Florida's

Energy Future:

Opportunities for Our Economy, Environment and Security

A Report to the Florida Department of Environmental Protection

January 16, 2004

Submitted by:

The Florida Solar Energy Center

and

CPI Consulting

About the Report

This report was prepared under contract with the State of Florida, Department of Community Affairs, Florida Energy Office (FEO). During the course of the project, the FEO was transferred to the Florida Department of Environmental Protection. Two prime contractors were chosen to carry out the project: The Florida Solar Energy Center (FSEC) and CPI Consulting (Creative Pursuits, Inc.).

This project was conducted in 2003 with a report sent to the Florida Energy Office on October 15, 2003. Following a review, revisions were made by the project team and this final report submitted January 16, 2004.

Created by the Florida Legislature in 1974, the Florida Solar Energy Center is housed within the University of Central Florida and is located in Cocoa, Florida. The Center is an energy research, testing and education institute with vast experience in diverse energy technologies and programming. Further information about the Center is available at www.fsec.ucf.edu. CPI Consulting (CPI) is a multi-disciplinary consulting firm established in 1984. Headquartered in Monticello, Florida, energy is among the specialty areas of the firm. Further information about CPI is available at www.creativepursuitsinc.com.

Special acknowledgements are extended to Colleen Kettles and Jim Tait as subcontractors to FSEC. Thanks also go to the Florida Regional Councils Association as FSEC's subcontractors. In addition, appreciation is extended to the Florida Conflict Resolution Consortium, The Florida House Institute for Sustainable Development, Concept Communiqués and The Matheny-Burns Group, each of whom was involved with selected aspects of the project as subcontractors to CPI.

Project work products are divided into three separate documents. The Project Report (this document) reflects the principal end-product of the project and includes findings and recommendations of the Project Team. The Appendix (also included within this document) contains various summaries, reports and other reference materials of direct relevance to the Project Report. A separate notebook of Reference Materials is being provided to the FEO containing more detailed records, reference materials and consultant work products.

The Project Team appreciates the opportunity to offer the results of its research and analysis to the State of Florida for consideration in future initiatives to address Florida's energy needs.

Florida's Energy Future - Contents

APPENDICES (Separate Document)

EXECUTIVE SUMMARY

The future of Florida's economy, environment and security is inextricably intertwined with our energy use decisions. Our state has one of the nation's fastest growing populations, promoting rapid expansion of an energy industry that imports its fuel supplies. Florida exports approximately $32 billion per year for these energy fuels. Moreover, the Florida economy depends critically on tourism and agriculture, and the fuels and energy products that maintain them. Our pristine environment is the primary natural resource supporting this unique economic engine and the adverse effects of our rapidly growing energy use now stress it. Our State's economic well-being and security lay in the balance.

The events of September 11, 2001 and the "blackout of 2003" in the northeast have made energy security a national priority. The nation imports more than 55% of its petroleum products from foreign sources. Fully 65% of the world's known petroleum reserves lie in the oil-rich Middle East, an unstable region which we continue to depend on for a large and growing portion of our energy supplies. Sudden interruption of these petroleum supplies would surely wreak havoc upon Florida and the rest of the nation. Yet, in too many ways, we have chosen to ignore these realities.

We have options. We can invest in high-efficiency technologies that pay us back for decades into the future. Or we can invest in commodities whose low first cost benefits us in the short term but mortgage the lives of our children and grandchildren. We can build homes the way we have always built homes, with limited regard for their resource impacts. Or we can build high-quality homes that pay us back for years into the future with increased disposable income. We can build minimum efficiency schools that cost Floridians many millions of dollars each year to operate. Or we can build high-quality energy-efficient schools and use the savings to hire more and better teachers for our children. Computed over the school life, the cost is the same. The same holds true for our government facilities. We can use the taxpayers' money to pay operating costs or return it in public services. We can choose to aggressively invest in indigenous alternative and renewable energy resources that create greater security, enhanced economic activity and job growth. Or we can continue to invest our limited capital in imported energy supplies, which deplete, rather than enhance, our long-term economic security

This report sets forth solutions for the future. It also details the interrelationships between energy and our environment. The fact – poorly known to most – is that 99% of atmospheric carbon dioxide emissions are caused by the combustion of fossil fuels and a carbon dioxide molecule resides in the upper atmosphere as a greenhouse gas for a full century. The accumulation of these "greenhouse gases" in the upper atmosphere is causing the average global land temperature to rise at alarming rates. Global warming is projected to result in significant global climate change, including melting of glaciers and polar ice caps. What will Florida do to accommodate a five-foot rise in sea level?

This report on Florida's energy future is also a report on Florida's economy. The current state budget crisis requires innovative solutions. Florida spends more than $500 million each year on energy for state-owned buildings alone. By making better decisions about energy, much of that money can be better spent on public services. On a broader level, if less money leaves Florida for energy supplies, we can put our capital to better use to build a thriving Florida economy? If we improve our environment through more efficient and wiser energy use choices, might we achieve improved health and business productivity as well?

This report on Florida's energy future presents a number of important findings and recommendations:

Findings

- **State energy policy remains fragmented and uncoordinated.** Despite more than 50 Florida Statutes related to energy use and policy, and repeated recommendations from experts, consultants and official government commissions, Florida does not have a coherent energy policy. There is no central entity with the responsibility, authority and funding to focus state energy policy. As a result, various agencies that have statutory responsibilities are often working at cross-purposes and are not coordinated. Implementation duties for other energy policies are unassigned and not acted upon. In addition, Florida's statutory energy policy requirements are largely "unfunded mandates", making them largely ineffective.

- **Imports of energy supplies to our state result in approximately $32 billion in Florida dollars per year being exported from Florida's economy.** Florida's electric utilities represent a $16 billion per year industry. Add to that the amount spent on motor fuels in Florida and the total doubles to approximately $32 billion per year. More than two-thirds of this amount immediately departs from the Florida economy, resulting in little economic activity within the state. On the other hand, if indigenous resources are used to meet energy needs, including manufacturing, installation and services of energy efficient and renewable energy technologies, then the dollars are re-spent in the local Florida economy. This creates what economists refer to as the "multiplier effect", whereby money that is spent in the local economy is worth much more (two to three times more) than money that is sent outside the local economy. *Thus, every dollar spent on increased efficiency or indigenous renewable energy is worth more than twice its value and results in real job growth, additional revenues and enhanced economic activity within the state.*

- **Rapidly increasing energy use in Florida is adversely impacting Florida's air and water quality.** Florida will continue to see rapid population growth. As a result, increasing energy supplies will be required to meet the needs of this growth. As the number of automobiles and trucks using Florida's highways and the number of needed power generation plants increase, the burden on Florida's

environment becomes greater. Now, for the first time, Florida is beginning to experience air quality non-attainment in some of its densely populated areas and to experience levels of mercury (a power plant emission and persistent toxic) in its waters that are beyond established safe limits.

- **Cost-effective energy-efficiency and renewable energy technologies are under-utilized in Florida.** Energy efficiency and renewable energy technologies have undergone significant technological advances during the past 20 years. However, their use lags far behind the available technology. Market and regulatory barriers, inertia and lack of awareness by consumers and decision-makers at all levels are primary factors. Yet these technologies offer considerable benefits. For example, life cycle cost analysis conducted during this study show that 25%-35% energy savings are readily achievable at net cost savings to consumers in both the new and retrofit buildings market – the largest single segment of energy use in Florida. Additionally, virtually every economic study that has been commissioned on this subject has shown that significantly enhanced economic activity and new job growth accompany these energy and cost savings.

- **The public requires more and better information on which to base energy decisions.** Generally speaking, consumers desire to make more responsible energy decisions, to save money, support a larger social goal or both. Driven by environmental concerns, consumers will often make more responsible energy choices when equipped with the right information. However, they generally don't take time to seek it out. In general, the two most common sources of consumer energy information are product salespeople and utilities. Utilities are in the business of selling energy so the best available energy savings options can be counter to their business interests. Thus, consumers tend to "stick with what they know" hoping they are making the right choice while often ending up with products that do not serve their best economic interests.

- **State government energy managers need better resources to improve energy efficiency in state operations.** Florida has several statutes aimed at state facility and fleet energy use reduction. However, facility and fleet managers are faced with significant budget constraints and a lack of energy efficiency incentive programs that would allow for greater investments in efficiency improvements. Thus, even though the long-term economics favor greater investment in energy efficiency, it rarely occurs. Where state facilities are leased, matters are complicated further as public energy managers currently have little if any influence over building design and operations.

- **Growth and development patterns in Florida are often resource inefficient.** Florida is a state dominated by patterns of sprawl development. Opportunities for efficient land use are often overlooked. These include compact development, redevelopment and re-use, neo-traditional design and walkable communities. Transit systems and transportation demand reduction strategies are generally underutilized. Energy has not been a priority in the planning process at the state

and local levels and is generally not addressed in Florida's growth management strategies.

- **The prime source of funds to support advances in energy efficiency and renewable energy resources in Florida is controlled by private utilities, whose business objective is to maximize profits rather than to conserve scarce energy resources.** The Florida Energy Efficiency and Conservation Act (FEECA) has been implemented by the Florida Public Service Commission to allow utilities to conduct incentive programs aimed at reducing demand for electricity. Utility customers throughout Florida are subject to a charge on their monthly electric bills to recover the costs of these programs. These Demand Side Management (DSM) programs totaled $267 million in ratepayer proceeds in 2002 and $3.8 billion since their inception in 1980. However, due to lost revenues, energy efficient products that produce significant energy savings, which outweigh their demand reduction savings, are not included in utility DSM portfolios. As a result, many highly cost effective energy efficiency options like compact fluorescent bulbs, high efficiency refrigerators and solar water heating are not included in utility DSM programs. *During the past decade, Florida's utility DSM programs have cost ratepayers more than $0.12 per saved kWh and more than $1,000 per avoided peak kW.*

- **Building energy codes and appliance standards are highly cost effective.** However, they lag the marketplace. Market intervention at earlier stages can provide significant additional savings and smooth the transition process. This makes regulatory measures like codes and standards much more effective and leads to more opportunities for "best practice" outcomes.

- **Florida and the nation are in a new era where energy security and reliability are in the forefront**. Florida consumes an enormous amount of energy in all end use sectors and, as with the nation, is vulnerable to fuel price volatility and the disruption of energy supplies. Florida's vulnerability is particularly severe in that virtually all of the energy we consume is imported, much of it coming from unstable foreign markets. Moreover, interruption of the fuel supply would be economically devastating to Florida as the economy is dependent of car-bound tourism. New actions are needed to address the changing geo-political climate, for the immediate and long-term security of our state and the public welfare.

Recommendations

- **Create or designate an entity to oversee state energy policy.** Give it the authority, responsibility and appropriations it needs, and hold it accountable for accomplishing its mission. The head of the entity should report directly to the Governor. A State Energy Policy & Planning Council comprised of the agencies most responsible for implementing state energy policies or who are major consumers, could be called on to work with and assist the entity in achieving its

mission.[1] The short-term goal should be to reduce Florida's primary energy use per capita to 85 percent of its year 2000 level by the year 2010 with long-term goals that provide for a continuing reduction in per capita energy use in Florida beyond that date. The entity should develop a Florida Energy Policy and Strategic Plan. The Energy Policy should be based upon an analysis of the Florida energy market, should be largely market-driven, and should adopt quantifiable goals upon which success of the strategic plan may be measured.

- **Create a fund that can be used to provide market incentives and encourage economic development as prescribed by a state energy plan.** This fund should be administered by a party independent of the state policy development and coordinating entity and be subject to its oversight for purposes of meeting current and future funding needs. Consider all funding alternatives, including use of current Florida Energy Efficiency & Conservation Act cost recoveries, and utility and gasoline "taxes." Require that incentives be based on independently verified energy performance rather than on product price. Use this fund to leverage federal funding opportunities for research, development, demonstration and deployment that require non-federal funding participation and to encourage energy-based economic development.

- **Create and fund a statewide energy management program modeled after the U.S. Department of Energy's Federal Energy Management Program and lead by example.** New state facilities should be required to be 15 percent more efficient than Florida's minimum code requirements, and commissioning, monitoring and evaluation, building tune-up and retrofit programs should be actively pursued. Government fleets and facilities can cost-effectively save substantial quantities of energy. This program should offer annual training and peer group support for government officials and employees responsible for energy management. It should also provide for easy to read energy scorecards for governmental managers based on the state's management accounting and budgeting system to remove duplication of effort and provide audited information. This program should include local governments and school boards to encourage energy-efficient local actions through incentives and education and by creating cooperative programs with appropriate state agencies and city and county organizations.

- **Support and expand the use of energy efficiency and renewable energy.** Adopt and maintain strong energy codes and appliance standards, bounty programs and bulk purchasing programs, and develop working relationships with industry, federal, private and other state entities actively engaged in these areas. Recognize solar energy systems, including hot water, as energy generators rather than energy savers (in the state's regulatory mechanism) and accord them the same benefits of other energy generating facilities. Provide meaningful incentives

[1] Department of Environmental Protection (DEP), Department of Community Affairs (DCA), Public Service Commission (PSC), Department of Management Services (DMS), Department of Transportation (DOT), Department of Education (DOE), and others.

for the use of existing technologies and wise energy practices. Support research and development of other indigenous renewable resources. Remove barriers to small-scale generation from renewables and Florida-preferred generation technologies or replacements. Capture supply side efficiency savings, particularly in energy transmission and distribution.

- **Develop energy efficient transportation options in Florida.** Florida has 7.4 million automobiles, 3.8 million trucks and 43,000 busses on the road. These vehicles plus our tourists consume 7.4 billion gallons of gasoline and 1.2 billion gallons of diesel fuel each year. Florida must set a goal to reduce vehicle miles traveled through improved land development patterns and transit options. Florida needs to improve the efficiency of tourism transportation including the development of energy-efficient rental car fleets and transit option. Private-vehicle purchase sales tax and rental-vehicle taxes should consider vehicle fuel efficiency to influence purchase decisions. Government agency purchasing procedures should encourage both alternative fuel vehicles and highly energy-efficient conventional models.

- **Support a prosperous economy through strategic energy choices.** Expand Florida's existing renewable energy and energy efficiency economy by establishing an active recruitment program that seeks out industry leaders in the manufacture of these products. Position Florida as a national leader in the production of energy smart goods and services, and promote their use in state.

- **Provide for education through marketing programs designed to encourage better consumer choices.** The public needs high-quality, independent information verifying the accuracy of energy claims. An information marketing campaign can make an enormous difference in purchasing habits. Expand information and education outreach to include energy decision-makers at all levels, including within government and the private sector. Offer technical assistance to end user groups with high savings potentials. Educate and credential professionals in our Universities and through continuing education programs for professions and trades.

- **Design and foster energy smart communities.** Expand efforts to curb sprawl and promote compact and transit-oriented development to reduce transportation needs and achieve efficient resource use. Update planning and growth management policies with an eye for efficiency. Promote walkable and bikable communities. Incorporation energy in local comprehensive plans and regional strategic plans, and incorporate energy into metropolitan indexing schemes. Assist local government with implementing energy efficiency measures.

- **Expand energy initiatives through environmental programming.** Incorporate energy with other Department of Environmental Protection (DEP) goals of efficient water use and pollution prevention. Partner with existing programs such as the Florida Green Building Coalition's Green City and County Designation

Program, Green Development Designation and Green Home Designation to help recognize good environmental stewardship.

- **Safeguard the public and public investments.** Recognize energy as a critical component of domestic security and public service reliability. Expand energy reliability planning beyond utility capacity and include distributed energy resources as an integral part. Ensure energy source diversity and pursue opportunities to make the highest and best use of fossil fuel supplies. Incorporate solar electric and water heating technologies in the state's emergency preparedness and response programs. Inform end users of security needs and options, along with other measures for protecting people, the environment and capital resources.

Specific energy-use sector implementation suggestions are included in Chapter 7 of this report and policy implementation strategies are provided in Chapter 9.

1.0 INTRODUCTION

1.1 Florida's Energy Future

> **"The unprecedented growth of Florida has caused a great demand for energy to be furnished to its citizens. The rate of growth in demand for electrical energy causes a doubling of supply every seven years. The energy demands of Florida's citizens depend almost exclusively upon the importation of fuels to serve these demands. The energy demands of the citizens in other states are increasing at a rate which will seriously affect the continued supply of adequate energy to Florida. The environmental costs of increasing energy reduction and consumption are causing widespread concern. The long-term outlook for a continuation of the increasing energy demands of all citizens is, at best, unfavorable. The state of Florida lacks a comprehensive and coherent policy in the area of energy supply and demand."**

While the above excerpt might seem fitting in the findings of this report, *it was actually written 30 years ago*. The quote comes from the preamble to the 1973 Florida law creating the Florida Energy Committee (FEC). That committee was created by the legislature on the cusp of the Energy Crisis to provide a long-range study of energy policy. What is remarkable about the excerpt is that it is evidence of little change in Florida's energy condition in the past 30 years.

The information presented in this report is designed to provide the Florida Energy Office and Department of Environmental Protection, with timely data and information, as well as reasoned recommendations, on the state's energy policy, trends, conditions and opportunities. It also includes historical background of relevance to Florida's future. This study emanates from a series of recommendations by the Governor's Energy 2020 Study Commission and subsequent directives from the 2002 and 2003 sessions of the Florida Legislature. The authors of this report hope that the information and recommendations presented will be used to make a measurable difference for Florida's economy, environment and energy security in the coming decades.

1.2 Global Energy Resources

The United States now imports some 55% of the petroleum required to meet its energy needs.[2] The largest single supplier of our imported oil and the location of the largest known petroleum deposits is the Middle East, an unstable region of the world emphasized by two American led wars in the region in the last decade. The United States uses about 25% of world energy resources though it comprises only about 4% of world population. Evidence shows the standard of living and per capita energy use being correlated, with increasing lifestyle expectations translating to greater resource consumption, including energy.[3] Modern communications have "connected" the world as never before and

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[2] U.S. Energy Information Administration.

[3] Gluskoto, Hal, "Some Enviornmental Effects of Increased Energy Utilization In the Tewenty-First Century," Proceedings of the 17th World Congress, 1997.

pressure to increase standards of living in other countries will surely increase as a result. The worldwide demand for energy is expected to grow by 60% between now and 2020.[4] How will this demand be met?

World petroleum reserves have been the subject of scientific and geologic study for many years. Experts in the field generally agree that virtually all of currently known oil reserves were discovered more than 30 years ago[5] with only a few, relatively small (<10 bbl) reserve discoveries in the recent past.

Perhaps among the most noted authors on world oil reserves are Colin J. Campbell, former oil company scientist, and scientist/geologist Jean H. Laherrere. They have projected that the world will soon reach the peak of its oil production capacity. From that point on, oil will become an increasingly scarce resource. In a 1998 Scientific American article entitled "The End of Cheap Oil", they provide the principal findings of their studies and analysis. Figure 1, taken from this article, illustrates their overall findings.[6]

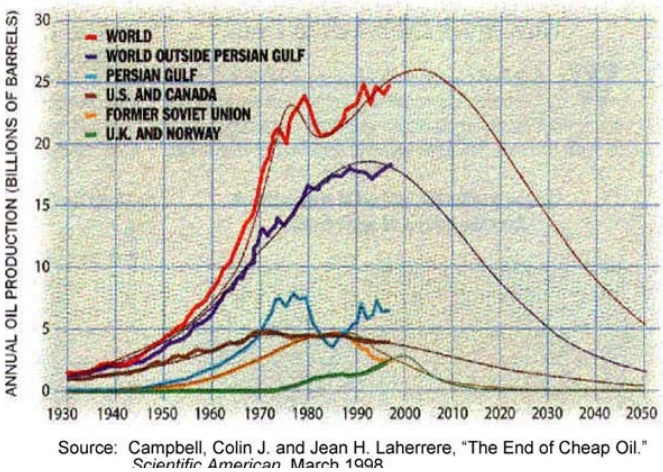

Figure 1. World oil production, historical and projected.

Even if the peak they predict does not occur until 2020 or 2050, it behooves the U.S. and other nations to determine now how we plan to address this energy resource depletion, not only for replacement of a major fuel source but also given the many other uses of petroleum as feedstock for a wide assortment of consumer products.

Natural gas capacity has very similar characteristics except that it is not as economically elastic on a global basis because it is more difficult to transport by ship. The United States is rapidly using up its native supplies of natural gas. Recently, natural gas prices have risen sharply and its use for cleaner and more efficient electricity generation is growing at an unparalleled rate. For example, in Florida, more than 80% of the electric generation capacity brought on line during the last 5 years (1998-2002) uses natural gas as the primary fuel. During the next 10 years Florida plans to build 19,000 MW of additional capacity, with 17,700 MW (92%) fired by natural gas as the primary fuel.[7] Florida industries also rely upon natural gas both as a fuel source and a raw material for

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[4] U.S. Energy Information Administration, *International Energy Outlook 2002*, Washington DC, U.S. Department of Energy, March 2002

[5] Campbell, Colin J., The Coming Oil Crisis, Multi-Science Publishing and Petroconsultants, Brentwood, England, 1997.

[6] Campbell, Colin J. and Jean H. Laherrere, March 1998. "The End of Cheap Oil" *Scientific American*.

[7] Florida Public Service Commission, 10-year Site Plans

production purposes, and industry groups are concerned about future fuel availability and cost.

The experience of the U.S. as a whole must necessarily put upward pressure on natural gas prices. Additionally, some experts estimate that the U.S. natural gas production peak has already occurred and federal energy data shows that the largest annual U.S. natural gas production to-date occurred in 1973.[8] Additional data from the petroleum industry indicates that even though the U.S. has added some 34,000 new natural gas wells since 1994 its overall natural gas production has not increased.[9] What has increased substantially (in fact quadrupled) since 1985 is the quantity of natural gas that the U.S. imports from gas fields in Alberta, Canada. It is not at all clear that this relatively rapid escalation in natural gas use will be sustainable even for the short term.

1.3 Energy and the Environment

Energy use is integrally linked to environmental impacts. The sources of energy used, the nature of that use and the level of consumption all have bearing upon environmental quality, the preservation of natural resources, ecosystem and habitat viability, and human health.

The burning of fossil fuels imposes environmental consequences to both our air and water. Urban air pollution due to ozone and particulate buildup occur from motor vehicle use and electric power generation. Los Angeles is no longer alone in this regard and air pollution non-attainment is beginning to threaten regions of Florida, despite our status as a peninsula surrounded on three sides by the sea and helpful sea breezes. Air pollution is likewise transformed to water and land pollution, with multiple avenues for human intake through food and drink. Emissions from electric power production have resulted in increased levels of mercury in Florida waters, a toxin that affects animal life and ultimately public health. From a health perspective, the frequency of asthma and respiratory ailments due to air pollutants are rising at an alarming rate, for Florida and the nation.

Apart from the burning of fuels, energy production and distribution affect the environment as well. Proposals for offshore drilling for oil and gas have met with objections due to environmental impacts to marine ecosystems. Transmission lines from power plants impact the environment in the siting process, particularly when traversing environmentally sensitive areas, and due to the electro-magnetic fields (EMF) created. Fuel pipelines affect the environment in the construction process and more gravely should leaks occur in operational lines. The transportation of fuels is also subject to possible leaks and spills and interruption by terrorism.

Environmental considerations related to nuclear power include the storage and disposal of waste products, including spent fuel, low level waste and deconstructed facilities and equipment through eventual plant decommissioning. While air emissions from nuclear

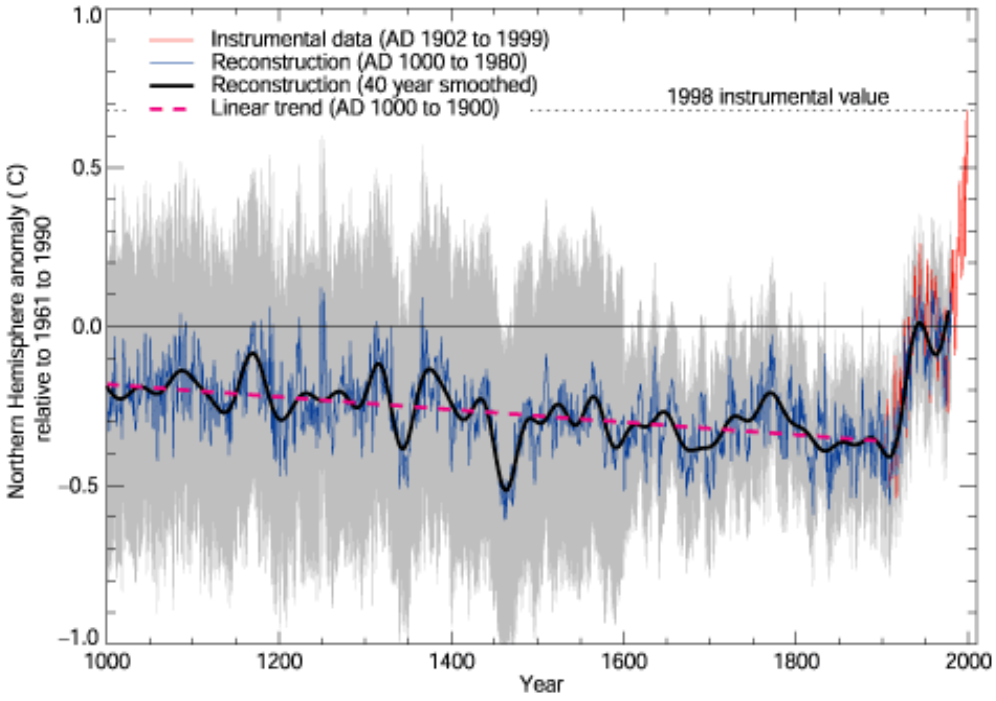
[8] U.S. Energy Information Administration
[9] IPCC, Climate Change 2001, Synthesis Report, Figure 2-3, IPCC, Geneva, Switzerland

plants are minimal compared to fossil fuels, the potential also exists for air and water pollution of considerable magnitude in the event of system failures or disruption. Thermal pollution can also be an issue.
The burning of municipal solid waste (MSW) offers the environmental advantage of conserving land that would otherwise be required for landfills, and the environmental risks they pose. MSW has its own environmental risks, however, through the burning of materials that contain or create toxins in combination with other materials. Such facilities can also reduce the economic viability of recycling programs.

Even more compelling are growing concerns about climate change and global warming. While not all experts agree, the International Panel on Climate Change (IPCC), as a group of 2,500 international scientists working under the auspices of the United Nations, has determined that mankind is impacting natural global climate patterns and that "The average surface temperature will rise between 1.4°C (2.5°F) and 5.8°C (10°F) by 2100."[10] These climate change impacts are caused by concentrations of "greenhouse gases" in the upper atmosphere. Chief among these gases is carbon dioxide (CO_2), which allows sunlight to readily pass through but "traps" heat at the earth's surface, causing land and sea temperatures to rise.

In their scientific studies, the IPCC has reconstructed historical surface temperatures from paleontological records. The scientific picture these data portray reveals a rapid rise in surface temperature, the beginning of which coincides with industrialization. Figure 2 shows the long-term trend (the last 1000 years) as one where surface temperature was decreasing very slowly until around the year 1900 when it began to increase rapidly and uncharacteristically.[11]

[10] Reuters News Service, January 22, 2001, on *IPCC 2000 Draft Summary for Policy Makers* .
[11] NOAA, National Climatic Data Center.



Millenial Northern Hemisphere temperature reconstruction (blue) and instrumental data (red) from AD 1000 to 1999, adapted from Mann et al. (1999). Smoother version of Northern Hemisphere series (black), linear trend from AD 1000 to 1850 (purple dashed) and two standard error limits (grey shaded) are shown.

Figure 2. Reconstruction of surface temperatures for last 1000 years.

The year 1998 shows in Figure 2 as the hottest year on record. Even more important, it is clear from the data that recent temperature trends have been significantly warmer than at any time in recorded history, from 1861 to present. The second hottest year on record occurred in 2002 and the thirteen hottest years in history have occurred since 1980. For an unprecedented 16 consecutive months from May 1997 to August 1998, the average temperature for each month was the highest ever recorded for that month.[12]

In the United States, the burning of fossil fuels accounts for 99% of carbon dioxide (CO_2) emissions. The average residence time for a CO_2 molecule in the earth's upper atmosphere is about 100 years. Thus, the impact of what we do today will be felt at least well into the next century.

These are compelling data. So much so that the current U.S. Administration has agreed that global warming, caused by human influence, is a real phenomenon. As such, it must be part of any meaningful discussion on energy policy and energy strategy for the future.

Floridians have time and again registered support for environmental protections. Though no energy source is devoid of impacts on the environment, sustainable energy sources

[12] National Oceanic Atmospheric Administration, National Climatic Data Center.

and more efficient use are technologies and strategies to help. Florida's challenge, and opportunity, is to devise a strategy that supports the environment, public health and the economy for the long term future of our state.

1.4 Energy and the Economy

Like the environment, energy and the economy go hand in hand. Energy has been referred to as the "lifeblood" of our state, and Florida commerce is heavily dependant on energy resources. The state's top economic mainstays – tourism and agriculture – account for substantial consumption of energy. Energy-related decisions also have important bearing on business viability and competitiveness. Tourism is particular, is *highly* dependent on the transportation sector.

Ready availability of energy at reasonable cost is a pivotal concern for Florida's economic health and well being. As such, price volatility and the threat of fuel supply disruptions are critical. Dependence on foreign oil from unstable markets is a growing economic concern to our state and nation as is the escalating cost of military action to secure energy supplies.

Whether energy supplies are purchased from other states or other nations, the dollars of Floridians, and Florida visitors that could otherwise be put to use in our own economy are exported across Florida's borders. Florida has long opted to tap energy sources other than our own indigenous resources to the extent that we utilize in-state energy, the Florida economy benefits.

Studies in varied locales have clearly shown how new economic activity can be stimulated through energy related businesses. In particular, new jobs can be created by way of new and expanded businesses and industries providing sustainable energy technologies. More jobs are created through these enterprises when compared with conventional energy industries.

In addition to the effects on business and industry, the economic welfare of consumers is also affected by energy decisions and conditions. Disposable income is significantly impacted by the cost of energy, and a consumer's costs relate to how much and what kind of energy they use. As in personal budgeting, those who conserve have more money to spend on other things, consumer spending being an essential ingredient to economic welfare.

Environmental impacts also interact with economic effects. For instance, where air pollution exacerbates respiratory ailments or other health maladies, days missed from work amount to an economic loss to business. Where air or toxic rain pollution affect property, such as through corrosion or other physical damage, an economic loss occurs.

The energy industry is the largest single sector of economic activity in the United States, at approximately $350 billion in 2001.[13] The impacts of this economic activity are substantial and decisions regarding investments in our energy future surely have great import for Florida and the nation.

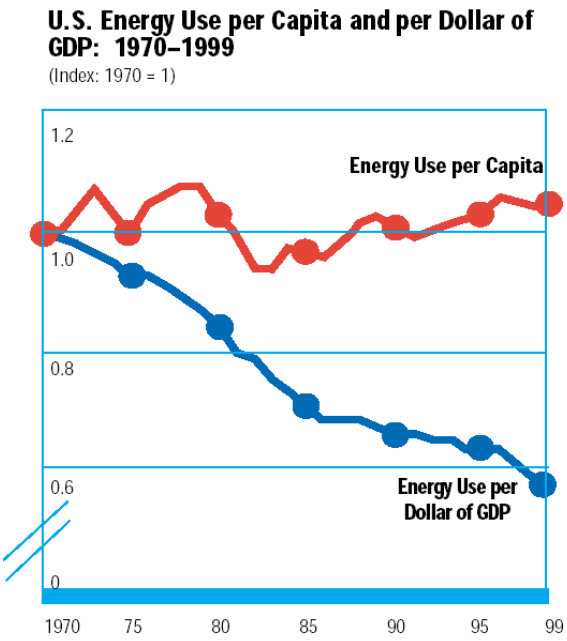


Figure 3. Energy and economic data from the national energy policy report.

The current Administration's Energy Policy Report for the U.S. makes the connection between economic activity and energy. Figure 3, as excerpted from this report, shows that the nation is using energy more efficiently than it did in 1970, with a 40% decline in energy use per unit of gross domestic product (GDP) since that time. The report states "… half to two thirds (of the corresponding economic gains) resulted from greater energy efficiency. Technological improvements in energy efficiency allow consumers to enjoy more energy services without commensurate increases in energy demand"[14]; or, in the alternative, to decrease demand and extend finite resources further into the future.

Economic gains, made possible through the more efficient use of energy, have barely been tapped. This study shows significant additional energy efficiency savings can be cost-effectively achieved through existing technology. In addition to efficiency technologies, the development of renewable energy technologies offers significant unrealized economic opportunities.

World markets for solar-driven renewable technologies like water heating, wind power, photovoltaic (electric) power, ocean power, and even biomass conversion are increasing. Wind generation is emerging in U.S. and world markets in a significant way. The technology and the market have advanced to the point that wind machines are producing power on large-scale wind farms at costs that are highly competitive. There are about 6,700 MW of wind power installed in the United States. Only Germany and Spain have more installed wind generation capacity than the U.S. By the end of this year, U.S. capacity is expected to produce 15-17 billion kWh of electricity.[15] Some of the largest U.S. electric utilities are now producing and selling significant quantities of wind-generated electricity.

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[13] U.S. Bureau of Economic Industry Analysis. "Industry Accounts Data." http://www.bea.doc.gov/dn2/gpoc.htm, February 2003.

[14] "National Energy Policy." Report of the National Energy Policy Development Group, Office of the President of the United States.

[15] Hopkins, Barry, "Renewable Energy and State Economics", Council of State Governments, Lexington KY, May 2003.

Photovoltaics (PV) are also seeing a rapidly expanding market. As shown in Figure 4, the U.S. PV market grew by 360% during the eight-year period between 1994 and 2002, with exports growing by 400% in that same period.[16]

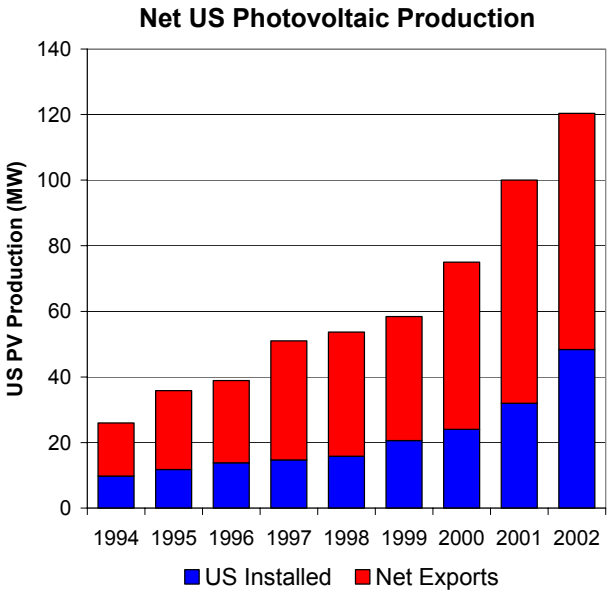

Figure 4. U.S. Photovoltaic Production Trend

Figure 4 also appears to show an exponential growth rate curve for the U.S. photovoltaic market, indicating the potential for rapid expansion in the future. The world market for renewable power production is enormous. In much of the developing world, little to no grid infrastructure exists and PV is both modular and highly competitive with conventional, non-renewable power technologies for remote applications.

1.5 Energy and Security

The security and reliability of our energy supplies are concerns of vital importance to the American public. They affect our way of life on a most fundamental level. While both are addressed at the national level, individual states and locales have significant roles to play in ensuring protection of the public.

From a security standpoint, the events of September 11 created a new awareness of America's vulnerability to domestic security incidents. As such, the security of energy supplies, infrastructure and services is critical to the health, safety and well being of Floridians.

Security Initiatives

The Florida Department of Law Enforcement (FDLE) has lead responsibility for domestic security concerns in our state, including those affecting energy. The Department has developed a plan and procedures relative to critical infrastructure (power plants, fuel terminals, pipelines, transmission lines, etc.). FDLE has worked directly with energy utilities and other related parties in conducting vulnerability assessments and specific plans for prevention as well as action in the event of an incident. The State's domestic security plans are confidential and not available for public review. Staff of the Public Service Commission has provided support to the FDLE in its domestic security planning.

[16] Photovoltaic News, Vol. 22, No.9. September 2003, Paul Maycock, Editor. PV Energy Systems, Warrenton, VA

The Division of Emergency Management, Florida Department of Community Affairs, is involved in the recovery phase of security incidents, as it is in weather-related or other forms of emergencies. The DEM is responsible for the State of Florida Comprehensive Emergency Management Plan

A long-standing policy through the Florida Statutes calls for an Energy Emergency Contingency Plan. The Public Service Commission works with Florida utilities on fuel contingency planning, updates for which have been underway recently. Lead responsibility for the broader function of contingency planning and fuel allocation rests with the Florida Energy Office.

Reliability Planning

Another issue of great importance to Floridians is energy "reliability." Power disruptions in the Northeast have raised concerns about energy reliability throughout the nation. The Chair of the Public Service Commission, Lila Jaber, has written a recent article that succinctly explains the nature and status of Florida utilities and the Florida electric grid in this regard (see Appendix A1).

The PSC addresses reliability in two categories: planning reliability and operational reliability. Planning reliability encompasses such functions as the Ten Year Site Plan process, Loss of Load Planning, plans for new transmission lines and other aspects of ensuring sufficient capacity. Operational reliability refers to real time operational management, such as responding to contingencies and ensuring continuity of service.

While the PSC's focus has been on utility capacity and reliability, energy reliability also includes ensuring that the vital energy needs are met in the event of supply disruptions. Distributed energy is a prime example of a reliability strategy for residential and industrial customers, and a way to curb peak power demands that strain the system of electric generation and transmission

Careful consideration of future price and availability of natural gas is another key issue in reliability planning. While security and reliability are separate in the world of the energy industry, they are linked with regard to effective energy solutions. A thoughtful analysis and well-founded action plan with steps worth Florida's consideration appears in Appendix A2.

2.0 FLORIDA ENERGY POLICY

2.1 Introduction

Prior to 1973, Florida energy law governed traditional areas such as utility regulation and conventional fuels. The Energy Crisis of 1973 ushered in a period of regulatory innovation with state leaders responding in a comprehensive manner to the challenges. From 1973 until 1980, Florida's Governors and Legislators created what is now the body of law that frames the state's energy policy. In 2000, responding to yet another energy crisis -- the challenges and opportunities presented by utility deregulation efforts throughout the country -- Governor Jeb Bush established the Energy 2020 Study Commission, recognizing the need for a comprehensive state energy policy. The Commission's final report, as did another done in 1982, found that, while a number of agencies were responsible for various facets of energy regulation, Florida lacked a coordinated energy policy. The Energy 2020 Commission recommended that the Florida Energy Office be revitalized to take on this task. The Energy Office was created as a result of the 1973 Florida Energy Committee's studies and, over a period of years, was elevated in stature, organizationally transferred, and ultimately downsized. More recently, in July 2003, the Energy Office was transferred to the Department of Environmental Protection as part of the Administration's desire to give new emphasis to the State's energy program and policies. The FEO is now poised to help prepare Florida for the "next generation" of energy challenges.

2.2 Historical Perspective

The Energy Crisis of 1973 marked Florida's entry into a new era of energy policy. Until then, state policy largely pertained to energy transportation, generation, transmission and use as well as oil and gas exploration. In response to the prevailing crisis, Governor Reubin Askew called a conference to address the urgency of Florida's energy problem. As a result of the 1973 conference, the Florida Legislature created the Florida Energy Committee (FEC). Their responsibilities included: studying in detail the *present policies affecting energy* conservation and use in Florida; studying the *available sources of energy* for use in Florida; *recommending a comprehensive system of energy policies* to meet the needs of Florida; and *making recommendations towards improving energy policies* which would require administrative, statutory, or constitutional changes.[17]

The FEC was established as a temporary committee with an initial two-year term (the term was extended by one year in 1974 to allow additional time for the committee to complete its work). In 1974 the committee issued a preliminary report that served as an early response to the rapidly growing energy crisis. "*To develop energy policy," the foreword states, "[there must be] a thorough understanding of energy sources, energy conversion and distribution, energy consumption patterns and the interaction of energy with Florida's economy and environment*."

[17] Energy in Florida: Report and Recommendations on Energy and Energy Policy in Florida, Florida Energy Committee, March 1, 1974.

Upon examining Florida's energy use patterns, the committee concluded that:

- Florida uses substantially more electricity than the national average, primarily because of the high use of air conditioning.
- The state's growth rate in overall energy use was almost twice the national rate.
- 93 percent of the total energy consumed in 1972 came from petroleum and natural gas, while the nation derived only 75 percent of its energy needs from these sources.
- In 1972, the citizens of Florida used 2.4 times the energy consumed twelve years earlier.
- World political instability and competition for energy resources may make sources of petroleum increasingly unreliable.
- Florida must compete with the rest of the nation and other nations for a part of the international market, while also competing for domestic energy supplies. Florida's extreme dependence on petroleum and natural gas entails greater risks.

The committee concluded its charge with the following preliminary recommendations:

- Establish an energy information center to report on energy data, including fuel sources, inventories and energy flows.
- Enact legislation to address an energy emergency response.
- Provide tax incentives to solar equipment manufacturers and consumers of such equipment.
- Enact legislation to require state agencies to establish criteria for a life-cycle or energy analysis of all major structures constructed with state support.
- Develop standards for automobile energy efficiency.
- Develop standards for energy consuming appliances.
- Identify funds to develop alternative transportation systems.

Following the publication of its 1974 report, the Florida Energy Committee issued an Energy Policy Statement.[18] In part, the statement found that:

- Florida, with little indigenous primary energy production or processing, is dependent upon other states and nations to supply its energy needs.
- Florida is most dependent upon petroleum and natural gas for its energy, and those fuels are in shortest supply.
- Florida imports much of its petroleum from overseas and therefore is subject to the high international prices for petroleum.
- The electrical ties with other states are relatively weak and thus the state is electrically somewhat isolated.
- Important sectors of Florida's economy, such as tourism and agriculture, are critically dependent upon adequate energy supplies.

[18] An Energy Policy Statement for Florida, Florida Energy Committee, January 14, 1975

The committee further identified issues that must be addressed if Florida was to remain an economically healthy and attractive place to live:

- The need to maintain adequate and reliable supplies of energy.
- The establishment of measures for improved energy utilization and energy conservation.
- Implementation of policies for stimulation of the development of alternative sources of energy, including renewable sources such as solar energy.
- Reconciliation of energy policy with the existing growth and environmental policies.
- Careful monitoring of energy production and use to minimize environmental impacts.
- Protection of all citizens from energy shortages and the maintenance of their economic and physical well-being.

The Policy Goals proposed by the committee were:

- Encourage the efficient utilization of energy.
- Encourage adequate and reliable supplies of energy.
- Act to assure that the minimum essential energy necessary for basic needs is provided at costs which the citizens of Florida can afford.
- Act to maintain the physical and economic well-being of its citizens during an extreme shortage of energy.
- Carefully consider the effects of energy development in order to achieve energy production with minimum degradation of the environment.
- Support and promote the public dissemination of information on energy and its environmental, economic, and societal impacts and effects.

As a result of these efforts, the 1974 Legislature created the Florida Solar Energy Center within the Board of Regents of the State University System; created the Resource Recovery Council to encourage recycling and resource recovery as an energy source; and adopted the Energy Conservation in Buildings Act for the purpose of minimizing consumption of energy used in the operation and maintenance of new state buildings.

The second, and final, annual report of the FEC built upon the previous report and ongoing efforts to develop a Florida energy profile.[19] It also supplemented policy recommendations, described energy programs designed to achieve those goals, proposed the creation of a state energy office, and provided additional legislative recommendations. To achieve "the policy of the state to act such that energy is available to maximize the health, safety, and economic and social well-being of its citizens," four goals were recommended:

- That there should be adequate and reliable sources of energy.

[19] Energy: Policy and Recommendations for Florida, Florida Energy Committee, March 1975.

- That there should be a minimum of environmental degradation resulting from the acquisition and use of reliable supplies of energy.
- That energy should be available at the lowest total cost to society.
- That there should be equitable access to energy, including the minimum energy necessary for meeting basic needs.

The report identified programs that would be the means of implementation for achieving the goals. Several considerations important to program development continue to be relevant today. *"By their very nature, energy programs require a stronger technical component than other social programs therefore they must be based on sound technical evaluation. Energy conservation [efficiency] programs must correctly identify areas of savings in order to be relevant. Programs to increase energy supply must reflect the range of actual options available. Programs must also be evaluated on the basis of their political and societal feasibility."*

The program areas identified included:

- Conservation and efficient utilization of energy
- Energy supply
- Energy for minimum personal needs
- Energy emergency planning
- Environmental protection in energy development
- Energy data collection and analysis

The FEC held numerous discussions with relevant state agencies[20] to determine if there was a consensus on the configuration of a state energy organization. The following criteria were established:

- State programs in energy should be subject to periodic review and evaluation.
- Florida should have the ability to quickly analyze the impacts of federal energy legislation on the state.
- Coordination of energy research in Florida should be unified with a timely response by both the university system and state government and federal programs.
- The agency should have the ability to coordinate activities at the state and local levels.
- Adequate provision should be made to represent the needs and interests of concerned groups.
- The agency should be concerned with the total energy picture.
- The agency should be responsible for collecting, storing, and analyzing data on energy.

[20] Public Service Commission, Departments of Commerce, Revenue, Transportation, Administration (including the Division of State Planning and the Petroleum Allocation and Energy Conservation Office), Natural Resources and Pollution Control.

- Increasing the public awareness to development in energy should be an important function.
- Attention is needed to develop and maintain the ability to respond to sudden emergencies, not only in petroleum, but also in other key energy forms.
- The agency must be able to draft proposed legislation.
- The agency must be capable of being justified on a cost-benefit basis.

The committee proposed legislation for consideration by the 1975 Legislature that would initiate some of the programs outlined in the report, and build on legislative action in 1974. Specific recommendations included:

- Standards for solar energy systems
- *Ad valorem* tax exemption for solar energy equipment
- Energy conservation in public buildings
- Energy life cycle costs analysis
- Thermal performance standards in residential buildings
- Display of energy costs of appliances
- Display of information on motor fuel economy

The Energy Committee recommended "formulation of an independent energy policy is essential: such a change would transform energy impact into a causative rather than a resultant factor in state policy decision-making."[21]

The response of the 1975 Legislature was far different than expected. The crisis resulting from the oil embargo had subsided in the fall of 1974, and by the time the Legislature met in 1975, energy had become only one problem among many. Requests for funding for major new programs by the Solar Energy Center and the Resource Recovery Council were denied.[22] Lawmakers abolished the Energy Committee.

Federal energy legislation in 1975 did impose on the state the requirement to adopt energy conservation plans consistent with federal guidelines in order to be eligible for federal funds. The law also directed each state to adopt energy conservation standards for new building and contingency plans for energy use reduction during severe supply interruptions.[23] In addition, the State Energy Office was created administratively in 1975 by the Lieutenant Governor under the Department of Administration.

In 1976, the Legislature passed the Solar Energy Standards Act which formally recognized the Solar Energy Center and encouraged the development of solar energy as an alternative energy source. In 1979, the Legislature transferred the State Energy Office to the Executive Office of the Governor.

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[21] Energy in Florida, Florida Energy Committee, May 1975.
[22] The Florida Solar Energy Center received a small appropriation while the Research Recover Council was transferred to the Department of Environmental Regulation, Energy Policy and Law in Florida, Center for Governmental Responsibility, University of Florida College of Law, edited by the Governor's Energy Office, February 1982.
[23] The Energy Policy and Conservation Act of 1975.

In 1980, Governor Bob Graham proposed a comprehensive legislative agenda. "Our response to the energy crisis since 1973 has not been adequate to prepare us for the difficult years ahead. Based on the need to establish an effective energy program for Florida, a comprehensive program of energy conservation legislation is required."[24] A compilation of current Florida energy law is presented in Appendix B. In addition, he announced proposed administrative actions affecting duties of executive agencies and the Florida Public Service Commission:

- Creation of the Florida Energy Trust Fund
- Fund, from the state surplus, vanpooling by state and local entities
- Fund local governments to produce energy from waste products
- Fund the Florida Highway Patrol to enforce the 55 mile per hour speed limit and ban the use of radar detectors
- New taxes on energy-related sources to build the Energy Trust Fund
- Create disincentives for energy waste
- Create incentives for installation of solar and energy conservation measures
- Make building codes tougher and more energy efficient

In spite of a successful Legislative Session, the hope that transferring the Energy Office would heighten the profile of energy issues and give the office greater power to influence energy policy decisions was not realized.

> *"Florida remains without a coordinated, enforceable state energy policy. There are several statutes containing objectives and statements of intent, and other statutes with incentives for energy conservation and efficiency, but the state lacks comprehensive, overall authority to guide energy-related activities…. Over 20 agencies have responsibility for energy policy, and there has been no common goal. Even with the Energy Office in the Governor's Office, little can be done to resolve conflicting agency policies because the Governor has not been given primary authority for implementing energy policy. In 1981, over 95% of the budget of the Energy Office is federal money to implement federal programs; less than 5% is state funds for implementing state energy policy. The primary emphasis in the Energy Office remains that of responding to federal initiatives."*[25]

During the early 1980's, Florida enjoyed a tremendous amount of activity with respect to adoption of conservation and solar energy measures, particularly at the residential level. The effects of several pieces of state and federal legislation enacted earlier were felt in the marketplace. Residential energy tax credits and business investment tax credits were provided in 1978 by Congress to encourage greater use of conservation and solar energy equipment. Coupled with the requirement by the Florida Energy Efficiency and Conservation Act (FEECA) that conservation programs be developed by the state's electric utilities, solar energy and energy efficiency improvements flourished. Financial incentives bolstered consumer interest in these measures, and a strong solar energy and

[24] Governor Graham's Legislative Program: Energy, 1980
[25] Energy Policy and Law in Florida, Ibid.

energy efficiency industry developed. However, in 1985, the federal tax credits expired, leading to the decimation of the solar industry. The single utility program, sponsored by FPL and authorized under FEECA, designed to promote solar water heating remained to support the industry. But that, too, was discontinued in 1994 when the Public Service Commission ordered utilities to examine Green Pricing programs as the means to promoting greater use of solar energy.

In 1988, Governor Bob Martinez initiated a state level conference to seek public input on the energy issues facing Florida. The Governor's Energy Conference[26] drew as participants key members of the public and private sectors. They were asked to submit their views of the major issues, problems and possible solutions concerning the state's energy policy.

The conference provided a series of presentations from experts on state and federal energy issues, and then engaged conference participants, breaking them into four discussion groups to identify top issues, framing Florida's energy problems. The discussion groups addressed the Residential/Community Sector; Transportation; Alternative Energy Sources; and the Commercial/Industrial Sector. The issues raised and suggested solutions bear a striking resemblance to the findings of the 2003 study.

State level action on energy concerns in the 1990's included, among other things, again moving the State Energy Office, this time to the Department of Community Affairs. The Energy Office continued to develop and administer energy efficiency and solar energy programs which were funded by Petroleum Violation Escrow account. They commissioned a study of the barriers to the greater use of solar energy, a report that was completed in 1994. The report, required by law to be submitted to the Legislature on an annual basis, has not been updated since. Enterprise Florida, created upon dissolution of the Department of Commerce, was directed by the Legislature to give priority to removing identified barriers, providing incentives for increased solar energy development and use, and capitalizing on solar energy as an economic development strategy for job creation, market development, international trade, and other means. Enterprise Florida has since determined that the solar industry is too small to warrant this assistance.

In addition, the sales tax exemption for solar energy systems was repealed, then reinstated, the property tax exemption for solar equipment effectively expired, and utility demand side management programs continued under the guidance of the Florida Public Service Commission. The Commission also instructed Florida's electric utilities to examine the use of "green pricing" and other innovative methods to encourage the use of solar energy. Rural electric and most municipal utilities were also removed, through legislative amendment, from the requirements of FEECA.

2.3 Current Florida Energy Policy

In May of 2000, Governor Jeb Bush recognized the need for a renewed focus on state energy policy by creating the Florida Energy 2020 Study Commission. The commission

[26] Building Florida's Energy Future, Governor's Energy Office, 1988.

was charged with the responsibility of proposing an energy plan and strategy for Florida. The premise behind this study was that, over the next 20 years, the quality of life, the quality of the business climate and the quality of the environment will be closely linked with how Florida addresses its energy needs.[27] The commission established a vision, along with five goals, as the foundation for its overall energy strategy:

The Vision: Florida's supply and use of energy promotes economic prosperity, limits environmental impacts and enhances the quality of life for all Floridians.

The Goals:

- Florida will be a leader in using energy wisely.
- Florida will have a sufficient energy supply to promote economic development and maximize economic prosperity.
- Florida will have an energy infrastructure that assures the reliable delivery of electricity.
- Florida will have an energy supply and delivery system that preserves Florida's environment.
- Florida will be a leader in encouraging the future growth and development of next-generation energy technologies and renewable sources of energy.

"There are several competent state agencies with responsibilities relevant to the energy industry…[however] no entity maintains energy data or coordinates the activities of the —DCA, DEP, and PSC. The FEO should be given resources and authority to carry out these responsibilities…. In 1991, the FEO was transferred from the Governor's Office to the Department of Community Affairs. Historically, the FEO has not received state general revenue funds to either operate or fund programmatic efforts. All operational funding is federal dollars received through an annual grant from the US Department of Energy. Over a period of years, the FEO staffing has been reduced…down from a staff of 80 in the late 1970s; there are currently four full time equivalent positions."[28]

As part of the ongoing effort to develop a comprehensive energy policy, the 2002 Legislature included proviso language in the appropriations bill directing that "funds be used to support initiatives consistent with the final recommendations of the Florida Energy 2020 Study Commission." This year, the Legislature referred to the preparation of a "Next Generation Energy Roadmap." The 2002 budget allocation allowed for this study of, among other things, Florida's energy policy, trends, conditions and opportunities in an effort to assist the state in charting the course of Florida's Energy Future.

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[27] Florida… EnergyWise! Report of the Florida Energy 2020 Commission, 2001, The full report can be found at:
http://www.myflorida.com/myflorida/government/taskandcommissions/energy_commission/pdfs/final_report.pdf

[28] Florida… EnergyWise! A Strategy for Florida's Energy Future, The Final Report of the Florida Energy 2020 Study Commission, December 2001.

2.4 Florida Energy Reports

Through legislative directive or Executive Order, a number of reports and plans have been published over the past few years that describe the state's energy trends, programs, and policies. This section will summarize and cite from several of those documents, including

- Florida Energy Office 2002 Annual Report
- Public Service Commission Annual Report
- Florida Public Service Commission Review of Electric Utility 2002 Ten-Year Site Plans
- Florida Energy Emergency Contingency Plan
- Clean Fuel Florida Advisory Board Cornerstone Report
- Florida's Strategic Intermodal System Steering Committee Final Report
- Governor's Energy 2020 Commission is summarized earlier in this section, and further detail can be found in Appendix C
- Florida Energy Office 2002 Annual Report (Show Me Results!, Florida Department of Community Affairs, March 2002)

"Finding new sources of energy continues to be a priority for Floridians as we move into the next decade. As our state continues to grow, we have a responsibility to provide reasonable and reliable sources of energy – the quality of life, the quality of our business climate and the quality of our environment will be closely linked with how we address Florida's energy needs. After all, the most important source of energy is the energy we conserve." - Governor Jeb Bush, from the introduction of the report.

The report showcases projects carried out under the State Energy Program:

> *Building Energy Efficiency.* Florida has over 5 billion square feet of building space this includes government, commercial, industrial, and residences. This sector represents 50% of Florida's electricity expended in the residential area, and accounts for 91% of Florida's electricity expenditures in governmental and the commercial markets. The following projects are being conducted to develop more energy efficient buildings.
>
> - Energy Codes and Standards
> - Hydroponic Solar Greenhouse Project
> - Federal Energy Management Program
> - Building Science Training and Certification Center
> - Home Raters Equipment Loan Program
> - Building America Industrialized Housing Partnership
> - Rebuild America
>
> *Transportation and Fuel Diversification. More energy is consumed in transportation than in any other sector of Florida's economy.* Transportation alone

accounts for approximately 88% of the state's total petroleum consumption[29]. Private passenger vehicles consume over 75% of the state's motor gasoline. It is also the sector most vulnerable to supply interruption. The Florida Energy Office sponsors programs that attempt to preserve the freedom of mobility through the use of alternative fuels and environmentally sound and energy efficient modes of transportation:

- Alternative Fuels
- Clean Cities
- Clean Fuel Florida Advisory Board

Notably missing within state actions or plans is any method of influencing the fleet average fuel efficiency.

Solar and Other Sustainable Fuels. The Florida Energy Office's solar strategy is to place solar in the midst of each energy decision in the state. Solar energy has many environmental and long-range benefits. Solar is particularly suited as an alternative fuel source to electricity for thermal heating. The Florida Energy Office has continued to emphasize the creation of the infrastructure to support the development and promotion of new and innovative solar technologies:

- Solar Industry Support
- Innovative Solar Applications
- Low-Income Solar Programs

Biomass Energy Efficiency. Biomass is virtually the only state indigenous, renewable, widely distributed natural resource capable of supplying heat, steam, and electric power. The following projects are being conducted in the biomass sector:

- Dairy Unit Biomass Demonstration Project
- Biomass Co-Firing Project
- Materials Recycling of Orlando
- Biomass Energy Crop Demonstration Plantation Project
- Suwannee River Mobile Irrigation Laboratories

Florida Public Service Commission 2002 Annual Report (Annual Report of the Florida Public Service Commission on Activities Pursuant to the Florida Energy Efficiency and Conservation Act and The Biennial Report on the Florida Energy Conservation Standards Act).

This report reviews the conservation activities of electric utilities and natural gas utilities. It also reviews the electric utility power supply and conservation education programs, and it reports the savings derived from the efficiency standards for certain equipment and appliances.

[29] Clean Fuel Advisory Board, "A Guide to Alternative Fuel Transportation in Florida," Florida Solar Energy Center, June 2002.

Conservation Activities for Electric Utilities. The PSC sets demand side management (DSM) goals for each utility at least once every five years. In 1994 and 1995, the commission established annual numeric demand side management goals for the five investor owned electric utilities, the eight municipal and six cooperative electric utilities. According to the report, these goals represented aggressive, reasonably achievable levels of conservation while minimizing the rates to the utilities' ratepayers.

To further encourage DSM, the Commission in 1994 also voted to allow for a case by case consideration of lost revenue recovery and incentives through the Energy Conservation Cost Recovery Clause for a specific group of DSM measures, including solar, renewables, natural gas substitution, high efficiency cogeneration, and other programs that have significant savings but exert negligible upward pressure on rates. Utilities were also encouraged to explore "green pricing," a method used to promote solar and renewable energy resources.

In 1996, the legislature increased the energy sales threshold that determined which electric utilities were subject to FEECA, leaving only the five investor owned utilities, Jacksonville Electric Authority and Orlando Utilities Commission to comply with conservation goals. However, the report notes that many of the utilities no longer subject to FEECA continue to offer conservation programs. DSM goals were most recently established in 1999. The report notes that these goals are lower than those approved in 1994 due to the fact that the cost of new generating units had dropped substantially in the previous five years. In addition, several existing DSM programs had approached their saturation levels. In addition to plans submitted to and approved by the commission in 2000, four of the largest investor owned utilities included a green pricing program or research program for its DSM plan. The DSM plan for the fifth investor owned utility, Florida Public Utilities Company, was approved in 2001. In 2000, the Commission set the numeric DSM goals for the two municipal utilities that remained subject to FEECA at zero, since they could not identify any additional cost-effective DSM programs to offer relative to the Commission's cost-effectiveness test. The test has been the subject of differing perspectives over the years in terms of the extent of conservation and cost savings possible through the utility sector. The commission has recently received petitions from investor owned utilities requesting program modification or discontinuation due primarily to a reduction in the cost of generation.

Investor owned utilities are permitted to recover prudent and reasonable expenses, including incentives paid to participating customers, for PSC-approved DSM programs through the Energy Conservation Cost Recovery clause (ECCR). Since FEECA's enactment in 1980, investor owned electric utilities have recovered over $3.2 billion of conservation program expenditures through ECCR. Total DSM expenditures have decreased slightly since 1996 due to DSM program saturation and to declining DSM cost effectiveness caused by the lower cost of new generating units.

Conservation Activities for Natural Gas Utilities. Gas conservation programs were historically used to increase gas usage so that Florida could reduce its reliance on foreign oil, and defer the construction of additional electric generation facilities. Currently, program cost effectiveness is based on the benefits obtained by the general body of gas ratepayers, without regard to the value of deferral of power plant construction. Conservation expenditures recovered by natural gas utilities in the year 2000 totaled $14.3 million.

Florida Energy Conservation Standards. According to the Commission, standards for refrigerators, refrigerator-freezers, and freezers (which took effect January 1, 1993) have saved 1,271 GWh through 2001. Lighting requirement standards (effective January 1, 1989) have saved 719 GWh through 2001. Standards for showerheads (effective January 1, 1988) have saved 1,799 Gwh through 2001.

Florida Public Service Commission Review of Electric Utility 2002 Ten-Year Site Plans

Section 186.801, Florida Statutes, requires that all major generating electric utilities in Florida submit a Ten-Year site Plan to the Florida Public Service Commission for review. The plans are to be submitted no less than once every two years. Ten-Year Site Plans were submitted early in 2002 by twelve utilities and two merchant plant companies, and were reviewed by the commission and found to be "suitable" (the standard for acceptance).

The following table presents the anticipated 2011 Installed Winter Capacity of the 12 generating utilities (not included are merchant plant data). Also presented are the expected reserve margins and peak demand savings as a result of DSM measures during the planning period (2002-2011).

Table 1. Florida's Electric Utilities 2002 Ten-Year Plans – 2010 Installed Winter Capacity

Utility	Existing Capacity (MW)	Proposed Additions (MW)	Total 2010 Capacity (MW)	Reserve Margin	Peak Demand Reduction (MW)
Florida Power Corporation	9865	2828	12693	20%	1611
Florida Power & Light	20526	6450	26976	20%	1955
Gulf Power	2383	577	2960	15%	532
Tampa Electric Company	4361	1410	5771	20%	1091
Florida Municipal Power Agency	1317	396	1713	15-18%	7
Gainesville Regional Utilities	536	93	629	15%	18
JEA	2910	1219	4129	15%	153
Kissimmee Utility Authority	303	136	439	15%	8
City of Lakeland	791	270	1061	20-22%	67
Orlando Utilities Commission	1385	469	1854	15%	32
City of Tallahassee	733	107	840	17%	28
Seminole Electric Cooperative	4144	1640	5784	15%	248
TOTAL	49254	15595	66859	18% avg.	5750

Florida's Energy Emergency Contingency Plan

Florida law (Section 377.703(3)(a), FS) requires that the Department of Community Affairs assume the responsibility for development of an energy emergency contingency plan to respond to serious energy shortages. Implementation of any emergency program "shall be upon order of the Governor that a particular kind or type of fuel is, or that the occurrence of an event which is reasonably expected within 30 days will make the fuel, in short supply." The department, in response, will institute the appropriate measures of the contingency plan. The law vests in the Governor the authority to carry out any emergency actions required.

The first plan was published in 1978, followed by plan modifications in response to changes in national energy policy up to and until 1989. The current energy emergency contingency plan is now embedded within the state's Comprehensive Emergency Plan, as Emergency Support Function #12, "Energy" – Annex: Management of Energy Supply Shortages. "ESF 12" establishes policies and procedures for "response to and recovery from shortages and disruptions in the supply and delivery of electricity, natural gas, and other forms of energy and fuels which impact or threaten to impact large numbers of the

State's citizens and visitors. The intended scope of ESF 12 is to address significant disruptions in energy supplies for any reason, whether caused by physical disruption of energy transmission and distribution systems, unexpected operational failure of such systems, and unusual economic or international political events."

This section of the plan does not deal with disaster related energy emergencies, as those are addressed within the Comprehensive Emergency Management Plan. However, this "sub-plan" (referred to herein as "Annex") relies on the organizational structure established by the master plan, whereby decision and control responsibility is held jointly by the emergency Coordinating Officers of the Florida Public Service Commission and the DCA Florida Energy Office. Other organizations and agencies participating in the response are the Nuclear Regulatory Commission, the Florida Petroleum Council, investor-owned and municipal utilities, rural electric cooperatives and the Florida Reliability Coordinating Council. The FPSC was responsible for emergency operations related to the loss or shortage of electricity or natural gas. The FEO is responsible for emergency operations related to all other fuel types.

The various operational phases are reliant upon the maintenance of information pertaining to key agency personnel; energy providers; energy supplies, demand, reserves costs; and, related emergency events. A notification process is established and three levels of activation are described. Level 3 requires monitoring of events, Level 2 requires mobilization of key staff to the state emergency command center, and Level 1 requires full activation of all staffing resources to provide support in the management and consequences of the energy shortage.

Recovery from a crisis is the responsibility of The State Emergency Response Team who will implement state and federal program assistance measures such as disaster business recovery loans, unemployment assistance, and energy cost subsidies for economically disadvantaged families.

The Florida Energy Office is responsible for training for implementation of the plan as well as for coordination of the maintenance of the plan.

Clean Fuel Florida Advisory Board Cornerstone Report

The Florida Clean Fuel Act was created in 1999 for the purpose of studying alternative fuel vehicles and formulating policy recommendations to the Department of Community Affairs on expansion of their use. The Clean Fuel Florida Advisory Board has comprised representatives of energy industries, motor vehicle manufacturers, vehicle fleet manager, Florida citizenry, transportation professionals, economic development and environmental interests along with state and local government and other interested parties.

In January of this year, the Clean Fuel Florida Advisory Board issued its "Cornerstone Report" containing the group's three-year findings on Florida's use of alternative fueled vehicles. The report presents a background of the need to expand alternative fuel use in Florida and provides a set of recommendations to "set in motion a comprehensive

transportation energy plan for the state". The report provides eight specific recommendations, that, if implemented will:

- Support and enhance Florida's alternative fuel vehicles infrastructure
- Create an organizational structure to support expanded alternative fuel vehicle use
- Expand levels of public awareness and general understanding of transportation issues
- Garner the support for research into the best application of emerging technologies

To guide their deliberations, the Board adopted the following principles:

- Be fuel inclusive
- Build on past work while incorporating creative ideas
- Focus on results
- Develop statewide policies through consensus decision-making

The board concluded that "significant expansion of alternative fuel use in Florida will not occur without comprehensive, clear and decisive policy action by the state." The fact that Florida is largely in attainment of air quality standards, compared to other states where AFVs have penetrated the market, is one of the barriers facing Florida's alternative fuel industry. State policy needs to be pre-emptive since the need for AFVs will be driven by shortages of conventional fuels from foreign sources.

The board's recommendations were developed through a consensus process to highlight the contributions that the expanded use of alternative fuels and AFVs can make to Florida's economic prosperity, environment, and community quality – see Appendix I for details.

Florida's Strategic Intermodal System Steering Committee Final Report, January 2003

The Florida Legislature created the Strategic Intermodal System (SIS) during the 2003 session to provide a mechanism for the efficient mobility of Florida's "citizens, businesses, and visitors, and help Florida become a worldwide economic leader, enhance economic prosperity and competitiveness, enrich quality of life, and reflect responsible environmental stewardship." The SIS and its advisory board were an outgrowth of an interim committee project of the legislature. In January of 2003, the Strategic Intermodal System Steering Committee issued its final report which outlined the vision, goals, and elements of the SIS.

> *"The 2020 Florida Transportation Plan envisions a transportation system that will enhance Florida's economic competitiveness. The plan calls for the development of the SIS, which will be composed of transportation facilities and services of statewide and interregional significance providing for the smooth and efficient transfers for both passengers and freight."*

The findings of the Steering Committee resulted in the enactment of Section 339.61-64, Florida Statutes, which is summarized in depth in Appendix B.

3.0 PUBLIC INPUT

3.1 The Public's Roles and Responsibilities

Public participation is a source of important information for governmental entities at all levels. In addition to offering their viewpoints on energy matters, members of the public represent a knowledge base that can be tapped for informed sound decision-making.

3.2 Public Participation

The public was provided with varied opportunities for involvement with this energy project:

- Submitting comments and recommendations by email or mail
- Completing online surveys via the project Web site
- Reviewing and commenting on documents posted to the Web site
- Participating in statewide public workshops
- Participating in Stakeholder Forums, and
- Direct contacts with the Project Team and FEO.

The results of input received through these means are reported in this section with further details provided in the Appendix D.

3.3 Web Site and Surveys

The public was invited to sign up for participation in the project by way of the project Web site. The sign-up form generated 211 responses. The Web site provided various ways for interested members of the public to take part in the process; and were invited to provide comments on documents posted on the site and on other energy topics of interest.

Two online polls were conducted. The first dealt with outcomes for an energy plan. Results of this poll and of stakeholder feedback on these same questions have relevance for other aspects of the State's energy strategies and initiatives.

The initial poll drew 115 respondents. On a scale of 1 – 5, with 5 being "extremely important", the average responses (with the topics/questions presented below in abbreviated form) were:

- Transitioning to a sustainable energy future – 4.7
- Protecting the environment – 4.6
- Enhancing the economy through energy approaches – 4.4
- Informing the public – 4.3
- Engaging government agencies – 4.3
- Safeguarding the public – 4.1

Public comments offered on each of these topics, along with other topics of interest and the survey form, are provided in Appendix D1.

The second online survey dealt with energy interests and concerns. It received 132 responses. Respondents were asked first to indicate which roles apply to them from a list of seven plus "other", indicating all that apply. "Concerned Citizen" received by far the highest number of responses (61 percent). Though much lower in the number of responses, the next highest, at 20 percent and 19 percent respectively, were "Citizen Activist" and "Government Employee".

When asked which of 12 considerations (plus any others of their choices) they considered to be the most important in the energy realm, "providing alternative energy resources" ranked highest at 71 percent of respondents, followed by "protecting the environment" (62 percent) and "saving energy" (50 percent). The next highest ranking was far less at 24 percent.

Issues of concern from a quality of life perspective were the focus of the next question. From a list of 13, plus an "other" category for participant entries, "water pollution", "limited access to energy alternatives" and "air pollution" ranked highest (at 3.64, 3.63 and 3.58 on a scale of 1-4). These were closely followed by "lack of consumer knowledge about energy alternatives" (3.52) and "dependence on foreign oil" (3.5). All but one of the remaining 7 issues ranked above a level of 3.

Participant views on the most important steps to pursue in addressing state energy challenges and opportunities were again wide-ranging. A list of 16 options was provided plus an "other" category for participant input. Of these, the highest ranked (on a scale of 1 – 4), were "bring more sustainable energy sources into everyday use" (3.64), "have government lead by example in saving energy and using alternative energy sources" (3.61), "use more solar energy" (3.59) and "establish conservation incentives for pollution control" (3.59). Ten of the remaining 12 issues were also rated at above the 3 level.

The percentages presented are based upon total number of any selections in each category (question) per the number of respondents. However, the data is reported by both means in the more detailed report provided in Appendix D2.

3.4 Regional Workshops

Eleven regional workshops were held in conjunction with the Florida Regional Councils Association. A survey was distributed in these forums. A total of 244 completed surveys were received from the local workshop attendees. As described above, the initial questions (in this case, the first three) allowed for multiple responses, and for purposes of this summary report the percentage data are reported according to number of respondents rather than the total number of responses. Thus, percentages in a given category can total more than 100% because respondents could select multiple responses. (The data are provided in Appendix D3.)

Participants in the workshops as a whole described themselves most often as "Concerned Citizen" (40 percent of respondents), with listings at 20-23 percent for "Citizen Activist", "Government Employee" and "Energy Professional". The highest rating on reasons for attending the workshops was to find out more about Florida's energy plans and strategies.

While interest was expressed in an assortment of end results, those considered by respondents to be of highest importance on a statewide basis were "providing alternative energy resources" (61 percent), "saving energy" (51 percent) and "protecting the environment" (46 percent).

In terms of energy issues, the top two issues of concern on a statewide average were (on a scale of 1 – 4) "water pollution" (3.51) and "air pollution" (3.44). As with the online survey results, most of the remaining issues asked about in the survey (10 of the 11 remaining) were also rated above 3 on a scale of 1-4, with 4 being of greatest importance and 1 being "not a concern". These results track the online poll in indicating the strong concerns about energy issues by survey participants.

Solutions pointed to by a statewide average of responses were again wide-ranging, with the top rated (on a scale of 1-4) as "building more energy efficient homes" (3.66), "establishing conservation incentives for building construction" (3.61), "government leading by example" (3.48) and "bringing more sustainable energy sources into everyday use" (3.47). Once again, 10 of the remaining 12 choices were scored at higher than 3.0 on average.

It should be noted that most surveys were completed following a presentation on energy use in Florida. The presentation included compelling evidence on cost-effective potential for energy savings in buildings. This likely corresponds with the high number of survey responses favoring action on these concerns. This may also indicate the value of public education programs.

In addition to the surveys, a facilitated exercise was undertaken in ten of the eleven workshops, aimed at identifying the highest priority concerns of participants. Facilitators invited meeting participants to each take a turn in identifying their top issues or concerns as priorities for the State to consider. These priorities were recorded and ranked by the participants. Each person then had the opportunity to cast four votes in favor of concepts or recommendations on the master list resulting from their group process.

In this section, the public comments are summarized to help indicate what action might be taken to strengthen implementation of current law and policy as well as other possible areas of state involvement or emphasis. The recommendations and ideas are categorized under these broad topics.

- Energy Codes and Standards
- Government Facilities
- Utility Regulation
- Renewable Resources
- Energy Efficiency
- Transportation
- Energy Policy and Planning
- Energy Education and Marketing

Subcategories are used to further group the specific public comments received. These are listed under each specific concept to illustrate the types of ideas, concerns and proposals brought forth by individual participants. For each of the specific concepts a score is given. Each score represents the sum of votes from all eleven regional workshops. For those with lower votes it is worth noting that some subjects scored high when raised at a given workshop, but the subject may not have been raised at every workshop. In addition, some categories with high votes were due to a high constituent turnout – for example, the waste incineration industry had strong representation at the St. Petersburg workshop.

Energy Codes and Standards

Florida Energy Code Enhancement and Compliance (Total score - 27)

- Strengthen state building codes
- Build-in energy efficiency
- Audit building code enforcement
- Employ building officials by state, funded from building permit fees to deter local influence
- Require the state to work with builders to improve energy efficient construction

Strengthen Appliance Standards (total score - 23)

- Allow Florida to establish Energy Star ratings for water heaters
- Strengthen appliance standards

Provide Incentives (total score 9)

- Provide incentives for Energy Star rated homes
- Provide incentives for commercial buildings (builders and owners)
- Provide sales tax exemption for energy efficient HVAC replacement
- Provide government incentives for energy efficient mortgages
- Fund incentives with an impact fee on electric water heaters

Government Facilities

Leadership (total score - 8)

- Government facilities should lead by example and be held to a higher standard

Construction Practices (total score - 12)

- Require daylighting and energy efficient lighting in public buildings and schools
- Impose energy efficient building standards on state subsidized projects
- Require energy efficient and solar energy systems on public buildings and schools
- Require green building standards in state buildings

Energy Management (total score - 7)

- Require government facility energy audits
- Promote energy management in government buildings
- Update energy managers on energy technology developments

Performance Contracting (total score - 2)

- Promote performance contracting in new and existing state and educational facilities
- Create a streamlined performance contracting procurement regulation

Utility Regulation

Regulatory Reform (total score - 55)

- Restore home rule in matters under FERC jurisdiction
- More local authority to review power plant siting (including cogenerators)
- Deregulate electric utilities
- Change Public Counsel's role to represent only residential class of utility customer
- Provide an independent operator for transmission
- Level the playing field for energy incentives
- PSC needs to implement laws as intended by legislative
- Change the cost-effectiveness test for DSM
- Establish time of use billing
- Require total cost accounting for all externalities
- Build an energy impact fee built into electric rate
- Tax inefficient users of energy
- Create a carbon tax on (impact fee) source of use
- Promote residential grid-tied PV and reduce utility barriers
- Regulate merchant plants
- Establish a progressive rate structure for water and energy

Distributed Generation (total score - 44)

- Provide open access for Distributed Generation
- Require utilities to buy back power
- Provide for Net Metering

Energy Efficiency

Incentives (total score -14)

- Establish a sales tax exemption week for energy efficiency purchases
- Provide incentives to Florida energy efficiency industries and users
- Encourage the insurance industry to reward energy efficient choices

Regulatory Reform (total score - 10)

- Create a regulatory framework for energy efficiency banks
- Evaluate regulations that impair innovation in energy efficient improvements
- Impose punitive measures for energy waste

Low Income (total score - 5)

- Provide grants to local government to support energy efficiency measures for low income consumers

Renewable Resources

Solar (total score - 32)

- Mandate solar water heating, passive solar design in new construction
- Provide incentives for solar retrofits
- Expand weatherization to include solar options
- Encourage innovation in the design community to develop solar integrated buildings
- Provide a constitutional amendment to allow a $1,000 (15%) rebate for solar equipment; require builders offer reasonably price solar water heaters and solar lighting
- Provide leadership to bring Florida to the pinnacle in the use of solar energy

Incentives (total score - 29)

- Provide incentives for interconnected and off-grid PV
- Reinstate tax and utility incentives
- Provide incentives to industry for potential energy savings from biofuels and waste heat
- Provide investment incentives for renewables
- Reward program for users of renewable energy
- Establish a 15-20% tax on energy use in buildings and dedicate to efficiency and renewable incentives
- Establish a trust fund dedicated to renewable energy
- Do more to encourage renewable energy (including MSW)

Municipal Solid Waste (total score - 14)

- Capture landfill gas for electric products
- Encourage waste to energy as "renewable"

Transportation

Alternative Fuel Vehicles (total score - 26)

- Fund and promote the use of alternative fueled vehicles (AFV)
- Develop the infrastructure for AFV
- Develop bio-diesel fuel sources
- Increase the gas tax to fund AFV subsidies

Public Transportation (total score - 22)

- Need a reliable, available and comprehensive mass transit system for movement of people and goods

Fuel Efficiency (total score - 16)

- Encourage use of fuel efficient vehicles
- Encourage large employers (public and private) to reduce vehicle miles traveled by employees
- Government should be set an example and meet a higher efficiency standard

- Base motor vehicle registration fee on fuel efficiency
- Establish high efficiency standards for rental vehicle fleets

CAFÉ Standards (total score - 16)
- Increase the CAFÉ standards in Florida

Incentives (total score - 16)
- Provide incentives for alternate fuel vehicles, high efficiency vehicles and employer provided commute programs
- Provide a sales tax exemption for high efficiency vehicles
- Increase conventional energy taxes to finance alternatives

Traffic Control (total score - 7)
- Lower speed limits and strictly enforce traffic regulations
- Improve traffic flow by reducing and synchronizing traffic lights

Vehicle Emissions (total score - 4)
- Resume vehicle emissions testing
- Hold large trucks to emission standards

Bike-Paths (total score -1)
- Increase safe bikeways

Energy Planning

Integrated Energy Plan (total score - 67)

Planning considerations:
- Coordinated energy policy
- Interconnect energy and water issues
- Better utilization of natural resources
- Define sustainability, taking a systems approach to planning
- Focus on achieving immediate efficiency measures
- Define and create policy on renewable energy
- Consider quality of life
- Maintain affordability of energy
- Mandatory recycling
- Establish emission standards for 2-cycle engines
- Consider quality of life
- Greater emphasis on efficiency with focus on achieving immediate efficiency measures

Planning assumptions:
- Balance energy, environment and economy
- Show data and basis to support energy policy
- Clarify supply side goals and examine primary energy and fuel supply

- Look at 5-year, 20-year, and build out

Implementation:

- Implement the plan
- Provide system for better tracking energy use
- Implement the plan on a regional basis, and require an energy element in comprehensive plans

Land Use (total score - 40)

- Use growth management to slow population growth
- Encourage mixed use planning and a systems approach to community development
- Encourage new living patterns, discourage urban sprawl
- Landscape for energy efficiency
- Build underground transmission lines in conjunction with high speed rail

Research, Development, Demonstration (total score - 19)

- Undertake a "Manhattan Project" -- on alternate energy sources
- Develop and deploy new technologies
- Pursue energy generation using gulf stream and ocean energy
- Pursue a high profile hydrogen project in the Orlando area
- Use hydrogen as an energy carrier in an integrated transportation and electrical system
- Look at large scale storage of energy

Process (total score - 13)

Public participation:

- Empower the public by removing barriers to participation
- Develop a coalition of public groups to assist in the adoption of state energy policy

Enforce policy:

- Implement current law as intended to accomplish legislative goals
- Enforce existing laws and rules

Barriers:

- Remove regulatory barriers
- Consider the impact of NAFTA when developing regulations

Leadership (total score - 7)

Administration:

- Leadership must be a priority, with a top down, proactive approach to energy policy

Legislative:

- Legislature must provide clear goals and directives for solar energy and energy efficiency

Local Government:

- Provide more training for energy trades, professionals, and builders

Education and Marketing

Marketing (total score - 40)

- Devote state tax dollars to a market research and energy awareness campaign with measured results that promote use of solar energy, conservation and alternative energy, especially in the residential market, with emphasis on measures that are readily available
- Demonstrate solar energy and sustainable energy measures
- Promote solar energy, energy efficiency in the existing and new home market in conjunction with the Florida Home Builders and Realtors.
- Promote alternate fuels
- Improve energy conservation awareness in the commercial sector

Informal Education (total score - 31)

- Educate the public about efficiency and renewables, including life cycle costs
- Encourage electric utilities to provide updated information to customers
- Provide information to the public on conventional energy subsidies
- Host a state-wide or southeast regional renewable energy fair
- Provide consumers with an objective assessment of nuclear energy
- Educate public and business about existing energy programs
- Develop and maintain a comprehensive information based website on energy alternative measures: "Consumer Reports of Energy"

Formal Education (total score - 11)

- Incorporate energy education in school curriculum (K-16)

Continuing Education (total score - 8)

- Provide training for energy trades, professionals, and builders on solar and energy efficiency
- Provide energy trades, professionals and builders with consumer ready information

Government Education (total score - 2)

- Educate state and local government officials about energy efficiency and renewables
- Promote energy management in government buildings

3.5 Stakeholder Forums

A series of three forums were held in Tallahassee to engage stakeholders in the process and elicit their input. Notices were sent to a broad range of state associations, organizations and interests involved with or affected by energy concerns of the State. Questions and documents were provided to forum participants for their reactions, and the floor was opened to general input from stakeholders in each of the sessions. The Florida Conflict Resolution Consortium assisted with meeting facilitation and breakout groups on major topical areas, such as transportation, energy supplies and the built environment.

Experts on varied topics made presentations, including leaders of invited stakeholder groups.

Forum participants offered comments and recommendations on a wide range of subjects, from the need for alternative energy sources and greater energy efficiency to the importance of reliability and security of current energy supplies and services to the need for a strong State government structure to deal with energy matters, including through the Florida Energy Office and the Public Service Commission. Some of the feedback received was broad in nature while other comments were very specific, such as:

- removal of barriers to waste heat recovery and co-generation
- concerns about natural gas supplies and price volatility, including possible over-reliance by utilities
- the need for innovation in using methane processes, offshore wind facilities and geo-thermal energy
- the role of waste to energy facilities; regulatory barriers to efficiency and renewables
- the importance of supply side energy efficiency
- opportunities for Distributed Generation
- a wide assortment of other concerns and ideas.

Strides made through the Governor's Energy 2020 Commission were discussed, and a presentation made by the former Commission's Executive Director, who, in part, emphasized the need for a strong state energy office. Staff to the Clean Fuel Florida Advisory Board also spoke about the opportunities available through alternative fuels for transportation. Floridians for Better Transportation, the Florida Home Builders Association, the Municipal Utilities Association, the Industrial Cogenerators Association, the Florida Green Building Coalition, 1000 Friends of Florida, the Florida Public Transportation Association and others each offered their perspectives and insights on the subject, as did other invited panelists with expertise and involvement in the energy arena. The Center for Economic Forecasting & Analysis and Florida TaxWatch added valuable information on the fiscal and economic aspects of energy.

Forum participants consisted primarily of industry trade associations and energy suppliers. Public interest groups and other interested persons also took part in the forums. Some participating organizations provided written comments. Meeting notes for each of the programs appear in Appendix D4.

3.6 Additional Input

Emailed and written comments were provided by interested parties. Comments and recommendations received through these means covered numerous topics of public interest. Among them were:

- Alternative Energy – this subject drew the greatest response, with participants calling for expanded use of alternative energy sources. Solar energy was the most frequently mentioned resource.

- Energy Efficiency – various options for increasing efficiency were offered, including demand side efficiency and supply side efficiency.
- Leadership – respondents called for Florida to be a national leader in alternative energy use and efficiency, through tapping existing technologies, implementing current laws, undertaking utility policy reforms and supporting new technology development. **It was noted that, for the most part, Florida doesn't need more studies, it needs to take action.**
- Current Technologies – concerns were expressed about natural gas availability and price volatility, as well as potential over-reliance for electric power production. Various forms of non-utility direct uses of natural gas were proposed. Liquefied Natural Gas was discussed as an option.
- The Built Environment – design standards, stronger building codes and code enforcement were among the suggestions offered in this area along with increased appliance efficiency standards and better community planning and design approaches.
- Education – various forms of education of the public, decision makers and others (industries, businesses, etc.) were noted, along with informing the public about the full costs involved in energy choices (such as hidden costs in transportation expenditures).
- Environment – numerous statements of support were made about environmental protection and long-term environmental sustainability for Florida. Concern was expressed about climate change, as well as the need for pollution control.
- Transportation – public transit, bicycle and pedestrian ways and better urban planning, including the reduction of urban sprawl, were addressed under this topic.

These are highlights of the input received through written comments. A further summary appears in Appendix D5.

3.7 Future Opportunities

Stakeholders and other members of the public have an important role to play in Florida's energy future and future state action on related matters. A broad-based database of contacts has been developed for future use by FEO/DEP in this regard, and records from the surveys and workshop sign-in sheets provide yet another resource for future outreach.

4.0 NATIONAL PERSPECTIVE: INSIGHTS FROM ENERGY LEADERS

A number of national experts in energy technology, energy policy and other aspects of the energy field have provided information and insights. Some of the information obtained through these means is very recent. Highlights appear in this section with more detailed information in Appendix E.

4.1 Natural Gas

Natural gas prices and availability are a matter of pressing state concern. Natural gas has become the "fuel of choice" for Florida utilities, and major industries of the state are concerned about supplies for their future needs.

The American Council for an Energy Efficient Economy (ACEEE) has just completed an important study on the subject, released earlier this month. The results show that policies to promote energy efficiency and renewables "can produce double digit reductions in natural gas prices by 2009, with efficiency providing large reductions even sooner."

The study was national in scope and includes findings for each of 48 states. ACEEE also provided Florida-specific data which they ran for purposes of the project to assist our state in deriving the greatest value from this information.

Among the report's findings:

- "We see a net increase in industrial gas use from the base case due in large part to reduced price motivated fuel switching and demand destruction. It is important to note these increases come on top of the electricity and gas savings that result from efficiency, so represent increased economic activity."
- The study anticipates substantial reductions in natural gas use overall, primarily in the power generation sector.
- On the wholesale side, ACEEE has projected a 20 percent reduction in natural gas prices from the base case, showing up in 2004-2008.
- The study is said to have taken a conservative approach and yielded a readily plausible and implementable scenario. The study underscores the relative value of energy efficiency and renewable energy. Even using a conservative approach, it points to fairly large impacts.

The Executive Summary for the report is provided in Appendix E, with further details on considerations for Florida.

4.2 Leadership for Efficiency Gains

The American Council for an Energy Efficient Economy is preparing for the immediate release of an in-depth and far-reaching report on energy concerns for the nation's future and how state can assume a leadership role in addressing issues and opportunities.

Efficiency policy categories addressed in the report include:

- Appliance and equipment standards. Setting regulations mandating minimum efficiencies for a range of residential and commercial products.
- Building Energy Codes. Creating regulations for new homes and commercial buildings that require minimum energy efficiency standards to be met.
- Combined Heat and Power. Several states support policies that encourage combined heat and power technologies that put otherwise-wasted heat from power generation to productive use, in both large power plants and smaller applications at manufacturing plants and commercial buildings.
- Facility and Fleet Management. Many states own and/or operate many buildings, from universities to office buildings and prisons, and also operate extensive vehicle fleets. Substantial innovation has gone into reducing energy use in these facilities, and fleet efficiency has also been improved in some states.
- Tax Incentives. Several states offer income tax credits or deductions, sales tax exemptions, and other tax-related incentives for energy-efficient products and practices.
- Transportation. States have innovated in transportation efficiency, from encouraging efficient vehicle purchases to reducing transport demand through growth policy.
- Utility Programs. Almost half the states tap utility revenue systems in various ways to pay for efficiency programs. These efforts currently top $1 billion annually.

The report offers a menu of opportunities for Florida's advancement in energy efficiency.

4.3 Powering the South

A 2002 report of the national Renewable Energy Policy Project provides insightful analysis and recommendations for action by southern states including Florida. It offers a series of policy initiatives to advance energy efficiency and renewable energy. In the efficiency area, it calls for:

- the creation of dedicated energy efficiency funds
- promoting education and market transformation
- rewarding efficiency through tax incentives
- tightening building codes and appliance standards
- requiring better utility planning
- making government more efficient
- establish demand-adjusted pricing.

For renewables, the report calls for:

- establishing Renewable Portfolio Standards
- creating dedicated renewable energy funds
- achieving equity in the market through tax incentives
- adopting fair transmission policies
- enabling customers to benefit from distributed power
- transforming the private market
- make green power choices widely available.

The report discusses each of the approaches and provides information on their implementation in U.S. states. A summary of the report appears in Appendix E.[30]

4.4 Strategic Industrial Efficiency

Florida's industrial sector has made important progress in energy efficiency and waste recovery. At the same time, opportunities exist for further achievements, in energy savings and non-energy benefits.

The national Alliance to Save Energy recently published a new report entitled *Strategic Industrial Energy Efficiency: Reduce Expenses, Build Revenues and Control Risk*. A copy of the report appears on the project Web site for public information and input.

The stated intent of the Alliance report was "to **improve industrial competitiveness** through the greater acceptance of energy efficiency policies, products and services." This goal is in keeping with the Administration's economic development priorities for Florida. The report refers to the strategic application of industrial energy efficiency as including the following:

- **Reduce expenses.** Fuel bill savings are complemented by reduced material waste and avoided need for emissions control equipment. Emissions and safety penalties are avoided. Improved reliability allows reductions in overtime labor and hazard insurance premiums.

- **Build revenues.** Reduction of energy use can also generate new revenues. The extra production capacity provided by energy optimization will benefit manufacturers that need to expand their output to meet growing demand for their products.

- **Control risks.** Energy management offsets industry's exposure to risks posed by utility deregulation, volatile fuel prices, and power supply concerns.

- **Improve the bottom line.** Energy efficiency's financial pay-off can be expressed in two parts: improved *profit margins* and increased *asset turnover* (a measure of increased productivity)."

[30] The full report is available at http://www.poweringthesouth.org/.

The American Council for an Energy Efficient Economy (ACEEE), another national expert on the subject, notes several timely points for Florida's consideration:

- In working with the Industrial Sector, focus on the individual industries as there are significant variations within this sector.
- When looking at key industries in Florida to work with on efficiency opportunities, look not only at what we have today but project ahead to what industries will be active in Florida in the future, including those likely to make significant investments.
- Very little retrofits take place in this sector. Industry goes through cycles of capital investments for modernization on a periodic basis.
- Florida industries need reliable and affordable power. Natural gas is key to Florida.
- Florida needs to examine and characterize its industries and also look at what industries can best benefit from energy technologies and approaches.
- Agriculture is of special importance in Florida. Energy consumption is 10% of the total cost of U.S. farm production and is probably the single largest controllable cost on farms. ACEEE has seen 5 – 15% energy reductions possible through efficiency measures. This has resulted in profit margin increases of 1 – 2% which, in the case of farm operations with tight margins, can be significant.
- A number of energy efficiency investments on the industrial side have substantial non-energy benefits and begin saving from the minute they are implemented. Energy savings may account for 10 – 20% of the total net benefit to the industry. Other benefits are often the ones that spark the investment, much more so than the opportunity for energy savings.[31]
- Often the companies don't have the time to deal with investigating efficiency options. Clear and illustrative information of the benefits can be a very big help.

4.5 Natural Resources Perspectives

NRDC (the Natural Resources Defense Council) has played a leadership role on energy issues for many years. They have offered an analysis and recommendations specific to Florida's needs. It addresses the following major areas of concern:

1. Florida's Strategic Framework for addressing energy concerns, and establishing a process for satisfying the state's energy service needs at the lowest possible cost.

[31] As one example: a cashmere processing facility ACEEE looked at was using a gas oven. ACEEE suggested radio frequency drying as an alternative. It eliminated the natural gas use and cut electricity use in half. The industry tried it and loved it, but the big draw to them was that it reduced degradation to the fibers and cut their losses there in terms of the cost per pound for fiber (where they saved $5 per pound in reduced fiber damage). That's what caused them to make and stick with the investment, but they benefited from the energy savings as well.

2. Implementing such an approach through the Building sector, "identified as by far the largest part of Florida's energy consumption and undoubtedly even a larger share of Florida's energy costs."

3. Implementation of improvements through transportation energy efficiency.

The paper speaks to the purpose of a State Energy Policy, which, in NRDC's view, "should be to develop mechanisms and market incentives that satisfy growing demands for energy services and environmental protection at the least cost to the state". They recommend a goal of "societal cost minimization" and, thereby, the importance of developing a "least cost energy plan."

The report points to two major policy options for Florida in improving the efficiency of buildings and of equipment used in buildings. These include increasingly stringent standards for buildings and appliances, which they regard Florida as being well positioned to carry out, and an improved system of utility regulations that aligns state interests with private profit.

They note that "Florida utilities have not been very active in promoting energy efficiency because the regulatory structure rewards them for inefficiency . . . regulatory regimes can be constructed easily for Florida in which distribution utilities make more money to the extent that they reduce the cost of energy services to their customers." This can be accomplished through regulation by revenue caps rather than rate caps; funding for energy efficiency programs; and shared savings incentives.

In the transportation area, they note that "smart growth development can reduce transportation expenditures by one to two thirds, a result with huge impacts for state economic development planning since a large fraction of transportation costs are sent out of state and thus do nothing to contribute to local economies in Florida." With regard to multi-modal transportation, they point to an important study that suggests that "traditional models may underestimate the benefits of expanded transit service by a factor of 5 or more". They point to one example of removing barriers to transit oriented development as the "Location Efficient Mortgage®", which they note can result in energy savings ten times larger than home energy efficiency savings. Their written comments are provided in Appendix E2.

4.6 Renewable Energy: Grading the States

The Union of Concerned Scientists (UCS) conducted a study of renewable energy activity underway in the 50 states and published a report of the results in May 2003. Called "Plugging in Renewable Energy: Grading the States," the group's findings were publicized by the Florida media. UCS has provided its full report for consideration by Florida in its energy planning and strategies.

The report notes that UCS "has assigned grades to each of the fifty states based on their commitment to supporting clean, sustainable energy sources such as wind, solar, geothermal and bio-energy. We measure commitment by the projected results of

renewable electricity standards for electric companies and dedicated renewable electricity funds. Current renewable energy regeneration is also considered." The report finds that:

- Nineteen states have assumed a leadership role by taking important first steps towards developing a clean energy system.
- Thirteen states have adopted renewable electricity standards.
- Fifteen states have adopted renewable electricity funds which UCS forecasts will invest nearly $4.5 billion over a twenty-year period.
- Financial incentives such as tax incentives, grants, loans, rebates and production incentives have been popular in many states. Millions of customers in thirty-six states also have the opportunity to support renewable energy directly through voluntary purchases.
- Meaningful progress toward "plugging in renewables" will come through establishing minimum requirements for states of 10 to 20% from renewable sources by the years 2020.

States receiving a grade of D or F did "not pass the UCS test of using their available renewable resources to-date or making firm commitments to do so in the future." ***Florida received a D grade. "D grades were given to states with a commitment to new renewable energy below 1% of total retail sales in 2017 or with existing renewable generation between 1 and 5% today".***[32]

4.7 National Panel of State Energy Leaders

The authors of this report met with key members of energy offices from New York, North Carolina and Wisconsin and a frequent Texas Energy Office contractor from Texas A&M. Convening in early August at FSEC, the panel encouraged Florida to:

- Create a mechanism to fund energy efficiency and renewables.
- Measure and verify energy savings or fossil fuel use reduction.
- Have the Governor lead the charge (good politics)
- Obtain baseline data.
- Make the energy/economy connection.
- Make the energy/environment connection.
- Compare utility DSM projects with public benefit fund projects.
- Add fuel costs to economic forecast.
- Get stakeholders involved,
- Go for big policies, large savings.

[32] The report is available at www.uscusa.org/clean_energy/renewable_energy/index.cfm

4.8 Appliance Standards

Significant legislation is pending before the U.S. Congress dealing with energy efficiency and appliance standards. A summary appears in Appendix E3, along with data on the energy saving benefits to Florida of current national appliance efficiency standards as well as the proposed standards.

Recently, the Southern Alliance for Clean Energy and the Florida Public Interest Research Group (FPIRG), supported by ACEEE and their national appliance standards project, also called for Florida to look at potential standards for a number of appliances, suggesting 10 for initial action.[33]

Further information on these measures is included in Appendix E4.

[33] FlaPIRG report included in Appendix.

5.0 FLORIDA ENERGY USE

5.1 Primary Energy Use

The State of Florida no longer maintains a comprehensive database of energy use in the state. However, Florida-specific data is compiled and maintained by the U.S. DOE Energy Information Agency (EIA). EIA has an energy consumption and costs database from 1960 through 2000 which tracks energy use and costs by state, fuel type and energy sector. Unless otherwise noted, the data presented in this section derive directly from this EIA database.

The data show that Florida's primary energy use has grown dramatically over the last 30 years. We can compare Florida's growth in primary energy use with that of the nation by indexing them both to a particular year, making the relative change in energy use readily apparent. Figure 5 below shows that Florida's year 2000 primary energy use is 250 percent greater than its 1970 primary energy use, while the same value for the nation as a whole is 147 percent. This means that Florida's primary energy use is growing at a rate approaching twice that of the nation.

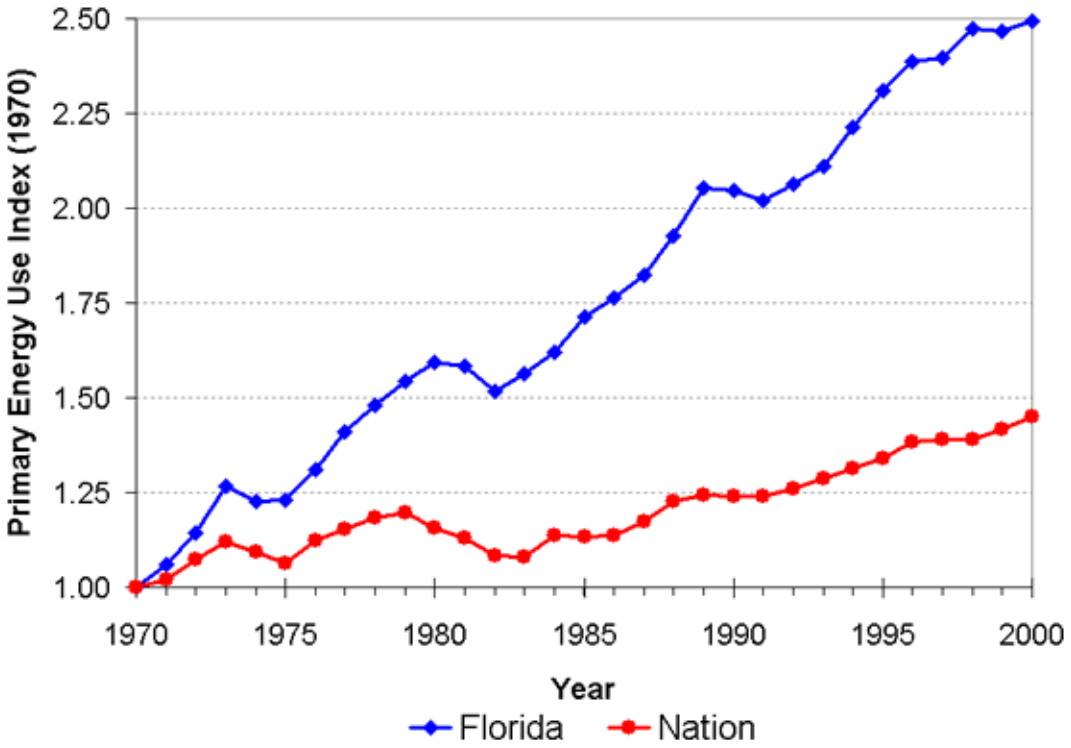


Figure 5. Relative growth in energy use for Florida and the United States as a whole, indexed to their 1970 values.

Unless this growth rate subsides, the obvious implication is that Florida must invest more heavily than most other states in meeting its future energy needs. Demographers do not predict any substantial change in Florida's population growth rate, which is the major

driver of its increased energy needs, so it is imperative that Florida pursue the wisest and most cost-effective means of providing for our future energy needs. Florida currently imports virtually all of our energy resources so the growing energy needs also have profound economic implications for the state. Additionally, our rapid growth in energy use has significant environmental implications.

To find out how to reduce energy use, we must first know how we are using energy. Traditionally, primary energy use is segregated into three sectors: building energy use, transportation energy use and industrial energy use. Looking at energy use by sectors clearly shows that that Florida uses energy very differently than the nation as a whole. Figure 6 illustrates how the state's energy sector use differs from that of the nation.

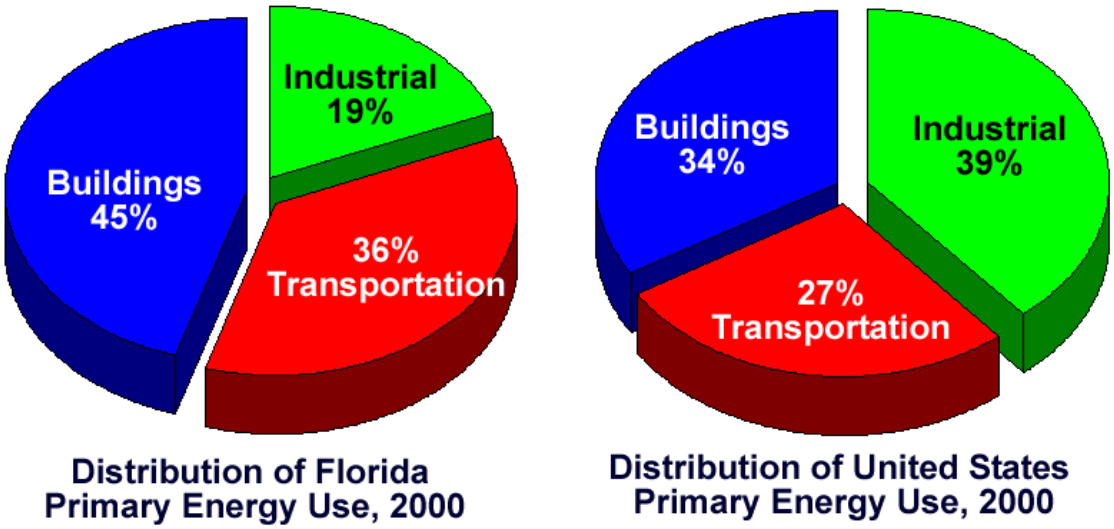


Figure 6. Primary energy use distributions in Florida and the United States in 2000.

While the U.S. uses approximately 1/3 of its primary energy resources in each major sector, Florida's energy use is heavily concentrated into the buildings and transportation sectors, with these two sectors making up more than 80 percent of the state's primary energy use. Clearly, these energy use distributions must impact decisions on how to most cost-effectively reduce energy use in Florida. In fact, while the rest of the nation has major concentrations of energy use concentrated among fewer major users in direct competition (industrial use) to improve their energy performance, Florida's energy market is made up of more difficult to reach consumers (smaller commercial and residential) requiring significantly different strategies. The primary strategies may be best described as "market-driven" rather than supply or direct support.

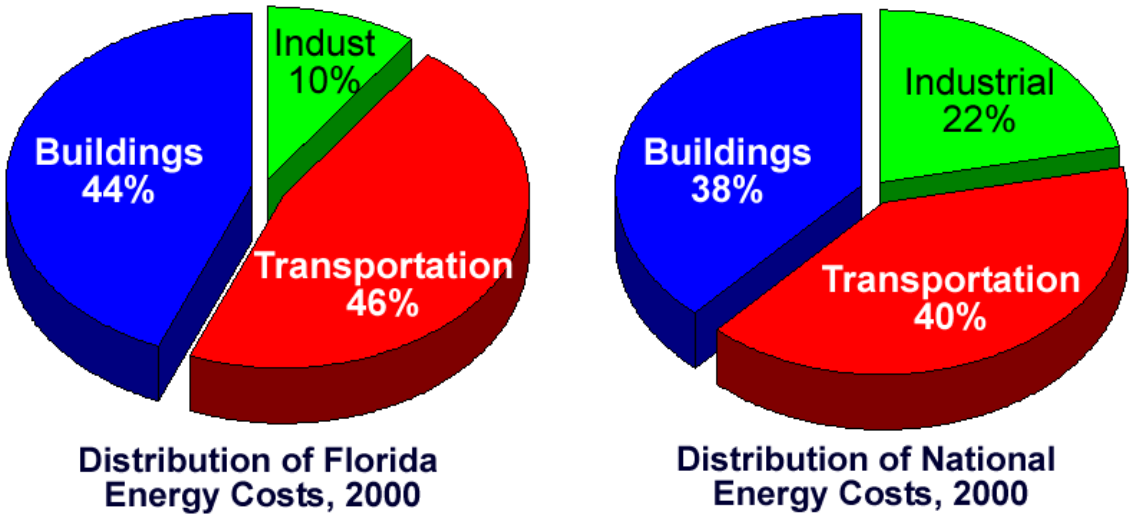


Figure 7. Distribution of Florida and United States Energy Costs in 2000.

Equally important, Figure 7 shows that if we examine energy costs instead of energy use, the buildings and transportation sectors make up more than 90 percent of Florida's energy costs, with the transportation sector growing to 46 percent of the total and industrial costs shrinking to less than 10 percent of Florida's total energy costs. Clearly transportation and buildings are the most important sectors to examine.

5.2 Comparative Trends

Each of these sectors can be analyzed and examined in greater detail. For purposes of comparison, data from the U.S. as a whole and data from four individual states (Florida, Texas, Nevada and California) are selected as a means of analyzing and examining energy use trends between 1980 through 2000 in more detail. The base year for the comparison is chosen as 1980 because in that year important Florida Statutes designed to impact energy use were either implemented or enacted. For example, Florida's building energy codes became effective for the first time in 1980. Florida also enacted the Florida Energy Efficiency and Conservation Act at that time which authorized electric and natural gas utilities to receive credit and additional money for engaging in energy conservation and "peak load" reduction programs.

For purposes of this analysis, all energy use data are "normalized" to the population by dividing the energy values by the population. Thus, values given by the analysis are "per capita." In addition, the per capita data are "indexed" to their 1980 value. This means that each of the values between 1980 and 2000 is divided by its value in the "index" year, 1980. The first data manipulation is done so that population growth is factored out of the results. Otherwise, the difference in population growth rates between comparisons would work to obfuscate the trends. The second manipulation, indexing, allows values with different magnitudes to be compared to one another on an equal basis (the change from a base year). Without indexing, it is virtually impossible to compare the data because of differences in absolute magnitude.

As an example, we can examine the population "index" for the five data sets. Figure 8 illustrates that, among other things, Arizona has grown more rapidly (190 percent growth rate since 1980) than Florida at 162 percent. The U.S. growth rate is the slowest of the group at about 123 percent, and Texas and California are in the middle at about 142-144 percent each.

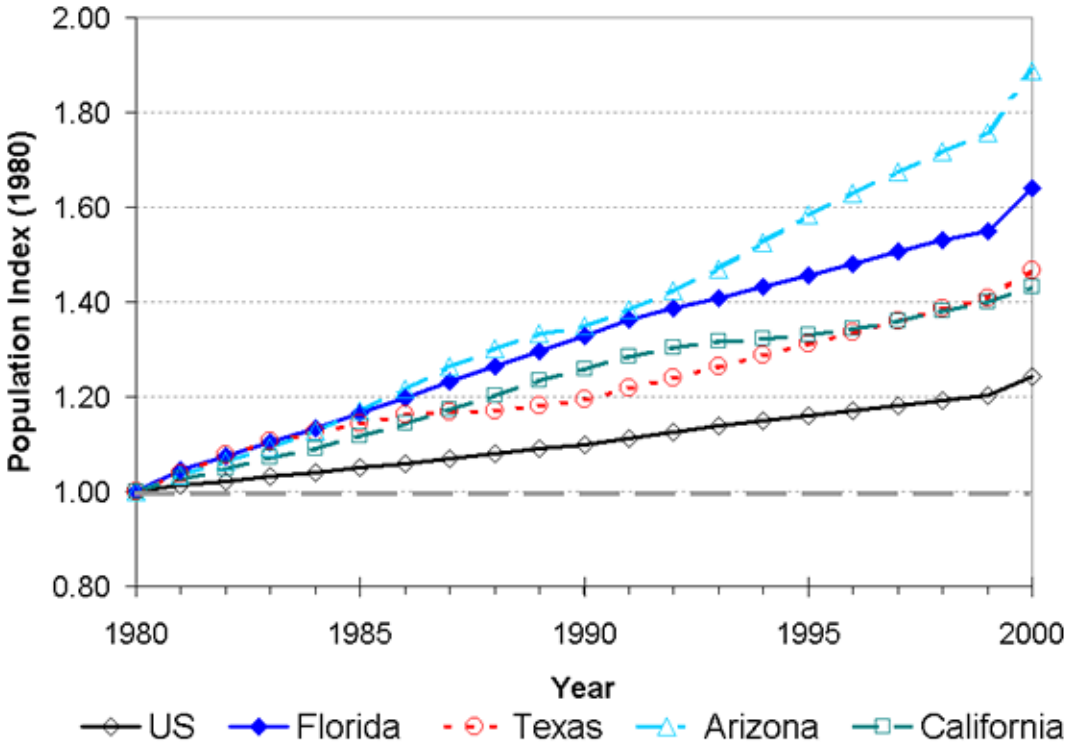


Figure 8. Population index for U.S. plus four selected states.

If we recast the total primary energy use (value charted in Figure 5) in terms of its per capita index value, we can much more realistically examine the historical trends in energy use in Florida as compared with the other selected states and the U.S. as a whole. Figure 9 provides these data.

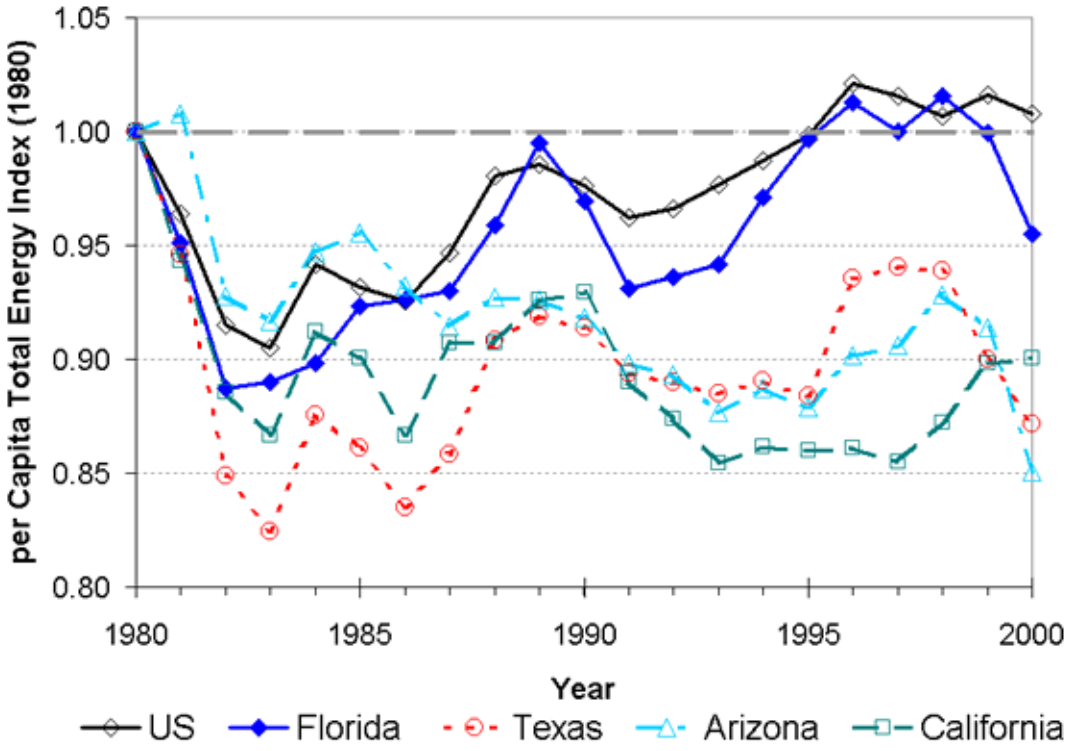


Figure 9. Total per capita primary energy use index for the U.S. and four selected states.

Data in Figure 9 show that U.S. per capita energy use has grown by about 1 percent while Florida's has declined by about 4 percent. Arizona, Texas and California have all seen 10-15 percent declines in per capita total energy use during the same period.

6.0 Hierarchy for Energy Decision Making

One useful approach for addressing Florida's energy needs is to examine the component parts of change in the energy arena before simply providing more of the same type of energy resources. Specifically, there are five hierarchal building blocks of energy strategies that should be considered

Energy strategies have various levels of cost-effectiveness and potential savings, but the greatest potential for savings and the most cost-effective strategies often begin in design. Whether it is design of a building to make use of correct orientation, or land use designed to minimize transportation distances, or the development of a manufacturing process that includes minimizing energy use, it is during the design stage that the highly cost-effective strategies for making an impact are selected. Design measures, whether done poorly or well, tend to persist for long durations, often for the entire life of the development, building, equipment or process. Good design requires access to good information and appropriate education for the designer. It can be encouraged through education, regulations and incentives.

Beyond the design stage, there are a number of efficiency measures that can be utilized. Efficiency measures provide the same or better benefit at no inconvenience to the user. An automobile that obtains 10 percent better gas mileage than another vehicle in the same class with similar features is an example of efficiency in transportation. Replacing a motor with one that does the same work with less energy input is an example of improving efficiency in an industrial process. Selecting a more energy-efficient light bulb that produces the same amount and quality of light as an incandescent bulb, while using far less energy, is an example of efficiency in a building. Once efficiency measures are made, they tend to be persistent until the item needs to be replaced. Creating more efficient technologies requires basic and applied research. Demonstrations, dissemination and education are required to begin market transformation.

Figure 10. The Building Blocks of Energy Choice.

Conservation initiatives involve reducing energy use, often with a change in occupant behavior. For example, turning off lights when leaving a room, participating in a vanpool and turning off a motor that is not in use are all examples of conservation. Although some conservation efforts are automated (e.g., motion sensors on light controls), others require continued consumer persistence for the savings to remain. Regular consumer education is required for conservation efforts to have large impacts.

Alternative energy technologies look at supplying energy from resources that offer some benefit (such as less pollution) as compared with conventional resources and, as such,

should be considered prior to considering conventional resources. Roof-integrated photovoltaics, natural gas-powered vehicles or wind-powered water pumps are examples of alternative energy supply methods. However, because these resources, like all energy resources, are very valuable (and often costly), they should be considered only after all of the design, efficiency and conservation potential has been exhausted. Research and capital expense for infrastructure or demonstrations are generally required in the early stages of some technologies. Others require some incentive to overcome institutional and market barriers; such incentives often are justified based on the environmental benefit derived.

Finally, conventional fossil-fuel resources should be explored to meet the needs in such a way as to assure cost-effectiveness and reliability. Even among conventional fossil-fuel choices there may be preferences for one of the options based on efficiency and application for particular tasks.

These types of strategies can be segmented, but sometimes the differentiation may be difficult. More importantly, there tend to be groups of measures from all of these categories that complement each other and work in synergistic ways. [see sidebar on Lakeland energy-efficient home].

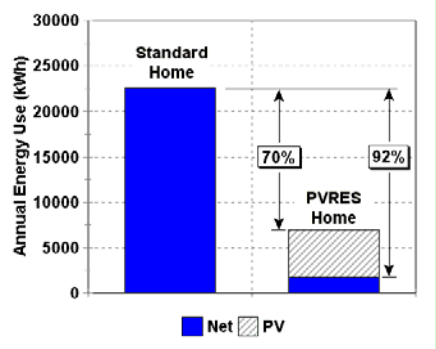
All too often, decisions made by policy makers concentrate on the supply of conventional sources without examining the great benefit available from the more cost-effective building blocks that take place at each end-use sector. The following chapter addresses observations, options and recommendations for each end-use sector.

Additional tools for examining and addressing state energy strategy appear in Appendix F.

Lakeland Zero Energy Home

The showcase example used by the U.S. National Renewable Energy Laboratory is a project in Florida conducted by FSEC and Lakeland Electric. Designed to demonstrate what was technically

achievable, a builder's standard model was compared with one upgraded and supplied with photovoltaics. First, the **design** was altered to include ductwork inside the conditioned space. Overhangs were extended to four feet and a white tile roof was used instead of dark shingles. **Efficiency** measures included better wall and ceiling insulation, efficient windows and appliances and very efficient heating and cooling systems. **Conservation** efforts included programmable thermostats. A solar water heating system was deployed. By incorporating all the measures, the model used just 30% of the energy for cooling as the comparison home. Submetered data indicates the 2400-square-foot zero energy home met the peak cooling requirements during the summer of 1998 with a two-ton AC system while the control home built to code could not maintain the temperature with a four-ton unit. Finally, **photovoltaics** were added that displaced another 22% of the electrical demand of the cooling system. **Conventional** gas appliances were used to further reduce electrical demand.



7.0 FLORIDA ENERGY SECTORS

7.1 Electricity Sector

The EIA database is segmented by energy use type. The largest of Florida's uses is for the generation of electricity. Figure 11 shows that electricity generation consumes almost 43 percent of Florida's total primary energy resources. Of this electricity segment, half goes to residential buildings and 40 percent to commercial buildings, with most of the remaining 10 percent going to industrial energy uses. Transportation consumes less than 1 percent of the electricity segment's primary energy.

Motor vehicle fuels, which represent 87 percent of Florida's transportation sector, consume 32 percent of our primary energy resources, making them the second largest category. Less than 15 percent of Florida's primary energy is used for non-electrical industrial process energy. The remaining 11 percent is used for all other purposes. Most of the "other" category is for other transportation consumption, like jet fuels, with a much smaller portion coming from other building energy consumption.

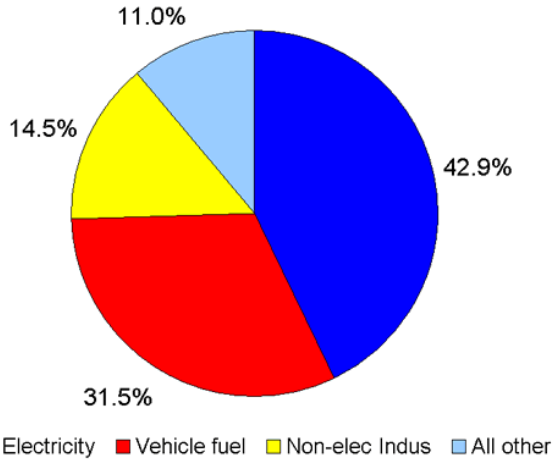


Figure 11. Distribution of primary energy use in Florida by type of use, 2000.

As shown in Figure 6 above, the buildings sector consumes 45 percent of Florida's total primary energy resources. More than 92 percent of building energy use is electric. Thus, even relatively small changes in building energy consumption can make large changes in electricity use, with almost the entire change accruing to the electric category of Florida's primary energy use profile.

Under our current energy use patterns, Florida's demand for electricity generation is estimated to grow by about 58 percent between 2002 and 2020 (from 39,469 MW to 62,269 MW in 18 years).[34] Other projections from utility 10-year site plans indicate that this projected electricity demand growth estimate is conservative. If one assumes the Florida population growth rate of 1990-2000 extends into the future, population should grow by close to 47 percent between 2002 and 2020.

Under the current projected course, per capita electric energy use is expected to increase into the foreseeable future. This may not be the wisest path however, since electricity energy use is closely tied to building energy use.

Figure 12 below gives the per capita electricity use index for Florida, the U.S. and other selected states.

[34] 2020 Commission Report

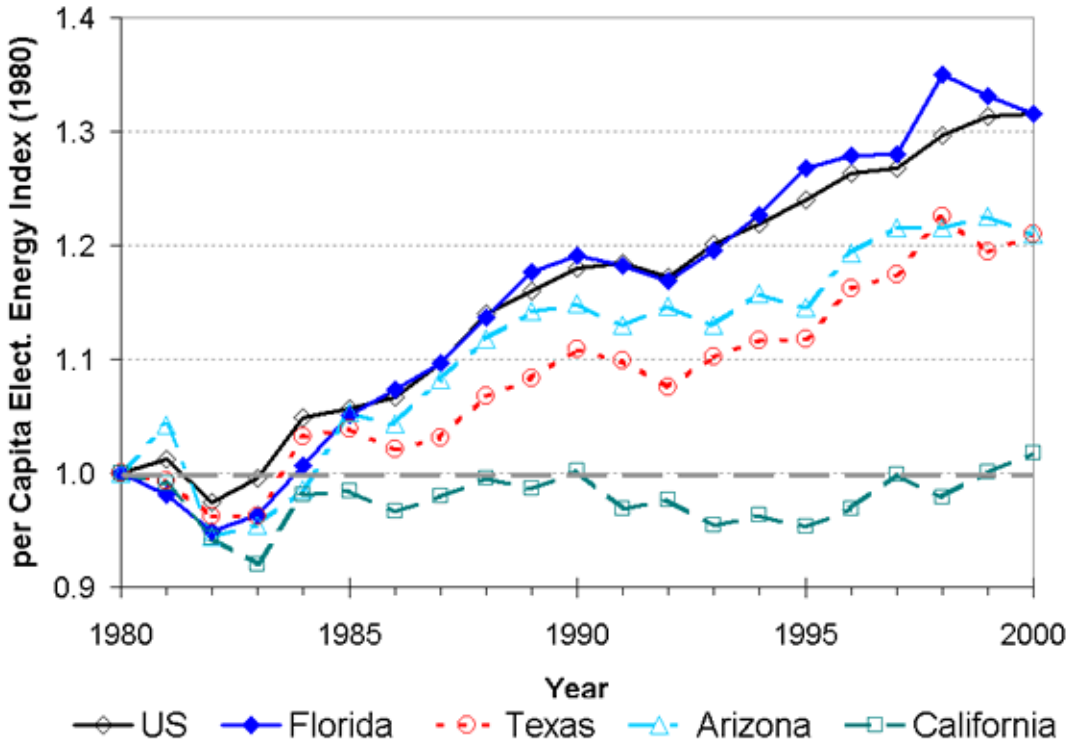


Figure 12. Per capita electrical energy use index for U.S. and selected states.

The data show Florida and the nation with a 32 percent increase in per capita electricity consumption. Arizona's and Texas' per capita electricity use increased about 20 percent and California's per capita electric consumption increased by only 2 percent! As will be shown under the buildings sector, California's ability to hold down its per capita electricity use may be enabled in large part by a significant reduction in its per capita building energy use index over this period, illustrating the strong correlation between changes in building energy use and changes in electric energy use. Generally, California and the Pacific Northwest have had the most aggressive programs in the nation to improve building energy efficiency. Florida can learn from this experience.

Electric Utility Market

Florida's electric utilities reported more than $15 billion in revenues to the Florida Public Service Commission for the year 2001 (up significantly from the $13 billion reported for 2000). Reported revenues from the major sectors included Residential $8.7 billion (56.7 percent); Commercial at $4.7 billion (30.5 percent); Industrial at $1.5 billion (9.8 percent) and Other (including street lighting) at $0.4 billion (3.1 percent).

Florida's electric generation mix remains dominated by coal at 38 percent of the year 2000 total. Natural gas generation at 23 percent and oil at 19 percent follow this. Figure 13 below gives the generation mix for both Florida and the nation for comparative

purposes. Coal is a large portion of the national mix while Florida's oil is a significantly greater portion than the nations'.[35]

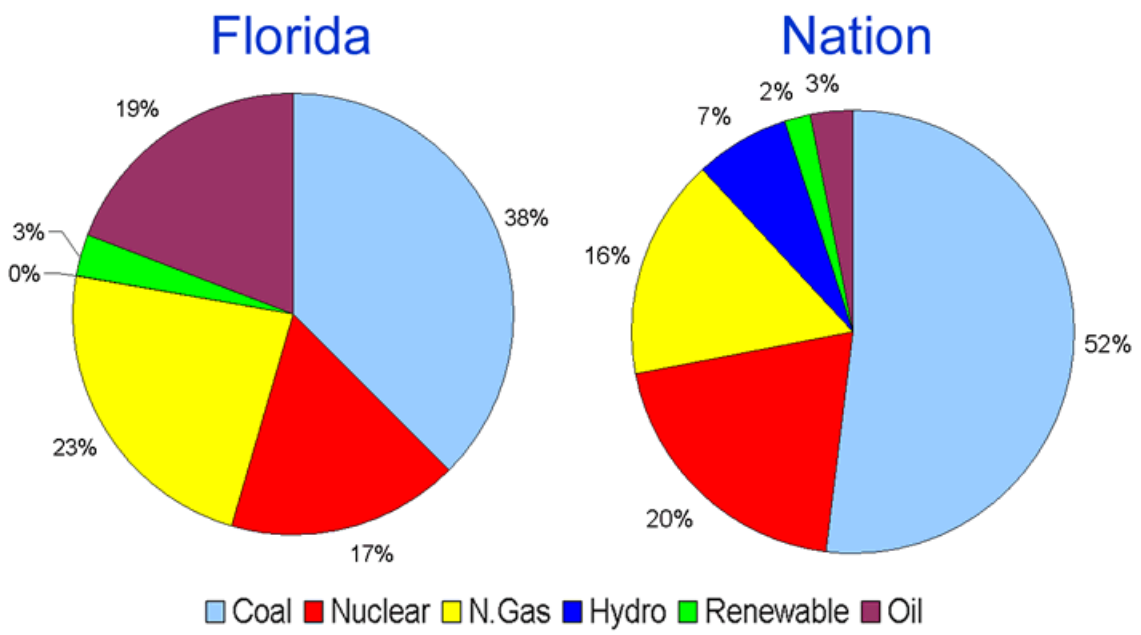


Figure 13. Distribution of electric generation fuel mix for Florida and the nation.

Florida's natural gas generation is rapidly growing. Figure 14 at the right shows that new generation capacity during the previous five years will be largely fueled by natural gas. Also important, the figure also shows that this natural gas trend is projected by the Florida's 10-year site planning process to extend into the foreseeable future.[36] Due to recent spikes in natural gas prices, there remain serious questions as to whether the supply of natural gas can keep pace with the this projected growth in natural gas generation capacity, especially in light of the fact that national projections for new natural gas generation facilities also dominate the projected fuel mix for new generation facilities.

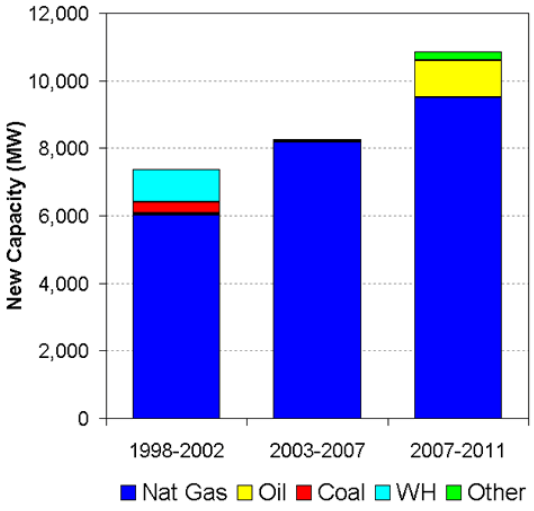


Figure 14. Distribution of fuel mix for new Florida generation capacity.

[35] Florida PSC, "An Assessment of Renewable Electric Generation Technologies for Florida." January 2003.

[36] 2003 Regional (Florida) Load & Resource Plan submitted by the Florida Reliability Coordinating Council (FRCC), July, 2003

Florida's current renewable generation capacity is approximately 1000 MW or 3 percent of total generation capacity (see Figure 13, above). Table 2 shows the distribution of this renewable capacity along with the near term potential for its expansion by 650 – 1400 MW, which would come close to doubling renewable energy generation in Florida according to the Florida Public Service Commission's 2003 report on renewable electric generation in Florida.[37] The report assumes renewable energy to include biomass, bagasse and waste heat as the primary near term sources, as noted below.

Table 2. Distribution of current and near term renewable energy generation in Florida.

Technology	Current Capacity (MW)	Near Term Potential (MW)
Biomass	245	225
MSW	393	60 - 300
Bagasse	----	150 - 225
Waste Heat	340	140 - 440
Landfill Gas	----	32 - 200
Hydro	----	43
Solar PV	----	1
Totals	**1028**	**650 - 1434**

The Florida Public Service Commission's report also lists "longer term" renewable energy technologies, but does not provide an estimate of the potential for these technologies within Florida's generation mix. The report defines "longer-term" as technologies where R&D may make sense in Florida. These technologies are:

- Widespread solar photovoltaics
- Renewable hydrogen fuel cells
- Ocean mechanical devices
- Off-shore wind
- Ocean thermal devices (OTEC)

Utility Efficiency and Conservation Programs

Florida's electric utilities have spent more than $3.7 billion on demand side management (DSM) programs since the Florida Energy Efficiency & Conservation Act [FEECA] was passed in 1980 . These programs encourage energy savings on the customer's side of the meter rather than on the generation/distribution side. The Florida Public Service Commission reports that the six utilities currently covered by FEECA have reduced statewide winter peak demand by 4,914 megawatts (MW), and lowered energy consumption by 6,239 gigawatt hours (GWh) since 1980, deferring the need for more than nine 500 MW generating units. It further reported that the goals the PSC set for these utilities in 2000 are forecast to reduce statewide winter peak demand by 5,760 MW and energy consumption by 3,566 GWh by 2011. The Commission did note, however,

[37] Florida PSC, "An Assessment of Renewable Electric Generation Technologies for Florida." January 2003.

that it had certified the need for an additional six generating units, adding 3,953 MW of natural gas-fired capacity by the end of 2005.

An earlier report summarized the plans of 22 electric utilities in 1994, representing more than 94 percent of the Florida market, to pursue programs which would save more than 2,400 MW from the potential peak usage by 2003, thereby avoiding an estimated capital cost of almost $1.9 billion in new generation units alone. It was noted that this would also save consumers almost 3.4 million kilowatt hours of usage annually by 2003. It should be pointed out that the PSC reported that the utilities achieved a reduction in demand at the peak of more than 3,400 MW and more than 5.8 million kilowatt hours of savings through 2002. Although the energy savings are significant, they represent less than 33 percent of the savings that the utilities found to be cost-effective.

Even though it has not taken place in Florida, recent market restructuring throughout the United States has still impacted the direction of utility demand side management and other conservation activities. Many utilities have adopted energy efficiency and conservation strategies that resulted only in activities that would act to reduce their rates rather than meet the broader societal goal of optimizing efficiency at the consumer level. Florida's Rate Impact Measure (RIM) test, which was adopted as the state policy by the Florida by the Public Service Commission in 1994, is an example of this principle. The adoption recognized that the primary purpose of any electric or gas utility was to sell their product in the most affordable and reliable manner.

When utility DSM programs over the past eight years are isolated and compared to each other between utilities, several observations can be made. The value of savings varies by utility for similar programs. For example, FPL does not credit any savings, either demand or energy, for their audit programs. They only credit savings that are derived from other programs that the homeowner or business may enter based on the audit. Other utilities seem to use a fairly uniform savings rate centered around 0.1 KW (winter and summer) with 300 kWh (energy) savings rates, although these do vary significantly by year and by utility. Some credit their program with fewer summer hours saved by their audits and mail-in audits are credited for about half to two-thirds of a walk-through audit. This remains inconsistent and should be addressed by research sponsored by the PSC or by utilities themselves.

Other examples appear when load management (LM) programs are studied. Only three of the five IOUs have residential load management programs (*Gulf and FPUC*, the two smallest, have only commercial LM). What seems significant about the reporting on the residential load management programs is the failure to accurately reflect the cumulative nature of program participants, if such exists. For example, the PSC data sheets for *Progress Energy: Florida* (formerly *Florida Power Corporation*), a former leader in residential Load Management, reflects that almost half of their residential customers would be included in the cumulative number (almost 600,000 of their 1,200,000 residential customers) in 1998. That figure dropped to 84,000 in 1999 and was begun again in the years after 2000 (new goals period). Whether the reported annual participant figure is the current population for the load management program is uncertain. If so, that

reduces dramatically the figures associated with the load management peak demand reduction capability.

Table 3 summarizes an analysis of this policy adopted by the Florida Public Service Commission in 1994.

Table 3. Summary of FEECA results since 1994.

Cumulative Avoided MW Winter	2,002
Cumulative Avoided MW Summer	1,954
Cumulative Energy Savings (GWh)	16,744
Cumulative Energy Cost Recovery (FEECA)	$2,077,497,998
Cost of Avoided Winter Demand ($/kW)	$1,037
Cost of Avoided Summer Demand ($/kW)	$1,063
Cost of Energy Saved ($/kWh)	$0.13

As noted in Table 3, Florida's utilities have accomplished significant load shedding since 1994. The overall energy savings from their initiatives, however, remain relatively costly. Even granting "blanket" persistency to past program measures, the cost of energy saved ($/kWh) exceeds the cost of commercial electricity by almost twofold. The cost of incremental energy savings (not including "persistence") remain relatively stable at tenfold the commercial cost of the annual electricity saved ($0.75/kWh). This is believed to result from more spending on demand management than on programs to encourage energy savings.

The values in Table 3 can be compared with similar values from other programs. For example, the State of Vermont shows in its report on energy savings from efficiency that their cost of energy savings is $0.029 per kWh or 53 percent the cost of commercial electricity and $311 per kW avoided.[38] Florida's energy code shows even lower costs at $0.00114 per kWh saved (about 1.4 percent the cost of commercial electricity) and $17 per kW avoided (see also Appendix G1). Table 4 below presents all these results side-by-side.

Table 4. Comparison of FEECA with other energy efficiency programs

Program	Cost of Energy Savings ($/kWh)	Cost of Avoided Demand ($/kW)
Florida FEECA	$0.12750	$1,037
Florida Energy Code	$0.00114	$17
Efficiency Vermont	$0.02900	$311

Florida's utilities have adopted programs that have emphasized peak demand reductions (load management) over energy savings. Smoothing loads and reducing peaks (and filling valleys) increases utility profits while saving energy loss revenue. The PSC indicated to the 2020 Energy Commission that spending appears to be allocated 70

[38] Efficiency Vermont, "The Power of Efficient Ideas – Efficiency Vermont Preliminary Report 2002", June 2003.

percent to load management and 30 percent to conservation. This is consistent with the state policy articulated by the Florida Public Service Commission that the Florida Energy Efficiency and Conservation Act of 1980 (FEECA) be used primarily to forward the purpose of peak load reduction and power plant construction avoidance rather than focus on consumer efficiencies and conserving energy. This is done through the adoption of the Rate Impact Measure cost-benefit test to evaluate utility programs for FEECA cost recovery. FEECA, as a state statute, began with a focus on energy savings. It was modified in later years at the request of the industry to add load management along with conservation.

In many states, both those with a restructured market resulting in retail competition and those with a traditional market without competition, the state also adopted a policy of optimizing energy efficiency and conservation in their marketplace and either established a public benefit fund or a single state entity responsible for implementing this policy. *Efficiency Vermont* is an example of the latter. This has led to many state programs that have emphasized the role of the state in assuring an active and effective marketplace for efficiency rather than the traditional role of assuring an affordable and reliable supply and, where necessary, interventions to balance supply and demand.

Austin Energy Offers Fixed 10-Year Fuel Charges for GreenChoice Consumers

Whereas many utilities offer voluntary green pricing programs at a premium addition to the regular fuel charge rate, Austin Energy offers its customers the potential to save money. The utility purchased over 100MW of green power on a ten-year fixed contract, and passed those fixed fuel charges onto consumers. The "GreenChoice" residential rate in 2003 is $0.0285/kWh compared to $0.0204/kWh. In 2004 the standard fuel rate will rise to $0.0279 so the two rates are projected to be almost the same. It is likely the "green choice" customers will pay less in future years. Fixed fuel charges have also attracted businesses - they like the certainty of locking in fuel charge rates.

Learn more at:
http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Choice/

Specific Recommendations:

1. Maximize the near-term use of renewable electricity generation using indigenous Florida resources. Consider providing aggressive credit for utilization of renewable energy resources as compared with imported energy resources.
2. Vigorously pursue R&D on potentially promising "longer-term" renewable generation such as off-shore wind and gulf stream generation.
3. Provide incentives for the use of photovoltaic electricity generation as a means of attracting high-tech industry and high-paying jobs to the state of Florida.
4. Require that utilities provide detailed accounting of FEECA cost recovery funds to include the split between load management and energy efficiency and conservation programs and require that cost recovery not exceed the commercial cost of electricity. Require consistent treatment of audit programs across utilities.
5. Consider the adoption of a Preferred Florida Portfolio (PFP) of energy resources that minimizes the cost of electricity production, including the economic costs and benefits of using indigenous rather than imported energy resources.

Implementation:

The state should request that the PSC conduct a cost-benefit analysis that considers the economic gains that can be realized from using indigenous energy resources as compared with imported energy resources. Options that save energy should receive incentives even

if they do so across the entire day or season. Aggressive efficiency credit programs could include:

- Interior duct system
- Audit sealed duct systems
- Reflective roof surfaces or Radiant Barrier Systems
- Solar heat water systems
- Efficient refrigerators
- Efficient washing machines.
-

Based on the results of the study and analysis, the legislature should consider the adoption of a Preferred Florida Portfolio of energy generation technologies. In addition, the State should commission a feasibility study on offshore wind generation. The analysis should fully consider the latest technological improvements to wind generation equipment. In addition, a feasibility analysis that examines the technical, engineering, economic and environmental impacts of gulf-stream electricity generation should also be commissioned and conducted. If these technologies are found to be feasible for use in Florida, an aggressive development and demonstration program should be adopted.

Time has not allowed an in-depth review of the conservation programs but results will probably be similar to those obtained in this preliminary analysis. The analysis reported here should be followed up with a significant study of the Utility DSM program. It is difficult to believe that a program that has cost the ratepayers of Florida more than $3.8 billion over the past two decades fails in both reporting and analytic evaluation of its impact and success. The Public Service Commission is scheduling a new round of reviews of these measures in their five-year cycle of review. The Florida Energy Office should actively participate and also should ensure that the data collected becomes available to all interested parties in an excel spreadsheet format through the Internet. Renewed emphasis should be given to the founding purposes of FEECA and the multiple benefits to ratepayers through conservation and energy savings.

Barriers:

Institutional barriers within state government have been a substantial impediment to progress in this area (utility regulations and regulatory approaches in particular) coupled with resistance to change within the industry. Florida industry lacks direct experience in many of the approaches addressed in this report and, as with human nature in general, limited familiarity has in large measure resulted in avoidance or rejection of proposals for change. More notably, regulatory provisions feature a formidable obstacle to efficiency and renewables by making the sale of more electricity the end goal rather than energy savings. Under the current state structure, the more electricity a power company sells, the more profits it reaps, making efficiency and renewables an inherently poor business investment for utilities. This provides further resistance to their implementation. Major restructure of the reward system may be required. However, since the largest utilities in Florida (or their holding companies) are operating in many states, they may be complying with similar measures in other states.

Measurement:
Total energy use per capita, fossil fuel energy use per capita.

7.2 Building Energy Use

Building energy use is Florida's largest energy use sector. Fully 45 percent of the state's primary energy use goes to buildings. As such, the buildings sector represents a prime candidate for saving large quantities of energy. The data for the building sector show that U.S. per capita building energy use has remained about the same since 1980 (Figure 15). Like the nation, Texas and Arizona have stayed very close to their 1980 index. However, Florida and California have diverged from each other, one growing and the other declining as compared with their index year -- Florida's per capita building energy use increased by 10 percent, while California's declined by a full 25 percent. California has been very aggressive with building sector energy efficiency.

Figures 16 and 17 examine the residential and commercial buildings sectors, which make up 55 percent and 45 percent, respectively, of the building sector's energy use. Through these figures it is possible to discern that a large segment of Florida's overall building energy use growth came from a commercial building increase in the 1980's when the state's per capita commercial building energy use grew by 135 percent.

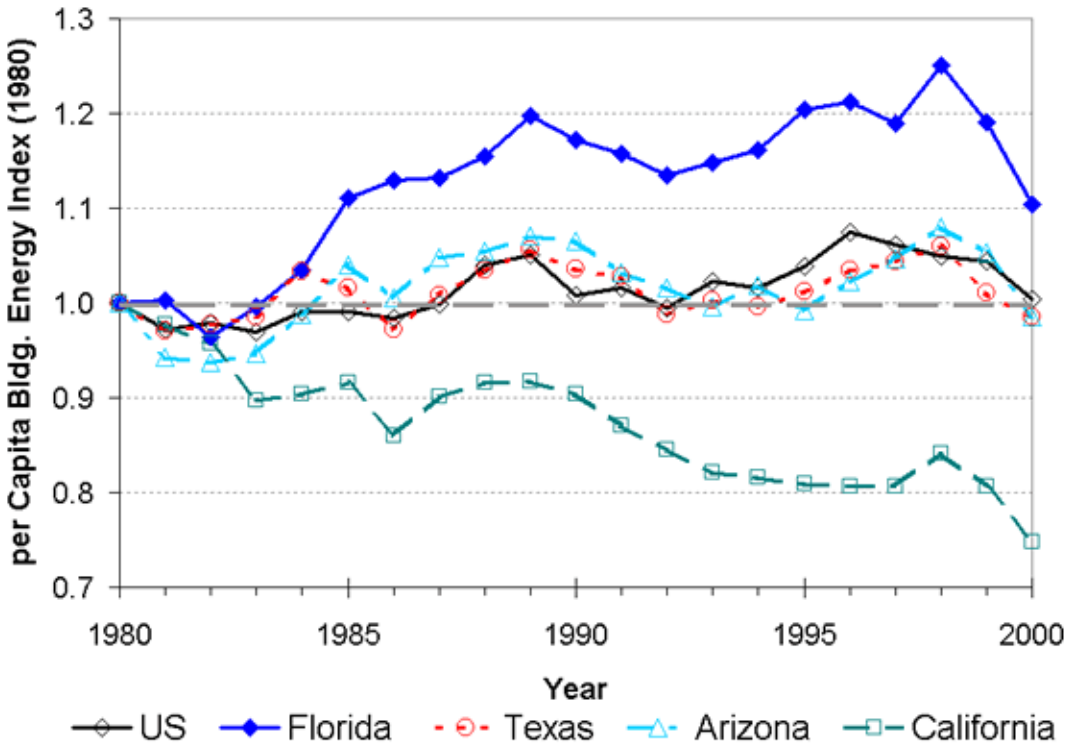


Figure 15. Buildings sector per capita energy use index for U.S. and selected states.

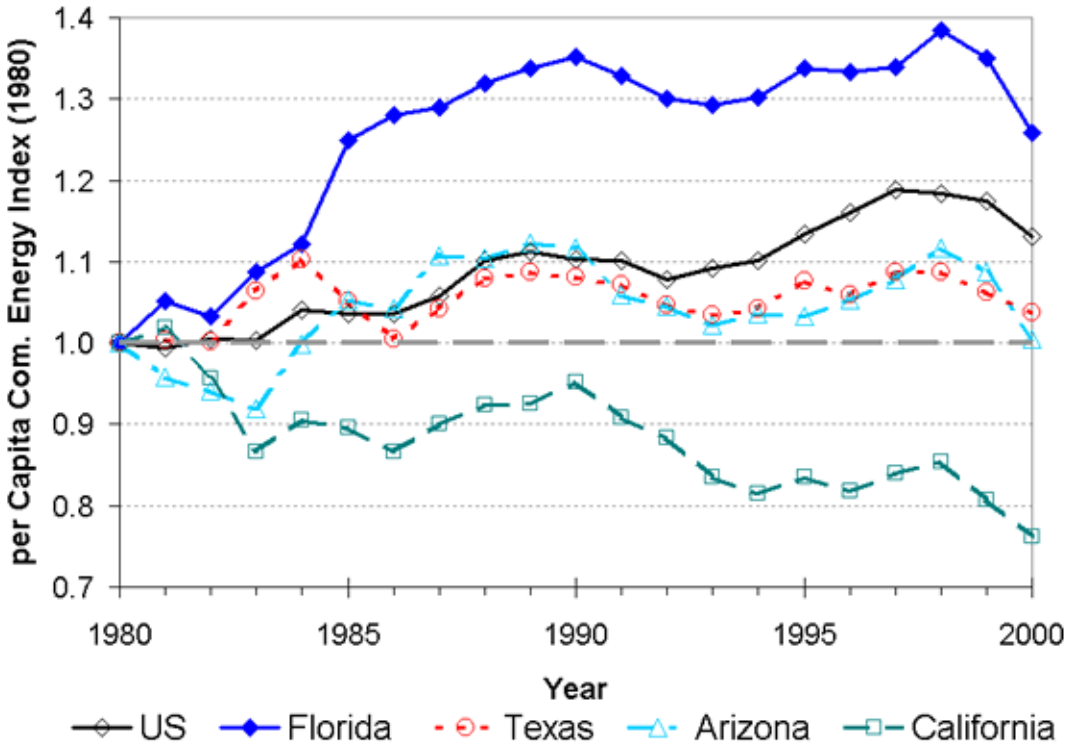


Figure 16. Commercial building per capita energy use index for U.S. and selected states.

It is clear from the data that most of the per capita building energy use increases stem from the large change in the per capita commercial building index between 1980 and 1990. In fact, Florida's per capita commercial building index has declined since 1990 from 1.35 to about 1.27, reflecting some change in 1990 that significantly altered the growth of this index during the '80s in Florida. None of the other states or the U.S. experienced this rapid growth spurt in per capita commercial building energy use in the 1980s. The U.S. grew by about 12 percent as compared with Florida's 27 percent. Arizona and Texas maintained per capita commercial building energy use at about 1980 levels. As in the overall buildings sector, California's index has declined by 24 percent.

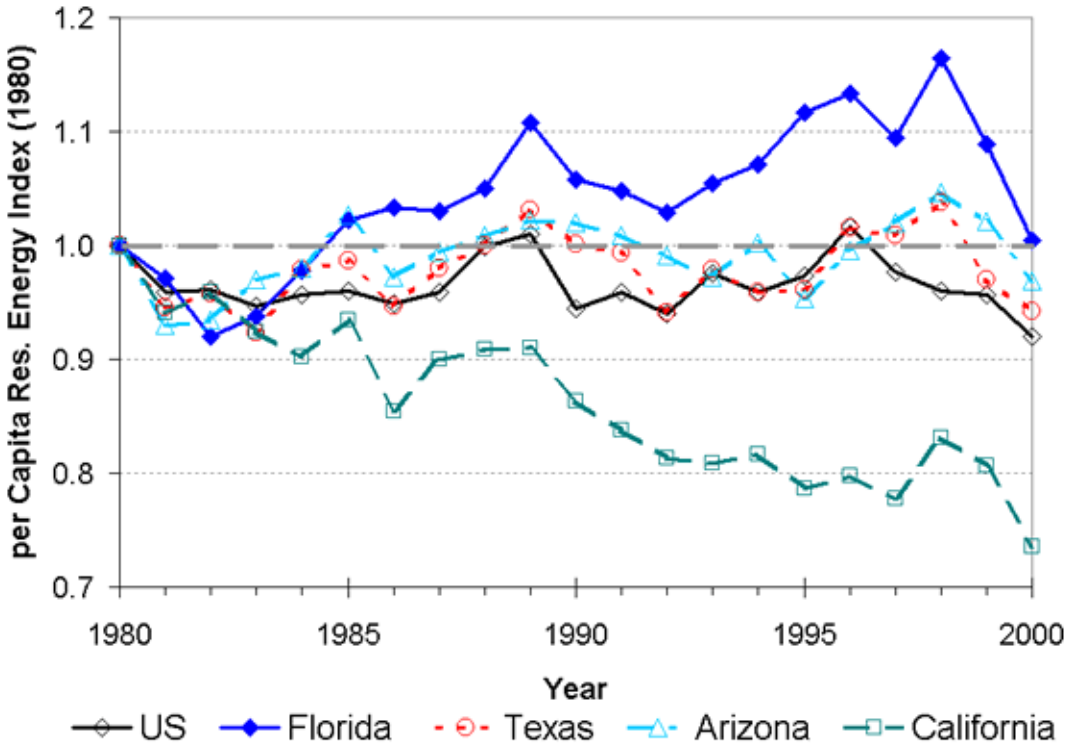


Figure 17. Residential per capita energy use index for U.S. and selected states.

The index in 2000 for Florida's residential energy use, which is the largest and most diverse piece of the building energy use pie, is about 1.0. An observation that is particularly apparent in this plot is the unusually steep change in the data at the year 2000 for Florida. Note in Figure 8 that there was apparently a significant "true-up" of population data in Florida as well as in Arizona, probably as a result of the Census. The true-up occurred in the other states and the nation as well, but is not as pronounced as it is in Florida. As a result, Florida's and Arizona's per capita energy use values for 1999, 1998 and perhaps 1997 are probably skewed to be slightly larger than reality.

Again, Figure 17 clearly shows that California is unique, with per capita residential energy use declining in 2000 to only 74 percent of its 1980 value.

Another aspect of building energy use that is critically important to understanding Florida's energy use patterns is that **building energy use is 92 percent electric in Florida. This compares with about 67 percent for the nation.** Thus, savings in building energy use accrue almost entirely to reductions in electricity requirements. Since most of new generation capacity in FL will be natural gas, improvements to sector efficiency will help to include against price shocks due to contained natural gas supplies.

Broad strategies for reducing energy use in the buildings sector include educating design professionals, tightening building codes, investing in technical improvements, increasing stringency of appliance standards, assisting voluntary programs and particularly for providing strong financial incentives for energy efficiency.

7.2.1 Professional Education

Background:
Most buildings are designed without regard to energy efficiency. Energy concerns are left to a mechanical contractor. However, there are many principles of energy-efficient design that, once embraced by a design professional, are forever incorporated into their buildings. These principles involve simple, age-old climate sensitive methods such as proper orientation, using daylighting and incorporating architectural shading. When included at the very inception of the design, there is often little or no cost increase to the project, whereas there neglect can never be addressed after construction.

Specific Recommendations:

1. Require that environmental-sensitive design be taught within each architectural/construction program at State universities.
2. Support energy-efficient certification programs that would be required by the design firm before bidding on state buildings.
3. Support programs designed for educating residential builders. Such programs are taught by the energy extension service and FSEC. FHBA also teaches programs at their annual conference.

Implementation:
Invite Architectural School Deans to meet with the DEP Secretary to implore the importance of teaching these concepts and how requirements for school buildings will require such expertise. Meet with DMS and the Department of Education (they have already started such a program) and discuss how best to require certifications. Distribute a press release that spells out the new requirements. As funding permits, support the development of new programs or instruments for reaching homebuilders.

Potential Barriers:
The largest barrier to change is inertia ingrained in the industry. That is why calling for certification among design professionals is critical to success.

Measurement and Verification:
There is no easy way to measure the effectiveness of educational efforts. Counts of the number of certifications or course attendees would be one measure, but the data on actual energy use and savings attributed to better education is more difficult to measure. Under our energy codes, design methods are rewarded, but someone building just to code might negate the benefit of those design measures through the use of less efficient components. However, as described above, most of the design features last for the life of the building and so are more important than efficiency and conservation measures. A research study could examine how buildings designed by certified professionals compare to buildings designed by non-certified professionals, but such a study is not essential given the base of knowledge that exists in this regard, and any such study would be costly since there are so many factors involved in differentiating building energy use.

7.2.2 Energy Codes

Background

Florida's residential energy code has been made stricter on six occasions during its 23 years of existence. Florida's residential energy code is in compliance with the national standard – the International Energy Conservation Code (IECC). Since its adoption in 1980, more than 30,000 GWh of energy savings and approximately $2.4 billion in consumer cost savings, along with 1950 MW of avoided power plant capacity, can be attributed to Florida's energy code. Appendix G1 provides details of the analysis conducted to determine these savings.

The agency responsible for Florida's building codes and standards is the Department of Community Affairs (DCA). DCA estimates that the state government's full cost of code administration is approximately $3 million per year. The majority of this amount is for administration of the life/safety aspects of the code, with energy aspects making up significantly less than half.[39] If a conservative estimate of half is used, the cost to the state government for the administration of Florida's energy code over its lifetime is less than $35 million (3 x 23 x 50% = 34.5). **Thus, the residential energy consumption savings attributable to Florida's energy code have cost its citizens approximately $0.00114 per kWh, or slightly more than one-tenth of a cent per kWh saved.** This performance and the lack of market response argues for much more aggressive energy codes in Florida's future.[40]

The statute governing Florida's energy code requires that measures adopted by the code be cost effective to the consumer. As such, the cost to the consumer for code compliance is zero or negative. Appendix G2 on life cycle cost analysis confirms the cost effectiveness of Florida's code (see Figure 18), showing that even today's code has left much room for cost effective energy savings (25%-35%). As a result, Florida's energy code has proven to be the state's most cost effective means of holding down energy use and costs.

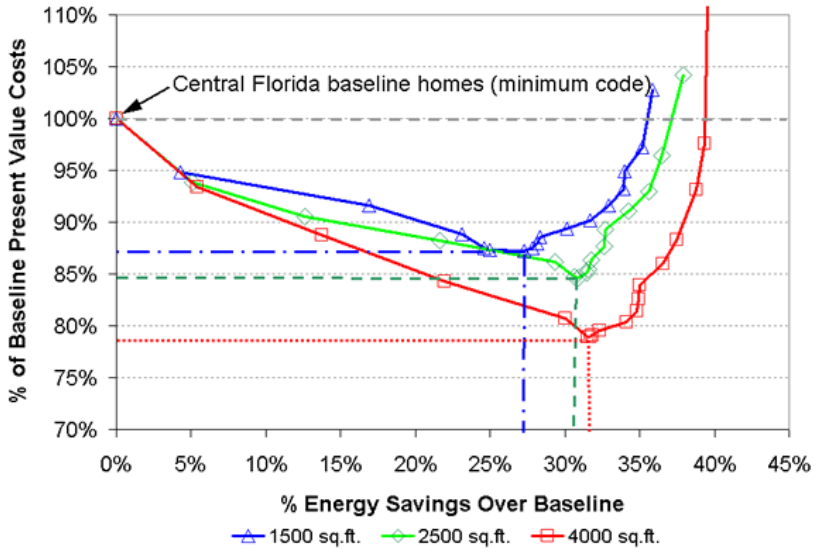


Figure 18. Present value of savings of energy improvements beyond code

[39] Personal communication between P. Fairey and Mo Madani of DCA's Codes and Standards Office.

[40] One example of market failure within the building industry is the widespread practice of excessive profit mark-ups for more efficient building measures. For example, radiant barrier systems and more efficient air conditioners are often marked up by 50-200%.

Specific Recommendations
It is recommended that Florida continue to comply with the IECC (International Energy Efficiency Code) level of strictness or better – targeting a 10 percent increase in efficiency for each of the next three code improvement cycles. As can be seen from the figure below, based on life cycle costs of energy and improvements, the typical new home can be improved by 25 to 35 percent while reducing life cycle costs by 15 to 20 percent. The full analysis is provided in Appendix G2.

Florida's commercial building code is moving to AHSRAE Standard 90.1-2001 in the 2004 code cycle. This commercial code revision is estimated to increase commercial building stringency by 15-17%.

Like residences, commercial buildings can also be cost effectively improved compared with minimum code requirements. However, unlike homes, there are numerous classes of commercial buildings, all of which have very different use characteristics and energy signatures. As shown in Figure 19 below, the life cycle cost analysis conducted in this study (see also Appendix G2) shows that most commercial building can be cost effectively improved by 15 to 25 percent, even as compared with the yet to be implemented 2004 version of Florida's commercial building code requirements.

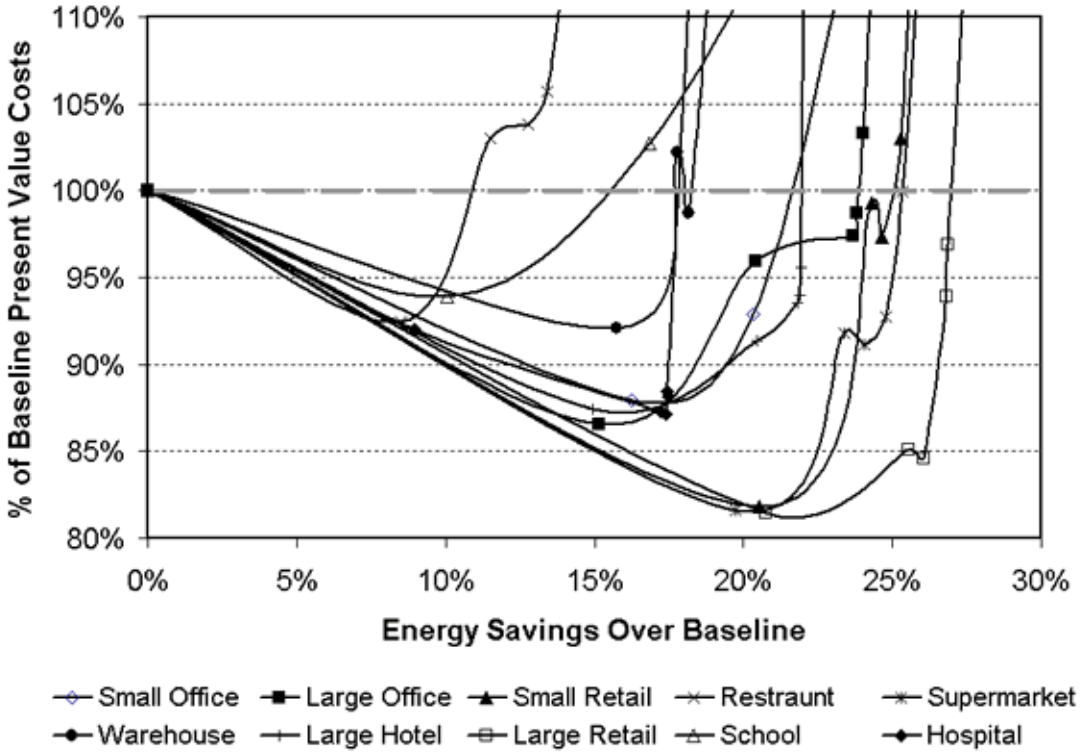


Figure 19. Life cycle cost analysis results for prototypical commercial building classes.

Implementation
Through the uniform building code process, there is already an infrastructure in place in Florida to support code improvements every three years. Local building officials require

code calculations and forms and, although it is not perfect, code compliance is reasonable. The state should develop an "energy code for the building inspector" course and certification, and require building inspectors to attend. The course would include how best to use limited time to find inaccurate code submittals.

Potential Barriers
The home building industry has resisted stricter code changes, particularly those that restrict their choices. To achieve improved results, it is recommended that the energy code continue to be performance-based to allow builders to choose whatever measures they desire to meet the code. For example, the residential code now allows for attic air handler location and the commercial code permits electric-resistance reheat, but these inefficient measures must be overcome through extra efficiency measures elsewhere in the performance-based code.

Measurement and Evaluation
1. A research project could randomly select new homes, where the owners would be invited to have complimentary full audits conducted with regard to energy code compliance. The results would be shared with local jurisdictions as a method to encourage inspectors to follow through with their inspections.
2. Energy use of the average new code home should be less than the average new home built under the less strict code. This data could easily be collected from cooperative utilities.
3. A research project should obtain annual utility records and code scores and measures to help refine understanding of the best performing measures (empirical data) to allow more effective code recommendations.

7.2.3 "Beyond Code" Voluntary and Incentive Programs

Background
"Beyond code" programs are voluntary, market-based programs intended to encourage consumers to purchase more energy efficient or renewable energy technologies. The U.S. Environmental Protection Agency (EPA) has pioneered the area of market transformation through its ENERGY STAR® branding programs. The consumer marketplace in now full of ENERGY STAR product options that offer 10 percent to 30 percent energy savings as compared with conventional or minimum standard products. Among EPA's branding programs is the ENERGY STAR new homes program, which provides marketing and labeling opportunities for homes that are independently certified to be 30% more efficient than the 1993 Model Energy Code (MEC). In essence, this independent certification procedure requires that, to qualify, these homes be "rated" by a certified home energy rating system (HERS) and that they receive a HERS score of 86 or greater.

In 1993, the Florida legislature passed the "Florida Building Energy Efficiency Ratings Act." This Act anticipated such "beyond code" market-based programs and required the Department of Community Affairs to adopt and maintain a statewide uniform rating system for buildings. As a result, Florida has implemented one of the nation's most

progressive uniform rating systems, which is fully accredited by the national organization responsible for such accreditations (RESNET).[41]

EPA's ENERGY STAR new homes program has been quite successful at the national level, resulting in construction of an estimated 115,000 new homes that are 30 percent more efficient than the MEC standard since 1995. Florida's share of ENERGY STAR new homes, however, has not kept pace with the national effort. Florida builds the largest number of new homes of any state in the nation, estimated at about 110,000 units in 2003. The nation is expected to construct approximately 1.5 million new homes in 2003, making Florida's contribution about 7.3 percent of the total. Since 1995, when the ENERGY STAR new homes program began, Florida has registered 3,696 Energy Star homes, or 3.2% of the ENERGY STAR homes registered nation wide – less than half of our anticipated share.[42]

Florida utilities also provide "beyond code" programs to their customers. Called "new home programs" and sanctioned by the Florida Public Service Commission to qualify for FEECA Energy Conservation Cost Recovery funds, these programs generally offer multiple tiers of qualification from 10 percent energy savings at the lowest tier to 30 percent energy savings at the highest tier. Generally, the highest tier also qualifies for EPA's ENERGY STAR label.

The Florida Green Building Standards also represent "beyond code" programs, and these programs are maintained and certified by the Florida Green Building Coalition, a non-profit organization started in 2000. The organization has a green home standard that relates to the goals of many Department of Environmental Protection programs. The green home designation is earned through measures that go beyond code not only in energy efficiency of the home, but also in the areas of water conservation, site selection and on-site preservation, material choices for waste reduction, healthy indoor air, durability and disaster mitigation.

Specific Recommendations

1. Provide for public service consumer education and marketing programs that extol the virtues (increased quality, comfort, durability and energy efficiency) of homes built to ENERGY STAR and other voluntary and incentive programs. The state should encourage conservation efforts in this sector by participating in the soon-to-be-released national ad council campaign on energy.
2. Provide financial incentives for new homes and buildings that reach targeted levels of savings compared with state minimum standards.
3. Provide "advantage" financing mechanisms for qualifying high-performance buildings.

Implementation

Because some program elements already exist, there is little to do in program formulation. Rather, it is how to best get the word out, which requires money and strategies.

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[41] See also http://www.natresnet.org/

[42] EPA

Task force formation: The first steps to implementation should be creation of two task force groups, one on local incentives and one on statewide awareness. The first group should consist of representatives from the League of Cities, Association of Counties, FGBC, the Florida Home Builders Association, the Urban Land Institute, regional planning councils, DCA, energy office and pollution prevention department of DEP. The other task force should consist of appliance distribution outlet reps (e.g., Lowe's, Sears, Home Depot, as well as local/regional appliance retailers such as Appliance Direct in east Central Florida), HVAC contractors, appropriate members from EPA, DOE and advertising media specialists.

Marketing and awareness: EPA has funded some of the creative work for public service announcements. Florida can customize such messages and attempt to receive greater placement of such messages in the media. The state should work with homebuilders, realtors, and the mortgage industry to develop a simple program and message. The benefit must be obvious to home purchasers as a way to encourage them to invest in the more energy-efficient home.

As a conservation effort that will target buildings, appliances and potentially transportation, *Energy Outreach Colorado* has worked with the *National Ad Council* (creators of Smokey the Bear, etc.) to create a public service announcement campaign for education about energy conservation and efficiency. The program has participation of 18 other states, including Georgia, and Florida can participate at a cost of $35,000 per year. The ad council campaign will begin in January, 2004 and the Department of Energy is one of the sponsors. By participating, local media outlets will be contacted to play or print the service announcements in Florida. Other benefits are listed in Appendix H.

Potential Barriers

There are many messages aimed at builders and homebuyers – it will cost money to have any message or program effectively heard.

Measurement and Evaluation

Number of homes that participate in programs that go beyond the energy code and their projected savings levels. A small sample of any such homes should be randomly visited and tested to assure compliance with the program, and energy bills should be compared with non-participants.

Short-term measurement: Increased awareness of Energy Star brand, FGBC designation.
Mid-term measurement: Continued increase of brand awareness, plus market share increase.

Long-term measurement: Reduction in per building energy use normalized for square-footage, occupancy, and weather.

7.2.4 Appliance Standards

Background:
Florida led the nation, along with the States of New York and California, in adopting a series of appliance standards in 1987 (Sections 553.951-553.975, F.S.). In response to the actions by the states, the federal government adopted the National Appliance Energy Conservation Act (NAECA) which imposes national standards on a series of products (appliances) used in the home. The Energy Policy Act of 1992 set federal standards for lamps, motors and certain other consumer devices. Where federal standards have pre-empted the states, the states have emerged as important supporters of a continuing process to establish and update national standards. Florida was instrumental, along with other states and national organizations, in reinvigorating the program at the U.S. Department of Energy (DOE) during the late 1990s. Based on DOE analysis, by the year 2020, federal standards already adopted will reduce projected U.S. peak electrical demand by 13 percent, annual electricity consumption by 8 percent and save consumers $186 billion net of projected impacts on product prices.

"If 10 commonly used consumer and business products—ceiling fans, commercial clothes washers, large packaged air conditioners, commercial refrigerators and freezers, commercial building transformers, exit signs, external power supplies, set top boxes, torchiere lamps and traffic signals — met the minimum energy efficiency standards recommended by this report: Florida businesses and consumers would save in excess of $300 million a year in electric and natural gas bills by 2010. Savings would reach more than $450 million a year by 2020.• Altogether, Florida consumers and businesses would net almost $3 billion in savings between 2005 and 2030," (see Appendix E4).

Energy Star is a national program run by EPA and the Department of Energy. Their program standards not only include new homes (as discussed above) but also appliances. Energy Star labeled appliances exceed federal requirements by 10 to 30 percent and products that meet or exceed those standards can use the Energy Star label for marketing purposes. Name recognition of the Energy Star label is high nationwide. New York State has invested heavily in promoting Energy Star products through advertising to consumers. *One of the key lessons from New York is the importance of offering financial incentives for appliances as bounties*. In other words, requiring that the old appliance be turned in rather than used elsewhere. For example, a "bounty" is provided for turning in an old refrigerator rather than just moving it from the kitchen to the garage. New York determined that without bounties, certain appliance programs like refrigerator replacement can actually increase energy consumption.

Specific Recommendations:
1. Support strengthening of federal appliance legislation
2. Set standards for appliances where the federal government has not taken action, specifically where these have importance to Florida (e.g., swimming pool pump and ceiling fan efficiency)
3. Offer financial incentives for choosing energy efficient appliances.

Implementation:
Review the Florida PIRG report (Summary is in Appendix E4) and bring together a stakeholder group of any appropriate Florida-based manufacturers, retailers and energy/environmental groups to arrive at recommendations. Have the Governor announce that he is in favor of stronger federal appliance standards, particularly those that greatly affect Florida's energy use such as air conditioners. This can be done in part by purchase incentives for appliances that exceed federal standards, such as those labeled under the Energy Star program.

Barriers:
Product manufacturers will resist state legislation for two reasons. First, they will resist change and any regulation, and second they will prefer national legislation so that they don't have to sell different products to (or be subject to different requirements in) different states. However, most manufacturers won't assist in the passage of national standards so states are left with developing their own standards as the only course of action.

Measurement:
The market share of more-efficient appliances.

7.2.5 The Use of Renewables and Waste Heat for Reducing Building Energy Use

Background:

Solar Thermal Systems:
Solar thermal systems have been available for decades and despite a variety of economic incentives, including state sales tax exemptions to promote their use, solar applications are far fewer than they could be. Solar thermal systems are much more cost-effective in the marketplace than solar photovoltaics (PV) that generate electricity.

The state should take steps to dramatically increase the use of solar systems for domestic water use. Historically, solar domestic hot water has been envisioned as competitive with electricity but not as competitive with natural gas. However, the cost of natural gas has continued to increase over the years, making the economics of solar more favorable in many commercial and large building installations regardless of fuel type. Solar systems have higher first costs than their competition but are generally viewed as more cost-effective where life cycle costs are considered. Figure 20 shows that solar hot water is a highly cost-competitive option for improvement in new buildings, occurring before options like R-13 walls and R-38 ceilings. The minimum present value of the life-cycle costs is reached after the solar hot water system is installed. (See Appendix G2 for details of life-cycle cost analysis).

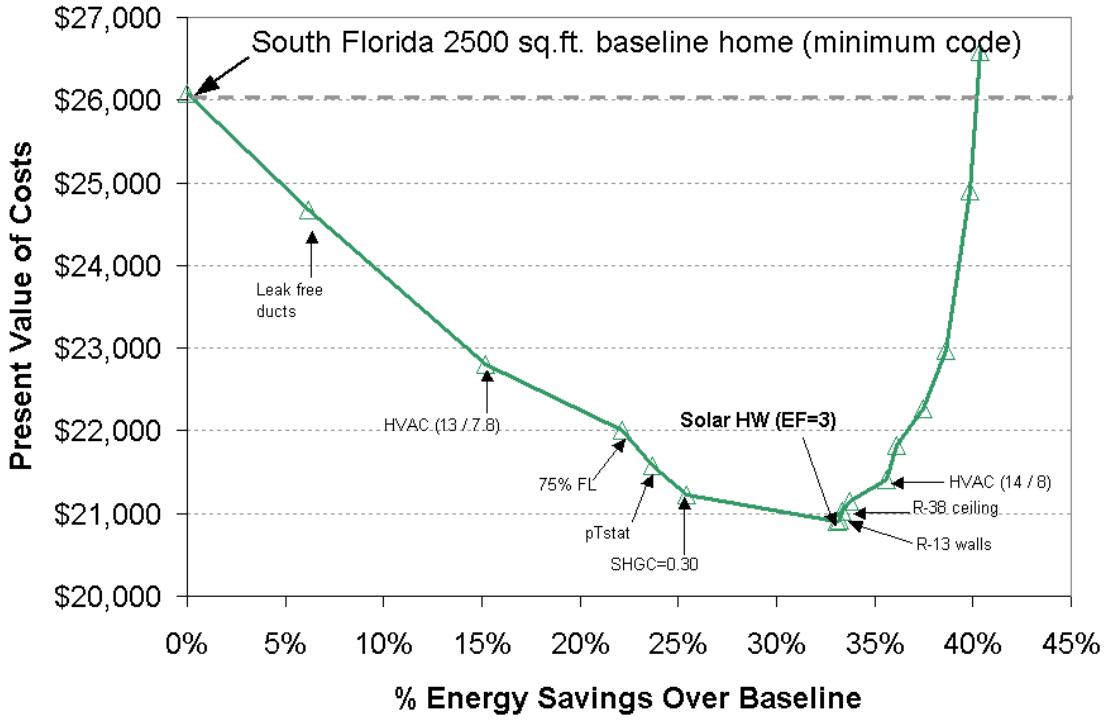

Figure 20. Order of selection for improvements to "baseline" code minimum home.

Temperature class can best describe solar thermal applications as follows:

Low temperature (80 –100°F): Solar is highly economical for these applications since the heat loss from the solar collector is very small. This is why solar pool heating systems are so popular – the systems are less expensive and operate efficiently.

Medium temperature (100-180°F): Although heat losses from a collector system increase as temperatures increase, solar can still deliver energy effectively at these temperatures with technology that has been popular for decades. Proper controls are important to make sure the water returning from the collector is warmer than the water sent to the collector. This temperature range includes domestic hot water use.

High temperature (steam and higher): To obtain higher temperatures, concentration of the solar flux is usually needed as well as more expensive evacuated tube collector systems to reduce heat loss at the greater temperature differentials. Absorption chillers and engines can be driven with high temperature solar systems.

Solar Electric Systems: Photovoltaics (PV) generate electricity from solar photons releasing a charge inside a material such as silicon. The electricity generated is direct current, and can be inverted to alternating current to be used by most household appliances or the PV can be used to power direct current devices. Because the sun is not constant, PV systems are best suited to sell electricity during the day and buy it back at

night. Because PV systems are expensive relative to conventional grid electricity, any PV design should assure that the most efficient equipment is installed to lower energy needs.

Renewables from a grid: Buildings, like other electric end-uses, could obtain renewable-produced energy via the electric grid if the grid has renewable plants. In this way, other renewable or semi-renewable sources such as wind, hydro, biomass and wastes could be used.

Waste Heat: Another excellent source for hot water and space heating is waste heat from a nearby processing plant, utility plant or other mechanism. Opportunities for cost-effective use of waste heat should be explored and encouraged. This topic is covered more under the industry section of this chapter.

Specific Recommendations:

1. Study appropriate large user outlets for solar water heating such as the laundry, lodging industry, state and private parks and recreational facilities, and university dormitories.
2. Continue solar water heating program efforts in the residential sector, including installation of solar water heaters in low-income housing and encouraging homebuilders to offer solar water heaters to homebuyers.
3. Make the solar system tax exemption (Section 212.08(7)(hh[CHECK CITE]), FS) permanent.
4. Extend the availability of the property tax exemption for solar energy systems (Section 196.175, FS)
5. Support aggressive performance based federal tax credit for solar water heating and solar electric equipment.

Implementation:

Develop a demonstration program to establish the technical and economic feasibility of solar water heating for large commercial users, including state dormitories and lodging facilities of the hotel/motel industry. Continue efforts of the Front Porch Sunshine initiative and the Florida Home Builder/Solar Industry partnerships. Support legislation to continue the solar sales tax exemption, restore property tax exemption and support federal legislation to develop an aggressive solar tax credit.

Barriers:

The historic barriers for solar equipment have been high first-cost, cross-trade applications and consumer resistance to change. Furthermore, most utilities have not been able to promote solar water heating because the Rate Impact Measure (RIM) test precludes its use, as the uniform use of energy throughout the day reduces too much revenue to the utility without a large enough offset for peak production time. The policy section of this report will address that issue.

Measurement:
Increases in sales of renewable equipment such as domestic hot water systems. With significant penetration it should also be measurable from an energy use per target building basis.

7.3 Transportation Energy Use

Transportation is Florida's second largest energy use sector with 36 percent of the total. It is also homogenous, being almost totally dependent on automobile and truck. Interruption to the petroleum supply would be crippling to the state's economy. Perhaps surprisingly, Florida's per capita transportation energy use has declined by about 9 percent since 1980. California and Arizona's per capita transportation energy use have also declined by about the same 9-10 percent in this time period, while the nation's use has increased by about 10 percent. Texas has maintained its transportation energy use per capita at about its 1980 level.

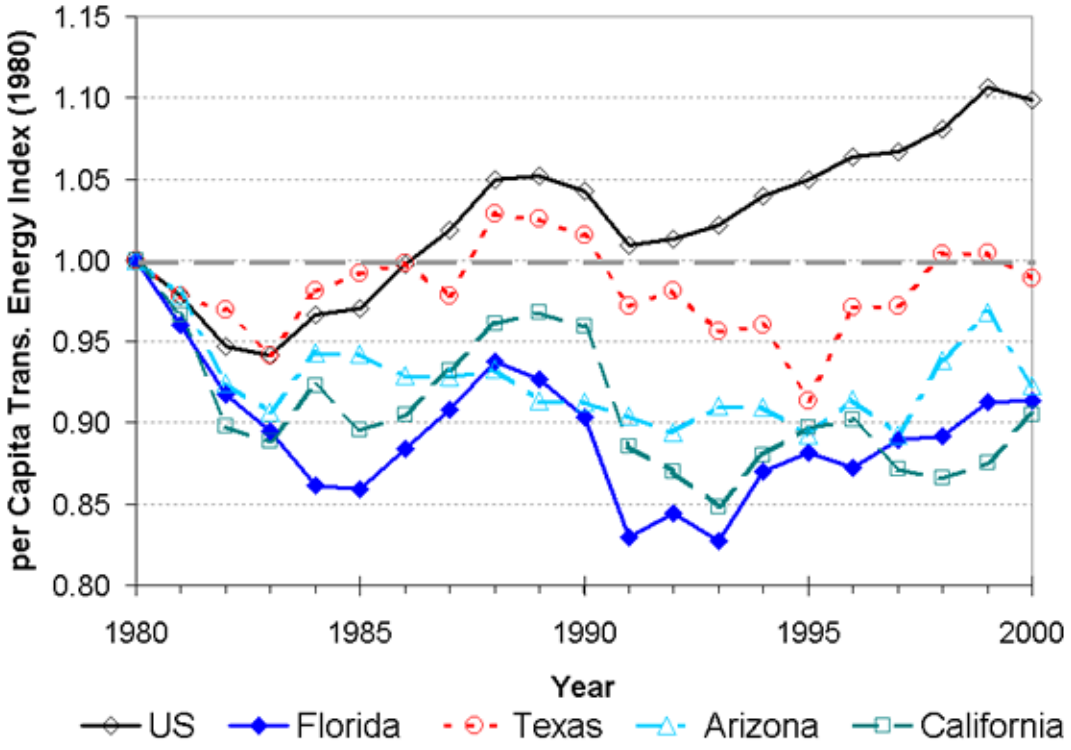

Figure 21. Per capita transportation energy use index for U.S. and selected states.

Transportation energy use is further broken down by fuel type to include individual data sets for aviation fuel and motor gasoline. Motor gasoline and diesel fuel make up more than 87 percent of Florida's transportation energy costs, with aviation fuel accounting for less than 10 percent.

The transportation sector includes shipping by rail, truck, air and water, as well as passenger travel by automobile, transit, rail, air and water vessels. However, 70 percent of transportation energy use in the state uses gasoline, and that is the focus of these recommendations. Airport and water port authorities should be tasked with examining methods of energy saving within their spheres of influence. A Statewide Intermodal Transportation Advisory Council (SITAC) has just been formed and could be charged with looking at energy-efficiency.[43]

Transportation planners often look at capacity – how many people can travel at one time by way of a given transportation facility or mode. Many of the solutions that save energy in transportation also reduce the demand for facilities, essentially increasing road capacity without building more lanes. Other strategies concentrate on vehicle efficiencies.

The transportation sector has also been examined with regard to mobile emissions. Emissions reduction and saving energy often go hand in hand, but not always. Some measures that save energy, such as using diesel-fueled vehicles, are considered sources of excessive mobile pollution. Similarly, some alternative vehicle fuels that are considered cleaner, such as CNG or even 100 percent electric, may not save energy. In the case of 100 percent electric vehicles, the energy is being consumed at a power plant, although such moves would increase diversity of energy use within the critical transportation sector.

Consistent with the hierarchical building blocks of energy efficiency (Chapter 6), appropriate strategies include land use decisions to reduce vehicle miles traveled, greater market share of efficient vehicles, more efficient transportation networks, more efficient transportation accessories, and greater market share of alternatively fueled vehicles.

7.3.1 Land Use Decisions that Reduce Vehicle Miles Traveled

Background

The number of vehicle miles traveled (VMT) per household has risen markedly over time (see Figure 22), and the energy use associated with that increase is significant. Reducing vehicle miles traveled while effectively meeting consumer and business needs is a key challenge that needs to be addressed both for saving energy and reducing air pollution. To that end, many organizations throughout the country have examined methods for reducing VMT. Land use decisions are viewed as one of the key reasons for vehicle mileage. High density, mixed-use development provides many opportunities for people to travel to destinations at short distances while the typical suburban sprawl development requires longer trips for various trip destinations. Figure 23 shows the average trip profile for the U.S. over a typical day – note the large number of non-work trips.

Transit can save energy if ridership is sufficient. However, even in many large U.S. cities, ridership tends to be relatively low in large part due to low comparative costs of

[43] see: http://www.dot.state.fl.us/planning/sis/

the car transportation mode due to fuel prices. One of the difficulties of sprawl is that people have to own the car and then drive it to transit locations. If developments were oriented so people could walk to transit, it would be more affordable and ridership would increase. In a Seattle study with relevance to Florida, it was found that residents of the mixed land use study neighborhoods traveled 28 percent fewer miles than those in adjacent areas and less than half of the miles of suburban areas. This trend of lower mileage held across different socioeconomic characteristics[44].

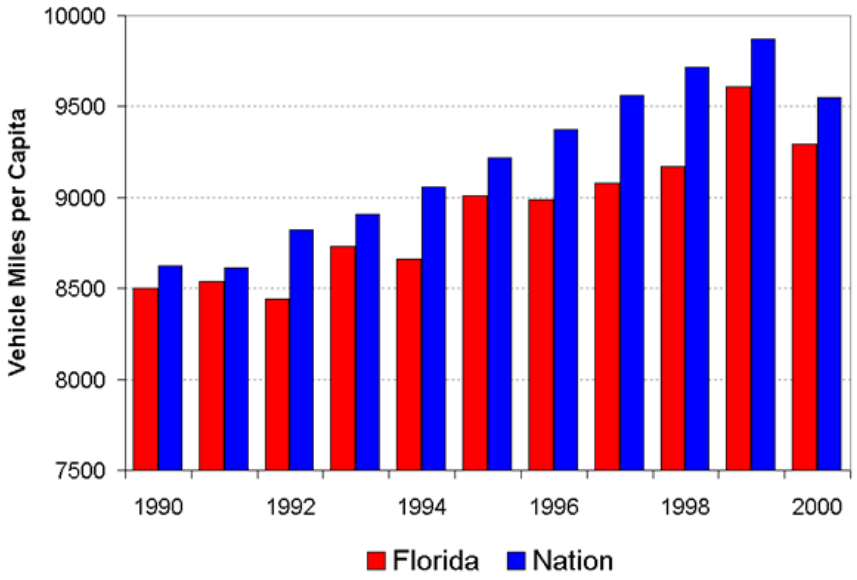

Figure 22. Vehicle miles traveled per capita

Specific recommendations:

1. The Governor should create a goal for DOT to reduce vehicle miles traveled per capita (adjusted for changes in tourism) by 3 percent per year..
2. Going back to the Pelham administration at DCA (under Governor Martinez), the DCA had some of the leading experts in the nation provide free seminars on land use planning concepts. It is recommended that DCA, DOT and DEP provide educational programs and technical assistance to MPOs, RPCs and local communities that stress the benefits of land use designed to reduce VMT.

Implementation

1. Officials of the DEP, DOT, DCA and the Director of the Energy Office should meet and discuss methods for achieving such a reduction. Overall responsibility for the reduction in VMT should rest with DOT while the Energy Office and DEP should be responsible for measuring the impact on energy use and air pollution.
2. DOT funds should be allocated to bringing experts to local communities to discuss land use planning as it relates to sustainability issues.

[44] (see: http://www.perspectives.cutr.usf.edu/articles/New_Urbanism/0017.pdf) and also "Community Impact Assessment: Assessing Potential Land Use Impacts of Transportation Projects," http://www.asu.edu/caed/proceedings00/KRAMER/kramer.htm

3. More research should be funded to detail relationships between land use decisions, energy use, air pollution and affordability.

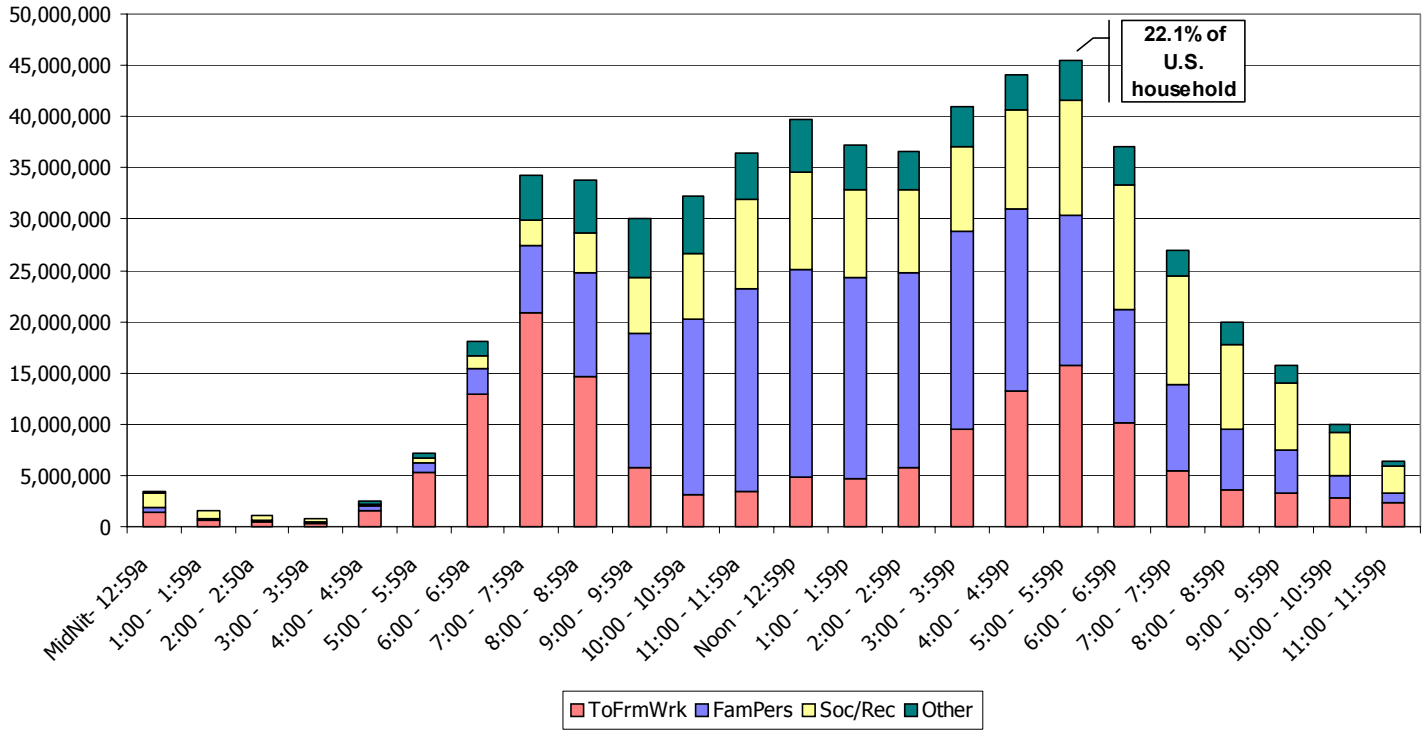

Figure 23. Hourly profile of number of transportation trips by trip type in the United States. Source:National Household Travel Survey, Nancy McGuckin, Travel Behavior Analyst, Nanda Srinivasan, Cambridge Systematics Inc.

Barriers:

Funding is a barrier. Because some of these tasks cost money, there should be funds within the DOT and DCA budgets going towards these activities. The largest barrier is one of attitude and perspective, on the part of transportation planners and others in decision roles, of supply-side thinking (build more highway lanes) rather than demand side reduction. Supportive statements from the Governor's office and the DOT Secretary are needed to help facilitate a paradigm shift toward efficient choices. Such a shift is not totally new as witnessed by certain International Transportation Engineers publications (e.g., "Traditional Neighborhood Development Street Design Guidelines," ITE Publication Number RP-027, 1997). Another obvious barrier is the attitude of motorists who may not want to reduce their travel or be subject to such a state goal.

Measurement:

Reduction in vehicle miles traveled per capita or per household. The DOE Energy Information Administration does a triennial household energy use study that includes such information. The state could use the same study to obtain state-based information. Other states have contracted to have a state study done at the same time.

7.3.2 More efficient vehicles

Private automobile energy efficiency is largely controlled through federal CAFE standards.[45] However, lack of federal action to raise fuel efficiency of light trucks along with dramatically increased sales of SUVs has led to steadily lower new fleet economy which has reached its lowest level in 23 years. This poses unique challenges to Florida's energy future. Measures available to states and local governments include educating the public on the importance of selecting energy-efficient vehicles, creating incentives through fees and taxes and passing air pollution reductions (though these do not always lead to less energy use).

Registration Fees: Because the weight of vehicles is a good indicator of vehicle efficiency, applying registration fees by weight of vehicle is one option to consider. Heavier vehicles also cause more road wear. Another would be to index registration to fuel efficiency itself. Thus, registration fees that increase with weight could be charged in part for energy efficiency and part for road wear. The fee is thus an incentive for purchasing a more efficient vehicle. A potential drawback is that most buyers do not consider registration fees at time of purchase.

Gasoline tax: Moving more of the tax burden to gasoline taxes instead of property and general sales tax is another way to encourage both conservation and efficient vehicle choice.

Sales tax: A weighted sales tax for new vehicles based on city miles per gallon could be implemented. This mileage value is listed on the vehicle window sticker. A tax-neutral measure could be made that would be structured to generate the same total amount of tax as presently. Because the tax is figured into the total expenditure of a new a car and the related payments, this has the potential to alter the decision-making process for many consumers.

Specific Recommendation:
A weighted sales tax on new vehicles should be implemented. An example of how it would works follows:

EPA City Gas Mileage	>=50 mpg	45-49	40-44	35-40	30-34	25-29	20-24	15-19	10-15	<10
Sales Tax %	0	1	2	3	4	5	6	7	8	9

The structure shown would lead to a 5 to 7 percent sales tax on most current household vehicles sold. However, there would now be an extra financial incentive to purchase the high efficiency vehicles. If the measure is successful and leads to a market shift to high mpg vehicles, the tax scale will need adjustment over time to provide the same amount of revenue to the state.

[45] see http://www.nhtsa.gov/cars/rules/cafe/overview.htm for extensive details

It is not recommended that this tax be applied to used-vehicles. There would be difficulty in obtaining the information for a specific vehicle model, engine and transmission, as well as training all used vehicle dealers. Instead, it is recommended that this measure just apply to new cars because they have the EPA mpg rating in the window sticker.

Implementation:
The state budget office will need to verify the revenue neutral position and as such may have to obtain annual sales data by model from Florida dealers. The legislature will need to pass legislation and verify any legality questions with the state attorney's office. The governor could announce the program as part of his energy program, with a press release to accompany the announcement with the details. New car dealers could be sent the information and be given a contact person within the energy office to answer questions.

Fuel efficient, ultra low emissions, and popular.
The 2004 Toyota Prius will generate up to 89% fewer smog-forming emissions than the average new car and has been designed to exceed a Super Ultra Low Emission Vehicle (SULEV) exhaust standard as set by the California Air Resources Board (CARB). In California and other states adopting these guidelines, Prius has been designed to be certified as an "Advanced Technology Partial Zero Emissions Vehicle" (AT-PZEV) [Source: Toyota promotional material].
The 2004 is rated 55 mpg in combined city-highway driving and, almost a month before its release, Toyota had received 10,000 US orders for the vehicle [Source: James R. Healey, USA TODAY, http://www.usatoday.com/money/autos/2003-09-23-hybrid_x.htm]

Potential Barriers:
This measure may be resisted by organizations that object to higher national CAFE standards. However, since this is state legislation in Florida, such a reaction may not be successful..

Measurement:
Trends in mean mpg of household vehicles sold in Florida vs states without incentives.

7.3.3 More Efficient Transportation Network (Less Braking)

Background:
Improving traffic flow is often a goal so that there is less congestion and travel time is reduced while also saving energy. Having a typical vehicle sit in idle traffic is very inefficient, both in fuel resources and time. Typical household motor vehicles are most energy-efficient at constant speeds of about 35-40 mph. Right-turn on red and similar measures are possible methods of reducing stops. Reduce toll-booth stops by using electronic scanning devices is another successful measure. For instance, using revenue obtained from a rental car energy tax (see tourism Section 7.,4.1) could be used to eliminate energy wasting toll booths.

Adding lanes to roads and building new roads has multiple effects. Road and highway additions lead to sprawl and thus any increase in speed may be more than offset by increased trip length. Wide roads and limited access highways become either difficult to cross or cut off existing transportation networks, making pedestrian travel more difficult. Thus the net energy savings of adding roads or lanes to reduce vehicle braking and stopping is difficult to assess.

Recommendations:
1. Continue to promote the use of Florida Sunshine pass and similar measures to reduce stopping.
2. Judiciously select road-widening and new road projects with the effect on traffic flow, sprawl, pedestrian/cyclist mobility and transit in mind.

Implementation steps:
Continue existing advertising campaigns to obtain higher percentage of toll-booth road travelers from Florida to use the available systems. As part of the implementation of the reduction in vehicle miles traveled, state-funded new road and road-widening projects should be examined from effect on long-term travel time and travel distance as well as effects on land-use decisions, pedestrian travel and transit.

Barriers: There are many aspects to any network efficiency measure, as safety aspects, effect on pedestrian modes, and the cost of implementing any such measures is determined.

Measurement:
Reduction in fuel sold per household adjusted for any change in vehicle efficiency.

7.3.4 More Efficient Accessories (Traffic Lights, Street Lights)

These areas often fall into the responsibility of DOT. LED traffic lights save 80-90 percent of the energy consumption while also reducing the number of light outages (a safety concern) and the resulting related labor expense for replacements. Payback estimates range from one to seven years in the literature.[46]

Street lights and parking lights require a balance between perceived or real safety and the amount of lighting. Unfortunately, the brighter the ambient area due to night time lighting, the greater the subject lighting must be to attract visibility to a site. Furthermore, police officers are concerned about the color quality of lighting for identifying suspects. Astronomers and others concerned about "visual pollution" prefer light fixtures that do not light up the sky, but are aimed towards the ground.

Recommendations:
1. Maintain a central database of preferred lighting systems with their pros and cons for various applications. Keep abreast of the latest research and fund research as needed with regard to light levels and acceptance of new technologies for street and parking-lot lights.
2. Any state funded transportation project that includes lighting must include a comparison of lighting alternatives, basis for lumens requirements and justification for not selecting the most energy-efficient method.

[46] See (http://auto.howstuffworks.com/framed.htm?parent=question178.htm&url=http://www.lrc.rpi.edu/Ltgtrans/LED/led-links.html)

Implementation:
Require the lighting analysis as part of any funding request. Although this adds a procedural step for the applicant and the reviewer, it will likely lead to considerable savings on the part of the utility-bill payer, as well as reduce energy use.

Barriers:
Resistance; however, resistance can be minimized by providing good information and examples.

Measurement:
Amount of energy used per traffic control task.

7.3.5 Reduce Vehicle Miles Traveled via Mode Choice

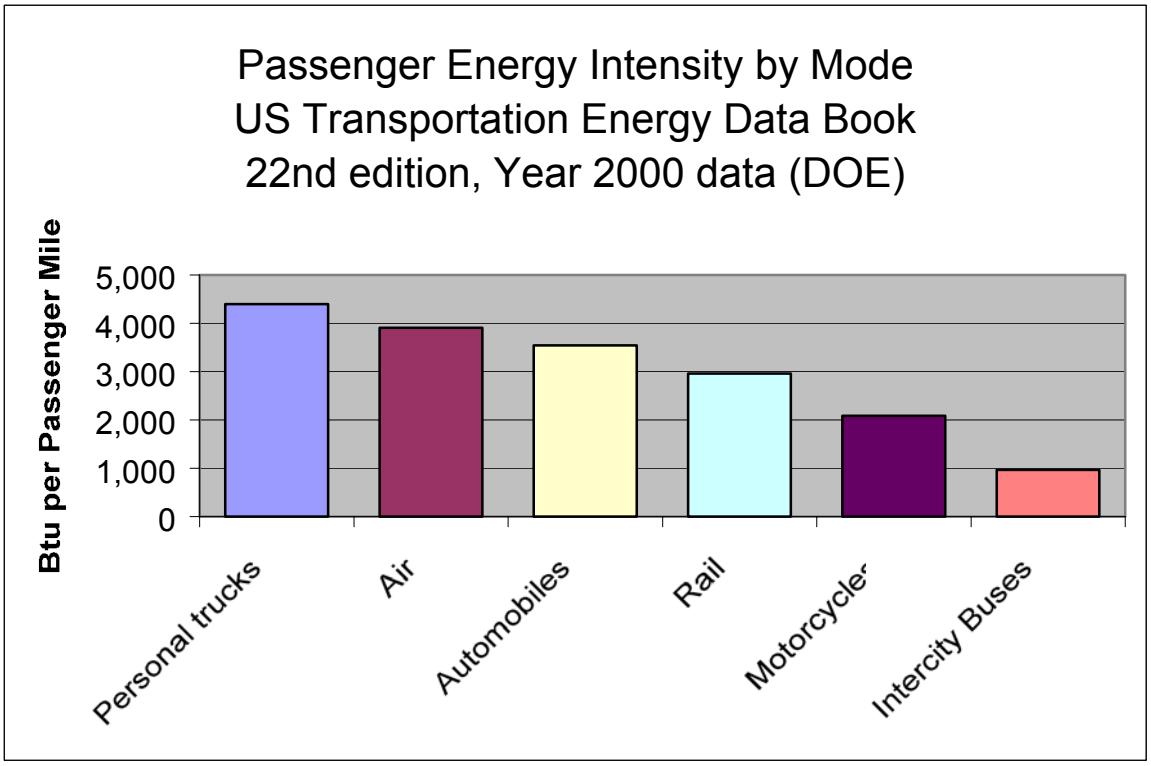

Figure 24. Passenger Energy Intensity by Transportation Mode

Background: As described in chapter 6, conservation has a major role to play in energy efficiency. When it comes to transportation, the role is largely filled through modal choice (method of travel – e.g., walking, bicycling, carpooling, vanpooling, bus, rail, single-occupancy vehicle). Bicycling can be considered the most efficient mode of transportation, followed by walking. Based on average vehicle occupancy, the energy demands of other modes are shown in Figure 24.

A Florida DOT study will soon be released on methods employees can use to reduce vehicle miles with regard to travel to work.[47] A decade ago the state produced a commute alternative director's manual that covers many transportation demand management issues and implications, and offered a certification program[48] The Center for Urban Transportation Research (CUTR) at the University of South Florida has also looked at reducing vehicle miles traveled by creating custom solutions and awareness among travelers.[49] A CUTR study on the subject included non-work trip reductions. Work trips are a minority of trips (see Figure 23) and non-work trips need to be addressed for any successful mode choice program.

Specific Recommendation:

1. As indicated in an earlier transportation subsection, the Governor should create a goal for DOT to reduce vehicle miles traveled per capita by 3 percent per year.
2. Consider the recommendations of the forthcoming employer-based commute alternative workbook.
3. Try a city-wide pilot project of custom education/ trip reduction/ mode selection.
4. Invest in bikeways , trails and sidewalks as part of community-based transportation networks, making sure they link residences with destinations.
5. Reward communities that have achieved compact growth and transit-oriented community design with grants to support the transit. Be particularly supportive of communities that have good pedestrian/transit stop linkages so as to increase ridership.

Implementation:

The State should fund CUTR or another group to implement a citywide pilot project. In order to keep costs reasonable and widely applicable, a growing city of 50,000 – 300,000 people with current bus-service should be selected for the pilot. DOT should reflect in their grant making policies and decisions for local community transit and pedestrian projects a solid connection to the VMT reduction goal.

Barriers:

Funding availability is a barrier, in general and in competition for road funds. Consumers often have shown reluctance to compromise the convenience of the single-occupancy automobile.

Measurement:

Reduction in household or per capita vehicle miles traveled.

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[47] Larry Hymowitz, AICP, Office of Modal Development Intergovernmental Manger, DOT personal conversation.

[48] CUTR, "Commute Alternatives Program Director's Manual," published by DOT, DCA, FEO and the Florida Commuter Assistance Program, 1992.

[49] See http://www.cutr.usf.edu/index2.htm.

7.3.6 Switch to Alternatively Fueled Vehicles (Not Necessarily an Energy-Saving Method but It May Reduce Pollution)

Background:
In an effort to reduce mobile emissions, various efforts have been made to encourage the purchase of vehicles that utilize alternative fuel sources instead of gasoline and diesel. Traditional alternative fuels such as natural gas and propane have been used in select fleet and transit vehicles for years. Transitional fuels such as ethanol and bio-diesel can use agricultural products and the existing fueling infrastructure. These products may be considered renewable, though the amount of energy used in the agricultural industry to produce bio-fuels has to be considered. Emerging technologies may include hydrogen and fuel cells that would provide zero emissions; however, the energy source for their production as well as serious storage questions still must be resolved.

A number of state bills have been aimed toward encouraging alternative fuels, and three Clean City alliances have been developed. The primary user of alternative vehicles has traditionally been government fleets and some transit vehicles. The Clean Fuel Advisory Board commissioned CUTR to conduct an inventory of alternative vehicles in Florida. They identified 5,725 alternative vehicles and 513 alternative fuel-refueling sites. Note that when vehicles have been purchased as duel-use vehicles, they have often filled with standard gasoline. Thus, incentives for such vehicles should be limited.

Specific Recommendations:
The Clean Fuel Florida Advisory Board released their Cornerstone Report in January 2003. They state eight recommendations:

1. Host an alternative fuels and advanced fuels transportation technologies summit.
2. Adopt rules for State fleets to achieve original EPACT intention by shifting the focus to fuel use instead of vehicle acquisition.
3. Dedicate sources of funds for alternative-fuel vehicle infrastructure and implementation.
4. Conduct workshops to assist in developing alternative fuel vehicle infrastructure needs.
5. Study methods to provide a revenue stream for transportation infrastructure.
6. Develop education and outreach programs related to alternative fuel transit.

Implementation: The cornerstone report provides some details for each recommendation as included in Appendix I.

Barriers:
There are serious costs for some of these recommendations, as well as the "chicken and egg" challenges. Greater acceptance of alternative vehicles won't happen without the infrastructure, but investing in the infrastructure seems imprudent without an existing demand.[50]

[50] See http://www.ccities.doe.gov/vbg/progs/laws.cgi

Measurement:
Because of the availability of dual-fuel vehicles, fuel supplied to vehicles is the preferred measurement tool –not alternative vehicles sold.

7.4 Industrial Energy Use Sector

Industrial energy use in Florida accounts for 19 percent of the state's total energy consumption and represents 10 percent of the total energy costs. The industrial sector is different from other energy using sectors in a fundamental way: industrial energy includes primarily only the energy that is used in industrial production processes, and thus it represents an energy use that results in the production of a product that is sold in the marketplace. As such, the economic implications of industrial energy use may be different from those of transportation and buildings energy use. Sometimes reductions in industrial energy use are due to increases in efficiency, but they can also be a reflection of the transfer of manufacturing (and jobs) offshore where labor costs are reduced.

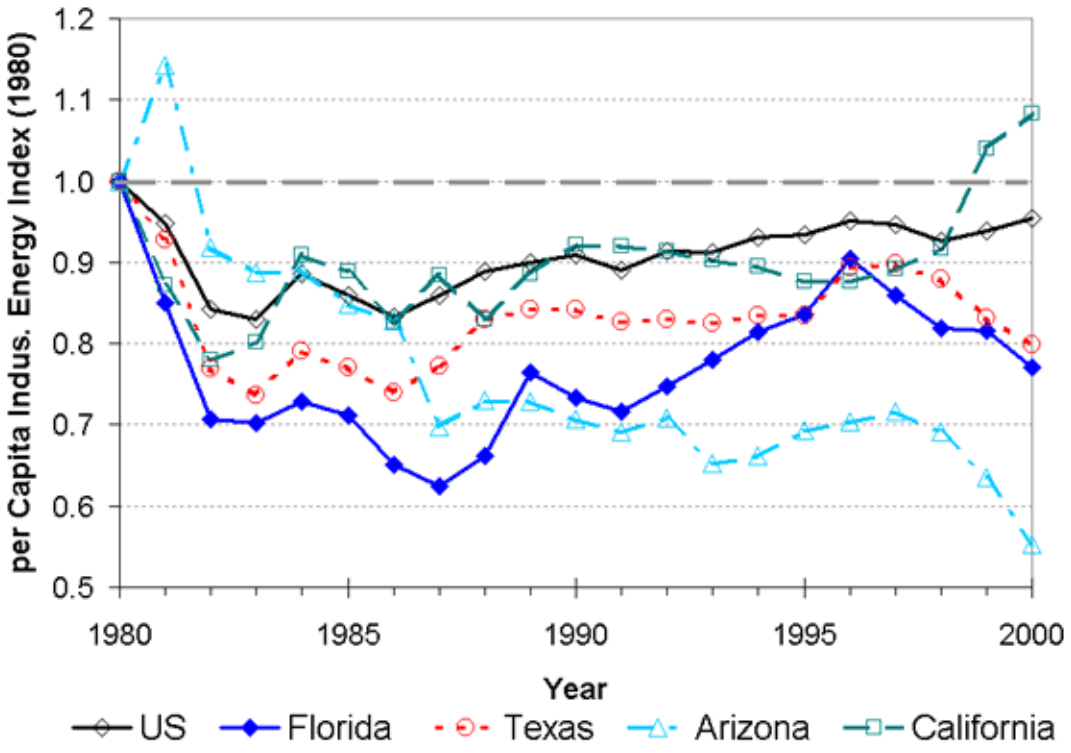

Figure 25. Per capita industrial energy use index for U.S. and selected states.

Although Florida's industrial sector only represents 19% of the energy use, there are still strategies that should be pursued. In a highly competitive international marketplace energy savings can help Florida industries remain competitive.

7.4.1 Tourism

Background:
Florida's tourism industry is covered largely through the items described in the previous two sections as transportation and lodging are two of the principal energy uses by tourism. Future multi-modal transportation efforts should examine how to move tourists arriving by air most effectively to their destinations. Single-passenger rental vehicles, private vehicles and taxi-cabs are inefficient when compared to multi-passenger vans, light rail and transit services taking many tourists to a destination. This particularly applies to business travelers. Leisure travelers are more likely to travel in groups and have higher vehicle occupancies.

Improving the efficiency of rental fleets for those who would still need or choose to rent vehicles, would not only save fuel, energy and reduce pollution, but would also leave tourist with more disposable income to spend within the state within tourism services. In a time of diminished fuel supply or elevated costs, it would help provide a rental car fleet that would cushion the shock to tourists.

This could be encouraged by setting a progressive tax on daily rental car prices based upon their fuel economy. The tax would be set up to advocate rental of more fuel efficient automobiles and encourage the rental car agencies to provide more fuel efficient choices. Collected revenue could be placed into funds to build and service mass transit and to provide rebates for purchase of very efficient automobiles for state use or for Florida's citizens. Also, the policy would result in more fuel efficient used rental cars being available for sale to Florida citizens after their use within the industry.

DEP and independent groups have been working with the lodging industry to reduce waste. By not changing sheets and towels every day for people staying multiple days, and other similar measures, energy and other resources are being saved. As described in the renewable buildings strategy section above, the lodging industry is a good target for solar thermal applications also.

Specific Recommendations:

1. Encourage better design and resource use by announcing that state run meetings and conferences will first seek out "eco-lodge" participating establishments and certified "green establishments" for their event locations.
2. Work with convention centers, convention hotels and airports to develop more efficient transportation systems for business travelers.
3. Provide incentives for fuel-efficient rental cars over other rental cars through the rental car tax system.
4. Continue efforts through DEP's Pollution Prevention group to work with the lodging industry to reduce waste and save energy.
5. Conduct research and demonstrations of technologies that will automatically shut-off air conditioning systems and lights upon occupants leaving rooms.
6. Work with the solar industry to determine appropriate underutilized cost-effective applications for the lodging industry, such as domestic hot water and pool heating.

Implementation Steps:
A task force of tourism industry interests, particularly lodging, should be formed to develop action steps for implementation of these recommendations.

The rental car agencies would need to be briefed on the anticipated legislation on the rental car energy tax. Metrics would have to be established and allocations for the weighted tax allocated.

Barriers:
Three of the recommendations will save money for the lodging industry and should not receive much opposition (#s 4- 6). Curtailing single-passenger business-traveler modes will be opposed by the car rental and taxicab industries and will involve some type of education of travelers.

Measurement:
The energy use per occupied lodging room is an appropriate measure. Transportation measurement is more difficult and may need to be done via special surveys of business travelers to see any change in transportation mode choice during ground travel in Florida.

7.4.2 Agriculture

Background:
Studies in industrialized countries have revealed that for every calorie of food consumed, on average, 10 calories of energy are used to produce, process and package the product. In addition, one unit of human labor energy expended by traditional farming techniques is estimated to result in approximately one unit of food energy for consumption. Energy is used in farm vehicles as well as for fertilizers, irrigation, livestock and food processing. Permaculture is a method to reduce the use of fossil fuels through alternative farming techniques. More efficient equipment and processes are available, and renewable energy resources have a role to play in some applications.

A 1990 project by the University of Florida, entitled *Agricultural Energy Consumption Patterns in the State of Florida,* still has relevance today. It points out that agriculture is one of Florida's major industries and that it consumes substantial energy because of its statewide scope and the nature of Florida's environment. Several findings from this project were:

- "The production of oranges in Florida consumes over 19.7 trillion BTU of primary energy, more energy than for any other commodity statewide. However, on a per acre basis, foliage plants consume about 90 times more energy than oranges. Horses require 14 times more energy than beef cows on a per head basis, but beef production consumes more energy statewide than horse production, because more beef is produced in the state."

- "Ornamentals require approximately 16 percent and livestock production, including forage pastures, consumes about 42 percent of the total primary energy used in production agriculture in Florida."
- "The energy utilized as direct inputs is only 28 percent of the energy consumed in agricultural production and only 1.2 percent of Florida's energy consumption."

Specific Recommendations:

1. Inform farmers on low energy-use farm practices.
2. Install energy-efficient equipment for processing.
3. Use biofuels and other renewables for powering relevant farm applications.

Implementation:

As described in the building blocks of energy section, reducing the need for energy is the first step, so any education that can take place in farming methods to reduce energy use should be attempted first. Second, the state should fund some pilot energy-saving techniques and then consider methods for doing large purchasing products tied to performance. Because some techniques (see variable drive sidebar) may be cost-effective but spread among many applications, this type of performance contract purchase is needed. The existing agriculture extension service should be able to help find participants for any program. Pilot research projects should be funded for using biowastes from farms to make fuels for vehicles or to produce power.

Variable Speed Drives Save Energy On 150 Farms

New York State invested in 3.1 million kWh of energy savings via performance-based incentives for variable speed drives for milking equipment. Paybacks of about two years are expected.

Source: New York State Energy Research and Development Authority, "Investing in New York's Energy Future," 2001 – 2002 Annual Report

Barriers

Any capital costs will be a barrier for an industry that has not recently had many good years.

Measurement:

Farm output per fossil-fuel energy input for particular products. This will need a University-level measurement as the inputs come from various sources, such as nitrogen fertilizers, vehicle fuels, and metered electrical and natural gas.

7.4.3 Industrial Processes

Background:

Industries are all different but there are a number of strategies that are consistent among many industries. First is to reduce waste. Reducing waste saves resources including energy. Second is to find a use for those items that are considered waste, whether it be a byproduct of an input resource or an output from a process. The DEP's Pollution Prevention Program has worked with industry on both of these aspects, particularly if the industry waste is not environmentally benign. Third, is to use the most efficient motors, boilers and other equipment. Retrofitting existing motors with new variable speed motors can save over 30% highly cost-effectively. Alternative sources of energy such as combined heat and power should also be considered. Waste heat from processing often

could be used, or power could be produced and the waste heat from power generation used in the processing.

Specific Recommendations:

1. Continue to work with industry to reduce and recycle waste.
2. Expand the effort to conduct energy audits.
3. Invest in efficient motor technology.
4. Encourage cogeneration where power and waste heat could both be used.

Implementation Steps:

Expand the role of pollution prevention activities to include more detailed energy audits of industrial processes. Consider a state-purchasing contract for efficient motors and loan programs to fund cost-effective customized energy measures. Create an environment that allows small-scale cogeneration.

Barriers:

Only the cogeneration recommendation should face any objections and those will largely be from traditional utility generators and providers.

Measurement:

Energy use per gross state product (GSP).

7.5 Schools

According to the 1999 Energy Consumption Survey by the national Energy Information Administration (EIA), Florida's educational buildings used 649 trillion Btu of total energy, which was 11 percent of total energy consumption for all state commercial buildings. Comparative information on major fuel consumption by size and type of education buildings appears in the Appendix J

Expenditure data for all Florida school districts for FY 2001-02 shows a total cost for energy used in school facilities (all sources) as $342.5 million. Most of that energy ($330.3 million) was in the form of electricity. Other energy sources used are natural gas ($7.7 million), LP Gas ($3.8 million) and heating oil ($893 thousand). Top ranking energy users indicated by the data include:

School Facilities	Electricity	Total
Miami-Dade	$44 million	$45.5 million
Broward	$36.68 million	$37.2 million
Hillsborough	$22.4 million	$23.0 million
Orange	$24.6 million	$28.39 million
Palm Beach	$23.9 million	$25.3 million

These five counties comprise close to half of the total expenditures for the state as a whole.

Data for school transportation is likewise compelling. Total expenditures for the transportation of students via school buses ran $40.58 million for FY 2001-02. Not surprisingly, diesel was the primary fuel of choice for the school districts' bus fleets. Only two districts indicated their use of alternative fuels.

In July 2003, the Florida Department of Education published an in-depth report on Florida School District Transportation Profiles for the 2001-02 school year. Among the highlights of their report:

- In the course of a year, public school students are transported nearly 283 million miles within the state.
- Total transportation operating expenditures for student transportation for the year were:
    - $725.5 million, including bus purchases
    - $640.4 million, without bus purchases
    - Total expenditures on motor fuel were $40,583,266
- Number of fuel sites was 207
- Fuel use (by numbers of buses)
- Diesel: 18,975
- Gas: 53
- Alternate fuels: 4

A table of related data by school district is included in Appendix J. The Appendix also includes tables for facility and vehicle cost data by county.

School data for 1995-96 shows energy expenditures for facilities only. Comparison of this basis shows a dramatic increase over a four-year period (see Table 5). Combined with fuel consumption, schools spent more than five times as much money on energy than did the rest of State government.

Table 5. School Energy Expense Trends

	FY 1995-96	FY 2001-02
Facilities	$249.0	$342.54
Transportation		$ 40.58
TOTAL		$383.12

A detailed survey of energy use and energy use characteristics of Florida's public schools was completed in 1995.[51] The typical Florida school used 1.4 million kWh and 7,400 therms of natural gas in 1995 at an annual expense of $94,000. The energy use per school varied from 2 - 226 Btu/ft^2[CHECK #]. An analysis was performed to examine the statistical influences on energy use in schools based on the responses to the survey questionnaire against the matched utility data. Floor area and number of students and faculty were significant factors in annual energy use. High schools and vocational schools used more. The analysis contained some enlightening findings:

- Schools with light colored roofs used 6 - 7% less energy than those with dark roofs.
- Schools that were heated or air conditioned on non-school days and after school hours, used more energy. Interestingly, schools with occupancy sensor lighting controls or operating EMS systems did not use less than schools with manual controls.
- Cooling set points were shown to have strong influence. Each degree the cooling system thermostat was increased was shown to decrease annual energy consumption by 20,000 kWh/yr.
- Classrooms with windows used 20% less energy than those without. This may be due to reduced need for interior lighting, available ventilation during mild weather, or both.
- Schools relying predominantly on packaged cooling equipment rather than central chillers used 24% less energy. In part, this stems from the fact that chillers in older schools evidenced very poor performance; newer chiller installations did not show this tendency. Elevated consumption associated with chillers may also reflect the potential for zoned cooling as well as the need for increased energy efficient chiller sub-systems such as pumps, air handlers and cooling towers.
- Heating system choices other than electric resistance heating were shown to be beneficial. This includes heat pump systems, although water loop systems showed less advantageous performance.
- Schools with a history of humidity problems used more energy (likely from electric reheat). Indoor air quality (IAQ) problems were strongly associated with humidity complaints and increased ventilation levels. Conversely, classrooms opening windows for ventilation reported a much lower incidence of IAQ problems.
- Facilities with ceiling fans in classrooms showed lower energy needs. One partial explanation is cooling thermostat setting. The 155 schools reporting the use of fans gave a cooling thermostat setting of 75.2^{o}F against the 74.8^{o}F without fans.
- Schools with low temperature air distribution systems or newer demand controlled ventilation systems used considerably more energy and also had higher annual energy costs even when normalized by floor area.
- Demand controlled ventilation may be associated with higher energy use because of increases to the effective minimum ventilation rate.

[51] Callahan, Michael P., D. Parker, W. Dutton, J. McIlvaine, "Energy Efficiency for Florida Educational Facilities: The 1996 Energy Survey of Florida Schools," Final Report FSEC-CR-951-97, July 1997.

- Energy awareness programs resulted in measurable reductions to annual energy use.

There have been many other school research projects. Currently, the National Association of State Energy Officials (NASEO) is examining many aspects of energy use and schools, including some retrofit options for improved air quality and energy-efficient portable classroom demonstrations in Florida. The Department of Energy has a national Energy Smart School program with a small number of Florida school districts participating. The Florida Department of Education has been working with the Florida Energy Office and the Florida Solar Energy Center in developing energy and air quality courses for school facility designers, engineers and facility managers. The Florida Energy Office and Energy Smart Schools have been working on K-12 curriculum development, a website (EnergyWhiz.com), and the state has funded photovoltaic demonstration projects at a number of schools. The state is also helping fund a pilot project for a monthly report card on energy use and savings at Orange County schools. Modeled after a Reedy Creek Utility program, the energy use and savings rating tool should pinpoint opportunities for savings and recognize outstanding efforts. Final reports on each of these projects are expected within the next two years.

7.5.1 Site and design schools for energy efficiency, durability, and ideal learning environments

Background:
School sites are often donated by developers, and they often are in less desirable locations like adjacent to interstate highways. Such locations may mean that access for half the immediate area is difficult as students on the other side of the highway (e.g.,1000 feet away) may have to travel by motorized vehicle one or more miles to cross the highway and then back one or more miles to the school.

Building design and orientation have a substantial impact on energy demand. To optimize energy-efficient design the longest sides of buildings should face to the north and to the south, so site and building orientation are important.

In addition to the utility costs described above, studies have shown that naturally-daylit classrooms correlate with better student test performance.[52] Thus energy-efficiently designed schools may lead to Florida students scoring better on state and national tests.

Energy and environmental design work hand-in-hand and schools are an excellent place to demonstrate such green principles. There are many energy awareness and school curriculum opportunities for science teachers to tie to educational experiences.

Green Schools Deliver Energy and Environmental Benefits at Low Incremental Cost
The per square-foot costs for two USGBC certified-green Pennsylvania K-12 schools were 2.3% higher than the state average and well within the range of many standard school projects. A third certified green school was built under the state average square-foot cost for comparable schools.

[52] Hershong, Lisa, R. Wright, S. Okura, "Daylighting Impacts on Human JOURNAL of the Illuminating Engineering Society, Summer 2002.

Specific Recommendations:

1. Select school locations to receive ideal solar orientation and to minimize transportation use.
2. Require all new schools to have a projected reduction in energy use of 25% from state code and incorporate daylit classrooms as part of their strategies.
3. Complete a state certification process for education facility designers and engineers and encourage local school boards to reward or require such certification in their selection process.
4. Require that by 2010 all new K-12 and University buildings must obtain green designations so that students and schools lead by example to create healthy and durable learning environments.
5. Work to convert a portion of the bus fleet to alternative fueled vehicles.

Implementation:

State guidelines should be issued to each school district to inform and guide them with regard to the preferred siting. A state directive should require the reduction in energy use for schools. Educated designers can incorporate features at very low cost from the design phase of a project. Certification should be strongly weighted in the design team selection process. Energy needs to be incorporated with other environmental measures in creating green educational buildings. Many other states are ahead of Florida in this regard. A number of state University campuses across the nation have built certified green buildings and some campuses are requiring that all future campus buildings achieve green designation.

Barriers:

The largest barrier is lack of energy education among the education administrators and design community. The message of the importance of energy to the environment and the economy, links to student performance and health, and involvement of the science education community, should help overcome these barriers.

Measurement:

Measure energy use per square foot and compare it to previous years.

7.5.2 Retrofit existing school buildings

There are many strategies that can cost-effectively be applied to existing school buildings. As part of the state energy service contract initiative, school boards can engage in energy service contracts. However, many energy service companies limit themselves to the "low hanging fruit" or concentrate on control strategies.

Specific Recommendations:

1. Set a goal of 3% reduction per year in energy use per enrolled student for schools and Universities.
2. Encourage school maintenance personnel and administrators to focus on energy and air quality measures for schools.

3. Encourage school boards to engage energy service companies.

Implementation:
Return energy savings from facilities and transportation into teacher salaries or other priority uses by the school board. Expand the energy school report card pilot begun with Orange County to other school districts as a way to pinpoint opportunities. Provide funding for facility personnel education into energy efficiency and air quality control programs. Clearly spell out opportunities and make contracting and verification as easy as possible to minimize administrative work. Assign state resource personnel to help school boards. If need be, recover the cost of the state coordinator(s) time through the energy service contracts.

Barriers:
The state needs to recognize that student performance, teacher/student ratios, increasing enrollment and budget concerns occupy the focus of attention for school board administrators. The relationship and benefits of energy savings must be communicated within this framework.

Measurement:
The consumption of all fuels for facilities, transportation and administration should be measured as well as student enrollment and tracked over time for schools.

7.5.3 Reduce school-related transportation use

"According to the FDOT 1992 Home-to-School Transportation Study, only one out of six children in Florida walk or bike to school. The rest are transported by bus or by private motor vehicle, often creating severe traffic congestion at school sites and unsafe conditions for children who are or would want to walk or bicycle to school. Our modern-day children have become captives of a car-dominated society, and parents, out of fear for their children's safety, are compelled to transport them wherever they want to go. These children are not only dependent on their parents for transport, but lack the exercise benefits that walking and riding bicycles affords. We have the highest level of childhood cardiovascular disease and obesity ever before in our nation's history. Parents and children are fearful of conditions related to both traffic and crime in their neighborhoods and community." [53]

As shown in an earlier section, very few school buses are currently fueled by alternative fuels, yet due to the consistent trip patterns and fueling locations, school buses provide an excellent opportunity for alternative fuels.

State University campuses are the cause of significant vehicle miles. Aggressive strategies are available to reduce student transportation use. These include increased parking fees, increased on-campus housing, and site plan/road access that allow shorter trip lengths from and to nearby destinations.

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[53] Florida Traffic & Bicycle Safety Education Program, Department of Urban & Regional Planning, U of Florida web site, http://www.dcp.ufl.edu/centers/trafficSafetyEd/swts.htm, listed as updated December 20001.

Specific Recommendations:

1. Restructure the way schools receive funding for buses and fuel so as to create incentives for school boards to invest in methods for students living close to schools to walk or bicycle and to reward schools that save bus and fuel expense without causing more private car trips.
2. Aggressively pursue more alternative fueled buses that will save energy and produce ultra-low emissions, with a goal that all new buses purchased by 2010 will be alternatively fueled.
3. Reduce transportation use on and around state University campuses by funding or bonding dormitory construction on campuses to facilitate greater student housing until 40% of students are housed on campus.

Implementation:
Coordinate with DOE, the university system, community colleges and related associations like the Florida School Boards Association to arrive at appropriate strategies on how best to proceed.

Barriers:
As with other schools measures, the difficulty is communicating the need for energy efficiency. The need to educate students by example provides one means.

7.6 Local Governments Energy Use

Background:
An interview conducted with the Florida League of Cities noted the following:

- 33 cities own their own utilities and either generates or generate and distribute electric power for their jurisdiction. For example, Tallahassee, Jacksonville and Gainesville are generators and distributors while Ocala is a generator only.
- Local governments typically do not have a single budget line item that reflects energy expenditures.
- Surveying local governments is a time-intensive process that could take months.
- Population in Florida cities widely ranges, from as low as just 12 residents to more than 800,000.
- There are 408 towns. Most have a population of 5,100 or less.
- An estimated 70-80 percent of cities lease their public buildings. Some that own facilities do so on a co-ownership basis with another entity, including private facilities like a Chamber of Commerce.
- Cities represent half of the Florida population.

In 1995, the Florida Energy Office funded a survey of local governments to assess their energy conservation awareness and related needs. The mailed survey generated an impressive response rate of 91%, including 510 city officials, 60 county officials and 25 other targeted entities (municipal utilities, planning councils, elected officials and others). The survey examined a combination of attitudes, knowledge base and implementation

efforts by local public officials in regard to energy and energy related programs. Among the findings:

1. Few local governments deem energy conservation programs a priority.
2. Revenue constraints and fiscal-related concerns rated as the leading problem facing local officials. However:
    a. Local officials do not correlate the cost of energy, nor the implications of cost-saving opportunities through energy conservation
    b. Locals are not showing interest in programs offered through the State that could help save them money.
3. There appears to be a general lack of awareness among local governments regarding energy matters.

The report goes on to observe that "Interestingly, while the expressed interest in energy is high (70% of respondents reported that energy conservation is a priority), the action of local governments towards implementing conservation measures appears to be quite low. It is unclear to what extent the low interest level is shaped by the revenue constraints that are the primary concern of most local governments. It does appear from the responses that there is limited understanding on the part of locals as to the relationship between energy and the other challenges they face, and about programs of the State that could provide needed assistance."

When asked about obstacles to energy conservation, one local official shared a view heard from many that "too many strings are attached" to state and federal support funds. Another noted that his local government owned its own utility and "was in the business to sell energy, not conserve it" because of the revenue generated for local purposes from the sale of electricity.

Town of Flower Mound Texas has Showcase Facility Energy Management Plan

The State Energy Conservation Office (SECO) of Texas uses this town's plan as a best practice example. The background section includes the benefits of energy efficiency relative to simply increasing supply of energy and discusses the environmental issues. The plan establishes a number of goals and objectives:

1. Increase the efficiency of all town facilities
    b. Include energy efficiency in the design stage
    c. Incorporate alternative and renewable resources
    d. Reduce energy used for heating and cooling
    e. Reduce lighting energy use
    f. Implement operation practices to continually maximize energy efficiency
    g. Fund energy efficiency projects
2. Increase energy efficiency in all Town operations and services
    h. Integrate energy efficiency into internal operations and services
3. Monitor and evaluate the Town Facilities' Energy Management Program
    i. Collect data, perform progress measurement and reporting capabilities of the Plan.
    j. Monitor and promote the program
4. Implement Facilities' Energy Management Program
    k. Strategy for implementation
5. Obtain long-term, low-cost, reliable services.
    l. Utilize energy audit reports, perform end-use forecasting and baseline projections required to obtain long-term, low-cost, reliable energy services.

Source: Garner, Jeff, 'Town of Flower Mound Facilities' Energy Management Program," May 3, 2002, see success stories at: http://www.seco.cpa.state.tx.us/sb5compliance.htm

The report notes that "75.5% of the responding local entities do not assign anyone to track energy for their organization, and another 53.7% do not assign someone to verify their utility bills, which may be a good indicator of the lack of concern for energy use. Ironically, from a budget perspective, for local

governments in Florida and the rest of nation, energy costs are second only to payroll, which is typically tops in municipal budget expenditures."

In addition, 42 percent of respondents said they did not want to receive any information from the FEO regarding its assistance programs, most of which at the time included financial assistance, a surprising result given their emphasis on fiscal constraints. Despite high costs associated with energy, coupled with serious financial concerns of local governments, three-quarters of the respondents still did not rate energy as a high priority for their agencies.

A copy of the survey is provided in the Appendix K, and a Summary Report of the results and the full report are on file with the FEO. This information should be helpful in devising a plan of action for the local level.

With the help of the League of Cities and the Florida Municipal Utilities Association, a survey of local governments has begun to identify their current energy use. From this, it is clear that local governments and school districts spend a large amount of money each year on energy costs. Significant savings are possible through new approaches to energy management. Local governments are facing severe budget shortfalls, and local communities cannot afford to forego the opportunity for cost reductions. At the same time, lack of awareness and many other competing priorities serve as barriers to progress in this area.

Specific Recommendations:

1. Set a goal for local government agencies to reduce their energy use by 3% per year and to index energy use within their communities.
2. Appoint a full-time local government energy coordinator to provide resources to local government entities.
3. Annually reward and recognize local government agencies that energy use. Create incentives for communities that participate in programs such as green city and county designation, clean cities or other energy and environmental programs.
4. Encourage local governments to include an energy element in comprehensive planning.
5. Obtain state-wide purchasing and energy-service contracts that allow even small facilities to participate in no-out-of-pocket capital cost energy improvements.
6. Hire one or more contractors to provide energy bill analysis for local governments.
7. Share success stories at state conferences, on web-sites and in other media.

Implementation:

Such efforts do not need to be expensive to either the State or local entities. For instance, the Florida League of Cities, Florida Association of Counties and Florida School Boards Association would likely all be agreeable to featuring such information in their publications and on their web sites. The State can easily engage such organizations as partners in these energy-saving efforts.

Barriers:
As described above, most local government agencies have not regarded energy as a priority even though it represents a large portion of the budget. Providing information and obtaining action at a local level takes time and effort, even if it is done at little to no direct cost.

Measurement:
Because local governments vary considerably in the functions they perform, the best criteria may be historical energy use per capita for the local government and it may be difficult to compare different local governments.

7.7 State Government Energy Use

The State must lead any energy strategy, first by applying the recommendations to its own energy bills and second, through policies, programs and legislation that it crafts and supports. With almost $500 million in annual energy use for buildings, the State is a large energy consumer and can undertake measures to save money.

As part of this study, a survey was disseminated to state agency heads, with a letter from the DEP leadership asking for their active participation (the survey appears in the Appendix L. The survey was intended to identify agency actions, accomplishments and feedback regarding energy use in government operations. The results indicated that many state agencies were undertaking significant energy efficiency efforts but that incentives and support for agency actions needed more attention.

Background:
Florida has significant experience in focusing management attention on the opportunities for investing in energy efficiency since the early 1990s. The Florida Energy Office initiated numerous efforts to support agency actions. Almost all efforts were focused on developing incentives to support agencies efforts to achieve a sustained and continuing effort to adopt new energy efficient technologies and measures; to gain management support for their initiatives; and to demonstrate the opportunities for saving operational expenditures. Full implementation of the four governmental areas "seeded" by a 1995 Appropriation of $20 million (state agencies, universities, community colleges and public schools), coupled with the projected savings, was anticipated to reduce the more than $350 million spent at the time by 20 percent or

Executive Order to Reduce State Energy Bill Saves Over $50 Million a Year

Governor Pataki of New York issued State Order 111 on June 10, 2001. Titled *"Green and Clean" State Buildings and Vehicles* , it calls for energy efficiency for all state agencies and departments. For buildings it requires:

- A 35% reduction in energy use by 2010
- Energy-efficient practices for existing state buildings
- Procurement of green buildings that reduce energy consumption by at least 20% more than state code
- Purchase Energy Star labeled products
- Purchase 10% of electric consumption from renewables and methane waste by 2005 and 20% by 2010

It also requires state agencies to procure increasing percentages of alternatively fueled light-duty vehicles until at least 50% of such purchases by 2005 and 100% after 2010. It gave NYSERDA the coordination effort and created a new Advisory Council with leads of key state agencies and departments as members. In a 2003 report, the agencies had already saved about 25% of their target building energy use reduction or over $52 million in avoided utility payments..
New York State Energy Research and Development Authority, *Executive Order No. 111 "Green and Clean" State Buildings and Vehicles, Annual Energy Report*, July 2003

$70 million annually. Actual achievements have not been tracked; however, it should be noted that the state agencies have been able to maintain the same level of energy expenditures despite rate increases and increased square footage.

The restructured state energy management program at the Department of Management Services, including a natural gas and electric procurement program and a strong linkage to the design community through the Florida Design Initiative, provided leadership in the 1990s to the governmental facilities area. Although performance contracting ("shared savings") was actively used at the district school board level, state agencies did not broadly use that authority. Only, the Department of Corrections had any significant involvement in performance contracting. Their program did provide some significant savings and provided a view of the success that could be gained through use of this program. Implementing the new USDOE-initiated protocol on measurement and verification of savings and the FEO's active involvement in the area of performance contracting was therefore most successful at the local levels and didn't impact the state agencies in a major way. The new ITN program, modeled after the federal "Super ESC" program, whereby qualified performance contractors are allowed to negotiate with individual agencies and receive central support through DMS, has gotten off to a slow start but shows distinct possibilities for significant savings.

7.7.1 State Facilities

Background:
As mentioned above, the state pays about $500 million a year in energy bills for facilities directly supported by state moneys. In 2001, the Department of Management Services created an invitation to negotiate program (ITN) which is now underway (as of July 2003). The Departments of Corrections, Children & Families, Management Services and Transportation are currently actively pursuing projects.

Specific Recommendations:
1. Require that each agency and department cut energy use per square foot relative to a 2000 energy use baseline by 5% per year with a goal of achieving an overall 25% reduction in energy usage by 2010.
2. Develop incentives and management reporting systems that will create an environment for continuing activity to achieve significant energy savings.
3. Require new state buildings to cut energy use below code by 25% and qualify for Energy Star.
4. Encourage each new state building to achieve green building designation both as a way to reduce the environmental impact of the building.
5. Support education programs for state industry professionals on energy-efficient building techniques, management reporting and provide certifications that have value in the state building procurement marketplace.
6. Provide support for an annual statewide conference on energy management that brings together state and local government facilities employees and energy managers.

Table 6. Florida governmental energy use

TABLE I	STATE GOVERNMENT --fy1995-96				fy 2001-02							
AGENCY	FACILITIES	SQ FEET	REPORTED COST*	COST/ SQFT	AGENCY	Gross SqFT-GSF	REPORTED COST*	Reported Electric	% Electric	COST/ GSF	Cond SqFt CSF	COST/ CSF
STATE AGENCY	**656**	**36,608,252**	**$63,163,001**	**$1.73**		**47,863,148**	**$66,561,139**	**$56,640,632**	**85%**	**$1.39**	**33,391,870**	**$1.99**
D/Corr	140	14,277,591	$23,671,458		D/Corr	17,429,664	$24,720,233	$17,955,536	**73%**	$1.42	8,417,109	$2.94
D/Child&Fam*	149	8,495,010	$15,037,086		D/Child&Fam	8,630,311	$13,192,902	$12,051,875	**91%**	$1.53	7,733,686	$1.71
D/Mgt Service	47	5,760,423	$10,400,286		D/Mgt Service	7,763,591	$9,983,568	$9,156,919	**92%**	$1.29	7,210,632	$1.38
D/Juv Justice	41	1,457,445	$1,949,858		D/Juv Justice	2,605,017	$5,158,002	$4,769,446	**92%**	$1.98	2,389,639	$2.16
D/Trans	25	1,113,959	$2,003,387		D/Trans	3,049,705	$3,964,396	$3,891,993	**98%**	$1.30	2,548,276	$1.56
D/Agric&CS	includied in all others				D/Agric	2,743,855	$1,177,552	$959,439	**81%**	$0.43	473,409	$2.49
D/HSMV	included in all others				D/HSMV	662,558	$1,012,597	$1,009,186	**100%**	$1.53	543,296	$1.86
D/Health	included in D/HRS-child & families				D/Health	630,361	$1,071,121	$873,942	**82%**	$1.70	611,450	$1.75
D/Mil Affairs	51	1,038,306	$1,230,595		D/Mil Affairs	669,745	$1,830,067	$1,697,742	**93%**	$2.73	545,069	$3.36
Outdoor lighting(e)--DOT & DEP [parks]			$9,500,000		Outdoor lighting	0	$11,000,000	$11,000,000	**100%**			
All other Depts	203	4,465,518	$8,870,331		various	3,678,341	$4,450,701	$4,274,554	**96%**	$1.21	2,919,304	$1.52
TOTAL--including outdoor lighting			**$72,663,001**				**$77,561,139**	**$67,640,632**	**87%**			
STATE UNIV	**10**	**33,791,032**	**$56,025,155**	**$1.66**		**55,329,878**	**$80,562,373**	**$70,781,441**	**88%**	**$1.46**	**41,167,499**	**$1.96**
STATE CC*	**28**	**17,242,384**	**$30,140,961**	**$1.75**		**20,000,000**	**$37,404,438**	**$35,394,791**	**95%**	**$1.87**	**19,000,000**	**$1.97**
SUBTOTAL--STATE		**87,641,668**	**$149,329,117**	**$1.70**		**123,193,026**	**$195,527,950**	**$162,816,864**	**83%**	**$1.59**	**93,559,369**	**$2.09**
LOCAL SCHOOL	**67**	**178,660,677**	**$249,031,508**	**$1.39**		**352,665,563**	**$342,707,101**	**$330,300,713**	**96%**	**$0.97**	**264,499,172**	**$1.30**
TOTAL--STATE SUPPORTED		**266,302,345**	**$398,360,625**	**$1.50**		**475,858,589**	**$538,235,050**	**$493,117,577**	**92%**	**$1.13**	**358,058,541**	**$1.50**

Implementation:
The Governor needs to create an executive order regarding the goal. Charge the head of each state agency to report their progress on an annual basis. Have DMS make available ESCOs and ESCO contracting policies. Share priority methods for reducing energy bills.[54] Pay for pertinent state employees to take classes on energy use reduction and certify. Set up a monthly energy report card with data from all state agencies and facilities indicating the utility cost per square foot by type of building utilizing the same data collected for budgetary purposes on an annual basis (SAMAS and facility square footage data used to budget maintenance and capital outlay). Indicate reductions over time from month to month and year to year for the same month. Require new buildings from all agencies to comply with the 25% energy reduction.

Barriers:
Barriers could be overcome by establishing clear goals, communicating the goal to Architecture and Engineering firms and providing training and certification programs.

Measurement:
There are two forms of measurement. One form is to measure specific reductions due to specific measures at specific buildings. This usually requires expensive submetering before and after a retrofit. Nevertheless, it leads to good validation for any energy service contract as well as providing good information for similar buildings to attempt similar measures. National verification protocols should be followed.

The second measurement is to simply create a central database of all state building energy use, and report it via email on a monthly basis so that agency decision makers can see how they and other agencies are performing. Particular attention should be focused on major facilities (oftentimes multiple buildings). This would be further enhanced and simplified by using the budget entity as the basis for reporting (SAMAS and Capital Outlay information) as well as easing burdensome and duplicative reporting requirements that are currently in existence. There are three current examples of ways to create a central agency database; each may be of use to one or more agencies. One has been implemented by the Reedy Creek Utilities and it has lead to energy use reduction. Secondly, the state is funding a pilot project for Orange County schools with cooperation from the utility companies. The bills will be submitted electronically and converted and archived by a contractor who will then send out the report card to each school. It will be easy to see how each school is reducing energy use.

Both forms of measurement should be used. The first for some facilities and the second for all facilities. There should be consistent reporting at all levels of government.

[54] See for example, http://www.fsec.ucf.edu/bldg/commercial/priorities/index.htm for how to construct a building for energy efficiency and avoiding moisture problems.

7.7.2. Transportation Measures for the State

Background:
As with the general transportation solutions, there are a variety of ways that the state can reduce its own transportation bills. The state has, through various policies, encouraged the purchase of alternative fueled vehicles. However, a much stronger target could be set to lead by example. Also, the state should show leadership in directing ride-sharing and other measures to reduce vehicle miles traveled by state employees. These measures should be designed to impact commuting trips, trips between state agencies in Tallahassee, and via education, social and recreational trips (see section 7.3).

Specific Recommendations:
1. Include transportation impacts in any study regarding new building location, and heavily weigh locations that will lead to reduced vehicle miles traveled.
2. Create an employer transportation certificate program. Allow for employees to become better educated on commute alternatives.
3. Create a goal for each state agency to reduce vehicle miles traveled to work by state employees by 3% per year by creating incentives for voluntary carpooling, vanpooling, transit and other commute alternatives.
4. Set a goal of having 50% of all light-duty state-purchased vehicles be low emission or high mpg types by 2010, with 100% by 2020.

Implementation:
Consistent with long-time growth management goals of discouraging sprawl, the State should implement a leadership role in locating new buildings or new leases in areas that are served by transit, are in walkable communities and have other destinations nearby (e.g., restaurants, child care) so as to reduce motorized travel. DOT should work with DMS to formulate any specific formula to be applied to the decision process.

The state should create a certification program for employers to have an in-house ride-to-work coordinator.

The DOT should assign an individual to be a resource for the state agencies and field coordinators, but responsibility for complying should remain with each agency. Strategies used in other programs include preferred parking, a guaranteed ride home for car-poolers, and parking space rebates for pedestrians and transit riders. Telecommuting and reduced work-weeks (four ten-hour days instead of five eight-hour days) are strategies popular among some workers.

The state should set a combined requirement on state vehicles that will comply with the goal for both energy and air quality. Gasoline, ethanol and hybrid vehicles could be rated based on their city mpg and EPA clean air rating. Other vehicles, such as CNG, could be converted to an equivalent energy use. Once the policy is formulated, the state should then negotiate each year with vehicle manufacturers for a favorable purchase cost.

Barriers:
As described in the transportation section, a prime barrier to most non-land use methods of reducing vehicle miles traveled is persistency and the challenge to personal convenience. The message and the techniques need to adapt to changing individuals and changing workforces. Reporting the reduction in VMT by the head of the agency should help create incentives.

Measurement:
New vehicle purchase records should be easy to obtain. Reductions in vehicle miles traveled would be more difficult. DOT should create a methodology that can be applied across all state agencies for consistency. Surveys and odometer readings are two measurement tools that may be available.

8.0 LEADERSHIP FOR FLORIDA'S FUTURE

8.1 The Needed Principles

The problems and opportunities in Florida's energy future make it essential that the state develop a clear set of principles to guide decision-making. Examples of include:

- Begin with the End in Mind: Whether on a "big picture" or more specific level, identify desired end results as the guide for *action*.

- Commit to Action: Regardless of form, a plan of action is needed to transition Florida to an energy future where the needs of Floridians are well met. There is a considerable difference between interest and commitment, but those that are the subject of genuine commitment, and the follow through that accompanies it, are the only reliable path to accomplishment.

- Create and Innovate: New results are needed in the energy realm. Producing a new result often means trying a new approach. Creativity and innovation are essential ingredients of effective solutions in the fast-paced, high growth and otherwise demanding era in which we live.

- Learn from the Past: While finding new ways to achieve success, there is also a great deal to be learned from the past. Much of what has been tried has not worked. It's time to learn from experience so as to prudently apply resources. Conversely, bookshelves are full of reports and plans that could have worked if tried. Numerous well crafted and documented energy proposals and reports of the past were never moved past the point of interest to the strength of commitment.

8.2 Government Leadership

- Honoring Commitments: Government should adhere to the policies it adopts. Longstanding statutory policies would have served Floridians well had they been implemented. Putting those policies into action is now sorely needed. Leadership is then needed in establishing priorities, pinpointing duties, assigning time lines, measuring results and ensuring accountability.

- Leading By Example: Government officials in the state have spent considerable time and effort directing, promoting and encouraging alternative energy sources and practices for many years. However, efforts to "show" versus merely "say" have been far more limited. The time has come for Florida to "lead by example."

- Play to Win: The "rules of the game" should be set so barriers to progress are removed and incentives are established for improved results.

- Carry Forward the Charge: Administrative structures should be put in place to support and achieve desired outcomes. The roles and administrative capabilities of the FEO should be strengthened. In addition, governmental regulations, programs and operational policies should be examined for their energy impact.

8.3 "New Era Strategies"

Key components include:

- Provide Energy Alternatives: People want alternative energy choices -- choices that they understand, can afford and know to be environmentally sound. Florida policy makers have acknowledged this need in state laws dating as far back as the '70s, but actions toward this end have been inadequate.

- Tap the Efficiency Potential: Energy efficiency potentials in Florida have been well documented and numerous strategies, both innovative and simple common sense, are known and available for achieving that potential. A new "mindset" is needed where efficiency becomes the behavioral norm for society.

8.4 Modernize Utility Policies

Regulatory policies are meant to support societal goals and to conform with policies of state statutes. Change is needed toward this end if renewable energy is to become a reality for Florida and energy efficiency is to be tapped in accordance with potential. Among the changes needed are:

- Provide incentives for renewables and efficiency. Current regulations not only lack incentives but in important ways actually serve as a barrier to these longstanding state goals. The regulatory relationship between utility revenues and sales is a formidable force against change, as is the absence of a win-win arrangement whereby it is to the economic advantage of utilities to invest in these approaches and promote them with ratepayers.

- Provide for supply side efficiency, to reduce the considerable energy losses inherent in distribution and transmission of power and to encourage industrial end users to capture waste heat and tap the power of cogeneration for energy use at the site of production.

8.5 Walk the Talk: Use Distributed Energy

Diversification is the key to energy reliability and security as well as to consumer energy independence. Centralized power plants are an integral part of the energy infrastructure for Florida and the U.S. But just as fuel mix should be diversified as a matter of sound resource planning for central station power, so should the larger mix of energy systems and services feature *distributed energy* as a key component.

8.6 Engage Local Partners

Partners at all levels are needed to accomplish effective goals for Florida's energy future – from such groups as business and industry, civic and public interest groups, community leaders and elected officials and the general public. A first step is to engage local governments and school districts as active partners in pursuing energy efficiency for Florida:

- Information and education are a starting point, with emphasis on "connecting the dots" between energy and the fiscal dilemma being faced by states and local governments across the nation.

- Incentives are needed to facilitate local commitments and create the momentum needed for efficiency action to catch on with the public and consumers.

- Solar energy should be put to work in a visible fashion on government buildings and facilities and public housing, in ways that save energy while also educating the public.

8.7 Make the Growth Connection

Florida is growing at an average of more than 800 new residents per day. This growth is placing enormous demands on many of the state's resources, including energy. Yet, energy is rarely discussed in deliberations over growth management, and prevailing growth patterns and practices seriously neglect energy considerations. A tourist industry that brings upwards of 75 million visitors a year to our state adds to the burgeoning demand. Among the steps needed are:

- Incentives for urban design approaches that make efficient use of resources, from urban infill and transit-oriented development to walkable communities and redevelopment/re-use.

- Rural planning to curb sprawl and protect vital resources, recognizing that half of Florida's population lives outside of cities and 77 percent of Florida land is classified as rural.

- Consideration of energy implications in planning and decision-making on water supplies.

8.8 Create Momentum

Education and marketing of the State's energy message are essential. Respect the learning curve and "resistance to change" that are a basic impediment to change. Design an outreach approach that not only informs but compels people to action. Publicize and acknowledge success stories in all end use sectors as part of this effort. Link initiatives to community-based interests, including economic development. Build political support for new approaches through public support as gained by increasing awareness.

8.9 Support Business Initiatives for Energy Success

Recognize that business and industry can be powerful allies in energy achievements for Florida if it makes "cents" for them to do so. Structure tax policies to stimulate desired end results for energy improvements. Remove barriers to energy savings through private sector initiatives. Acknowledge business leaders for their accomplishments.

8.10 Safeguard the Public and Protect Public Investments

Our nation has entered a new era where security concerns are fundamental. Critical energy infrastructure must be protected. The public welfare should also be safeguarded by providing consumers for energy services in the event of fuel supply interruptions, or energy price spikes. Distributed energy is a critical component of this achievement.

8.11 New Directions for Florida's Future

Achieving Florida's energy goals will require many steps. The path to success will be dramatically assisted by new approaches to education and marketing.

The Importance of Education

Education can be a powerful force in carrying out energy plans for Florida's future. The education process should start at the earliest opportunity to get the most lasting results through to our youth. The Florida Energy Office has funded past initiatives for K-12 education that made an important difference in the learning of young people. Renewed effort is needed in this area. Where state funding is not available, the state could facilitate a sponsorship program for those interested. This is a most worthwhile endeavor with long-term dividends.

Marketing Innovation

Effective marketing of the energy message – to consumers, stakeholders and decision-makers at all levels – is perhaps one of the most crucial steps needed to produce new and improved results for Florida's energy future. A paper is provided in Appendix M toward this end. It assumes a state level effort in tandem with community based economic development initiatives.

8.12 Defining End Results

Having a clear sense or picture of what the future you are seeking will look like is an excellent strategy for actually achieving it. At the beginning of this project, the participants looked ahead to the following broad outcomes:

- ***Transitioning Florida to a sustainable energy future,*** including increased energy efficiency, reduced dependence on fuel imports, increased diversity of energy sources and greater use of renewable energy resources.
- ***Enhancing the Florida economy*** through energy choices in all end-use sectors that emphasize energy efficiency, resource diversification and energy independence. Position Florida as a leader in the development and deployment of new energy technologies.
- ***Preserving and protecting environmental resources*** by way of judicious decision-making.
- ***Informing and empowering the Florida public*** in all end-use sectors to play a meaningful role in achieving the energy goals.

- ***Actively engaging governmental agencies*** at the state, regional and local levels.
- ***Safeguarding the welfare*** of Florida's citizens and business community against domestic security incidents and other forms of energy emergencies.

9.0 STRATEGIES

Strategies for an action plan for Florida's energy future are provided in this chapter, followed by initial implementation steps. Useful information for future consideration is also included in earlier-referenced public participation documents.

9.1 Overview

Major strategies include:

- **I.** Establish an Effective Administrative Structure for State Energy Policies & Programs
- **II.** Adopt a State Energy Policy Plan & Strategy
- **III.** Provide Adequate Funding for Policy Implementation and Market Incentives
- **IV.** Demonstrate Leadership in Governmental Operations
- **V.** Tap the Power of Renewable Energy
- **VI.** Make Efficiency the Accepted Standard
- **VII.** Support a Prosperous Economy Through Energy Decision-Making
- **VIII.** Design Energy-Smart Communities
- **IX.** Create an Informed & Empowered Constituency
- **X.** Further Environmental Sustainability Through Energy Decisions
- **XI.** Safeguard the Public & Protect Public Investments

9.2 Implementation Steps

I. Establish an Effective Administrative Structure for State Energy Policies & Programs

- Create an entity to spearhead the oversight and implementation of state energy policy.
    - Provide for enhanced interagency coordination on energy and energy-related duties and functions of the State.
    - Evaluate division of energy responsibilities. As part thereof, consider approach undertaken in some states to separate utility regulatory functions from renewable energy and efficiency incentives and promotions.
- Strengthen the administrative wherewithal of the Florida Energy Office.

II. Adopt a State Energy Policy Plan & Strategy

- Develop an Effective Action Plan: Map out Florida's action course through a far reaching and cohesive plan of action, including policy priorities, timelines, pinpointing of responsibilities and strategies designed for success.
  - Spell out the plan in writing – No such plan exists today nor is there a central point of focus for energy action and responsibilities.
  - Engage state government – Each agency of the State should have a role in helping to further the action plan toward meaningful results.
  - Address all end use sectors – Examine the needs in each end use sector in developing policy priorities and plans.
  - Seek consensus & partnerships – Actively seek partners in the development and implementation of the action plan.
  - Create a living document – Recognize the need for progressive achievements over time and build on the plan accordingly, as milestones are achieved and new resources are available.
- Set State Level Goals for Energy Advancement
  - Reduce per capita energy use – As a starting point, establish a statewide goal of reducing Florida's primary energy use per capita to 85% of the year 2000 level by the year 2010.
  - Advance the use of renewable energy – Establish an aggressive but achievable measurable goal for the advancement of solar technologies and other renewable energy resources.

    Note: This could be a percentage or performance goal, or it could be a goal to have certain policies or standards in place by a time certain.
- Stick to Policy Commitments
  - Implement current policies – Longstanding statutory policies on energy that have gone unimplemented or under-implemented should be carried out for the benefit of Floridians.
  - Examine energy laws – The provisions of current law should be carefully examined to ascertain which need the greatest attention and which offer the greatest benefits for Florida's energy future. These should then be the initial focus for new or renewed action.
  - First things first – Initial priorities for implementation should include policies calling for: emphasis on solar and renewable energy resources; increasing the efficiency of energy production; use of waste heat and cogeneration as conservation measures; reducing the growth rate of

electric power consumption; and consideration of alternatives to new power plants.

- Address next generation technologies, energy supply diversity and infrastructure required to meet long-term needs.

- Consider true cost accounting as a principle for related decision making—the Governor has provided important leadership through this approach in the realm of growth and development, and it has comparable value as a tool in energy education and decision-making.

III. Provide Adequate Funding for Policy Implementation

- Identify funding sources for energy priorities – Immediate action is needed to fund the administrative structure for energy coordination and policy planning as discussed above. Ongoing funding is needed for policy and program implementation.

- Capture savings as a recurring source – Produce tangible dollar savings through energy conservation and efficiency, and put those savings to work for future energy benefits. Create a revolving fund to support future energy programming.

- Create market incentives – Establish an incentive fund for use in facilitating market transformation.

- Anticipate future opportunities – Designate a portion of Florida energy funds as a reserve for future matching requirements whereby Florida is positioned for timely action in seeking support funds that become available from the federal government and other possible sources.

- Ensure the availability of low income energy assistance for those in need.

IV. Demonstrate Leadership in Governmental Operations

- Make energy management a priority – Create and fund a state energy management program to capture the energy savings potential in state government, while also supporting fiscal prudence in the public sector. Ensure that each state agency has a qualified Energy Coordinator (as called for in current law) whose job it will be to plan, coordinate and oversee operational aspects of energy use within state government.

- Provide financial incentives – Enable agencies to share in the savings they produce whereby such monies can be reinvested in further energy improvements.

- Set state facility goals – Require that new state facilities be 15 more efficient than state code. Recognize agencies that have already achieved substantial savings. Address energy use in leased facilities by including energy

considerations in the bidding and selection process and by informing lessors of opportunities for savings.

- Build upon performance contracting initiative – Ensure full and timely participation by agencies, coupled with careful monitoring of results. Establish limits on Energy Service Company and Performance Contractor charges/profits in supplying goods and services to the State available at guaranteed lower prices under the SNAPs program, enabling more end product delivery from the State's energy dollars.

- Utilize alternative energy – Continue and expand state agency use of alternative fuel vehicles. Expand the use of solar technology on state facilities and structures.

- Orient public employees – Provide training for those responsible for facility and fleet management so that they achieve the best energy results for the state. Establish a Web site featuring Best Practices for agency implementation, and for the exchange of feedback on strategies and approaches. Provide information to public employees at large on how they can make a difference and why it's important to do so.

- Make policies & programs consistent – Examine the regulations, programs and operational policies of state agencies to ensure that they do not run contrary to state energy policies and goals and that they instead serve to further them.

- Engage local governments & schools in energy achievements – Undertake an outreach program focused on fiscal and energy savings. Partner with state associations in conveying the savings potential and opportunities. Establish incentives for energy savings and alternative energy use. Link certain appropriations to energy achievements. Expand the referenced Web site to include strategies for local entities. Publicize locals that undertake exemplary actions, and their strategies for success. Complete process of documenting local government expenditures and use results for energy improvements.

- Involve higher education – Include universities and community colleges in initiatives to save energy and use alternative energy sources. Provide Best Practices and other technical support. Consider establishment of university system goals.

V. Tap the Power of Renewable Energy

- **Diversify Florida's energy supply mix to make meaningful use of renewable resources.**

  - Provide incentives for renewables, such as dedicated funding, percentage use policies and favorable tax policies.

  - Consider establishment of a Renewable Portfolio Standard, and disallowance of credits for renewables use outside of Florida.

- Implement interconnection policies for renewables-based distributed generation on a win-win basis between utilities and customers as power generators, with particular regard to connection fees.
- Offer green power options to utility customers.
- Include demand and supply side renewables in power generation and reliability planning.
- Recognize distributed energy as a vital part of energy supply and energy security.
- Remove disincentives to renewable energy deployment, including by revamping the state regulatory connection between utility revenues and sales.
- Employ renewables in the governmental sector and publicize their use.

♦ Increase renewable energy use over time, in the interest of long term sustainability.

♦ Invest in Florida's future through continued research and development for promising renewable technologies and approaches.

- Continue RD&D for near term, high return energy options.
- Re-examine the Florida potential for wind and ocean thermal technologies.
- Further explore potential for Florida grown bio-fuels.
- Continue to test the potential for hydrogen technologies.

♦ Define renewable energy for purposes of Florida policy and policy incentives and regulations.

- Refrain from extending renewables designation to fossil fuel based power sources. Focus the definition on solar energy, biomass, wind, water and other forms of natural, near-term regenerated power.
- Define "green, greener and greenest" for energy technology options.

♦ Inform consumers, in all end use sectors, about renewable energy choices, specific alternatives available, their costs and benefits, and related technology considerations.

♦ Support improvements in renewable service delivery.

- Provide for sound technology and installation standards and practices.
- Ensure that consumers have access to an adequate base of qualified and reliable installers and service companies.

VI. Make Efficiency the Accepted Standard

- Remove institutional impediments to efficiency actions.
- Establish financial and other incentives for greater efficiency .
- Set standards for efficiency gains in targeted areas of high potential .
- Reduce energy losses in electric power production and transmission .
- Capture waste energy that can be put to productive use .
- Facilitate increased energy management and savings in all end use sectors.
- Enable more low income households to participate in efficiency measures by continuing community grant support for those most in need, and by providing information services through agencies, non-profits and others that work with and are most likely to influence low income populations.

VII. Support a Prosperous Economy Through Energy Decision- Making

- Incent private sector leadership –Acknowledge and publicize examples of leadership in commerce and industry. Offer technical assistance to assist and inspire the business sector to partner in efficiency achievements and alternative energy use.
- Strategically expand the business sector:
  - In recruiting new businesses for Florida, target manufacturers and product /service suppliers of renewable and efficiency technologies. Position Florida as a national leader in energy products of the future.
  - Create an in-state market for such products and related services through publicizing the technologies and acknowledging Florida industries that produce them as well as businesses and other users.
  - Seek new and expanded businesses and industries that are prudent in their resource use (recycling, waste recovery, conservative packaging, etc.) and/or that produce products or offer services that enable consumers to be more resource wise.
- Support business competitiveness – Encourage waste heat recovery/cogeneration by Florida industries and implement state regulations accordingly. Provide information services, including Best Practices, to the business and industrial sectors, with a focus on those least likely to be well informed but with high potential for favorable results. Emphasize both energy and non-energy benefits, and address a diverse range of operational types where uniform approaches do not apply. Capitalize on opportunities at times of plant and equipment or process modernization and upgrades.

- Protect business welfare – Assist business and industry with information on energy diversity, reliability and security for their planning and operational needs. Address industry concerns about ensuring the highest and best use of fossil fuel resources, especially natural gas.

VIII. Design & Foster Energy-Wise Communities

Identify opportunities to curb energy waste and emphasize efficiency through improved land use planning, development practices and growth management measures.

- Examine the impact of transportation concurrency policy on transit use.

- Expand efforts to promote and incent compact development and the reduction of urban sprawl.
- Expand efforts to provide for walkable and bikable communities .
- Support and provide incentives for redevelopment and reuse as a means of conserving energy and other resources.
- Give greater emphasis to public transit and improve access and convenience to riders.
- Facilitate increased efforts to conserve water resources, and consider energy requirements of future water supply, treatment and distribution systems and approaches.

IX. Create an Informed & Empowered Constituency

- Develop new means of informing the public of opportunities for saving money while also benefiting the state, local communities and their own personal welfare by saving energy and utilizing alternative energy sources. Communicate in a way that captures consumer interest and inspires action.
- Provide reliable, easily understandable information about energy products and services so that consumers can make informed choices between available alternatives. Make the process easy with a ready understanding of "what's in it for them."
- Target end use and policy decision-makers with strong potential for substantial positive results through investments in energy outreach.
- Revitalize efforts to educate youth through the school system, and include ways of engaging their support and participation in energy saving.

X. Safeguard the Public & Protect Public Investments

- Establish a mechanism, with assigned responsibility, for determining and addressing Energy Reliability, beyond the PSC process of considering Utility Reliability. Include distributed energy an integral part thereof, including through industry, homeowners and other sources. Encourage distributed power as a means of enhanced reliability and self sufficiency, including through facilitated efforts to reduce peak demand for centralized power.
- Expand the Utility Reliability process to include supply side efficiency measures and utility system usage of renewables and other forms of distributed energy.
- Ensure fuel supply diversity in the power generating sector (including with regard to future reliance on natural gas), and seek such diversity in other energy supplies and services, particularly in the transportation sector.
- Consider the establishment of demand response programs utilizing financial incentives for utility customers to reduce or shift electricity uses, including the use of generators should system demands necessitate.
- Upgrade utility transmission systems to achieve improved capacity and efficiency.
- Incorporate the use of solar electric and solar thermal technologies in the State's emergency preparedness and response plans, including domestic security initiatives of the FDLE as applicable. Inform appropriate parties of the role such technologies played in Hurricane Andrew response efforts, and develop agreements with FSEC, the solar industry and other related trades for support services and equipment under emergency conditions.
- Engage State Agency Energy Coordinators in energy-related response roles under emergency conditions affecting State employees and government property.
- Expand education initiatives to include foreign oil dependency, and the war in Iraq plus post-war efforts, as important rationale for new energy approaches by consumers, including stepped up conservation and efficiency efforts and the choice to use alternative energy. Assist the public at large, and targeted consumers, in envisioning the consequences of energy related disruptions due to security incidents, and how to avoid or respond to such impacts.

- ♦ Anticipate public health and safety needs attendant to nuclear power plant decommissioning and the transportation of spent fuels from nuclear reactors.

9.3 Strategy Action Steps

As an extension of the above recommendations, following are selected steps that can be employed to translate desired outcomes into realized results. Additional measure are embodied within this report, most notably in the chapter on Energy End Uses. The steps below also serve as examples of diverse ways by which advances can be made through all end use sectors and decision processes.

A. Industry

1. Monitor actions of the October 2003 Special Session on Economic Development and tap opportunities to secure funding, financial incentives and recruitment support for high tech industries involving sustainable energy.

2. Recruiters of new industry for the state should seek companies that will be good stewards of Florida's resources, including energy, water and land. Whether through track records of success or committed plans, industries that use resources prudently and/or that enable others to do so should be the subject of special recruiting attention. Examples of the latter category range from manufacturers of energy efficiency and renewable energy products to waste recyclers to producers of innovative or practical products or merchandise that are sustainability conscious.

3. Identify industries that have undertaken exemplary efforts in energy efficiency and the use of energy alternatives. Acknowledge such success stories and publicize the results of their efforts so that others in the field can benefit from them for even greater results in the Industrial Sector.

4. Identify new ways to reduce the energy consumption impacts of tourists and the tourism industry, including greater efficiency in transportation, lodging, commercial laundromats, restaurants and entertainment facilities. Work with Visit Florida to identify major points of tourist influx and engage them as partners in seeking innovative ways to achieve the state's energy and economic goals in tandem. Undertake a showcase initiative in Orlando in cooperation with major commercial outlets that serve tourist populations.

5. Many Florida industries will be conducting upgrades of technology, equipment, motors and processes in the next five to ten years, as technologies become outdated and capital investments degrade. The State of Florida can provide a valuable service through information sharing with industry on opportunities for reduced operating costs and increased business competitiveness. In addition to a "win" by industry, the State wins by better achieving its energy, environmental and economic goals. The State can work with a range of industry associations to reach their members through articles in trade publications, Web sites and other such means on a highly cost effective basis.

The talent and information resources of such organizations as the American Council for an Energy Efficient Economy (ACEEE) and the national Alliance to Save Energy can well serve the state in this process.

6. Utilizing information provided by ACEEE, the Alliance and the University of Florida (see Reference Materials), identify ways to assist and incent agricultural operations in becoming more energy efficient while at the same time more cost competitive. Given the tight profit margins of farming operations, an increase in energy efficiency can produce meaningful savings that translate into greater business success.

7. Industry has proposed that cogeneration and waste heat recovery be defined as "renewable energy resources". Where the source of such energy is fossil fuel based, a renewables definition would not be appropriate. However, industry's point is well taken that barriers should be removed to industrial applications of cogeneration and waste heat recovery, and such efficiency practices instead encouraged.

8. Undertake initiatives to utilize existing stand-by generators through connection to the utility grid as dispatchable generation. Generator owners would be compensated based on spot pricing for power production. Also implement Combined Heat and Power (CHP) distributed generation at targeted facilities such as hotels and commercial laundries.

9. Florida's long-range planning should include a careful evaluation of transportation and distribution infrastructure needs for fuel supplies (ports, pipelines, highways, etc.). Factors to consider in such evaluation include: capacity needs, right-of-way costs, environmental impacts, public safety, location efficiency, domestic security, and the impact of energy alternatives on capacity needs (e.g., distributed energy, other).

10. Ensure that Waste to Energy operations meet high standards for environmental protection and are complimentary to recycling and reuse goals while offering an alternative energy source.

B. Utilities/Suppliers

1. Regulations of the Public Service Commission should be reviewed in order to align state interests for efficiency and alternative energy with private profit. Discriminatory policies with regard to efficiency and renewables should be eliminated.

2. Stand-by rates for non-utility generators should be examined to ensure that such rates are fair and equitable, and that distributed energy generation is encouraged rather than discouraged.

3. Consider alternative rate structures to encourage conservation and efficiency and to reflect community interests in and benefits from renewable energy resources.

4. Distributed generation should not be disregarded as a reliability measure on the basis that it is intermittent and may not provide total backup supplies to consumers. Both intermittent power as well as other forms of distributed generation represent a valuable component of the supply mix, and increasingly so for future years. In addition, in an emergency situation where power resources are strained system-wide, customers may have to conserve beyond the norm in combination with their use of distributed energy (rather than assuming that *all* needs can *always* be met to the *fullest*).

5. Undertake utility regulation in accordance with revenue caps rather than rate caps, thereby removing a formidable disincentive to energy efficiency and renewable resources.

6. Facilitate utility innovation and aggressive action in saving energy by allowing utilities to share in the savings that they help generate through end-user participation.

7. Amend PSC regulations and/or operational policies to provide a higher price for power from waste heat sold by industry to power companies for use on the electric grid, by industrial or other consumers, and otherwise facilitate energy recycling and recovery.

8. The potential for wind energy should be reevaluated using updated testing methodologies from those employed in past years. A new study from Stanford University should be consulted for timely information on the power of wind energy, including in Florida. In addition to considering the benefits of this renewable energy source, other impacts must be evaluated, including those associated with proposed off-shore wind farms such as visual (and economic) impacts on tourism and private property rights.

9. Gulf stream power generation should be thoroughly explored. The large untapped potential of this resource should be defined and the technologies to utilize it further examined. Environmental concerns must be considered and addressed in any studies of this resource.

10. Expand efforts to take advantage of innovations in supply and demand side efficiency and utility cost reductions. Investigate such measures as advanced transmission lines now available through companies like 3M to as much as triple power carrying capacity while also greatly reducing line losses; and "smart meters" for automatic utility readings. Learn from the approaches and results in other states, through such examples as Illinois ComEd's Negawatt Power Plan, Ft. Collins Colorado's comprehensive utility efficiency plan and strategies (adopted September 2003) and varied initiatives undertaken by the State of New York .

C. Transportation

1. Examine ways to achieve conservation in the Transportation Sector, including reduced vehicle miles traveled, without adversely impacting future funding for transportation purposes as derived from user fees.

2. Investigate options for Per Mile Insurance (PMI) whereby insurance rates are based in full or in part on the number of miles driven per vehicle (as a way of facilitating reduced driving and increased ride sharing).

3. Provide incentives for the purchase and use of more efficient vehicles. For example: car dealers in Florida currently benefit from an exemption from the state sales tax. This "dealer allowance" costs the state roughly $705 million per year in revenues. Consider restructuring this provision in two ways: a) to pass through a substantial savings to purchasers of energy efficient vehicles; and b) to offer discounted fees on the selection of energy efficient vehicles from rental car agencies.

4. Consider granting privileges to drivers of compact and subcompact vehicles, such as preferential parking, free parking, waived tolls, High Occupancy Vehicle (HOV) lane use, or other means. Engage employers, government agencies and others to participate. *Note: This measure requires a process for determining eligibility in a fair and time efficient way. Such mechanisms can be determined by sponsoring organizations (like certain airlines did a few years back to set carry-on limits).*

5. Reexamine cost effectiveness calculations for public transit in Florida, whereby "traditional models may underestimate the benefits of expanding transit service by a factor of five or more. Such a finding, if validated for Florida, would substantially alter the economics of transit expansions . . ." Base transportation planning models, processes and decisions on the most current, substantiated information. See the NRDC study in Appendix E2.

6. Designate more and expanded highway shoulders as official bike lanes, particularly in urban areas with ready access to travel destinations (work, shopping, entertainment, etc.).

D. Buildings

1. Enforce the building energy code on the final product, not just in the permitting phase.

2. Increase standards and guidelines for reducing lighting energy use for commercial buildings (the biggest single contributor to energy use in a commercial building). Models that can be utilized and adopted by Florida are available from other states as well as ASHRAE

3. Zoning requirements should be examined to remove impediments to offices located in the home, whereby employment in the home can be compatible with residential land use and, at the same time, save energy and other resources involved in transportation.

4. Identify neighborhoods, subdivisions and communities that are undertaking sustainable energy approaches. Publicize success stories with the media and trade associations (Florida Home Builders Association, American Institute of Architects, American Planning Association, Council of Neighborhood Associations, citizen and consumer groups, etc.), as a way of achieving better results for the future and informing the public of available alternatives to seek for their own locales.

E. Education & Civic Involvement

1. Florida has learned a valuable lesson through the recent Constitutional Amendments approved by the electorate due to their worthy social goals but absent an understanding by the public of the price tag involved. That lesson should be put to work by ensuring that decision-making on energy includes informing decision-makers, stakeholders and the public of the trade-offs involved. Energy choices involve both benefits and costs. Taxpayers who will ultimately bear the costs should understand the impacts of individual choices, and the comparative impacts of current approaches and available alternatives.

2. Continue sponsorship of a Web site to inform the public about energy alternatives, Best Practices, energy activities of the State and other related information. Include information relevant to specific end-use sectors as well as the public-at-large, and gear the information towards practical use in the lives of everyday, busy people.

3. Tap the power of volunteerism toward achieving improved energy results for Florida. Many people are willing to devote time and resources toward endeavors that they consider to be worthwhile for the public good. Both employed and retired citizens (educators, scientists, engineers, builders, the religious community, etc.) have a wealth of talent and knowledge to share for these purposes. Reach out to public service organizations (like Volunteer Florida and a range of others) to include energy outreach as part of their functions. Provide a mechanism for concerned citizens to be involved at the state, regional and local levels in positively contributing to Florida's energy future.

4. Establish a fund whereby businesses, industries, institutes, charitable foundations and other organizations, as well as philanthropically minded individuals, may contribute financial and tangible in-kind resources toward generic energy initiatives as well as specific projects with specified purposes. The generosity of such parties could enable a broad range of worthwhile energy initiatives at the state, regional and local levels that would otherwise go unfunded. Funding generated through these means could also serve as matching dollars for grants

from the federal government and other entities. In addition, the State could assist and empower local communities by identifying grant opportunities and assisting with concept development for local and regional projects to advance local and state energy interests.

5. The surveys conducted through the project were not scientific in nature and, rather, were used to gauge the interests and feedback of participants in the project. A statewide scientific survey could be undertaken at reasonable cost as part of the next phase of efforts on creating an energy strategy for Florida.

F. Communities & Land Use

1. Include energy considerations in planned DCA review of growth management policies, including energy use implications of alternative planning, design and development approaches.

2. Enable Regional Planning Councils to assume a more active role in energy matters affecting their respective regions. Look to the work of the Treasure Coast Regional Planning Council for examples of leadership in the energy realm. Involve the public in considering regional energy impacts and opportunities. Consider a mechanism for public participation such as was used by the State of Florida in the 1970s through Regional Energy Action Committees.

3. Undertake a pilot initiative utilizing the Location Efficient Mortgage™, a concept similar to the Energy Efficient Mortgage except that it is said to result in savings as much as ten times more than through home efficiency savings. Work with the development and financing communities to sponsor such an initiative and publicize its results.

G. State & Local Governments

1. Preliminary progress was made in obtaining information on energy consumption through local governments. Cities, counties and other units of local government consume significant amounts of energy. Public facilities and vehicles also provide a means of "leading by example" in energy efficiency and alternative energy use. The FEO funded a survey of local governments in 1995. Data for selected locales has been updated as part of this project, and it would be worthwhile to continue data gathering in an effort to ultimately assist and influence local governments with regard to their energy practices and consumption.

2. Provide training and incentives for public landfills and waste treatment plants not now doing so to capture waste energy for facility use where cost-effective.

3. Provide an effective communications and coordination mechanism between regulators concerned with state energy codes, mitigation codes, water management, environmental regulations, local code enforcement and other such measures, to achieve improved results at the state and local levels.

H. General

1. Water supply is a major issue of concern for Florida's future. Water is an essential ingredient to conventional power production (fossil fuel and nuclear power plants). It is also a fundamental requirement of Florida agriculture, other industries and all residents of and visitors to the state. Water supply recovery, treatment and distribution also require a substantial amount of energy. Planning for Florida's energy future should give significant consideration to water supply needs in all end-use sectors. In the late 70s, the Florida Department of Environmental Regulation conducted a review of the energy implications of water and waste water treatment regulations. A similar review should be conducted today whereby the energy requirements of water supply alternatives, facilities, technologies and processes are examined. The delivery of usable water supplies, as an absolute necessity of modern society, is an ongoing "binding" commitment for the use of energy resources.

2. The principle of "true cost accounting" should be utilized with regard to energy approaches of the future, including renewable energy resources, energy efficiency, and distributed energy as compared with conventional energy alternatives. The cost of roads should also be examined in this context as compared with transportation alternatives such as public transit. The end product of an FEO funded project that concluded in 1996 ("Merge Lanes Ahead", 1000 Friends of Florida) should be examined for additional considerations on the economics of transportation alternatives.

3. Measures of success should be defined for the state's energy outcomes and strategies, including the establishment of quantitative standards, so that progress (or the lack thereof) can be accurately tracked and reasonably evaluated.

4. In recognition of resource limitations, identify geographic areas of the state, and areas within individual end-use sectors, where action by the State of Florida (whether direct or through facilitation or assistance) has the greatest potential for impact. Prioritize initiatives with an eye for cost effectiveness and payback.

5. Tap the resources of available national organizations and experts. Such parties have generously given of their time and resources toward this project in an effort to assist Florida and, as one of the largest states, the nation. Many organizations are available to serve as an extension of the state's institutional energy resources.

6. Develop a least cost energy plan based on the goal of societal cost minimization *(see NRDC recommendations)*.

7. As part of the State's energy strategy, include "fast results projects" in addition to longer-term initiatives. Projects with quick, obvious and "meaningful" payoffs will produce a meaningful return in a direct sense and also in creating the momentum needed for larger scale returns. The results of such efforts should be documented and heavily publicized. Longer-term projects should be included as well but tend to get lost from public view and thereby lack the same value in sustaining momentum toward addressing the State's energy concerns.

8. Recognize that any energy plan or strategy for Florida is, in effect, the "map", not the destination. Clear outcomes should be identified and quantifiable parameters set for achieving broad aspirations such as "sustainability" and "energy security."

9. Success strategies/ Best Practices – In addition to developing our own success strategies, opportunities abound to learn from the experiences and accomplishments of others, whether other states, companies, agencies, organizations or individuals. Learning from the mistakes and achievements of others saves time and resources that can be applied toward Florida's best interests where the proverbial wheel need not be recreated.

10. Wise use of fiscal resources – Florida, like states across the nation, is encountering serious fiscal constraints that affect our immediate and longer term economic welfare. Through the Bush Administration, energy concerns have returned to the forefront of state level priorities, a development that aligns with our budgetary needs given the many opportunities for fiscal savings and economic vitalization through wise choices.

This report provides courses of action, and a menu of individual actions, for use by the State and its varied partners in charting and implementing a powerful and necessary action plan for Florida's Energy Future.