Ontario, Canada, April 1993.

g) The Florida Legislature should support continuation of low-income weatherization programs with a long-term goal of self-sufficiency; and, reduce pollution by giving tax relief for production, installation, and use of new pollution control technology and/or other cleaner technologies that exceed minimum permitting standards.

Sick-building syndrome and poor indoor air quality (IAQ) affect 30-50%[5] of all buildings nationwide and may be an unintended consequence of some energy efficiency measures. The hot and humid, subtropical climate makes the condition more prevalent here in South Florida. These problems are not exclusively those of the architectural, engineering, construction and facilities professions, because the current codes and standards they are required to follow do not, by themselves, deal specifically with the problems associated with designing and building for our subtropical climate. Florida must shape a response to this situation that permits incorporation of national codes and standards into practice where sound, but rejects elements that are deleterious to acceptable IAQ in Florida buildings.

14. Florida should address sick-building syndrome/indoor air quality problems associated with designing and building for our subtropical climate.

Action Steps:

a) The Governor's Commission on Building Codes should address IAQ as an important issue and a substantial challenge to the unification of building codes.

b) The Department of Community Affairs (DCA) should take steps to take exception to proposed revised ASHRAE[6] Standards 90.1 and 62 and the various model codes (including CABO[7], SBCC[8] BOCA[9], and MEC[10]) if subtropical climate concerns are not addressed in current revisions.

c) DCA should seek appropriate, selective incorporation of ASHRAE Standards 62, 90.1 and 90.2 within the Florida Energy Efficiency Code.

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[5] OSHA Docket H-122 (59 FR 15968), testimony by Dr. James Woods of Virginia Polytechnic Institute, Blacksburg, VA.

[6] The American Society of Heating, Refrigerating, and Air Conditioning Engineers

[7] The Council of American Building Officials

[8] Southern Building Code Congress

[9] Building Officials and Code Administrators

[10] Model Energy Code

d) The Governor should create a Florida Building Commissioning Council, or similar umbrella organization, where architectural, engineering, construction and affected professions are educated to construct and operate "healthy buildings" suitable for our particular climate.

e) The Legislature, working with the Department of Business and Professional Regulation and affected professional associations, should incorporate indoor air quality climate-specific issues into professional license testing for architects, interior designers, engineers and contractors.

In Florida, there is a lack of awareness and understanding among the engineering, construction, and building management communities about the efficiency and environmental benefits of desiccant and natural gas cooling technologies. Desiccant technologies remove humidity and can effectively address many of the indoor air quality issues we face. The Florida Public Service Commission has recognized the need to encourage the use of natural gas technologies during the summer months to offset peak demand for electricity. Natural gas cooling is an efficient alternative in South Florida's hot climate. In addition, in an uncertain, deregulating environment, fuel diversification is a valuable asset for consumers, providing more options in controlling energy costs.

15. The state should encourage the inclusion of desiccant and natural gas cooling technologies in, and objectively analyze the design of, existing, retrofit, or new construction, and evaluate capital and operating costs.

Action Steps:

a) The Department of Community Affairs (DCA) and the Department of Management Services should continue to promote the inclusion and analysis of viable technologies, including desiccant and natural gas cooling technologies, in construction and retrofit requests for proposals.

b) DCA should participate with industry in a program to reach out to architectural, engineering, construction, and related professions to educate them on the availability, applications, and benefits of desiccant and natural gas technologies.

c) DCA should seek appropriate, selective incorporation of desiccant and natural gas technologies into the Florida Energy Efficiency Code.

In 1996, Florida used some 593,000 megawatt-hours of electricity for street lighting. This represents 0.4% of the 154 million megawatt-hours of the electricity sold in Florida. Assuming an average rate of $.08 per kWh, the expense associated with street lighting is $47.4 million per year. While street lighting does not represent a large proportion of the total energy used in Florida, it does create secondary pollution effects. Misdirected and unnecessary lighting produces glare, light pollution, energy waste and increased costs to local governments. Substantial improvements in lighting efficiency are possible with relamping and better directional control.

16. Local governments and the Florida Department of Transportation (FDOT) should identify and discourage lighting practices that result in energy waste and light pollution.

Action Steps:

a) The State University System or Florida Solar Energy Center should be called on to undertake an analysis of the non-safety related street, building and signage lighting technology that is currently used in Florida, and to identify lighting practices that result in waste, light pollution, and unsafe conditions for both humans and wildlife. Measures and technologies should be set forth to address these problems in a cost-effective manner.

b) Recommendations from this study should be considered for incorporation into the FDOT requirements for street and highway lighting.

c) At the local level, a model community lighting standard should be developed and incorporated into development requirements for communities.

Planning and Permitting

The development and administration of governmental policies regarding planning and permitting create the framework within which development occurs. Poor laws wisely interpreted and administered can produce judicious results, while excellent legislation and regulations poorly administered can produce no results at all. The broadest principles of sustainability should inform both policy development and in Florida's government sector. Anything less than our best effort is taking unnecessary risk and may jeopardize the quality of life for future Floridians. To the degree that government can exercise its authority, every effort should be made to create the conditions for sustainability to become standard practice for business, industry and government.

17. State and local planning and permitting decisions should provide incentives and guidelines that create the conditions for sustainability to become standard practice.

Action Steps:

a) The Florida Department of Community Affairs (DCA) should work with local governments, Metropolitan Planning Organizations (MPOs), and regional planning councils to incorporate sustainable energy concerns in local government comprehensive plans, MPO plans, strategic regional policy plans, and land use regulations to provide for energy efficient land use patterns and compact urban development. As recommended in *The Governor's Commission for a Sustainable South Florida October 1995 Initial Report*, such land use patterns and compact development will enhance transit and pedestrian opportunities; provide for a reduction of vehicle miles traveled; and increase transit service, particularly within urban boundaries and core urban areas.

b) Local governments should utilize transportation concurrency exception areas to promote public transportation opportunities.

c) DCA should include energy efficiency and renewable energy resources in the built environment and transportation as priority criteria for sustainability in the Sustainable Communities Demonstration Project, and promote successful energy approaches in other communities throughout Florida.

d) Enterprise Florida and DCA should work with state and local permitting authorities to support co-location and multiple use of facilities to recapture waste heat, share cooling, and facilitate the use of waste products as feedstocks (eco-industrial parks).

e) The Department of Community Affairs, in conjunction with regional planning councils, should develop programs to maximize sustainable energy systems in Eastward Ho!

f) The Florida Department of Community Affairs should encourage local governments to develop and implement mitigation techniques in residential, commercial, and public facilities, which will conserve energy following future disasters.

g) The Executive Office of the Governor, in conjunction with the DCA, DOT, DEP and the Water Management Districts, should ensure that energy planning is integrated with state level planning for land use, water supply and transportation facilities.

GOVERNMENT LEADERSHIP

The *Initial Report* of The Governor's Commission for a Sustainable South Florida included recommendations that called for government to lead by its actions. In that report, the key area identified for government leadership was "urban form," and local, state and federal governments were asked to site their new buildings in ways that support sustainable growth management. This report extends this general concept by asking government to lead by example in support of sustainable energy systems as well.

Florida has a broad set of energy policies that must be implemented. If we are to make important progress toward a sustainable energy system. Local, state and federal governments set important examples by the choices they make, especially in the design and operation of government buildings, purchasing policies, and in government vehicle fleets. As a large energy consumer, government's purchasing power can give pivotal leverage to help develop sustainable energy markets. Impediments to government's sustainable energy choices, including market barriers, should be identified and removed at local, state, and federal levels. An agency's discretionary choices, within its authority, become the prime basis for governmental leadership. Government cannot expect its citizens or the private sector to follow energy policies that it cannot or does not follow.

Sustainable energy practices also extend to existing infrastructure, not only in buildings, but to public water and wastewater treatment and municipal electric utilities. Public utilities are major consumers of power, and leadership at all levels of government can be demonstrated by ensuring that they are operated both efficiently and sustainably. For example, 20%-30% of wastewater treatment plant operating expenses are electricity purchases. As municipalities are pressured to expand plant capacities, process optimization measures can defer expensive new additions.

In this era of declining research and development funding, government also has an important leadership role in its support for research and demonstration projects that promote sustainable energy systems. Local, state and federal government investments in clean renewables, energy efficiency, and indoor air quality technologies, including demonstration projects in building design and transportation systems, should be continued and expanded. Projects such as EV Ready Broward, Tri-Rail, Florida House, and the Florida Gold Coast Clean Cities Coalition are notable examples of these investments. Additional opportunities for research and demonstration

projects exist across the entire spectrum of our energy system and, if pursued, can provide important leverage in attaining a sustainable energy future.

South Florida's climate provides the state with an inherent opportunity to be a world leader in the development of sustainable energy systems in subtropical regions. Success requires educated and inspired leaders at the local, state, and federal levels. The example we set for ourselves is the essential component of that leadership!

RECOMMENDATIONS

18. All levels of government should ensure that their building construction policies are based on a full life-cycle analysis, pursuing investments with the lowest lifecycle costs as opposed to buildings with the lowest initial capital cost.

    Action Steps:

    a) The Department of Management Services (DMS) should review its design and leasing guidelines to ensure they consider energy efficient equipment, materials and practices, consistent with indoor air quality standards, as important opportunities to lower life-cycle costs in state buildings.
    b) DMS should share the results of its review with the League of Cities, the Florida Association of Counties and the state's school systems (Board of Regents, Department of Education) so that local government can also take advantage of these opportunities to provide lower-cost, healthier buildings.
    c) The Governor should endorse this report to his Commission on Building Codes for its consideration as they recommend revisions to the state's design guidelines.
    d) DMS should promote performance-based contracting at the state and local levels by streamlining statutory and contractual procedures.

19. Federal, state and local governments should implement efficiency and clean renewable resources in public buildings, facilities, operations and employee practices.

    Action Steps:

    a) The Florida Energy Office/Department of Community Affairs, in cooperation with the League of Cities and Florida Association of Counties, should sponsor an annual

forum to inform and involve the Department of Management Services (DMS), the General Services Administration and local governments on sustainable energy concerns. Participants will be called on to share examples of energy efficiency or renewable resource initiatives in public facilities, operations, and employee practices. The meeting should also allow federal, state and local government managers to identify barriers within government that limit their ability to make sustainable energy consumption choices and potential actions that could remove them.

b) DMS and local governments should incorporate the most promising sustainability initiatives into their programs and seek to provide incentives to government managers and employees to facilitate their success. Incentives could include authority for government managers to retain some of the dollars saved from energy efficiency measures for use in other agency programs while passing a significant portion of the savings to taxpayers. The Department of Community Affairs' (DCA) energy efficiency financing pool is an example of such an approach.

c) The Florida Energy Office (FEO)/DCA should work with the League of Cities and the Florida Association of Counties to promote the most promising of these ideas and initiatives to local governments, school boards, Florida School Boards Association and related public school associations.

d) FEO/DCA should establish partnerships with the State University System's and the State Community College System's professional programs in the design professions to incorporate these principles into their curricula and research programs; establish an information clearinghouse for energy efficient and healthy buildings; and promote outreach with appropriate providers in the private sector.

e) The Governor should direct that implementation and accountability provisions, including the "benchmarking" of buildings and government vehicles (using the most efficient government buildings and vehicles as a standard), be added to the DMS Energy Management Plan for state facilities.

f) FEO/DCA should encourage the Department of Business and Professional Regulation to assure that design professions with continuing education requirements have a mandatory course in best practices in energy efficiency.

g) Municipal and county utilities should review and audit plant and demand-side energy efficiency measures.

h) Municipal and county utilities should promote energy efficiency and energy sustainability successes.

20. Florida should expand its efforts to provide high-profile, high-return demonstration projects that serve as an example for the public and promote a sustainable energy system.

Action Steps:

a) The Florida Energy Office/Department of Community Affairs (FEO/DCA), and other appropriate entities should more aggressively seek opportunities for federal funding of high-profile, high-return demonstration projects.

b) FEO/DCA should maintain and expand its support for projects such as EV Ready Broward, Florida House and the Florida Gold Coast Clean Cities Coalition.

c) FEO/DCA should seek authority and appropriations for a public/private research and development partnership that would provide a state match to private sector research ideas that support a sustainable energy system.

d) The Department of Management Services (DMS) should sponsor the most promising initiatives as demonstration projects that can increase the public education component of these initiatives.

e) The Florida Department of Transportation, working with DMS, transit agencies, Metropolitan Planning Organizations and local governments, should similarly support demonstration projects in state and local government vehicle fleets, such as electric and alternative fuel public vehicles, that reduce energy consumption and support a sustainable energy system.

f) Monies to replace oil overcharge funds should be appropriated.

g) DCA should make the five current sustainable communities models of the most sustainable energy use and establish a mechanism for replicating the best examples in other parts of the state.

h) The Department of Environmental Protection should sponsor demonstrations of energy efficient operations in water, wastewater, solid waste and electric utilities. Recipients of funds for public building efficiency retrofits (e.g., DMS, Board of Regents, local schools, etc.) should evaluate expenditures to date and determine the best use of remaining funds.

21. Florida should promote solar energy by creating a Solar Community designation program that recognizes the achievement of communities that invest in solar energy.

Action Steps:

a) The Florida Energy Office/Department of Community Affairs (FEO/DCA) should, after consultation with appropriate sources, develop a "Solar Communities" logo and adopt criteria through which a Florida community may be designated as a Solar Community in recognition of its having made certain levels of investments in solar technologies for governmental use or through municipal utilities for general public use (e.g., as Gainesville has and Tallahassee plans).

b) Local governments and municipal utilities should make the requisite investments in solar, apply to DCA to secure a "Solar Community" designation, and advertise themselves as such on local signs, in Chamber of Commerce literature, and in other ways that would encourage other communities to want to participate.

The ISO 9000 family of quality standards is recognized throughout the world. The ISO 14000 family is their environmental counterpart. Government's energy use and the shaping of energy policy can be improved immeasurably with knowledge, and adaptation, of these important international environmental standards.

22. The Department of Management Services, in conjunction with DCA should develop a strategy to adopt the principles of the ISO 14000 family of environmental standards at all levels of government, and ISO 14001 "Environmental Management Systems" in particular, as a model to improve their energy activities. Further, they should be encouraged to seek certification where practicable.

Action Step:

The Governor's policy staff should adopt the principles of the ISO 14000 family of environmental standards, and ISO 14001 "Environmental Management Systems" in particular, as a benchmark model for both energy and environmental sustainability standards.

ENGAGING THE PRIVATE SECTOR

The role of the private sector in building a sustainable future is paramount, for without private means, public purposes cannot be achieved. So interrelated and dependent upon one another are these dual roles, especially in any vision which seeks to *permanently change* the status quo, that there is a compelling need to engage the private sector immediately in the endeavor.

Our world revolves around the activities of private enterprise. For a sustainable energy future, the business community must be a full partner, convinced that there is a need for change, and encouraged by a competitive marketplace to engage fully in the development of the infrastructure necessary to sustain us. Only with market acceptance of energy products, services and competitive pricing, will the private sector engage fully. Therefore, the task must be to engage those members of the private sector who have an interest in investing in, marketing for, and building the infrastructure of a sustainable energy future. Informed decisions and actions by the private sector can have positive impacts.

The university system could benefit from the relationship with the private sector in commercializing new energy technologies. It is widely accepted that science and technology provide the essential foundation for economic prosperity. Investments in research, development, demonstration and deployment (RDD&D) spawn new technologies which can increase long-term productivity and high-wage job growth. This has been especially true for energy technologies. RDD&D is an investment in the future and must compete with current spending priorities. Industry is the largest supporter of short-term energy-centered RDD&D in the nation, while the federal government has been the main sponsor of longer-term energy-related research.

Timely strategic partnerships with federal, state and private sector interests will help Florida businesses capitalize on sustainable energy technologies as an economic development opportunity and take leadership in the global marketplace. To be more effective in bringing the results of scientific research and technology development to the market and to help South Florida capitalize on RDD&D investments, The Governor's Commission for a Sustainable South Florida must encourage communication and cooperation between the public and private sector participants in this area. The goal is to bring science and technology to successful market application through the formation of a seamless network of information and service providers. This approach will ensure that South Florida's science and technology, coupled with the private sector and Florida's universities, will improve communication and possible synergies across the

continuum of basic science, applied research, development, demonstration and deployment (RDD&D) and commercial development.

The choices are many, the opportunity is here. The key is getting the private sector motivated to get involved in a sustainable South Florida. That is engaging the private sector.

RECOMMENDATIONS

Partnerships

23. Enterprise Florida should establish and convene a public/private partnership to develop a plan to guide long-term sustainable energy RDD&D, and accelerate bringing new technologies to market.

Action Steps:

a) Enterprise Florida, working in cooperation with the Governor's Office, shall establish a committee that consists of key decision-makers from government, the State University System, and Florida stakeholders. The work of the committee shall include:

   i. An independent study to inventory energy technology RDD&D capabilities of Florida universities, energy companies, and entrepreneurs;

   ii. An independent study of the goals, objectives, structure, and effectiveness of ongoing sustainable energy RDD&D programs implemented by other American states as well as abroad;

   iii. An independent study to evaluate alternative funding mechanisms, including a fee on all forms of energy consumption and/or end uses, to meet sustainable RDD&D needs; and,

   iv. Identifying and prioritizing RDD&D needed to facilitate manufacture and implementation of sustainable energy systems in Florida and for export.

Enterprise Florida should:

b) Create and/or support Florida-based not-for-profit groups to bring stakeholders together and to organize and distribute energy information to the public.

c) Support appropriations for one-to-one match of federal or private sector funding for deployment of alternative fuel vehicles and fueling infrastructure.

d) Develop appropriate partnerships between various sectors that would promote sustainable energy developments.

e) Work with the fossil fuel supply industry to implement carbon reduction through fuel switching and evaluate the feasibility of innovative carbon sequestration strategies.

24. Enterprise Florida, in conjunction with the Florida Energy Office/Department of Community Affairs (FEO/DCA), should seek to leverage short-term private sector and federal funding to both encourage demonstration and deployment of emerging sustainable energy systems and to get more out of existing fossil fuel energy infrastructure and systems.

Action Steps:

a) Enterprise Florida, FEO/DCA, the Governor's Office, and the Florida Department of Transportation should cooperatively create a Clean Corridors Program to sponsor deployment of alternative fuel infrastructure for heavy-duty trucks.

b) Enterprise Florida, FEO/DCA, the Governor's Office, the U. S. Department of Energy, Department of Agriculture and Consumer Services, and other appropriate agencies, should more aggressively promote deployment of end-use efficiency in the built environment through emerging programs, such as Energy Star, Ag Star, Climate Change Initiative, etc.

c) FEO/DCA should prepare a status report of these actions, plus any other appropriate programs, for submission to the entity described in *Recommendation* 2.

d) DCA should encourage private sector participation in the development and implementation of a master plan for "Eastward Ho!" including the development of demonstration projects.

e) FEO/DCA should promote deployment of alternative fuel infrastructure and vehicles through the expansion of such programs as Clean Cities and EV Ready Broward.

f) DCA, working with EV Ready Broward, Clean Cities Coalition, the rental car industry and other appropriate entities, should develop a plan to achieve the goal of transforming 25% of the South Florida rental car fleet to alternative fuel vehicles by 2010.

g) The Legislature should dedicate a portion of motor vehicle registration fees to go to renewable energy and alternative vehicle infrastructure development.

Accelerate New Technologies into the Marketplace

25. Enterprise Florida should seek ways to transfer the success of those businesses and institutions that have effectively implemented efficiency and renewables measures to those that are not aware of the opportunities such approaches offer.

Action Steps:

a) The committee, to be established as a result of Action Step a) under *Recommendation* 22, would develop ways and means for accelerating and integrating new sustainable energy technologies into the marketplace.

b) Enterprise Florida should develop sustainability trade shows (such as the Dade Green Alliance) which would include sustainable energy development for the residential community.

Private Sector Leads by Example

The most powerful catalyst for change is leadership by example. The private sector can play a vital role in building a sustainable energy future and committing itself to the enterprise by taking a leadership role in moving toward that goal. The following recommendations and actions will actively engage private sector enterprise in moving toward a more sustainable economy.

26. Enterprise Florida should encourage the development and implementation of techniques and lending practices that increase the opportunities in the application of sustainable energy sources and system applications in the following industries and communities:

Financial Community

Action Steps:

a) Encourage mortgage lenders to provide financing which takes energy efficiency and renewable resource improvements into account in financing ratio calculations.

b) Develop an incentive-based approach to facilitate energy efficiency investments in commercial and residential buildings by developers, builders and capital investors. Specifically address the unique challenges of investment properties and the need to include those properties in the solution.

Development Community

Action Steps:

a) Forge partnerships with builders, realtors, consumer interests and other key stakeholders to assure effective implementation of the Energy Efficiency Rating Act, including any revisions that may be needed to address the special needs of a subtropical climate.

b) Identify and recognize those builders who practice sustainable development.

c) Engage private development interests in the master planning process for "Eastward Ho!"

Utilities

Action Step:

Encourage increased efficiency and renewables use within electric and other utility operations.

Agricultural Community

Action Step:

Expand the application of a systems approach to energy conservation and sustainable best management practices to minimize impacts to the environment.

All Businesses

Action Steps:

a) Transportation

i. Initiate programs and policies which reduce transportation impacts of private employment (e.g., telecommuting, van and carpooling, subsidizing public transportation, providing transit commute benefits (IRS 94-3) supporting sustainable travel choices, and eliminating free parking.)

ii. Participate in and support initiatives like the Clean Cities Coalition and EV Ready Broward, by purchasing alternative fuel vehicles (AFVs) for fleet, van, and carpooling opportunities.

iii. Encourage the rental vehicle industry to provide AFVs and to participate actively in cooperative efforts with government to provide the necessary fueling infrastructure.

b) Environmental Standards

The ISO 9000 family of quality standards is recognized throughout the world. The ISO 14000 family is their environmental counterpart. The private sector's energy use can be improved immeasurably with knowledge, and adaptation, of these important international environmental standards.

i. The private sector in Florida should be encouraged to adopt the principles of the ISO 14000 family of Environmental Standards, and ISO 14001 "Environmental Management Systems" in particular, as a model to improve their energy activities, further, they should be encouraged to seek certification where practicable.

ii. Private, standards-setting trade and professional organizations should adopt the principles of the ISO 14000 family of standards, and the ISO 14001 "Environmental Management Systems" in particular, as a benchmark model for both energy and environmental sustainability standards and apply them in their awards program for industry.

c) "Clean Corporate Citizen" Programs

i. Through the creation of an award and recognition program, seek to increase the energy efficiency and lower the pollution impact of small motors (chainsaws, lawnmowers, outboard engines).

ii. Encourage commercial and industrial entities to achieve greater reuse and recycling of materials that otherwise would be regarded as waste.

d) Dialogue

Establish a forum for dialogue between private industry, the academic community, and government, at senior levels of each organization, to obtain an understanding and a commitment to move toward sustainable practices and programs.

ENGAGING THE COMMUNITY

Energy decisions in Florida have typically rested more in the hands of energy suppliers than in the hands of energy consumers. During the oil crisis in the mid-1970s, people were forced to become aware of their energy usage and become involved in energy choices at a personal level. When supplies were low and prices were high, consumers chose to drive less, turn off nonessential lights and appliances, and purchase smaller, more energy-efficient automobiles. As we envision a future with enough energy to sustain us and our grandchildren, Floridians must once again consider their energy options and the consequences of the alternatives they choose. These choices, which have traditionally been left in the hands of utilities, land developers/builders, and manufacturers, impact all of us: from the size of our annual energy bills, to how and where we travel and even where we live.

Currently, Florida's residential energy users (comprising 27 percent of all energy consumed) are making important energy decisions with inadequate information. In order to increase awareness of the impacts our energy choices have on our communities and environment, the general population must learn about energy issues and become involved in making tough energy choices.

Since these "tough choices" will directly impact the sustainability of South Florida, we must collectively make these difficult decisions. An excellent example of how this idea is being implemented is the PLACE^{3}S approach which was developed cooperatively by state energy offices in California, Oregon, and Washington. PLACE^{3}S is an acronym which stands for PLAnning for Community Energy, Economic and Environmental Sustainability. Following is a description of the PLACE^{3}S process from the publication, *The Energy Yardstick: Using PLACE^{3}S to Create More Sustainable Communities*:

> This method of planning uses energy accounting to evaluate the efficiency with which we develop our land, design our neighborhoods to provide housing and jobs, manage our transportation systems, operate our buildings and public infrastructures, site energy facilities, and use other resources. The outcome is a well-informed, inclusionary public process that balances community values and integrates environmental, economic and social goals.[11]

[11]California State Resources Conservation and Development Commission, Oregon Department of Energy, Washington State Energy Office, *The Energy Yardstick: Using PLACE^{3}S to Create More Sustainable Communities*, 1996.

These and other initiatives for guiding broad participation in a systems-based comprehensive planning processes to achieve wise energy use, should act as a model for Florida. Including a well-informed public in the energy decision-making process will lead to better decisions. Floridians have a right and responsibility to determine their energy future.

RECOMMENDATIONS

27. Local governments, regional planning councils, state government agencies and other appropriate entities should undertake initiatives to increase public awareness of the benefits of sustainable energy choices.

Action Steps:

a) Local governments, water management districts, and all other entities with ongoing sustainable outreach initiatives should educate the public by integrating sustainable energy into these initiatives.

b) Print and broadcast media should sponsor stories and programs that educate the public about sustainable energy choices.

c) The Florida Energy Office/Department of Community Affairs (FEO/DCA) should establish and publicize a state information clearinghouse with local and state information on sustainable energy.

d) Government agencies, business and community leaders, and public interest groups should develop and use effective methods to motivate people to use conservation and renewable technologies that are cost-effective now.

e) Enterprise Florida should work with interested private industry groups to promote use of sustainable energy systems by the general public.

f) The State University System, in conjunction with FEO/DCA, should continue and strengthen the capabilities of the Energy Extension Service in the delivery of education about sustainable energy at the community level.

g) FEO/DCA, Enterprise Florida and Florida Solar Energy Center (FSEC) should recognize and, where appropriate, sponsor awards for exemplary projects and actions by the media, private sector, and public agencies on sustainable energy concerns.

h) Non-governmental organizations, FSEC, the Energy Extension Service and trade associations should create partnerships with home shows, auto shows, hardware and building supply stores, etc., to sponsor and host displays, demonstrations, or models of efficient and sustainable energy technologies, construction methods, etc.

28. Local governments, regional planning councils, state government agencies and other appropriate entities should involve and interest the community in making decisions related to energy use, energy efficiency and energy conservation.

Action Steps:

a) Local governments should provide town hall-like gatherings to give meaningful citizen input into decisions that affect individual and community energy use

b) The Department of Community Affairs (DCA) should identify community leaders (Community Action Agencies) and through them promote use of PLACE^{3}S methodology.

c) Transportation Management Associations (TMAs) should seek out successful programs in other communities and implement those successful programs designed to move people away from single-occupant vehicle travel to other modes.

d) The Department of Children & Family Services, the Department of Elder Affairs, in conjunction with the Florida Energy Office/DCA should make social workers aware of energy consumption and savings opportunities so they can pass this information on to their clients.

e) Local governments and regional planning councils should invite community input on sustainable energy concerns as part of the development of and amendments to local government comprehensive plans and strategic regional policy plans.

f) DCA should solicit the input and involvement of local citizens in the implementation of the state's Sustainable Communities program both in officially designated communities and through replication of related sustainable energy resources on a statewide basis.

29. Local governments should encourage and sponsor community-wide efforts to cut energy consumption, lower energy costs, or use sustainable transportation and energy technologies. These efforts should be delivered through community organizations such as neighborhood groups, owners' associations, business groups, churches, etc.

Action Step:

Develop and implement programs, modeled after replicable successful local initiatives elsewhere, to continually publicize information on energy use and its impacts.

30. Local governments should undertake an initiative to inform the public about opportunities and problems associated with a restructured electricity market.

EDUCATION AND PUBLIC OUTREACH

Human social behavior is a critical part of promoting sustainable energy. Behavioral changes alone (i.e., without the effect of any technological change) can achieve very significant energy savings[12]. Furthermore, as it is people who make the choice of what technologies they will use, even the adoption of sustainable energy technologies is, ultimately, dependent on human behavior change. Education and outreach for both policy-makers and the public-at-large, are essential tools to bringing about this change.

To promote energy sustainability, education and outreach must be designed to accomplish the following three objectives:

- educate people about the impacts on their environment of individual actions and energy choices;
- inform them about available alternatives; and
- motivate them to make choices that are compatible with the principles of sustainability.

These efforts must be directed to both decision-makers and the general public. Existing education and outreach programs have focused primarily on the dissemination of information. Although one of the goals of environmental education is to promote behavioral change, few programs have been designed with the express purpose of motivating energy consumers to modify their behavior.

To be successful, education and outreach must set in motion a process that helps both parties move toward a common goal: creating a sustainable energy system while increasing satisfaction, comfort, health, and safety. Effective education and outreach programs have shown that they can achieve significant behavior change that persists over time.[13]

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[12] According to Loren Lutzenhiser, 1993 "Social and Behaviorial Aspects of Energy Use." *Annual Review of Energy and the Environment,* Vol. 18, pp. 247-89. It is estimated that energy savings on the order of 50% can be achieved.

[13] Merrilee Harrigan, 1991 "Moving Consumers to Choose Energy Efficiency." The Alliance to Save Energy, Washington, DC.

Existing programs have not adequately targeted decision-makers. The following recommendations address the education of decision-makers in government and in the private sector, and educational institutions. (Please note that education of the general public, outside the education system, has been addressed in the section entitled "Engaging the Community.")

RECOMMENDATIONS

GOVERNMENT

31. Educate state policy-makers (legislators and high-level executive officials) about the opportunities and potential problems related to energy and sustainability. Among the topics addressed will be the issue of restructuring of the electric utility industry, global climate change and economic development, and their relationship to Florida's energy future.

Action Steps:

a) Through a collaborative effort of appropriate state agencies, university officials, business associations, and public interest organizations concerned with energy matters affecting Florida, an educational forum(s) should be sponsored for state policy-makers.

b) The Public Service Commission should continue and complete its report on the experiences of other states with restructuring, widely disseminate the final report, and organize a number of meetings where the report is presented to the state's policy-makers.

32. The Governor's Office, through the Department of Management Services (DMS), should provide a program to educate executive branch officials, in their capacity as energy consumers, on sustainable energy choices.

Action Steps:

a) Executive agencies should identify appropriate personnel to take part in this program.

b) DMS should organize and conduct educational seminars for this purpose.

c) Executive agencies should co-sponsor these seminars for their respective employees.

d) The Governor's Office should secure the participation of high-level executive officials in the seminars.

33. The Department of Environmental Protection (DEP) should initiate research to document existing impacts and understand possible effects of the use of energy in stationary and mobile applications on human health, the built environment, the ecosystems, the climate, and the economy of South Florida.

Action Steps:

a) DEP should expand its research funding in this area to document these impacts.

b) DEP should incorporate this information into a GIS/geospatial database.

34. Educate local government officials on their energy consumption choices.

Action Step:

The Florida League of Cities, Florida Regional Councils Association, and the Association of County Governments should put together a series of symposia to address energy issues facing Florida. This would include appropriate officials such as representatives from county departments equivalent to the Department of Environmental Resources Management, and at least one elected official from each county.

PRIVATE SECTOR

35. Educate business leaders on their energy consumption choices.

Action Step:

Chambers of Commerce, in coordination with Enterprise Florida, should organize seminars for their members on various energy issues including restructuring, sustainable energy choices, ISO 14000, and designing, developing, manufacturing, transportation, telecommuting and marketing of green products and services.

EDUCATIONAL INSTITUTIONS

36. The education system should become a vehicle to deliver balanced educational information about sustainable energy systems.

Action Steps:

a) The Department of Education should develop and provide curricula, materials and teacher training to be used at all levels of formal and informal education, to inform people about energy and motivate them to make sustainable energy choices. An effort should be made to identify appropriate existing educational materials.

b) School districts should seek donations and forge partnerships to provide for hands-on learning tools (alternative fuel vehicles, solar technology, etc.) to enhance the learning experience.

c) The Department of Education, Florida Energy Office/Department of Community Affairs, Florida School Boards Association and other education associations should encourage school-based energy initiatives, such as Solar for Schools, to educate students, parents, and the community-at-large.

d) Local School Boards should encourage the development of "Energy Fairs" for K-12 grades, including booths and demonstrations about the various forms of energy, how they are used, and their environmental impacts.

e) Encourage energy education school fundraisers, which take advantage of school children's interest in the environment and their parents' interest in supporting the school (and saving money in the long run). Children can sell (and educate their families and friends about) energy efficient and renewable energy products in their neighborhood to raise money for school functions and other education-related purposes.

ACCOUNTABILITY

In February of 1996, the Florida Commission on Government Accountability to the People (GAP) published *The Florida Benchmarks Report*. This publication begins by discussing Americans' love for junk food. Although we love to eat cookies, potato chips, ice cream, and french fries, most of us do not eat junk food as much as we once did. Why? Because nutritional information must now be included on the packaging of food and because Americans are more aware of how important good nutrition is to their health. This awareness has caused food companies to respond by offering healthier products.[14]

The goal of the GAP report is to provide users of Florida's services with more information so that they are better able to understand how well (or poorly) Floridians are being served by their government. Clear and useful information with benchmarks and indicators will empower citizens, business leaders, and government leaders to make better energy choices. Government has an important role to play in compiling and making such information available.

South Florida cannot become sustainable without Floridians being better informed about energy concerns including what energy resources we use (including primary fuels), how much, for what, how much we need, related impacts (including emissions), and energy alternatives. GAP has created some benchmarks on energy use. We applaud this effort and hope to build on it.

RECOMMENDATIONS

37. *The Florida Benchmarks Report* should be expanded to include the following energy-related benchmarks and indicators:
    a) Track changes in per capita use of energy (currently measured by GAP as "Total energy use per resident");
    b) Track percent of per capita income spent on energy (not currently a benchmark, but very important);
    c) Track per capita air pollutant and CO_2 emissions from energy consumption (this measure should replace the current benchmark on the percentage of people living in areas where the outdoor air meets or exceeds air quality standards); and,
    d) Track energy use per unit of land area (not currently a benchmark).

[14] The Florida Commission on Government Accountability to the People (GAP), *The Florida Benchmarks Report*, Tallahassee, 1996.

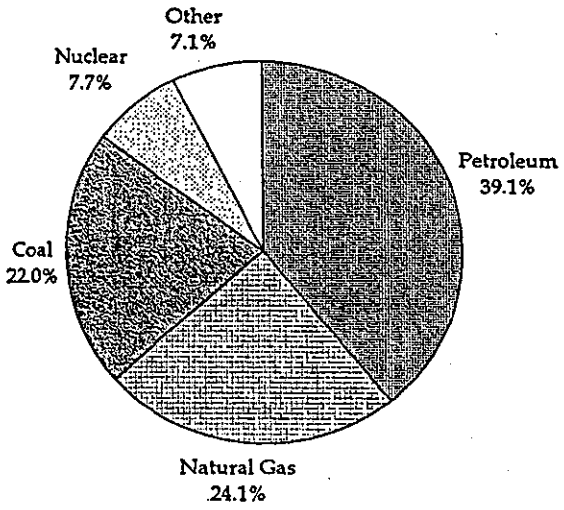
38. Utilities should report their energy resource mix and general information about associated emissions at least once a year, in a bill stuffer.

TRENDS AND CONDITIONS

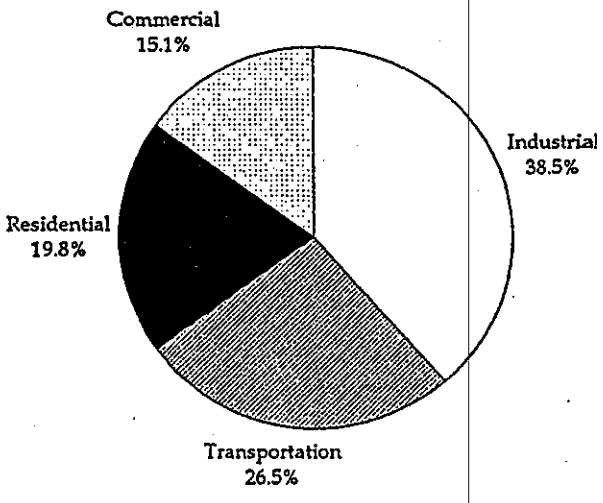
THE NATION'S ENERGY PROFILE

The U.S. has historically relied primarily on fossil fuels (coal, oil, gas) and nuclear power to meet its energy needs. The breakdown of energy sources consumed nationwide in 1994 consists of the following: oil (39.1%), natural gas (24.1%), coal (22%), nuclear power (7.7%), and all other sources (7.1%). As noted, the United States depends most heavily on petroleum resources, both domestic and foreign. In 1996, the U.S. economy consumed an average of 17.7 million barrels (one barrel=42 gallons) of oil equivalent[15] per day (MBOD). Less than 7 MBOD of oil was produced domestically. More than 10 MBOD was imported from Mexico, Venezuela, Nigeria and many other countries, including the major oil producing nations in the Middle East (EIA, 1996). Ten years ago, imports were only about 31% of total use; today imports are over 50%. The vast majority of this petroleum is imported to serve the nation's growing appetite for transportation fuel. The American transportation industry is overwhelmingly dependent on petroleum-derived fuels, that is gasoline and diesel fuel. Dependence on one primary energy source makes the economy vulnerable to rapid increases in oil costs or disruptions in supply.

United States
Energy Consumption by Fuel Type, 1994



United States
Energy Consumption by Sector, 1994



[15] Oil equivalent is a term used to describe a given amount of energy in relation to the amount of energy contained in a specified amount of oil. For example, a 42 gallon barrel of oil = 5,800,000 Btu, so this Btu value = 1 barrel of oil equivalent.

National Trends

After 10 years of decline, primarily as a result of conservation efforts, per capita energy consumption in the U.S. resumed an upward trend. The Energy Information Administration projects between 1990 and 2010, primary energy consumption will increase at a rate of 1.2% per year. A second important trend affecting the U.S. energy industry as a whole is marketplace competition. If this trend continues, the law of supply and demand will be the major force determining the balance of energy resources used in the U.S. However, the market cannot account for environmental and social costs of different energy resources unless these costs are incorporated in the price of energy resources. This does not happen automatically but, rather, is the result of our regulatory framework. Furthermore, efficient market operation does not guarantee price stability, or continued supply of any energy resource.

The most significant trend in the oil industry is the continuing rise of oil imports, both in absolute numbers and as a percentage of U.S. oil consumption. According to the Energy Information Administration's (EIA) latest forecasts, U.S. net oil imports are projected to increase from 15.2 quadrillion Btu annually in 1990 to 24.6 quadrillion Btu by 2010. The proportion of imported oil consumed in the U.S. is predicted to grow from 45.3% in 1990 to 62.1% in 2010. While it is impossible to predict when or how much prices will increase, oil prices in December 1996 were about 20% higher than December 1995 and 50% higher than the post-Gulf War lows. Global oil consumption is also projected to increase significantly as the rapidly growing economies of Southeast Asia and China dramatically increase consumption of energy. This global trend can only exacerbate pressures for future oil price increases and supply shortages.

Natural gas has the least environmental impact of the fossil fuels, particularly as relates to acid rain and global warming. Domestic supplies of this fuel are relatively abundant. As a result, natural gas has become "the fuel of choice among many utilities for compliance with emission restrictions placed on electric generation sources." (Florida Public Service Commission, 1995).

Coal is the most environmentally unfriendly of the fossil fuels. It is the major cause of acid rain, and contributes more carbon dioxide for each unit of energy delivered than either oil or natural gas. Furthermore, due to the predominance of surface mining methods, the extraction of coal also has major environmental consequences. Coal is also the most abundant domestic energy resource, where the U.S. possesses substantial reserves. Coal is almost exclusively used as a primary fuel for electricity generation. As a result, changes in the electricity industry will be a major force shaping the future of coal production and use in the U.S.

Nuclear power is also almost exclusively used in electricity generation. Therefore, it will also be affected, to some extent, by the on-going changes in the electricity industry. As no new nuclear power plants have been ordered since the late 1970s in the U.S., and as the oldest plants are beginning to be decommissioned, the share of nuclear power in the nation's energy supply is projected to decrease from 7.7% in 1994 to 7% in 2010.

Other energy resources currently in use include large-scale hydropower, waste-to-energy, and other renewable energy sources such as geothermal, solar and wind. Most available sites for large-scale hydropower have already been developed. The economic and environmental costs of developing the few remaining sites make such projects unattractive. As a result, the total amount of energy from this source is not projected to increase significantly. Waste-to-energy remains very controversial for environmental reasons, so its future is very uncertain.

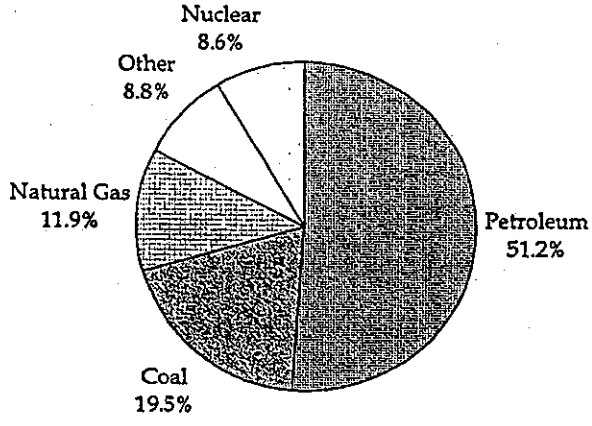
Geothermal and wind energy are utilized for commercial power production primarily in the West. The use of solar technology is also most prominent in the West, for centralized power production as well as individual use, although solar is used in states across the nation. In the 1930s-40s Florida was a leader in the use of solar water heating. Solar water heaters became popular again with consumers in the 1970s when federal tax incentives were provided to stimulate their use; such incentives, however, were short lived. A broad range of solar technologies is now available for thermal power and electric power production, along with passive applications for daylighting, space heating and cooling. The costs of wind and solar technologies have dramatically dropped over the past ten years and the downward trend continues.

The National Energy Policy Plan, July 1995, predicts that "in the year 2010, we undoubtedly will use greater amounts of renewable energy resources, but still will rely primarily on the energy resources that we use today. Further into the 21st century, we could rely much more heavily on solar and other renewable resources, and our energy portfolio may include hydrogen and fusion energy." Broader use of renewables could be accelerated by the removal of institutional and market barriers as discussed later in this chapter.

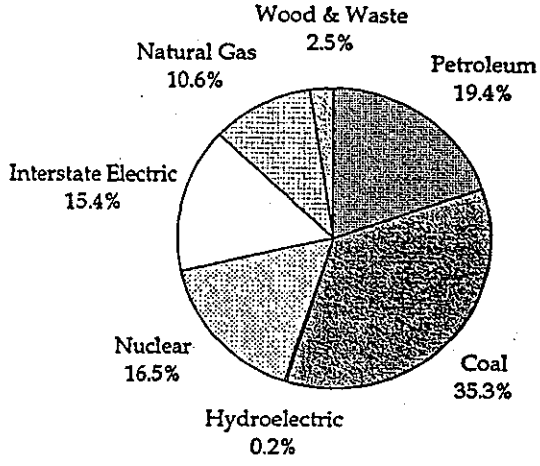
FLORIDA'S ENERGY PROFILE

Florida's demographics and economic composition are unique from that of other states. With a strong tourist-oriented services industry, a relatively small but growing industrial sector, and distinct weather characteristics, the state's energy consumption patterns differ greatly from those of the nation. Most of Florida's energy is used for transportation and electric power generation. Compared to other states, Florida depends heavily on petroleum, ranking third behind Texas and California. Florida also relies heavily on electricity, ranking third in 1993. Florida's energy consumption by fuel type and the resource mix of Florida's electric utilities is shown on the following charts.

Florida Energy Consumption by Fuel Type, 1994



Florida Electric Sector Energy Consumption by Fuel Type, 1994



Note: "Other" includes hydroelectric, solar and purchased power, where solar accounts for less than 1% of total energy use.

Florida produces few of the fossil fuels it uses--only 2% of its annual natural gas consumption; and only 6 million barrels of crude oil in 1994 with a steady decline in production. In addition to importing the balance of the oil and gas we use, Florida imports about 26 million short tons of coal annually. This imbalance between consumption and production makes Florida one of the nation's largest net fossil fuels consumers.

Energy Supply

Florida is a state with few energy resources. The crude oil and natural gas extracted from 16 active oil fields, with 86 producing wells, supplied 1.3% (41 trillion Btu) of the state's energy needs in 1993 (*Florida Data Report*, Florida Energy Office). More so than any other state, Florida is dependent on imports of domestic and foreign energy sources.

The petroleum products used for transportation, the natural gas used directly by consumers, and most of the energy used for electricity generation are imported into the state. A portion of the electric power used in Florida (254.8 trillion Btu in 1994) was obtained from other states via intrastate transmission and is generated from fossil and nuclear fuels. A small portion (42.9 trillion Btu in 1994) is also produced through the burning of municipal solid waste.

A single interstate natural gas transmission company has historically supplied natural gas to Florida. Florida Gas Transmission has transported natural gas to Florida via pipelines extending across the panhandle of Florida from supply sources in the western gulf region. Once the natural gas is piped across the high-pressure transmission system, local distribution companies distribute it to consumers. New gas transmission pipelines are being planned and are now under construction.

The mix of renewable energy resources is limited in Florida, with virtually no commercially viable opportunities for wind or hydropower. Biomass is used to a limited extent as derived from agricultural activities (e.g., wood, wood pulp, and bagasse) and -- to a very small degree-- from recycled materials, such as cooking oils and other waste products. The one energy resource the state of Florida has in abundance is solar energy.

Energy Consumption by Fuel Type

According to the latest data published by the Florida Energy Office, the State of Florida was ranked eighth among the 50 states and the District of Columbia in terms of total energy consumption in 1994. This same data report shows petroleum supplied 51.2% of all the energy used in Florida, coal supplied 19.5%, natural gas supplied 11.9%, nuclear power accounted for 8.6%, and other sources (including renewables such as biomass, hydroelectric, solar, and ethanol) supplied 8.8% of Florida's total energy in 1994.

The electricity provided by Florida's utilities accounts for almost half (49%) of the energy Florida consumes. During 1995, Florida's electric industry served some 6.5 million residential accounts, some 770,000 commercial customers, and over 37,000 industrial customers. The generating utilities produced about 179,000 gigawatt hours (Gwh) of electricity. Annual electric sales for the period 1986 through 1995 grew at a rate of 4.1% or an average of 6,100 Gwh per year.

Energy Source Diversity

The main advantages of diversity in fuel supply are security of supply and a hedge against the risk of price increases. The availability of reliable, abundant fuels, with minimal environmental impacts, at reasonable prices is essential to maintaining a healthy economy. Historically, diversity considerations have focused on conventional fuel sources, which ultimately are not sustainable.

Florida Power & Light Company (FPL), which serves most of the South Florida area, uses a diversified fuel mix in its generation of electric power. In 1995, FPL produced 31% of the electricity it supplied from natural gas, 19% from oil, 25% from nuclear, less than 7% from coal, and approximately 6% from all other sources (e.g., bagasse and wood waste). Ninety-five percent of the electricity sold by FPL is either directly imported, or generated from fuel sources from outside the state (e.g., fossil fuels and nuclear).

The transportation arena has the least fuel diversity, being almost wholly dependent--99.35%-- on petroleum as an energy source. The only exceptions to this are electrified rail and in excess of 7,500 alternative fuel vehicles used in demonstration programs, in large part, in South Florida. The economy of Florida is especially vulnerable to petroleum price increases and supply disruptions because its reliance on tourism and commerce make it heavily dependent on transportation. The agricultural industry of Florida is also heavily dependent on petroleum and has the same vulnerability as transportation. Residential, commercial, and industrial consumers depend substantially on electricity (99.3%), which is not a primary fuel.

Per Capita Energy Consumption

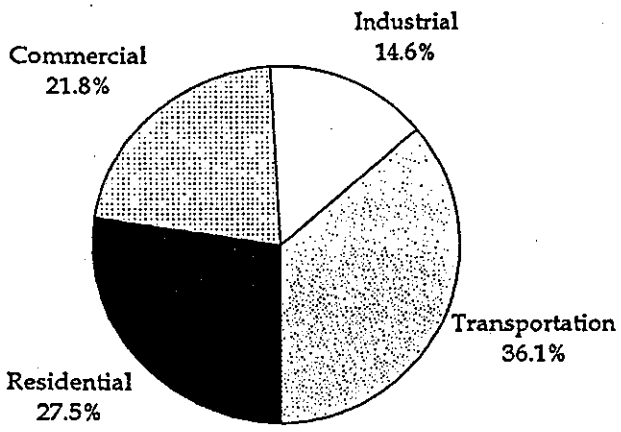
The demand for electricity in Florida is high, and Floridians use more electric energy than other consumers do in the U.S. Per capita demand for electricity has steadily risen for the period 1970-1994. Due to Florida's high use of electricity, small industrial base and weather conditions that

differ significantly from other states, Floridians use about a quarter less energy (all sources) than the average U.S. citizen. However, in considering the source value for electricity, Floridians rank among the top states in the nation in per capita energy use.

Energy Consumption by Sector

Referencing the latest statistics available from the Florida Energy Office, energy consumption by sector in 1994 was as follows: transportation – 36.1%, residential – 27.5%, commercial - 21.8%, and industrial - 14.6%. Institutional energy uses are assumed to be a part of commercial energy use.

Florida
Energy Consumption by Sector, 1994



- Transportation Sector

Efficiencies are being realized nationwide in the primary modes of transportation given the role of efficiency as a cost consideration by business and individual travelers. A growing economy generally results in increased transportation use. The total amount of energy consumed has stabilized or even declined for some modes of transport (See Table 1, Appendix A - Transportation). The reasons are fuel economy efficiencies motivated by federal regulation of automobile manufacturers (e.g., Corporate Average Fuel Economy standards) and market competition pressures resulting from the deregulation of rail, trucking, and aviation industries. Florida has a relatively high dependence on motor vehicle transportation as a proportion of its total energy usage (36.1% in 1994, as measured in Btus). Efficiencies are being realized in the transportation sector, which has declined from being 40% of total energy consumed in 1982.

Single-occupant vehicles still represent the most energy intensive form of passenger travel. A driver alone in a car uses an average of 24% more energy than does the typical transit bus rider. The current problem is that transit services are not being sufficiently used to take advantage of the inherent energy savings provided by transit. Nationally, transit passenger-miles have changed relatively little since 1985. The picture in Florida is a little better, where transit use has increased, but there are still substantial amounts of unused transit capacity available in every Florida city where transit is available. (See Tables 2 and 3, Appendix A, Transportation.)

While Florida-specific data is not available for other transportation modes, national data has relevance for Florida. Aviation has made substantially greater energy efficiency gains than highway vehicles since 1970, including a 20% decrease in energy use per passenger mile in just four years. Other modes of transport, such as rail, pipeline, and ship, account for still lower portions of the transportation sector's energy consumption. In 1993, the most recent year of record for all modes, water transport used 1,473 trillion Btu of energy, pipelines consumed 889 trillion Btu, and railway travel used 463 trillion Btu. Collectively, these non-highway modes accounted for 12.6% of total transportation energy used in 1993. Energy use by railway travel was down in total in 1993 from 1970, but on per ton-mile basis among the larger U.S. railroads was half what it was in 1970. Water-borne travel used twice as much energy in 1993 as it did in 1970, while that used by pipelines was relatively unchanged over that period (normative data not available).

- Residential Sector

In 1994, the residential sector was the second largest consumer of energy (27.5%, equivalent to 876 trillion Btu in Florida). Almost 93% of all residential energy used came from electricity. Over 68% of this energy represented by the primary fuel was lost in generation and transmission. This is true for other electricity-using sectors as well.

- Commercial Sector

There was an increase in the use of coal, natural gas and electricity. The use of petroleum products decreased over 37% in the commercial sector. Electricity provided over 90% of the energy used in the commercial sector in 1993.

- Industrial Sector

In 1993, electricity accounted for 45% of the energy used, while petroleum and renewables accounted for 26% and 19%, respectively. The renewables used were primarily comprised of wood, wood waste, and bagasse. Comparing Florida energy use data to that of the nation shows Florida has substantially lower energy use in the industrial sector. This reflects the lack of considerable manufacturing activity in the state's economy (10.9% of total employment in 1994).

TRENDS

Florida, particularly south Florida, is one of the nation's fastest growing regions. The population of South Florida is projected to increase by 30% (1.25 million) between 1990 and 2010, and by an additional 12% (633,000) by 2020 (South Florida Regional Planning Council, 1997). This tremendous growth in population is expected to place significant additional strain on the region's energy and environmental resources. As the 21st century approaches, dynamic energy markets and continued advances in technology have the potential to expand the primary and secondary energy options available to Florida. Exactly what additional choices Florida will have remains to be seen; however, based on the knowledge we have today, certain trends exist.

Electric Market

The demand for electricity is forecasted to increase substantially. Currently Florida has some 37,000 megawatts of electric generating capacity. According to industry projections (now under consideration by State regulators), Florida utilities propose to increase their existing capacity by 7,000 megawatts or 18.7% during the coming ten years. According to their plans, by 2005, 43% of all electric generating resources (and 80% of new generation) will be fueled by natural gas. Recent technology developments in gas fueled power systems, combined with competitive gas prices, have made natural gas units economically competitive with more traditional coal and other fossil steam technology.

A number of alternative energy system technologies are now available or in development that could have dramatic effects on the way electricity is provided in the future. These include renewable technologies such as solar photovoltaic modules that produce electricity directly from sunlight, and fuel cells that can be installed close to the end-use customer. Distributed

technologies (power is produced where it is to be used) take advantage of energy conversion efficiencies and eliminate or minimize the need for transmission and distribution lines.

- Competition and Restructuring of the Electric Market

The last 20 years has witnessed the restructuring and deregulation of various industries once thought to be natural monopolies. Through Federal initiatives and legislation, the airline industry, trucking industry, and natural gas production and transmission industry have been deregulated. Partial but ongoing deregulation is occurring in the telecommunications and natural gas distribution industries.

Electric utility service has traditionally been provided by a franchised local utility that is a vertically integrated company that owns the generation, transmission and distribution facilities and markets its product to a group of end-use customers. In return for the franchised service area, the Public Service Commission or an equivalent regulatory body would regulate the rates, charges, and service standards.

However, energy policy is at a crucial crossroads at the national level. Electric utility service is in the process of being restructured at the national level and will have impacts on the traditional manner in which utilities have previously recovered their investments. The regulatory, economic and environmental implications of these changes may be substantial; and the cost of energy to consumers will, no doubt, also be affected.

Ironically, the regulated environment in which Florida's electric utilities operate is a direct result of the failure of competition in the early part of this century. At that time, numerous power plants and a maze of transmission and distribution lines were built. What emerged was a glut of power plants, overlapping lines and services, and high cost electricity. As a result, Florida recognized the essential service provided by electricity and adopted a public policy to ensure that reliable, safe, and reasonably priced electricity would be available to all Floridians. This public policy, along with oversight by the regulatory agencies, has worked to provide for the electricity needs of the state despite enormous growth.

In 1996, at the wholesale level, the Federal Energy Regulatory Commission (FERC) issued Order 888, which requires all utilities that own electric transmission facilities to make these lines

available under standard tariffs for use by wholesale electric providers. Florida utilities have submitted their open access tariffs to FERC as required by Order 888.

While the actions of the FERC have not yet addressed retail competition, several states have passed legislation or have designed experiments to permit end-use customers to shop around for power. Many other states are examining issues related to restructuring. Because Florida's electric rates are near the national average and since its rates have been falling over the last 12 years, the momentum for restructuring has been less evident here. However, large industrial customers have been pressing the legislative and regulatory bodies to allow some form of competition in Florida. This trend will probably continue.

Transportation

Florida's growing population, including permanent residents as well as tourists, has resulted in an increasing demand for transportation facilities, services and vehicles. While vehicles are becoming more efficient, consumers are driving more and there are more of us driving everywhere. Substantial energy is consumed in the process, and other environmental and social impacts are likewise significant.

Over the past decade emphasis has been placed on improved transportation planning and intergovernmental coordination by way of the State's Growth Management Act and related implementation efforts. Urban sprawl and the motoring public's preoccupation with the single passenger automobile have inhibited sustainability achievements.

Some communities have capitalized on multi-modal transport to enhance their efficiency. South Florida has excelled in this regard through such undertakings as Tri-Rail and the Dade County Transit System, including Metrorail. However, ridership remains a problem in many areas, where transit is not sufficiently convenient or is not perceived as such.

A public transportation alternative in the works is the high-speed rail system, approved by the Department of Transportation and endorsed by the Florida Legislature. If fully funded as planned, the system will include a corridor between Miami, Orlando and Tampa, linking tourists as well as residents with a much broader range of destinations on schedules better than or equal to air travel.

Alternative fuels are being utilized in some Florida communities on a pilot basis, including in the South Florida area. Under such initiatives portions of fleets are being converted to utilize natural gas as an alternative to gasoline. Programs to use electric vehicles are also in the works.

Given Florida's peninsular geography and wind patterns, the impact of air emissions due to vehicular use are less than in other states. While Florida currently has no non-attainment areas as defined by Federal standards, at least two urban areas are known to be close to the threshold. Carbon dioxide emissions from cars and other vehicles are also regarded as contributors to global climate change, the effects of which are particularly threatening to states with significant coastal expanse such as Florida.

Built Environment

While increases in fuels used and emissions generated are reflected in the Transportation Sector, the roads and parking lots for these vehicles are a part of the built environment. Florida's growing population, coupled with suburban sprawl and the market trend toward larger residences, means more land used in development, more schools, and more miles of roads and parking spaces to accommodate low-density patterns. This desire for larger houses, with more area per person, with more electrical appliances, and larger lots, results in high energy demand and overall use.

Florida's climate also poses unique challenges for designers to prevent sick-building syndrome and achieve high energy efficiency. To accommodate the past inadequacies of building design and construction, owners are turning to performance contracting methods to retrofit their buildings and finance the costs through future energy savings. State and local governments are developing examples of significantly improved building design and construction. These new buildings have high performance in energy efficiency, space utilization, and occupant comfort.

Following the new national trend toward traditional neighborhood design and transit-oriented design Greenfield development, Florida does have a few good examples of this type of development that revives the small scale, pedestrian-friendly town planning of the early twentieth century. Not only are these developments more energy and resource efficient, and require less use of vehicles, they make profits for their investors.

Some 48 million tourists currently visit Florida each year. While their presence accounts for many favorable economic effects, it also results in enormous energy use and environmental impacts. Tourism is projected to grow at 3% per year, resulting in over 100 million visitors by the year 2025. Florida's population of permanent residents is expected to triple in that same time frame. Such increases mean that the above trends will continue or increase unless new choices are made with regard to sustainability.

BARRIERS

A range of barriers exists which has served to inhibit or block sustainability in Florida. In this section, barriers to moving toward the use of more sustainable energy systems are identified.

Federal and state regulations exist that encourage energy use and discourage the use of renewable energy technologies and energy efficiency. Disproportionate funding support for conventional energy technologies is another barrier. The elimination of state and federal incentives (while retaining tax benefits and other incentives for traditional energy industries) has also hindered the advancement of renewable energy technologies and energy efficiency.

In the early 1980s, the Federal government instituted the Federal solar tax credit, which was extremely effective in stimulating consumer interest and solar sales. As an example of the impact that removing incentives can have, when the tax credit was eliminated in 1985, there was a 70% drop in solar energy collector sales. This issue was acknowledged when the 1993 Legislature directed the Florida Department of Community Affairs to conduct a study of barriers to commercialization of solar energy in Florida and present findings and recommendations to the 1994 Legislature. Their report identifies a range of obstacles along with goals and strategies for overcoming them.

Florida's development patterns, geography, and economic base form a barrier that limits the ability of public agencies to alter or economically add transportation-mode choices for the traveling public. A dispersed development pattern means that most home-to-work trips come from many locations. The resulting crisscrossing trips are not suitable for traditional transit services.

Mass transit vehicles (e.g., buses) produced in the U.S. have not improved their energy use while transit buses produced in Europe and Asia have seen significant improvements. Federal grants to U.S. recipients mandate the purchase of U.S.-built equipment. As a result, a barrier has been erected preventing local governments from acquiring the more efficient, foreign-built vehicles. By eliminating competition, it also removes incentives for U.S. manufacturers to increase the efficiency of their products.

To make cost-effective efficiency investments, consumers need reliable information about their typical consumption patterns and the energy savings available from a broad range of new and evolving sustainable energy technologies -- information that can be difficult both to access and to understand. Further, after years of buying energy services by plugging into kilowatts and paying utility bills, many consumers do not see efficiency as an energy service option.

Although many efficiency options make the most financial sense during new construction, most builders focus on the first cost of the structure, not on minimizing operating costs for future occupants or life-cycle costs. In addition, building design professionals are often paid a percentage of the capital costs of the project. As a result, producing a system design that requires more time than "rule of thumb" equipment sizing, is discouraged -- although efficiency-optimized systems can significantly reduce both capital and operating costs (e.g., heating, ventilation and cooling systems are commonly oversized).

Resistance to change by consumers, utilities, government agencies, financial institutions and others who influence energy choices serves as a powerful barrier to sustainability. Such resistance has occurred for a variety of reasons, among them lack of awareness of both the benefits and availability of more environmentally-friendly energy technologies.

Personal convenience is a significant obstacle to the selection of more sustainable energy systems in the transportation arena. The public is unlikely to use public transit until using a personal car becomes too inconvenient or expensive. Switching from personal cars to public transit is likely to occur only after highway congestion is critical, parking is unavailable, automotive fuel is extremely costly, and transit routes fully connect origins and destinations.

The costs of some sustainable technologies are necessarily higher until mass production through greater demand can provide for economies of scale to reduce them. As a result of these forces, markets for such technologies remain limited, creating a "chicken and egg" situation, where

consumers who want to purchase them have difficulty in doing so (stifling demand) and suppliers (stores, manufacturers) do not offer them until demand is more apparent.

From a broader perspective, the low price of energy in the U.S., compared with other countries, has the effect of inhibiting sustainable energy technologies as well. Energy prices abroad tend to be significantly higher than in the U.S. Energy efficiency and renewable energy resources are typically in much greater use where this is the case. Energy prices are artificially established based upon factors accounted for in a country's economic system. In America these prices take into account direct costs and do not consider the broader array of sustainability concerns such as environmental, health and other societal impacts of energy production and use.

Barriers to sustainability must be dealt with in order for meaningful progress to be achieved. Identifying and understanding such barriers is the first step to eliminating or ameliorating them.

GLOSSARY

Alternative Fuels: Natural gas, liquefied natural gas, liquefied petroleum gas, electricity, hydrogen, coal-derived liquid fuels, fuels (other than alcohol) derived from biological material, methanol, and mixtures containing 85% or more by volume of methanol, denatured ethanol, other alcohol with petroleum or other fuels.

Alternative Fuel Vehicle: Vehicles that are powered by fuels other than current forms of petroleum or diesel oil.

ASHRAE Standards: ASHRAE writes standards and guidelines in its fields of expertise to guide industry in the delivery of goods and services to the public. ASHRAE standards and guidelines include uniform methods of testing for rating purposes, describe recommended practices in designing and installing equipment and provide other information to guide the industry. ASHRAE has some 87 active standards and guideline project committees, addressing such broad areas as indoor air quality, thermal comfort, energy conservation in buildings, reducing refrigerant emissions, and the designation and safety classification of refrigerants.

Bagasse: The 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) A unit commonly used for measuring energy production or consumption. 5,800,00 Btu = 1 standard 42 gallon barrel of oil.

Bench marking: Setting a base standard

Biofuels: Nonfossil biomass energy sources and biomass-derived fuels, which together encompass all energy sources from recent-term organic matter (plant or animal).

Biomass: organic material in any form (wood, crop residue, animal manure, and others) that contains energy stored in chemical form.

British thermal unit (Btu): the energy required to raise the temperature of one pound of water by 1 degree Fahrenheit.

Carbon Sequestration Strategies: regulatory and/or business policies and practices designed to reduce anthropogenic emissions of greenhouse gases to the atmosphere by capturing and storing such gases in chemical, biological, or geological media that are stable or isolated from the atmosphere; also may refer to policies or practices which remove greenhouse gases from the atmosphere by facilitated production of biomass or other relatively stable materials.

Clean Cities Coalition: "Clean Cities" is a voluntary program initiated by the U.S. Department of Energy (DOE) 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. Efforts in the Gold Coast (Dade, Broward and Palm Beach counties) began in August 1993 to encourage participation by state and local government officials, fuel providers, and fleet operators. The Gold Coast was selected as Florida's first "Clean City" due to its designation as an ozone non-attainment zone by the U.S. Environmental Protection Agency.

Co-generation: 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.

Corporate Average Fuel Economy Standards: A regulatory fuel economy standard imposed by Congress for an average passenger car, originally set at 18 miles per gallon in 1978 and continuously revised to 27.5 miles per gallon by the late 1980s.

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.

Deep well drilling: the act of drilling wells in the earth to depths that penetrate oil, gas, sulfur, or other mineral formations or non-potable water aquifers. Such wells can be drilled for exploration purposes, for recovery of valuable minerals, or the disposal or long-term storage of chemicals, wastes and/or gases.

Demand-side management: Utility programs used to reduce peak electric demand from consumers and increase energy efficiency.

Deregulation: A proposed policy reform to reduce government intervention of the energy industry, based on the rationale that such reform will allow more number of energy producers

and suppliers to compete in the market and that increased competition results in efficient energy production and protects consumers.

Eastward Ho!: An initiative which seeks to revitalize and improve the quality of life in our historic, urban areas in order to lessen development pressure on sensitive western land which are needed in order to restore the Everglades and ensure future water supplies.

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 feedstocks 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 temperature.

Energy alternatives: Alternative forms or sources of energy such as fossil fuels (coal, petroleum, and natural gas), nuclear, biomass, hydrogen, geothermal, and solar.

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 loan than the normal amount.

Energy Information Administration: (EIA) is an independent statistical and analytical agency within the U.S. Department of Energy. EIA maintains a comprehensive data and information program relevant to energy resources and reserves, energy production, energy demand, energy technologies, and related financial and statistical information.

Enterprise Florida, Inc.: The government-business partnership to which the Florida Legislature conveys principal responsibility for statewide economic development. Enterprise Florida has capital access, workforce training, and technology development programs designed to assist in the development, expansion, and retention of Florida businesses. This is a comprehensive economic development organization.

Environmental Management System (EMS): A program of continuous environmental improvement by following a defined sequence of steps, drawn from established project management practice and, routinely applied in business management. An EMS program (a) reviews the environmental consequences of the operations; (b) define set of policies and objectives for environmental performance; (c) establish an action plan to achieve these objectives; and (d) monitor performance against these objectives on a continuous basis and take actions for improvement.

EV Ready Broward: a public/private partnership to educate consumers and prepare the community for full introductions of electric vehicles.

Externalities: Considerations, often subtle or remote, which should be accounted for when evaluating a process or product, but usually are not. For example, externalities for a power plant may include down-wind particulate fallout and acid rain.

Final Energy: A form of energy that is used directly by consumers (ex. electricity).

Financial mortgage ratios: The ratio of monthly mortgage payment (principal, interest, property tax and other charges) to total monthly income of a borrower. This is a standard ratio used by banks to assess the credibility of a borrower. Generally a ratio of 0.28 and above is an accepted industry standard.

Fossil fuels: Fuels, such as coal or petroleum, derived from remnants of plants and organisms of a past geological age.

Fuel cell: A device that produces electricity from a chemical reaction between hydrogen and oxygen.

Full cost: Cost of a good when its internal costs (direct costs paid by the producer and buyer of the good) and its estimated short- and long-term external costs (spill-over costs of producing and using the good on society) are included in its market price.

GIS: Geographic Information System: a computerized system which enables its user to graphically layer information in cartographic format.

Green pricing: A practice, either through government policy or market decisions, that force producers and consumers of energy, any product, or services to bear the "full costs" of production and distribution. See full cost.

Hydrogen energy technology: any technology that is used to generate, store, distribute, or use hydrogen in a sustainable energy system.

Infill development: An intense urban development that occurs in the form of growing built environment (e.g., buildings and roads) in an existing, small geographical area rather than across a broader spatial area.

ISO Quality Standards: A series of self-enforced, internationally uniform standards on elements of an environmental or energy system which can be audited and certified, and provides a common basis for development and comparison of Environmental Management Systems (EMS). ISO 14000 standards are designed by the International Standards Organization. See also Environmental Management System.

Lifecycle costs: Initial costs plus lifetime operating costs of an economic good, equipment, physical structure, or a system (e.g. a transportation system or a physical plant). Load management: A practice that utility plants follow, in response to fluctuating energy demands (loads) during a day or a period, by running base-load electric plants all the time and by running peak-load plants only when the electricity demand is highest.

Market-based approach: A policy reform, rather a philosophy, that motivates private producers and consumers to make their production and consumption decisions based on (price and cost) incentives signaled by private markets.

Mass transit: Buses, trains, trolleys, and other forms of transportation that carry large numbers of people.

Micro-climate effects: Physical changes in the ambient environment of a small geographic area such as cities, towns, suburbs and villages as a result of any kind of human activities (production, development, mining, landscape changes, resource extraction, etc.)

Natural gas: The gaseous component of petroleum. It is primarily methane (CH4) and is commonly used as a household and industrial fuel. It is also the least environmentally malevolent of all fossil fuels. Many consider it to be a transition fuel.

Net metering: Net metering measures the difference between the energy which is generated and the energy which is consumed. Net metering is used when a generator of electricity wishes to sell excess energy to a centralized grid. Net metering requires the installation of bidirectional meters , at the cost of the generator seeking to sell excess power, to measure the net difference. Net metering can be used by large co-generation facilities or, theoretically, by individual homeowners with individual generation capability which exceeds their needs.

Open Access Tariff: a fee that is assessed to those who wish to make use of privately owned transmission lines.

Performance-based contact: Sometimes referred to as a "guaranteed energy savings" contract, this is a contract for the evaluation and recommendation of energy conservation measures, including the design and installation of energy efficient equipment. These contracts are a method of financing energy conservation measures, generally in buildings, that results in measured reduction fuel and energy costs, the savings being used to pay for the professional fees and financing charges and the improvements.

Petroleum: A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oils, petroleum products, natural gas plant liquids, and nonhydrocarbon compounds blended into finished petroleum products.

Photovoltaic cell: Commonly called solar cell, it is a device that converts electromagnetic (solar) energy directly to electric energy.

Primary energy: Energy that is used to derive final energy. Primary energy is usually refined or concentrated into final energy.

Primary fuels: Conventional fuels such as petroleum, coal, nuclear and hydroelectric.

Renewable energy: Form of energy that theoretically can last indefinitely without reducing the available supply because it is replaced more rapidly through natural processes than are nonrenewable energy resources or because it is essentially inexhaustible (solar energy). Examples include solar, biomass, wind, geothermal, and hydrogen.

Restructuring: A departure from the current system of highly regulated energy (particularly electricity) industry to a more competitive industry that allows energy suppliers, distributors, and consumers to base their production and consumption decisions on open market prices.

Seismology: The study of earthquakes and the structure of the earth.

Sick-building syndrome: A symptom of un-hygienic indoor quality prevailing in a building that could cause variety of human health problems.

Solar cell: see photovoltaic cell.

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 Florida residents and businesses towards cleaner, safer, more reliable, more efficient, domestically produced, and, ultimately, renewable or inexhaustible fuels and associated energy technologies.

Sustainable energy choices: Energy sources, forms and technologies that are practically available on a continuous basis in required quantities without jeopardizing the availability of their sources upon which present and future economic growth and life depend.

Systems approach: Practice of examining not only the most straight forward attributes or impacts of a single component of a "whole system" but also feedback, interactions, secondary

impacts, energy-use tradeoffs, alternate procedures for obtaining the same technical, economic and/or social benefits associated with all components of that "system."

Transportation Conformity Requirements: The transportation conformity requirements under ISTEA and Clean Air Act Amendments of 1990 (CAAA) would apply only to areas designated as nonattainment, and to areas that have been redesignated as attainment, but that are still subject to the maintenance plan requirements of the CAAA. The bill also clarifies that areas designated as nonattainment under section 107(d) of the CAAA are required only to conduct a conformity analysis for those specific transportation-related pollutants for which an area is designated nonattainment.

Transportation fuel: Traditional fossil fuels, such as gasoline, kerosene and diesel fuel, or alternative fuels, such as natural gas, liquefied natural gas, liquefied petroleum gas, electricity, hydrogen, coal-derived liquid fuels, fuels (other than alcohol) derived from biological material, methanol, and mixtures containing 85% or more by volume of methanol, denatured ethanol, other alcohol with petroleum or other fuels used to power aircraft, automobiles, boats, buses, heavy equipment, railroads, trucks, ships and all other modes used to transport people and / or cargo.

Urban sprawl: A phenomenon in which an urban area is continuously expanding spatially with little consideration given to community's ability to provide service to increasing number of residents, natural area degradation, pollution prevention, etc.

Weatherization programs: The Weatherization Assistance Program provides grants to 32 local governments, non-profit organizations, community action agencies and federally recognized Indian Tribes to improve energy efficiency in low-income housing. Funding sources are Petroleum Violation Escrow funds, the U.S. Department of Energy and federally appropriated funds.