

FLORIDA'S ENERGY SITUATION

James M. Harvey
Assistant Energy Director
Governor's Energy Office

The majority of people in Florida, as well as in the country as a whole, are only now beginning to digest a notion that they have been chewing on for some time--sooner or later, we will run out of oil and natural gas. So much emphasis has been placed on debating the honesty of the oil companies, the actions of the OPEC nations, and the value of President Carter's energy policies that we sometimes have lost sight of the critical point that oil and natural gas supplies are exhaustible.

For an economy so singularly dependent on these limited natural resources, the effects of this on the future could be devastating.

Florida faces the possibility of serious energy and economic problems in the next ten years, given current and projected energy conditions. The state, and the nation, must deal with a worsening international energy situation. Florida is particularly vulnerable because of its heavy dependence on oil and natural gas--the two energy sources in shortest supply and most likely to experience steep price increases in the next few years. The availability of these fuels is constantly tightening, and untimely market interruptions are increasingly probable. Rapidly increasing prices charged by the oil producing nations (OPEC and others) are causing economic repercussions that may have particular significance to Florida.

Florida's economy is highly sensitive to energy problems. Tourism, agriculture, and construction are the state's largest industries in terms of jobs and gross sales; all three depend heavily on the availability of petroleum fuels. If the price of these fuels becomes too high, an adverse impact on all of these activities will result.

A more detailed look at sources of energy and energy consumption in the state provides additional insight into the problems to be resolved.

SOURCES OF ENERGY

Petroleum

In 1978, Florida depended on petroleum for almost 70 percent of its primary energy needs. This contrasted with the United States as a whole, which used petroleum for slightly less than 50 percent of primary energy consumption. (See Figure 3.)

The state's heavy reliance on petroleum is attributable primarily to the high consumption of transportation fuels, as well as to the fact that

FIGURE 3.

**Percentage of Total Energy Consumption
By Primary Energy Source**
Florida and the U.S., 1978

Total Consumption:

Florida 2,266.5 trillion BTU
U.S. 78,474.9 trillion BTU

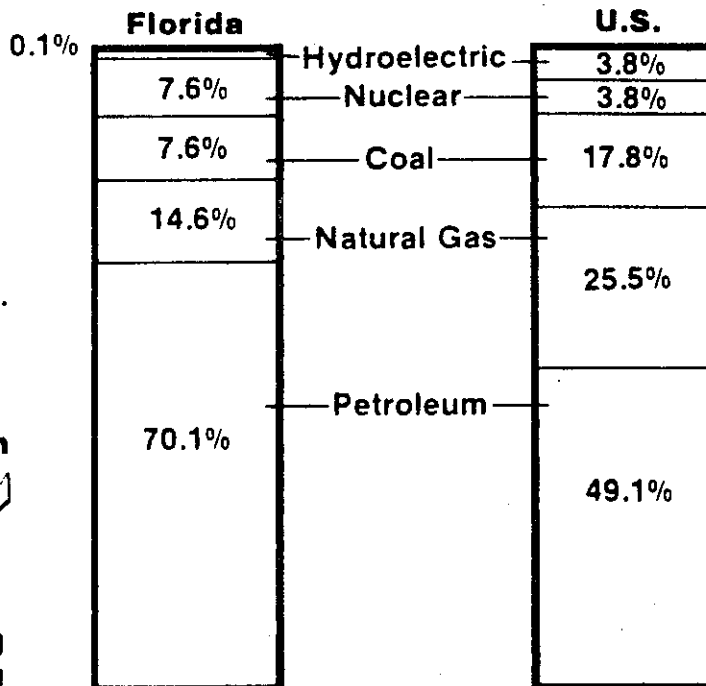
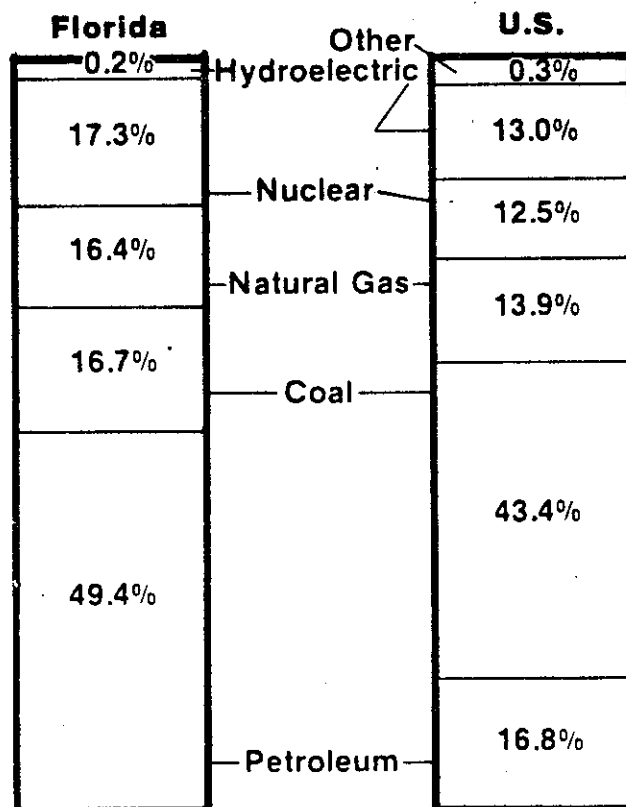


FIGURE 4.

**Percentage of Net Electric Generation
By Fuel Type**
Florida and the U.S., 1978

**Total Electric Generation
Fuel Consumption:**

Florida 980.1 trillion BTU
U.S. 23,724.0 trillion BTU



close to 50 percent of the state's electricity is generated from this fuel (1978). Nationwide, less than 17 percent of electricity was generated from this source. (See Figure 4.)

Although Florida produced (mainly from the Jay Field) the equivalent of 17 percent of the petroleum it used in 1978, none of this was directly available for in-state consumption. There are no petroleum refineries in the state. The state must rely on petroleum products imported from other states or foreign countries. The refined products consumed in Florida fall into two general categories: residual oil, a thick product used in industrial boilers, and the principal fuel used to generate electricity in the state; and light products, consisting of diesel fuel, home heating oil, jet fuel, gasoline, and propane.

The majority of residual oil used in Florida is imported from refineries in the Caribbean and South America. These refineries use Venezuelan crude oil and, increasingly, crude oil originating in the Middle East. Because of the increased use of Middle East oil, Florida's electric power system is vulnerable to potential supply disruptions caused by events in Mid-East countries.

Most of Florida's light products, particularly gasoline, come from coastal refineries in Texas and Louisiana. The crude oil used is approximately 56 percent domestic and 44 percent foreign-imported, primarily from the Middle East and Africa. The supply of these products, then, is also critically dependent upon international events.

Florida's dependence on petroleum, specifically imported petroleum, is projected to remain high for the next 10 to 15 years.

Natural Gas

Natural gas is second to petroleum as a primary energy source in Florida. As shown in Figure 3, natural gas accounted for 14.6 percent of all primary energy consumed in Florida in 1978. During that year, the state produced 16.3 percent of natural gas it consumed. This came primarily from the Jay Field in northwestern Florida, which is the state's only large gas-producing field. The remainder of the natural gas consumed was imported, via pipeline, from other producing states.

It is estimated that well over half (65 percent) of the state's known natural gas reserves were consumed during the eight years the Jay Field has been in production. If a high level of gas production is maintained, Florida's gas reserves could be exhausted in less than five years; the state will then have to depend completely on supplies from other states.

Coal

During 1978, coal provided only 7.6 percent of the primary energy consumed in Florida (see Figure 3). Since the state has no coal deposits, all the coal used must come from other sources.

Coal is used primarily for generating electricity. In 1978, coal was used as the primary fuel source for only 16.7 percent of total electric generation in the state (see Figure 4). The majority of Florida's electric power generating facilities were built or expanded during the 1950s and 1960s when the state's population was increasing dramatically. Because petroleum was very inexpensive, it was the fuel-of-choice for electric power generation. Therefore, the majority of the state's electrical generating capacity is relatively new and oil-fired. The state's energy transportation, storage, and consumption infrastructure is designed for petroleum. Because of this, the capital costs, especially at current interest rates, for converting to coal would be very high.

The only way a rapid shift to coal could occur would be to convert existing oil-fired power plants. Since most of these plants are both new and large, the costs of shutdown for conversion could leave utility systems short of generating capacity. Many older plants do not have room for coal piles and would require expensive pollution control equipment to burn coal. Also, because of the smaller size of these older facilities, their conversion to coal would do little to reduce total petroleum consumption.

Over the longer-term, the route to coal conversion will be through building new plants that are coal-fired. A program to achieve this is currently underway in Florida. Between 1979 and 1983, almost twice as much coal-fired capacity will be added than in any previous 5-year period. At the end of 1983, approximately 29 percent of Florida's total generating capacity will be coal.

If the plans of Florida's utilities materialize, coal-fired power generation will almost double between 1984 and 1987. It is only during this period that the state will make any significant shift away from petroleum-fired electric power generation.

Nuclear Energy

In 1978, nuclear power was the primary source for 7.6 percent of the state's total energy consumption (see Figure 3), and 17.3 percent of net electric generation (see Figure 4). Nuclear energy for commercially generating electricity was not used in Florida until late 1972, when Florida Power & Light's Turkey Point #3 plant began service. The opening of three other nuclear power plants between 1973 and 1977 increased the amount of nuclear generation to its present capability.

No new nuclear plants are scheduled to begin operation in Florida before 1983. Nuclear power will have relatively little impact on the state's dependence on petroleum in the next several years.

Solar Energy

In the 1930s, a higher percentage of Florida homes had solar water heaters than today. Because of the relatively inexpensive cost of electricity during the 1950-1973 period, use of solar energy declined. The

use of solar energy presently has only a small impact on total energy consumption in the state. However, with the price of electricity rising and the fuel supply unpredictable, use of solar power is increasing.

Solar energy, particularly in proven water heating and passive construction design applications, has the potential for significantly reducing residential energy consumption. Approximately 6 percent of Florida's total energy consumption is used for heating water in dwellings. Solar water heating has been shown to be cost-effective in all areas of the state.

The Florida Solar Energy Center carries out an active program to promote and encourage the use of solar energy. Their certification program for solar collectors provides quality control, protecting potential consumers. The educational programs conducted by the Solar Center have increased public awareness and use of solar energy. The role of the Solar Center in the establishment of a trade association for solar manufacturers, sellers, and installers has assisted the commercialization of this energy source.

The solar equipment sales tax exemption enacted by the 1979 Legislature, and the federal income tax credits for installing solar systems, have also increased and encouraged solar energy utilization. However, the fact remains that only a very small percentage of Florida homes and businesses are presently solar-equipped for water heating. If solar energy is to assist the state in reducing its dependence on petroleum, this percentage will have to increase dramatically.

High technology solar systems, such as photovoltaic cells, thermal electricity, space satellites, and ocean conversion, are not cost-effective at this time. The Florida Solar Energy Center, the University of Florida, and other universities and researchers in the state are experimenting with a number of these technologies. It is not anticipated, however, that high technology solar systems will have an appreciable impact on energy availability before the turn of the century.

ENERGY CONSUMPTION

As is the case with sources of energy, consumption of energy in Florida differs from the country as a whole (see Figure 5). Primarily because there is relatively little heavy industry in Florida, the state's per capita energy consumption is lower than the national average. However, since 1960, Floridians have increased their use of energy at a faster rate than the rest of the country (see Figure 6).

Transportation is the largest consumer of energy in the state. In 1978, transportation accounted for 38.1 percent of energy use in Florida, but only 26.3 percent of the nation's. More than half of all energy used for transportation in the state fuels private passenger vehicles (see Figure 7). Florida has over 5-1/2 million automobiles that average less than 14 miles per gallon of fuel. During 1978, over 22 million tourists arrived in and toured the state by automobile. The distribution of goods and services (the majority by truck) consumes 26.4 percent of

FIGURE 5.

**Percentage of Total Energy Consumption
By Sector**
Florida and the U.S., 1978

Florida		U.S.	
6.9%	Other	36.0%	37.5%
15.3%	Industrial		
16.3%	Commercial	26.3%	37.5%
23.3%	Residential		
38.1%	Transportation		

FIGURE 6.

Primary Energy Consumption Per Capita
Florida and U.S., 1960 - 1978

	Per Capita Energy Consumption (million BTU)		Percentage Increase. 1960-1978	Relative Growth Rate. 1960-78
	1960	1978		
Florida	144.8	250.3	72.9	1.7
U.S.	242.0	358.5	48.1	1.4

FIGURE 7.

**Residential End Uses of Energy
In Florida**
(Percentages of Total Residential Consumption)

Total Residential Energy Consumption:
1978 523.2 trillion BTU

26.4%	Water Heating
31.2%	Air Conditioning
9.9%	Space Heating
12.4%	Refrigeration
5.2%	Cooking
5.2%	Lighting
9.7%	Other

*Other includes: clothes drying, television, miscellaneous.

FIGURE 8.

**Transportation End Uses of Energy
In Florida**
(Percentages of Total Transportation Consumption)

Total Transportation Energy Consumption
1978 854.6 trillion BTU

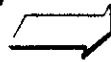
53.3%	Private Passenger Vehicles
26.4%	Distribution of Goods & Services
14.5%	Public Passenger
4.7%	Health & Emergency
1.1%	Other

transportation energy. The bulk of public passenger transport in Florida is airline traffic; buses account for less than one percent of petroleum use in the transportation sector.

Residential uses account for 23.3 percent of Florida's total energy consumption. Air conditioning and water heating are the highest energy users in Florida dwellings (see Figure 8); these uses consume a much higher percentage of total residential energy than in other states. Conversely, heating Florida homes uses far less energy than the national average. The majority of energy used in the home is electrical energy. Over 48.8 percent of electricity generated in the state in 1977 was for residential use. This compared to a national average of 33.2 percent (see Figure 9).

FIGURE 9.

**Percentage of Sales of Electricity
To Ultimate Customers
By Class of Service**
Florida and the U.S., 1977



Florida		U.S.
6.3%	Other	6.0%
14.6%	Industrial	
30.2%	Commercial	37.7%
48.8%	Residential	23.1%
		33.2%

Only about 15 percent of total state energy consumption is in the industrial sector, while industry accounts for 36 percent of total national consumption (see Figure 5). This reflects the relatively smaller role of industry in the state's economy when compared with tourism, agriculture and construction.

In 1978, tourism accounted for over \$12 billion in gross sales in the state; the sales tax attributable to tourist activity amounted to almost \$608 million (approximately 33 percent of total sales tax collected). Over 12 percent of the state's civilian labor force works in jobs directly related to tourism; many other jobs are indirectly associated. Estimates indicate that tourism accounts for approximately 12 percent of total energy consumption in the state, with 32 percent of total transportation energy consumption credited to this activity.*

The estimated retail value of Florida's agricultural products (in 1977) was \$7,786,780,000. Approximately 7 percent of the state's civilian labor force works in agriculturally-related jobs (e.g., food processing). As previously discussed, agriculture in Florida is energy-reliant, and estimates indicate that this industry accounts for slightly over 5 percent of the state's energy consumption.**

In 1978, the value of building permits in Florida amounted to approximately \$7 billion. The construction industry employs 5.6 percent of the state's civilian labor force. Since Florida produces very few of the building materials needed for construction, most must be transported from the other states. This places the construction industry in a position of dependency upon fuel supplies. It has been estimated that construction accounts for slightly over 5 percent of the state's total energy consumption.***

The energy consumption patterns in Florida show the high degree of dependency on petroleum fuels. Petroleum is used for transportation, which is the largest consuming section. Tourism, construction and agriculture depend on transportation. Electricity is the major form of energy used in Florida homes, and close to half of the electricity used in the state is generated from petroleum. This reliance on petroleum, then, is the major problem to be dealt with in the future.

THE FUTURE

National projections of energy availability between now and 1990, even assuming no severe market disruptions due to unexpected international events, are not optimistic. These projections indicate that Florida's

*Energy Patterns Study Group, College of Business, Florida State University.

**Institute of Food and Agricultural Sciences, University of Florida.

***Energy Patterns Study Group, College of Business, Florida State University.

"share" (based on historic patterns and allowing for growth) of the 1990 national energy supply will be about 25 percent less than needed if use continues at current levels.

If Florida is to avert the severe, adverse economic and social impacts that would be caused by the 25 percent shortfall projected, it will have to examine and take action in those areas that will be most significant in reducing energy consumption. Without reductions in consumption, serious problems may occur in the state well before 1990.

The following actions and measures will be necessary to avert such problems:

- The use of fuel in the transportation section will have to be drastically decreased.
- Significant reductions in the amount of energy used in Florida homes, especially for air conditioning and water heating, will have to occur.
- Business, industry, and agriculture will have to evaluate their present methods and institute more energy-efficient operations.
- The use and application of solar energy technology will need to be increased.
- The shift to greater use of coal to generate electric power will have to take place.
- Research and development of alternative fuels and other energy-saving measures will have to be supported and encouraged.
- All of the state's citizens will have to increase their individual efforts to conserve energy, changing their life-styles to become energy-conservers rather than energy-wasters.
- Government will have to assume a strong leadership role, setting an example and charting a low-energy course for the state's future.

Although the future may hold new technologies and alternative fuels that will assist in meeting energy problems, the only viable alternative for dealing with the energy crisis in the next 10 to 20 years is energy conservation.