

**Oil and Gas Energy Issues
in
Florida's Future**

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Table of Contents

Executive Summary	1
I. Introduction	3
II. Fueling the Florida Economy and Lifestyle	4
III. The Historic Debate	5
IV. Reframing the Dialogue: Public Policy and the Demand for Energy	5
V. From Coal-Fired to Combustion Turbine Plants	6
VI. Fueling the Debate	6
VII. Natural Gas: A Fuel-Side Look at Supply	7
VIII. Florida’s Pipeline Connection	7
IX. The Gulf of Mexico Connection	8
X. Energy Questions and Answers	9
XI. A Heads Up for Florida Policymakers	13
XII. Conclusion	14
Florida Energy 2020 Study Commission.....	A-1
Fuels from Florida: Exploration and Production Policy	A-7

Figures

<i>No.</i>	<i>Title</i>	<i>Page</i>
1.	Florida’s Electric Energy Policy Model	4
2.	U.S. Gulf of Mexico Natural Gas Production.....	10
3.	Gulf of Mexico—Offshore Gas Production and Future Demand	11
4.	Lower 48 Natural Gas Resources Subject to Access Restrictions	12

Appendix Figures

<i>No.</i>	<i>Title</i>	<i>Page</i>
1.	Oil and Gas Field Maps and State Leases	A-9
2.	Florida Panhandle Offshore Areas	A-12
3.	Eastern Gulf of Mexico Proposed Sale 181	A-14

I Introduction

From the gas pump to the light switch, Florida residents and visitors alike depend on energy. Gasoline, natural gas, coal, oil, nuclear fuel rods, water, and the sun provide power for transportation and for daily life. Alternative fuels such as hydrogen derived from natural gas may also become a part of our energy inventory.

Oil prices skyrocketed through 2000, nearly doubling to \$40 a barrel by year's end. As a result of OPEC cutbacks, former President Bill Clinton released token amounts of crude oil from the Strategic Petroleum Reserve. Within the first two weeks of his term, President George W. Bush announced plans to initiate drilling in the Arctic National Wildlife Refuge. Reserves of heating oil and natural gas are low and prices remain high. California's electric generation crisis has been blamed in part on high natural gas prices. At the start of the 21st century, energy issues are an action item on the public agenda.

The Florida Energy 2020 Study Commission began its 18-month mission in the summer of 2000 to consider the future of electric power in the state, focusing largely on the thorny issue of who will generate electricity. But, beyond the topic of generation, the commission will reshape the mix of fuels used to create electricity. As a consequence, in future Florida legislative sessions, seasoned and freshman representatives and senators alike face policy decisions critical to our energy needs, the environment, growth and development, tax revenues, and the availability and uses of fuel. (See Appendix A for a description of the Florida Energy 2020 Study Commission.)

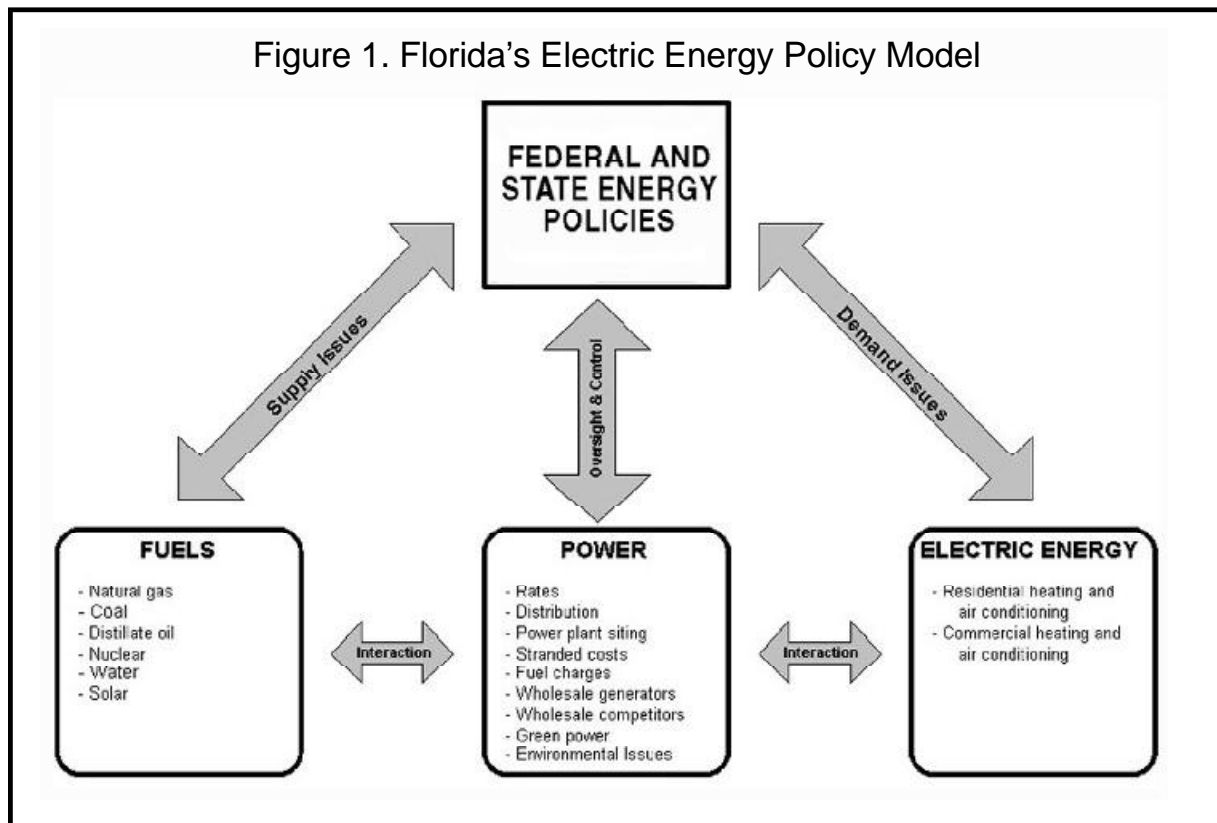
Our discussion focuses on the fuels used to generate electricity. We believe that policymakers must address fuel types and fuel demand as critical issues. Early indicators suggest that Florida and much of the nation will sharply increase consumption of natural gas in the early part of the 21st century, largely to generate electricity. The commitment to natural gas, however, will be shared by states across the nation, thereby fostering competition and price uncertainty.

As energy debates unfold, policymakers must recognize and understand the complex dynamics that operate between and among the parts of the energy system. For example, talk about electric utilities commonly focuses on the structure of the industry, the individual utility companies, consumers, or the agencies that regulate the environment or shape electric rates. The connections between other parts of the system—that is, the policies that foster or impede development of fuels—remain invisible.

This *Backgrounder* examines the trend toward the use of natural gas in the context of changes in the electric utilities industry. It concludes with a list of energy issues likely to be debated by policymakers and the Florida legislature in the near future.

II. Fueling the Florida Economy and Lifestyle

Fuel is part of the system that produces power to convert energy to use for human purposes. For clarity, we define fuel as a material or resource that is burned to produce heat or power. In turn, power is defined as a source of energy or the point at which fuel is converted to energy. Energy is defined as the capacity to do work. Re-stated, oil (a fuel) is burned to produce steam, which turns the turbines (power) that produce electricity (energy for cooling and lighting homes). Coal, oil, natural gas, nuclear fuel rods, water, and solar power—in descending order—are used to produce electricity in Florida. The flow of fuels from source to user is tracked across Figure 1.



This model can be used to recognize the interconnection between fuel sources and fuel uses in Florida, and to recognize the effects of policy change on the multiple parts of the system. Figure 1 reads from left to right, proceeding from fuels to power to the electric energy that individuals and organizations use to cool their homes, cook their food, and produce goods and services. The model can also be used to focus discussion and to illustrate the effects of policy crafted outside Florida's geopolitical boundaries.

III. The Historic Debate

Florida is a fuel-dependent state. Nearly 100 percent of the fuel used to generate electricity in the state is imported from other states and from international markets. The flow of fuel resources from points of production to locations of consumption, depicted in Figure 1, is influenced or regulated by policy decisions made in Florida, in other states, and in Washington, D.C.

- 1 Coal used as power plant fuel is shipped by barge, ship, or dedicated coal trains to electric generating facilities.
- 1 Natural gas produced in the Gulf Coast areas of Texas, Louisiana, and Alabama is processed, then piped into Florida for use at the stove top in domestic settings or, increasingly, by utilities to generate electricity.
- 1 A small amount of crude oil is produced in Florida, refined out of state, and then shipped back for use as power plant and motor fuel.
- 1 Nuclear fuel rods are produced and processed outside of Florida.

For years, the Florida policy debates have been polarized between environmental values and the production of fuel, namely oil and natural gas. Should the petroleum industry be allowed to drill in Florida or federally owned waters offshore or in environmentally sensitive areas such as the Everglades or the Big Cypress? Consistently, political decisions have been a disincentive to finding oil and gas as fuel for Florida's use.

Moratoria and increasingly restrictive regulations define policy. Little, if any, discussion addresses the interaction of such policy with other parts of the system that produces power to keep Floridians and visitors moving, cool, and in touch. Power plant siting issues in locations around the state have hinged on fuel selections among coal, oil, and nuclear or, most recently, emulsified heavy crude known as Orimulsion. "Fuels from Florida: Exploration and Production Policy" in Appendix B discusses exploration issues that have framed a portion of this debate.

IV. Reframing the Dialogue: Public Policy and the Demand for Energy

The electric power industry is at a crossroads throughout the nation, shifting in many states from a structure defined by monopoly and dominated by investor-owned utilities (IOUs) to a free-form market where independent power producers (IPPs), also known as merchant plants, compete side by side with the IOUs. The debate is framed by the rhetoric of promised but as yet unproven lower prices for consumers and the benefits of market forces; by the wisdom of IPPs versus IOUs and other providers; and by the recent plans to add transmission lines to the open market. At the periphery and left largely unexamined are the issues of technology and fuel, both of which are influenced by demand and, in turn, determine reliability.

Public policies can change the dynamics between supply and demand in the model in Figure 1. Policies created to treat *demand* issues affect the price and availability of fuels listed under *supply*; likewise, policies created to address *supply* issues affect *demand*.

V. From Coal-Fired to Combustion Turbine Plants

Coal-fired plants dominated the U.S. power marketplace through the 1980s. Changes in the regulatory arena for air quality, coupled with changes in engineering and business practices, initiated a trend toward the use of natural gas as the preferred fuel, with many power companies bowing to political expediencies to avoid costly permitting.

The Clean Air Act Amendments of 1992 prompted a series of new rules that were implemented throughout the 1990s. These rules reduced nitrogen oxide emissions by 85 percent in the eastern states, created new ozone restrictions, and set new source performance and review standards that ultimately fostered a strong environmental case for natural gas as a fuel.

Power industry practices expanded the use of combined-cycle combustion turbines and straight combustion turbines to supply peak power generation during high demand periods. Combustion turbines are essentially industrial applications of jet engine technology. Straight combined-cycle turbines burn natural gas or liquid petroleum fuel to spin the turbine while combined-

cycle units also generate steam from waste heat to generate more electricity. These units are extremely versatile since they can be brought online in minutes when needed. Combustion turbine technology is also adapted easily to repower older plants to meet new standards.

VI. Fueling the Debate

According to the Florida Public Service Commission (PSC), 16 percent of Florida's electricity in 2000 was generated with natural gas-fired boilers or in combustion turbines. Recent decisions by investor-owned Tampa Electric Company (TECO) and the promises of independent power producers suggest that natural gas will be the fuel of choice over the next decade. By 2010, natural gas is expected to supply nearly 43 percent of the electric generating fuel in the Sunshine State. Natural gas retrofits such as proposed by TECO are expected to replace older coal- and oil-fired plants during this period.

Florida is expected to more than double the amount of natural gas consumed over the next decade to nearly 2.4 trillion cubic feet per year (Tcf/year). The state will need 10,000 to 15,000 megawatts of new power by 2010. Nearly all of the new electric generating capacity will be based on natural gas as a fuel according to the PSC. Similarly, energy analysts estimate that more than 60 percent of the new capacity in the nation's electric marketplace will be fueled by natural gas. The demand for natural gas nationwide is expected to increase from 20 percent to more than 25 percent by 2009 and to 30 percent by 2015. So it appears that Florida and other states across the nation will be in competition for natural gas.

Two questions emerge from this consideration of demand for natural gas as a fuel for production of power in Florida. On one hand, everyone with a stake in the energy future needs to ask, "Where is all the natural gas going to come from if almost every new generating plant in Florida and many in other states are predicted to be combustion turbine systems?" On the other hand, the makers of Florida's energy policies need to consider the implications of competition. Will a rise in the price of natural gas cause power producers to switch from the clean-burning gas fuel to liquid petroleum alternatives, or to a new look at coal and nuclear fuels?

VII. Natural Gas: A Fuel-Side Look at Supply

Natural gas was considered an abundant resource in the late 1960s and into the 1970s. Prices were low, artificially controlled at the wellhead by federal regulation. The sale of natural gas at the wellhead was deregulated in 1978; since that time, the price has been dictated by a competitive market system.

Beginning in the late 1970s, the petroleum industry had the capacity to produce more natural gas than the market could handle, creating a phenomenon referred to as the "gas bubble." After the economic crash of the oil and gas industry in 1986, followed by major corporate and industry restructuring, exploration activities slowed and natural gas reserves were not replaced. During most of the 1990s, the number of drilling rigs in the U.S. remained low, meaning fewer oil and gas wells were being drilled to supply and replenish reserves. By late 1999, however, drilling activity picked up and reached record highs by early 2001. Given the increased demands sparked primarily by changes in the electric utility industry over the last five years, the gas bubble is depleted and large numbers of new discoveries are needed to supply the new demand and to replace reserves.

VIII. Florida's Pipeline Connection

Where will all the new natural gas for Florida come from and how will it get here? The natural gas supplied to Florida will be transported through interstate natural gas pipelines regulated by the Federal Energy Regulatory Commission (FERC) and the U.S. Department of Transportation. A significant increment of new gas will flow from the Mobile Bay area, from production in the state waters off Alabama, and the federal outer continental shelf (OCS) areas off Alabama, Mississippi, and Louisiana. A substantial portion of gas in the future may come from liquefied natural gas (LNG) shipped from other countries.

Presently, Florida Gas Transmission Company (FGT) operates the major natural gas pipeline that crosses the Panhandle and serves downstate areas. FGT, which is owned by Enron and a subsidiary of El Paso Energy, has a current capacity that is about 60 percent of the projected demand for the next decade. However, system upgrades and new pipelines in the planning and development process could supply 100 percent of Florida's pipeline needs for the long term, according to FGT press

releases. FGT intends to be the main supplier of natural gas to the state. But pipeline competitors are rushing to complete plans so that they can capture some of the delivery contracts to power plants for the new gas demands anticipated if and when merchant plants are approved for Florida. Here are the plans announced to date:

- 1 In late 2000, the Duke/Williams partnership acquired the Gulfstream Pipeline Project crossing of the Gulf of Mexico from the area of Mobile, Alabama, to a landfall near Port Manatee. The Gulfstream pipeline is to be a 36-inch diameter pipe that crosses approximately 400 miles of the Gulf of Mexico.
- 1 Perhaps the most innovative proposal involves bringing LNG from overseas. Southern Natural Gas Company is working jointly with Enron Corporation for the construction of the Cypress Natural Gas Pipeline from near Savannah, Georgia, to an interconnect with the FGT system near Jacksonville, Florida. LNG from overseas may be expected to compete with domestic natural gas if prices remain high.
- 1 Enron also announced plans for another LNG terminal in the Bahamas with a pipeline connection to Ft. Lauderdale. LNG supplies are expected to originate in Trinidad and Venezuela.

IX. The Gulf of Mexico Connection

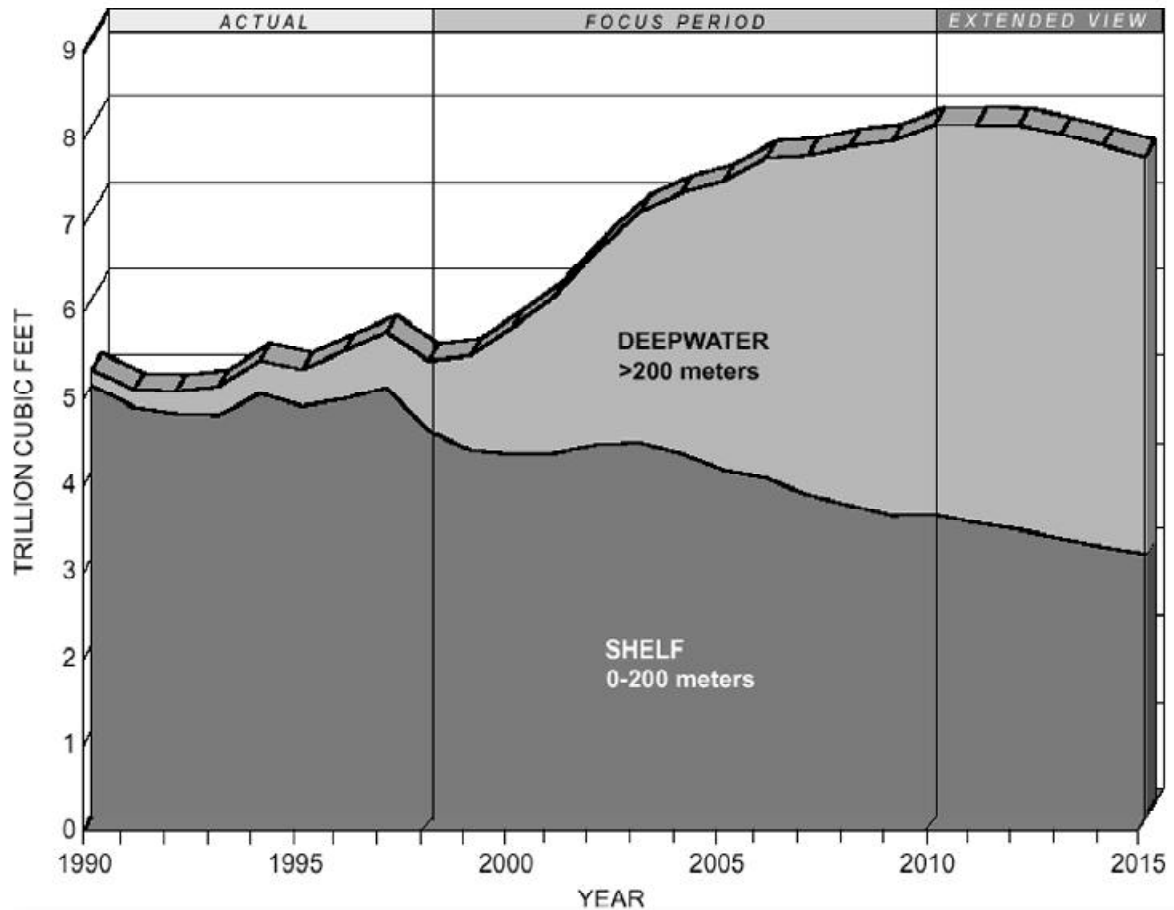
Most projections of natural gas supplies, particularly for the offshore Gulf of Mexico area, are optimistic for the next decade. These projections are based on the assumption that the drilling rate for oil and gas will be increased dramatically; that record amounts of capital will be invested in the area; and that nearly unlimited rigs and personnel will be available for the task. Industry experts claim that all of the remaining areas of the Gulf of Mexico need to be evaluated in the next five years in order to meet the projected natural gas demands.

New drilling activity in the Gulf of Mexico will be increasingly in deepwater and will be expensive, but because of the huge fields to be found, this effort likely will translate in the marketplace to competitively priced fuel. Some of the expected natural gas supply will be from federal waters in the Interior Departments Lease Sale 181. The area in the sale is about 64 miles offshore Louisiana, 15 miles offshore Alabama and at least 100 miles offshore Florida. Mineral Management Service (MMS) of the U.S. Department of the Interior is considering a lease sale on 1,033

blocks involving 5.9 million acres across in the proposed area. However, in late January 2001, in a blow to the energy industry, Governor Jeb Bush requested MMS to exclude Lease Sale181 from further consideration.

Participants in the Energy 2020 debate and Florida legislators should understand that the cheap natural gas from the bubble is

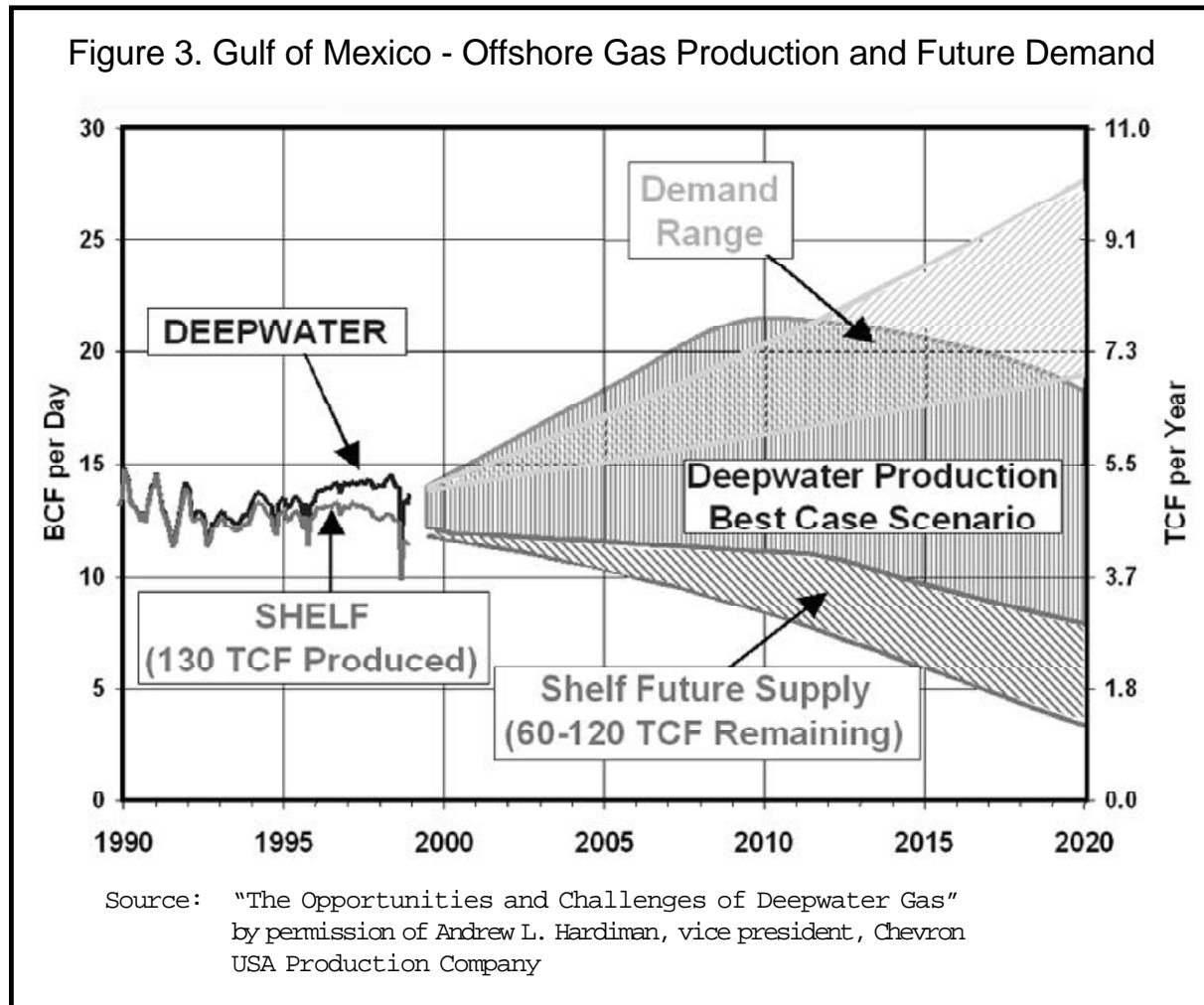
Figure 2. U.S. Gulf of Mexico Natural Gas Production



- 1 Gulf of Mexico production increases by 2.7 Tcf by 2010.
- 1 Deepwater production increases from less than 1 to more than 4.5 Tcf/year.
- 1 Gradual decline is projected for shelf production.

Source of historical data: PI/Dwights production reports. June 1999.

Source: Natural Gas Meeting the Challenges of the Nation's Growing Natural Gas Demand: A Report of the National Petroleum Council, December 1999.



depleted and that drilling near Florida's coast may be required to satisfy demands created in the state or a serious consideration of alternative fuel sources for required generating facilities must occur. The debate over the development of natural gas discovered 25 miles south of Pensacola by Chevron should cause a rethinking of policies against such development off Florida's coast or a rethinking of the demand-side policies that require ever-increasing supplies of natural gas. Chevron's discovery confirms that natural gas is present offshore Florida. Natural gas can be produced without any risks of spills to the surrounding water and could supply all of Florida's natural gas needs for more than three years at current demands.

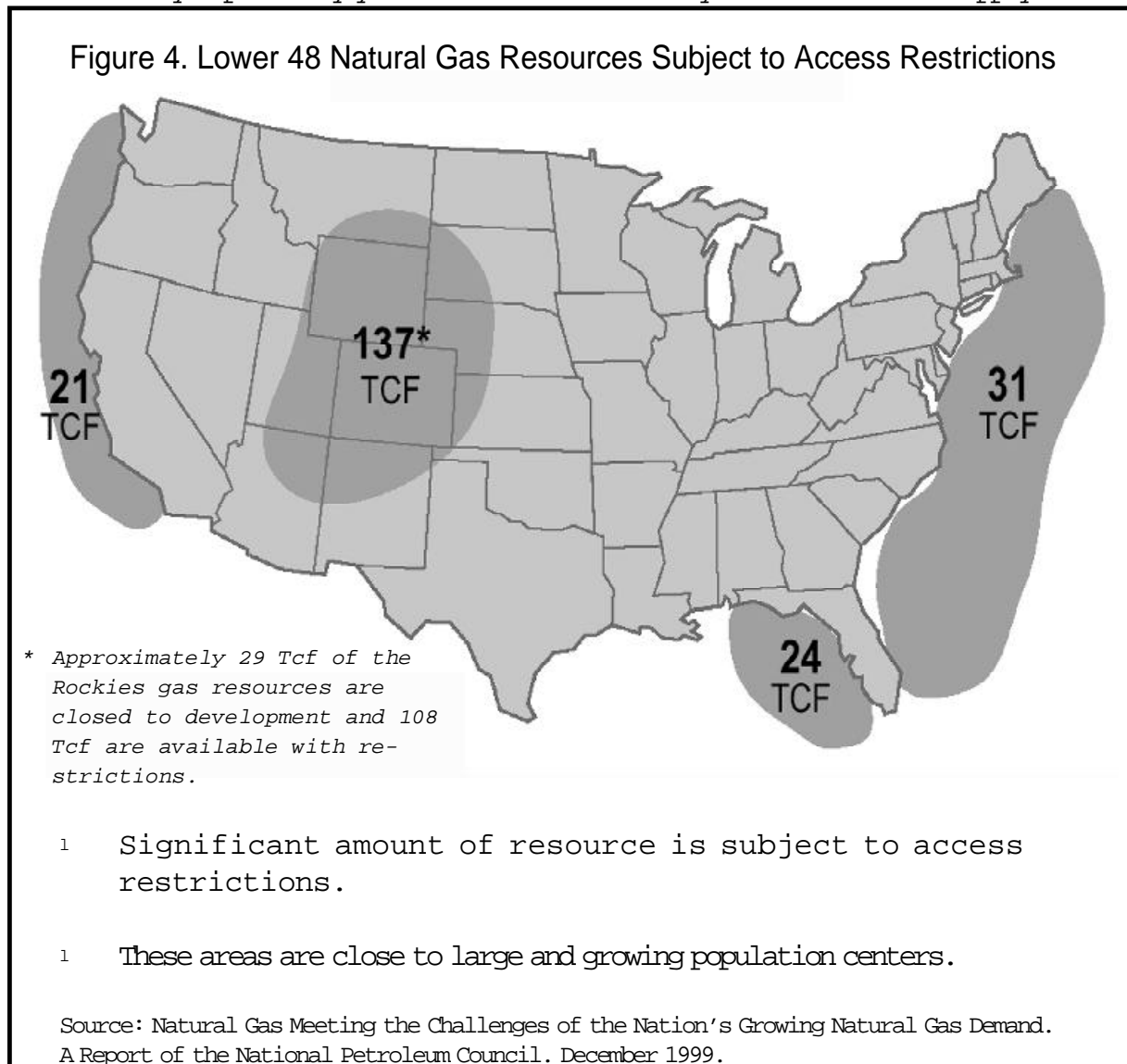
With the exception of LNG from overseas, all of the natural gas used in Florida will be supplied from fields in the Gulf Coast area. The majority will come from fields offshore in the Gulf of Mexico. The resources of natural gas in the Gulf of Mexico

have provided 25 percent of the nation's demand for more than a quarter century. The supplies have been tapped at a rate of 5 Tcf per year for the last 20 years. Until recently, nearly all of the natural gas was produced in water depths less than 200 meters. Now, as the demand for natural gas is expected to increase dramatically, the ability of the Gulf of Mexico region to supply the demand are in question.

X. Energy Questions and Answers

1. *Are natural gas reserves in the Gulf of Mexico adequate to meet projected demands?*

Most industry experts say yes but remind us that many fields that will supply the



new demands are in deep water and have yet to be found. Deep water refers to depths between 200 and 2,000 meters.

The petroleum industry has always had a positive business attitude and many of their statements tend to be optimistic, particularly from the natural gas producing side. Conversely, MMS, as caretaker of most of the technical data on offshore reserves, is more cautious. Also in the cautious camp is the National Petroleum Council, which reported in late 1999 that the potential for natural gas production in the Gulf of Mexico would peak about 2010 and begin a gradual decline as depicted in Figure 2.

The supply and demand issues are restated in Figure 2, which is adapted from a presentation by Andrew J. Hardiman, vice president of Chevron USA Production Company, and data from the National Petroleum Council taken from Figure 2. Figure 3 shows that the OCS supply is expected to keep up with demands until about 2010. At that point, the demand range continues to climb in response to projections based on the switch to natural gas as a power plant fuel, but the best-case supply scenario begins the downturn. Corresponding price increases would be expected.

2 Can the energy industry produce the natural gas supplies rapidly enough to avoid serious price spikes?

Industry analysts predict a boom in drilling activity is required to replace the base supply of 5 Tcf per year in the Gulf of Mexico, which is already in a declining state (as indicated in Figure 2), and to meet the increasing demands. The petroleum industry must mobilize, drill, find, and produce both oil and the associated natural gas at a record pace over the next decade to accomplish this mission. Most of the gas will be found in association with oil.

To meet the demand range shown in Figure 3, natural gas must be discovered at a replacement rate of about 125 percent per year for the next 15 years. Currently there are not enough drilling rigs and trained personnel to accomplish this task. Moreover, the drilling effort will take place in deepwater with expensive drill ships and expensive collection and supply lines to shore. This process will require technology breakthroughs and financing at levels not seen before in the industry. Further, many of the deepwater fields have not yet been drilled nor proven.

Many of the prospective areas off Florida along the eastern Gulf of Mexico shelf remain closed to offshore exploration un-

til 2012 by federal policy. The National Petroleum Council estimated that as much as 24 Tcf of natural gas is currently off limits in the eastern Gulf planning area off Florida (see Figure 4). In relative terms, 24 Tcf would amount to about a decade's worth of production for the state's projected power plant demands.

3. *What is the likely Florida natural gas demand scenario?*

The Florida scenario for natural gas demands could look something like this.

- 1 The Florida legislature may pave the way for merchant plants, unleashing a rush to build combustion turbines plants over the next five years.
- 1 Meanwhile, the new pipelines would be built and existing systems upgraded to supply the natural gas.
- 1 After the turbines all go online, a short honeymoon of reasonably priced natural gas-generated electricity may occur.
- 1 Electric rates may begin to rise dramatically as competition for natural gas from declining Gulf of Mexico reserves drives prices higher.
- 1 Liquid petroleum fuel substitutions would become common as natural gas prices rise.
- 1 As consumer rates rise, policymakers and environmental regulators would be back, likely in a crisis mode trying to diversify the fuel supplies, and even to recommission some of the older coal plants.

At the midpoint this decade, power generation in Florida might look like the chaotic California energy scenario in 2000-2001. If the pace of exploration and development required to find and bring online new gas reserves does not keep up with projections, the honeymoon period could be even shorter.

XI. A Heads Up for Florida Policymakers

Energy issues that may be debated over the next two to three years by policymakers in the Energy 2020 group and by the Florida legislature are listed here:

- 1 Early in 2001, merchant plant promoters requested legislative approval for ways to fast-track construction of new facilities. As a component of new legislation, the reviewing and permitting agencies should also review the life-cycle fuel supply and alternatives for fuel substitutions for each proposed installation.

Appendix A

Florida Energy 2020 Study Commission

Seventeen men and women—all but one or two neophytes in the realm of energy and the generation of electricity—recommended statutory changes in January 2001 that could open Florida to construction of merchant power plants.

The Florida Energy 2020 Study Commission, created and appointed by Governor Jeb Bush, began its work in September 2000. Appointed to chart a course for the future of electricity production in Florida, the group is mastering the intricacies of deregulation, restructuring, wholesale and retail competition, convergence, unbundling, and other system-defining concepts and processes before it submits its final report on December 1, 2001.

Yet the commission unanimously voted to send its proposal for restructuring the wholesale power market to the legislature after barely five months on the learning curve.

Drawn from Executive Order No. 00-127, the commission's initial work plan ranged from reliability and reserves of electricity to diversity of fuels used to generate electricity. Specifically, the executive order calls for examination of a lengthy list of topics including:

- 1 The need for and supply of electricity
- 1 The need for and supply of fuels to generate electricity
- 1 The reliability of electricity and of natural gas as a fuel
- 1 The influence of emerging technologies that may alter the points of generation and the kinds of fuels used for generation
- 1 The impact of regulatory changes, particularly as they pertain to the workforce and to low-income, elderly, rural consumers
- 1 Unbundling of what is known as electricity to refocus on the individual components of generation, transmission, and distribution
- 1 The impact of change on state and federal tax revenues

- ¹ Methods to deal with "stranded costs," which are investments made in a regulated environment that may not be recoverable in a deregulated environment.

The commission represents Florida's most recent strategy to tackle changes that are occurring nationwide state-by-state in electric utilities. As of March 2000, Florida remained one of only two states with no active plans to examine or change the way electric utilities conduct business within their geopolitical regions. Bush created the Florida Energy 2020 Study Commission after legislative attempts to investigate the topic ran afoul of competing politics. Some factions preferred an independent study group, while others advocated for a task force that included industry representatives.

Walter L. Revell, former secretary of the Florida Department of Transportation, chairs the commission, and Sen. Tom Lee (R-Brandon), chair of the Senate Regulated Industries Committee and sponsor of the ill-fated 2000 legislation, is among its members. Few members hold direct expertise in electric utilities; Dr. Sanford V. Berg, director of the Public Utilities Research Center, University of Florida, represents the exception. J. Terry Deason, chair of Florida Public Service Commission (PSC), and Jack Shreve, public counsel, are ex-officio members. No member officially represents the investor-owned utilities that currently operate as monopolies in Florida or the independent power producers who need a policy change to allow them to operate in the state.

The group's scope of work goes beyond the wholesale and retail market issues commonly associated with deregulation to include supply of and access to sources of fuel or energy. The very name of the group, also called Energy 2020 or E2020, suggests that policy recommendations could extend beyond the historic boundaries of the electric utilities industry. Perhaps this is a tacit acknowledgement of the increasing convergence of electric utilities and fuel or energy companies in the corporate setting. The commission's recommendations are expected to guide Florida policy for merchant plants and the anticipated increase in the use of natural gas as the fuel of choice. Merchant plants are built on speculation; at least a portion of the electricity is generated without a firm commitment or contract.

"Inaction is not an option," Bush charged in a brief appearance at E2020's first session, predicting dire consequences if the state fails to insure reliability. He urged the group to think big about what energy options could be like in Florida, beyond the here and now. At the same time, Bush acknowledged the challenges inherent in policy changes and urged commissioners to listen to the voices that speak to the environment, saying that it is time to revalidate conservation.

The commission added a component for environmental protection to the workplan. It also decided to examine issues related to the wholesale market in Florida, includ-

ing merchant plants or independent power producers, before it issued a preliminary report in January 2001.

The Structure of Inquiry

E2020's first task, one that is common to an appointed, citizen-surrogate committee, was to learn about the topic. To do so, the commission is looking to three groups for information on the industries and the issues: government agencies, technical advisory groups, and working groups

Government Agencies. Initially, the commission relied on the expertise of several government groups, namely:

- 1 Florida PSC, which historically regulates rates and operations that affect rates in the electric utility industry
- 1 Florida Department of Environmental Protection (DEP), which regulates the location of generating plants and transmission and distribution lines as these affect the environment
- 1 Florida Department of Community Affairs (DCA), which, through its links to the Federal Coastal Zone, influences the regulation of pipelines used to carry fuels such as natural gas
- 1 Public Utilities Research Center (PURC) at the University of Florida in Gainesville, which conducts research and educational outreach related to utilities.

Technical Advisory Groups. The commission set up six technical advisory groups, consisting of volunteer members who have content area expertise but little if any overt, strong links to utilities or utility markets. They are, in the parlance of the commission, non-stakeholders who are responsible to conduct research and make recommendations related to the following:

- 1 Wholesale markets
- 1 Retail markets
- 1 Environmental protection
- 1 Public purpose programs, to include conservation, emerging technology, and

universal service

- 1 Impacts to state and local tax structures
- 1 Economic development.

Working Groups. Equally important are members of cross-interest working groups. These special-interest citizens are stakeholders who represent the utilities, energy companies, consumer groups, and environmental organizations.

The commission early on solicited nominees to provide technical advice, while the working groups are self-organizing from within the E2020 membership. Both groups are helping to set the agenda for the larger commission and therefore are influencing energy policy in Florida.¹

The Language of Power: The Language of Change

Until recently, electric utilities generally operated in the United States as natural monopolies, which assumes that a single supplier or monopoly can provide the lowest cost product in the case at hand. The utilities are regulated by the Federal Energy Regulatory Commission (FERC) at the national level and by public utilities commissions or similar group at the state level. In Florida, the PSC regulates the rates charged by utilities, including those that produce electricity. As a monopoly, the utilities commonly own and control three functional or service areas:

- 1 The power plants that generate electricity
- 1 The lines that transmit the power from the plant to distribution centers
- 1 The wires that distribute the power to the customers.

Energy 2020 was created in response to changes in the energy regulatory system. These changes are collectively known as deregulation or restructuring, and are generally associated with a shift to operation in a competitive economic environment. The origins of deregulation are commonly traced to the federal Public Utilities Regulatory Policy Act of 1978 (PURPA), which created qualifying facilities—small generating plants powered by nontraditional fuels or technologies. PURPA allowed

non-utilities to construct and generate power and required the larger utilities to purchase the power. The qualifying plants were the first of what are now known as independent power producers.

Fourteen years later, after initiation of deregulation of electric utilities in other parts of the world, the U.S. Energy Policy Act of 1992 provided the platform for the next round of changes by creating a new class of generators—exempt wholesale generators (EWGs) or independent power producers. The EWGs, which are now known as merchant plants, may construct and operate generating plants with the intent to sell power only to the wholesale market where authorized by state regulations. Without a rewrite of Florida law, the EWGs will not be able to build new plants.

Together, the PURPA, the Energy Policy Act of 1992, and the implementing rules or orders from FERC created the foundation for development of a power market and separation of services or what is known as unbundling. Two FERC orders (No. 888 in 1996 and No. 2000 in 2000) encouraged utilities to create voluntarily independently owned transmission organizations on a regional basis (RTOs). Florida utilities, including investor-owned Florida Power and Light, Florida Power Corp., Tampa Electric Company, and other stakeholders, organized the Florida TransCo to operate the transmission lines for the Florida peninsula. Gulf Power and its parent company, Southern Electric Company in Atlanta, are expected to create a separate RTO for the Florida Panhandle region.

The PURPA, the Energy Policy Act of 1992, and FERC orders reflect changes in the regulatory sector of the electric utilities industry. In response, many electric utilities have developed strategies to overcome the loss of most favored monopoly status. These include acquisitions (sometimes at an international scale), formation of multi-utility holding companies, plans to construct their own merchant plants where public policy allows, and convergence. Convergence refers to the increasing tendency of electric utilities to add pipelines and fuel or energy sources to their lines of revenue even as they

stand to lose traditional access to transmission lines in the future. In many cases, power companies create separate energy groups to reflect the broader spectrum. Similarly, traditional energy companies are moving to acquire electric power generating capacity through mergers and acquisitions.

Florida Energy 2020 Study Commission

The mission of the study commission is to plot Florida's course for energy over a 20-year horizon. The immediate concerns, and those addressed in the interim report, focus on merchant plants. Applications from Duke Energy and other companies that want to construct these plants in the state must await statutory changes. Duke originally received approval to construct a power plant in New Smyrna Beach from the Florida PSC in 1998. However, the Florida Supreme Court ruled against the PSC decision in 1999 in response to challenges filed by Florida Power and Light, Florida Power Corp. and Tampa Electric Company. In addition, Energy 2020 is expected to consider the potential for retail competition, which would allow consumers the right to select a power company rather than be restricted by the geographic territory of a monopoly. The group met monthly in Tallahassee in 2000 and is doing so at various locations around the state in the first half of 2001. The report will then be written over the summer and presented at public meetings in the fall.

The Energy 2020 Study Commission stands to alter the expectations of power long held by electric utilities and by corporate and individual consumers in Florida. A change made in one part of the system will almost certainly engender change in another. Before finalizing recommendations, the commission will do well to ponder the likely impacts to the energy regulatory system at large to reduce the likelihood of unintended consequences.

Endnote

1. While the members of the commission and the technical advisory groups are not paid for services, both groups are eligible for travel reimbursements. Members of the working groups, however, are not eligible.

Appendix B

Fuels from Florida: Exploration and Production Policy

I. Oil and Gas Production in Florida

The production of oil and natural gas began in south Florida more than 65 years ago. Seven oil fields developed in the Sunniland area of south Florida over the intervening 55 years are still producing. The largest onshore oil field east of the Mississippi River is near Jay, Florida, in Santa Rosa County. Exxon discovered the Jay Field in June 1970 and the smaller Blackjack Creek Field just south of Jay two years later.

The development drilling for these two west Florida fields took several years and by the late 1970s, the combined production from Jay and Blackjack Creek pushed Florida to the rank of the ninth largest producer in the nation.¹ This high-ranking distinction lasted only two years as the production from west Florida quickly peaked, then declined. Presently, Florida ranks 18th in production by state but third in the nation in the consumption of motor fuels.²

The total production of oil and gas from west Florida produced to date would be valued at nearly \$20 billion at 2000 prices³. The west Florida fields are expected to continue to be minimally productive for at least another 10 years. The Jay and Blackjack Creek Fields will ultimately produce more than 600 million barrels of oil and 800 billion cubic feet (bcf) of natural gas.⁴ The value of the oil already produced from south Florida fields is estimated to be nearly \$3 billion at late 2000 prices.⁵

II. Three Approaches to Petroleum Policy

The public policies that govern exploration for and development of petroleum-based fuels in Florida reflect three separate approaches to policy over the past 65 years.

In the early days of Florida's development as a state, the executive branch encouraged exploration and development with incentive-based policies.⁶

As the environmental movement began to gain momentum in the

early 1970s, Florida policy vacillated between outright prohibition of exploration to attempts at cooperation.

By the turn of the century, state policy—and federal policy related to near-Florida resources—was defined by moratoria on water-based drilling and the threat of prohibition in environmentally sensitive areas of south Florida.

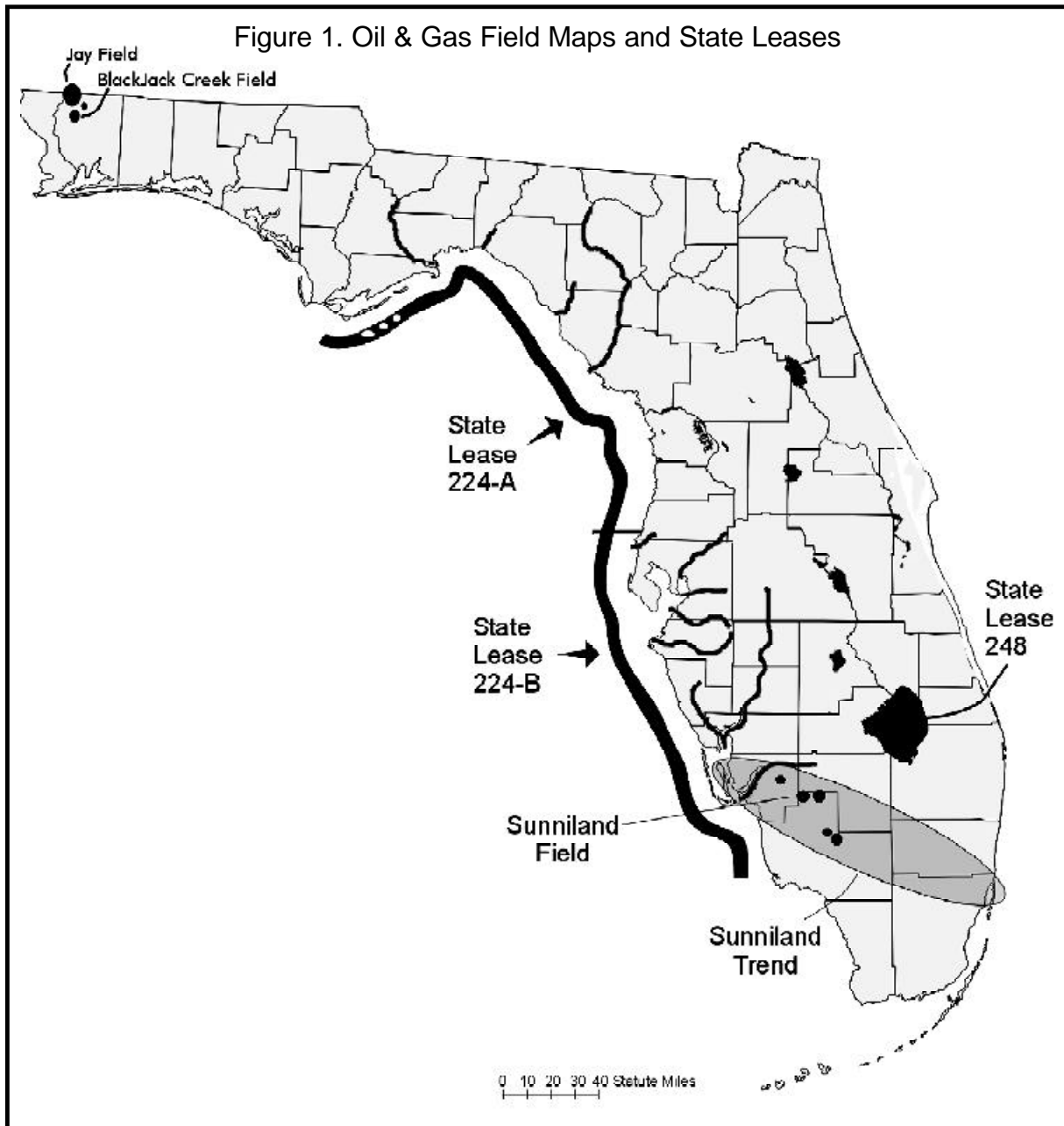
These three approaches are considered in this appendix and provide a backdrop for Florida's present energy policy.

1. The Era of Incentive-based Policies (1935 - 1970)

Petroleum exploration began in earnest in Florida in the mid-1930s when the governor and cabinet offered \$50,000 cash for the first oil discovery in the state and, at the same time, demonstrated proactive public policymaking. The prize was a significant incentive and explorationists took the offer seriously.⁷ Companies and individuals initiated extensive petroleum exploration studies and onshore drilling programs. The pace of exploration slowed at the onset of World War II. However, Humble Oil and Refining Company (later Exxon and now Exxon-Mobil) claimed the prize in 1943 with a wildcat well⁸ drilled to 11,800 feet near the small community of Sunniland on State Road 29 in Collier County. Using oil industry terminology, the collection of wells developed around this discovery is called the Sunniland Field (see Figure 1). Similarly, Humble's geologists named the 75 million-year-old Cretaceous limestone that is the oil reservoir rock in the area the Sunniland Formation.

Over the second half of the twentieth century, eight additional fields were discovered onshore in south Florida along the area that has become known as the Sunniland Trend (also shown in Figure 1). The trend, an area of high potential for oil, extends from the Everglades National Park of western Miami/Dade County across the Big Cypress Swamp to Fort Myers and offshore into Florida-owned waters in the Gulf of Mexico north of the Florida Keys and up to 125 miles offshore from Naples. Two of the fields in the present-day Big Cypress National Preserve adjacent to the Everglades National Park still produce oil. The original Sunniland Field produced oil into the mid-1990s.

The discovery of oil in Florida onshore spurred policy decisions that extended incentives and interest to state water bot-



toms and offshore.⁹ In 1944, the governor and cabinet, sitting as the trustees of the Internal Improvement Trust Fund, agreed to lease the mineral rights for several million acres offshore in the Gulf of Mexico in the area from Apalachicola to St. Petersburg to Coastal Petroleum Company.¹⁰ In a separate action, the trustees also leased the water bottoms of Lake Okeechobee and rivers flowing to the Gulf of Mexico to Coastal Petroleum Company.¹¹ By 1945, Gov. Millard F. Caldwell pledged the support of the state to help find more oil in Florida and urged legislators to pass regulations that would allow exploration to continue with "thoughtful and orderly planning".¹²

The trustees granted additional leases for offshore areas along the southwest Florida coast and in the Florida Keys to Gulf Oil Company and Coastal Petroleum Company in 1946¹³ and 1947. The trustees continued to encourage exploration activities for 25 years with additional offshore oil and gas leases in the Florida Keys, Florida Bay, off the Marquesas Keys near Key West, and in the Pensacola Bay estuary system.

Gulf Oil Company drilled four exploratory wells offshore in the Florida Keys between 1947 and 1959. Coastal Petroleum partnered with California Company (later Chevron) and Mobil Oil Company to drill 13 wells in the offshore area between Apalachicola and Naples between 1947 and 1968. Getty Oil Company drilled the last exploratory well in Florida waters in 1983 on state lease 2338 in the Pensacola estuary system near the center of East Bay in Santa Rosa County.¹⁴ To date, none of the offshore wells in Florida-owned waters has produced commercial quantities of oil or natural gas.

2. Shifting Policies: A Period of Toleration and Cooperation (1970 - 1980)

The oil spill offshore Santa Barbara, California, in 1968, coupled with several large spills from transport tankers during the same period, heightened public awareness of offshore drilling practices and the potential for oil spills in marine environments. By the early 1970s, Florida's pro-industry policies began to draw criticism from elected officials as the emerging environmental movement gained influence. Florida's policies reflected this changing mood, shifting first from incentives to cooperation and finally to prohibition.

The Big Cypress Swamp Advisory Committee

With the advent of the environmental movement, Gov. Claude Kirk in 1970 placed a moratorium on exploration in the Big Cypress area at the urging of south Florida environmentalists. In 1971, Gov. Rubin Askew created the Big Cypress Swamp Advisory Committee to foster a cooperative approach to oil exploration and development. The committee, composed of industry and environmental interests who reviewed all drilling and production proposals, has proved to be a model for environmental

dispute resolution.

Oil exploration programs in this area are stymied by the land management vision of the National Park Service. In 1974, the Big Cypress National Preserve was created over much of the southern end of the oil producing area of the Sunniland Trend. The Department of the Interior's National Park Service acquired the surface rights only for most of the land in the Preserve; the mineral rights remained with the original surface owners. The authorization from Congress to purchase the Preserve carried specific language permitting mineral rights' owners to continue to explore for and produce oil. In truth, the government did not want to pay for the value of the oil likely to be found in this area.

The National Park Service has since interpreted its mission more stringently than the language of the 1974 Big Cypress law may have intended. Since the early 1980s, Park Service rules have made exploration activities in this area difficult. Collier Resources Company, representing the Collier family who has owned the minerals under the Big Cypress for more than 80 years, recently proposed exploration programs to examine more than 20 geologic prospects that could lead to the discovery of additional fields. The proposals are pending environmental review by the National Park Service. But by the late 1990s, Florida agencies had reversed policies of cooperation to a position opposing drilling activities in the Big Cypress area.

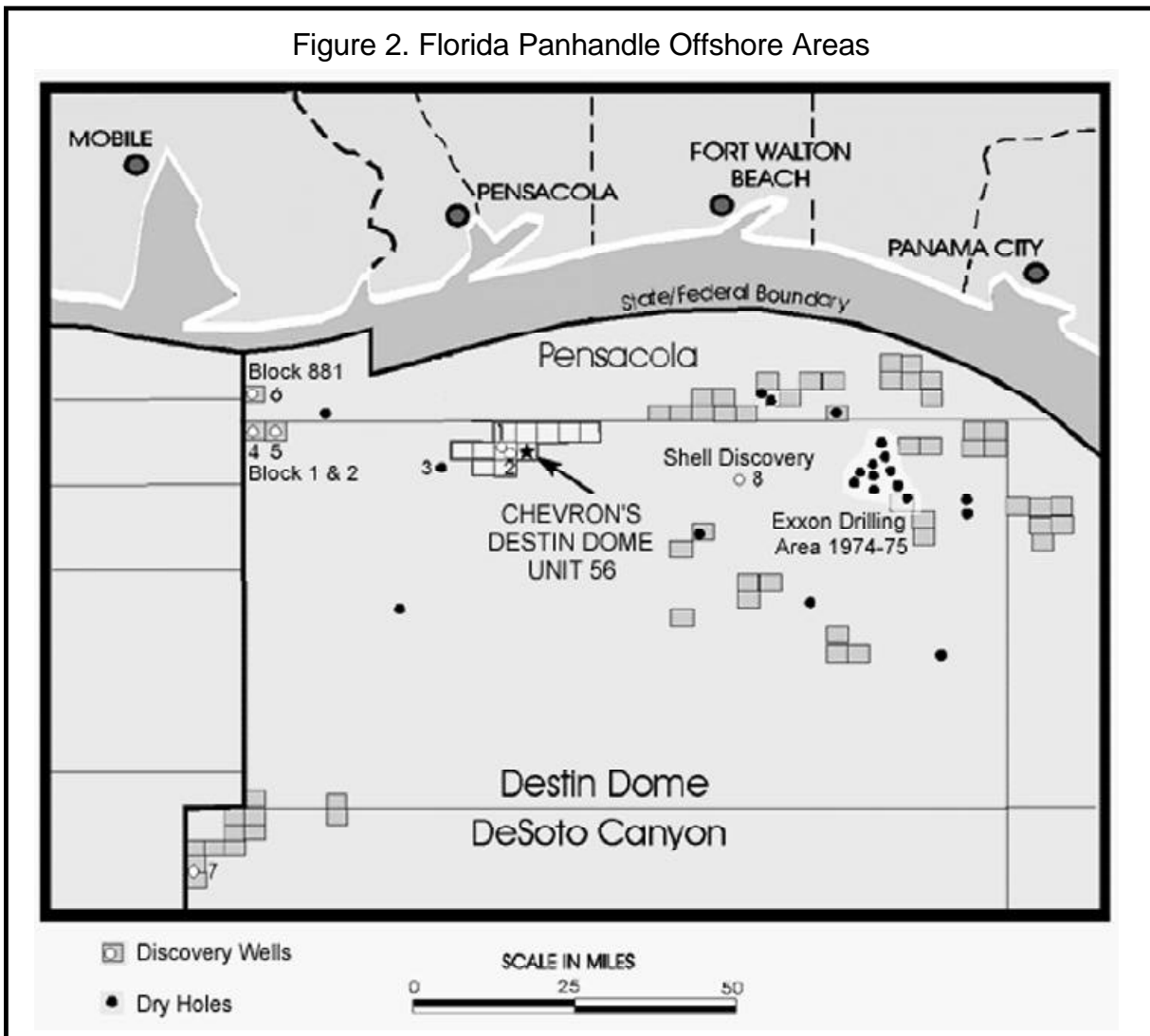
3. From Cooperation to Prohibition (1980 - 2001)

Florida's environmental community throughout the 1980s maintained and expanded its antidrilling stance toward exploration in waters offshore and in environmentally sensitive inland areas such as the Big Cypress National Preserve. Regulators began siding with the environmental groups even on lands where there was a legal right to explore. This policy of prohibition even applied retroactively to leases issued during the period when the state promoted oil and gas exploration activities. Getty Oil Company drilled the last well in Florida waters in 1983, some 10 years after initiating the permitting process on a lease that had been originally issued in 1968. Coastal Petroleum Company faces a similar challenge today. If permits are obtained, Coastal plans to drill exploratory wells off St. George Island in Franklin County on the original lease granted

by the trustees in 1944. Coastal, which opened the permitting process in the early 1990s, has yet to drill a well¹⁵ and recently announced its intention to sue the state for the value of the lease¹⁶.

Gov. Bob Graham and the cabinet as trustees funded a study of offshore leasing on state-owned lands in 1983.¹⁷ After more than a year of research by the Florida Institute of Oceanography on the leasing topic, the governor and cabinet quietly buried the report by removing it from public consideration.

In 1989 in the immediate wake of the Exxon Valdez spill, the Florida legislature placed specific language in the statutes to prohibit oil and gas permits on state-owned lands along the coast.¹⁸ The legislature followed up in 1990 by removing the



language from the 1945-era statutes supporting oil exploration activities.¹⁹ By 1991, the trustees and the legislature made exploration in many prospective areas on state lands in south Florida off limits. These include areas where the Miccosukee Indian Tribe has oil rights in common with the state.

Outer Continental Shelf Leasing and Exploration

In the late 1940s, the federal government began actively leasing offshore waters in the Gulf of Mexico off Texas and Louisiana. Since that time, the Minerals Management Service (MMS) of the U. S. Department of the Interior has maintained a proactive leasing program in the central and western portions of the Gulf.²⁰ Since the late 1970s, MMS has been swayed by congressional actions that have delayed leasing and even declared some areas offshore Florida in the eastern Gulf of Mexico off limits.²¹

The U.S. Department of the Interior began leasing tracts in the outer continental shelf (OCS) areas off Florida in 1973 in the eastern Gulf of Mexico on the Destin Dome²² that lies 30 to 40 miles southwest of Panama City. Exxon, the high bidder for these leases, and its drilling partners took the business initiative and began exploration drilling in 1974. Exxon's drilling confirmed the presence of the Norphlet sand formation, an ancient sand dune stratum more than 500 feet thick that is proven to be a reservoir rock for extremely productive oil and gas fields in Alabama and the Florida Panhandle. The Destin Dome drilling by Exxon was suspended after 15 dry holes.²³

Buoyed by the favorable geologic conditions as determined by drilling on the Destin Dome, the industry went into OCS Lease Sale 79 in January 1984 with optimism. Leases on 156 tracts in the eastern Gulf were purchased with bids totaling \$310 million.²⁴ Shell Oil Company drilled in the Destin Dome area again in 1985 and discovered oil and natural gas in the Norphlet sand (see Figure 2.) Although this well was the first to contain petroleum hydrocarbons off Florida, ultimately it was declared noncommercial because of low yield and the lease was relinquished in 1990.²⁵ Optimism remained strong for this frontier area in the eastern Gulf until opposition from environmental groups raised the specter of a moratorium.²⁶

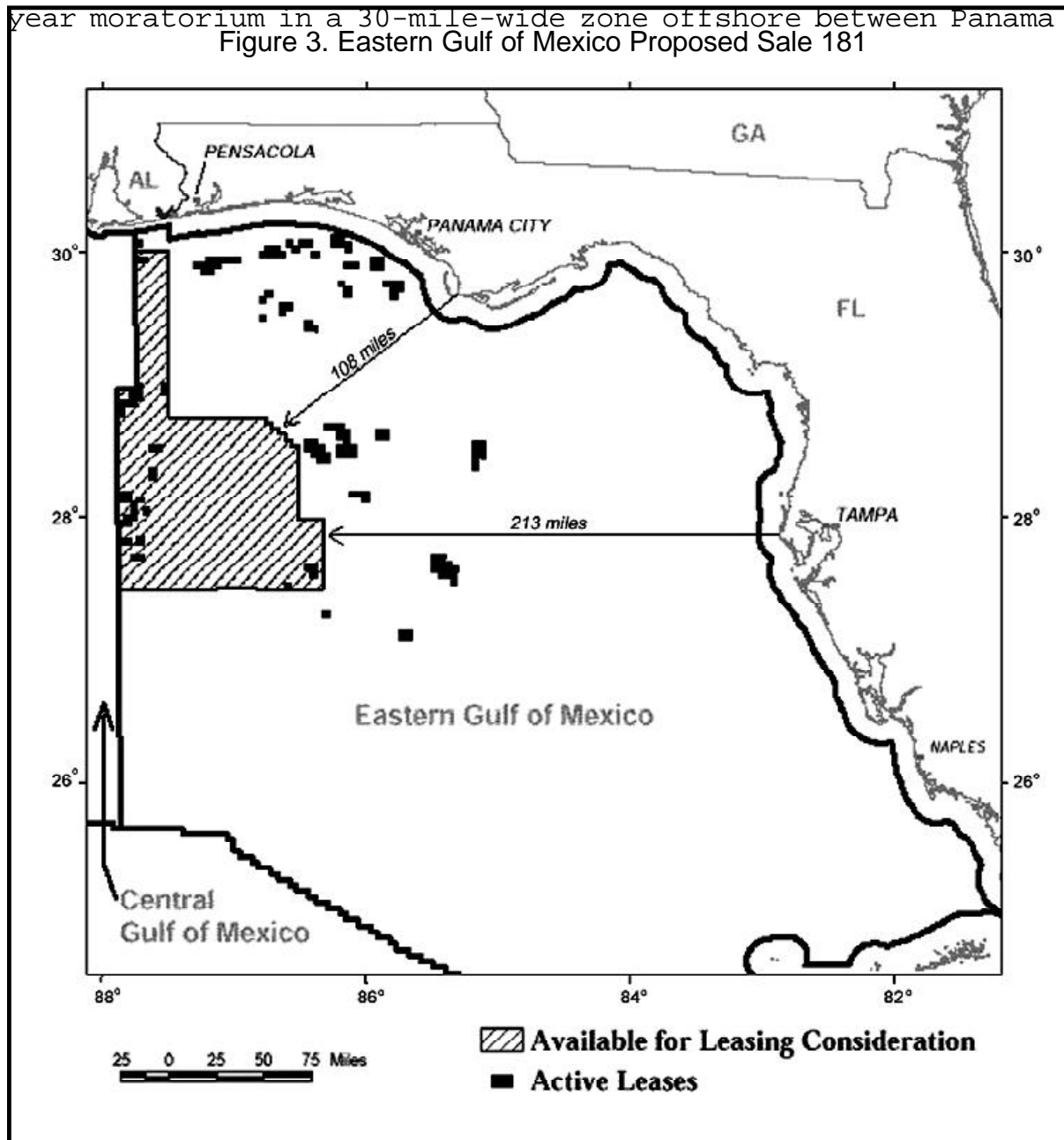
A Policy Crescendo

In 1982, then-Interior Secretary James Watt announced plans to lease the entire U.S. coastline for the next five years. This announcement inflamed the environmental community.

Gov. Graham, who, while in office initiated the antidrilling policies in state waters, along with the Florida congressional delegation pushed through legislation in 1983 to create a one-

year moratorium in a 30-mile-wide zone offshore between Panama

Figure 3. Eastern Gulf of Mexico Proposed Sale 181



City and Naples. Valid coastal leases 224 A and 224 B were in-shore of this moratorium area. The moratorium legislation also postponed drilling on tracts already leased in the area. Congress passed similar moratoria in 1984, 1985, and 1986 providing for incremental one-year delays.²⁷ The pressure from the environmental community finally forced the Department of the Interior to offer to buy back the leases off the southwest Florida coast more than 10 years after purchase.²⁸ Owners of 73 lease blocks relinquished exploration rights as part of a litigation settlement with MMS.²⁹

Shell's discoveries in the mid-1980s on Destin Dome in areas outside the congressional buffer zone strengthened industry optimism for finding more oil and gas in the eastern Gulf. But that optimism was short lived. In 1990, President George H. Bush, at the urging of Florida political leaders and the congressional delegation, cancelled any further federal lease sales and excluded federally owned areas off Florida from leasing until after 2000.³⁰ Later, in 1998, President Bill Clinton extended the moratorium when he withdrew all areas of the eastern Gulf of Mexico within 100 miles of the Florida coast from lease sales until 2012.³¹

III. Offshore Florida Discoveries

The debate and policy decisions by Florida officials banning exploration activities shifted from the sale of new leases to the development of previously discovered natural gas reserves.

1. Destin Dome Block 56

In 1987, Chevron discovered a field on the western end of Destin Dome in Block 56 leased in 1984.³² However, Chevron has yet to produce any natural gas from the field.³³ Florida political leaders objected in a strongly bipartisan manner at every step of the regulatory process to Chevron's plans to develop natural gas due south of Pensacola (also shown in Fig. 2). Chevron's discovery can be put into perspective by understanding that the estimated 1.5 Tcf of natural gas from this field alone would supply Florida's gas power plant demands from 2000 through 2005.³⁴ Natural gas is already being produced closer than Block 56 at Block 881, 15 miles from Pensacola. Production is scheduled to go online at Destin Dome Blocks 1 and 2 in the OCS off

Alabama³⁵ in the near future.

Meanwhile, Chevron awaits the outcome of an appeal to the U.S. Department of Commerce filed in April 1998. Separately, Chevron filed suit in July 2000 against the federal government because of long delays on permit decisions associated with the development of natural gas from the Destin Dome.

2. Lease Sale 181: Hydrocarbons in Deep Water

Lease Sale 181 is scheduled for the eastern Gulf of Mexico planning area for December 2001. The lease blocks are in deepwater (water depths of 1,500 to 8,000 feet), however, and more than 100 miles offshore Florida's west coast (see Figure 3). The MMS attempted to tailor the sale conditions to address previously voiced opposition from political leaders (for example, to stay more than 100 miles offshore). Since 1991, Florida governors have opposed drilling activities within 100 miles of Florida's coast. However, Alabama does not have similar offshore drilling restrictions. Notwithstanding that oil and gas production operations already exist off Alabama 15 miles from Florida, Gov. Bush has requested MMS to exclude Lease Sale 181 from further consideration. Southwest from Pensacola, portions of the Lease Sale 181 acreage are within 25 miles of the closest point of land in Florida, but the area is due south of Alabama.

3. Success Record in the Eastern Gulf of Mexico

Drilling in the eastern Gulf of Mexico off Florida confirms that large areas of the continental shelf adjacent to the Florida Panhandle carry high prospects for the discovery and production of natural gas.³⁷ Industry analysts place the natural gas reserves in the eastern Gulf of Mexico at between 7 and 24 Tcf.³⁸ Exploration drilling has been underway for three decades and to date there have been 47 exploratory wells, with petroleum hydrocarbons discovered in 13 wells.³⁹ For the deep Norphlet formation particularly, drilling prospects have demonstrated that dry gas is the likely product. However, the eastern Gulf of Mexico remains a frontier area for exploration because of the environmental restrictions that have delayed the drilling and evaluation activities of the petroleum industry.

IV. A Review of the Policy Calls against Leasing and Drilling

Reversals of policies by both state and federal governments are costly for corporate interests and for taxpayers alike. Companies incur huge costs to develop exploration data, buy leases, and conduct environmental studies; companies also incur lost opportunity costs when policies are reversed. Exploration companies would be better off spending dollars in areas where the chances of bringing oil and gas production online are more certain.

State and federal governments are confronted with a potential liability if drilling is banned on a valid offshore oil and gas lease in state or federal waters. Buybacks of mineral leases in oil-prone state waters are costly. Similarly, actions to stop exploration plans onshore in the Big Cypress area on privately owned mineral rights could be financially troubling to Florida. Drilling bans carry legal and monetary consequences. As the resource reserves for oil and gas in the Gulf of Mexico become more costly to exploit and depleted in near-shore areas, the direction in energy policy away from exploration becomes a strategic issue.

V. Opposition from Environmentalists

Since the early 1970s, public policy in and for Florida has shifted from incentive-based or cooperative activities to outright prohibition of exploration. During this period, environmental groups have brought political pressure to establish the following policies:

- 1 Oppose drilling on valid state leases in state waters areas
- 1 Oppose drilling on land on private mineral rights area in the Big Cypress National Preserve
- 1 Make the Miccosukee Indian Tribe mineral rights off limits
- 1 Halt leasing in the eastern Gulf of Mexico within 100 miles of Florida's coastline
- 1 Reverse MMS lease and exploration policies in OCS areas and buy back leases

¹ Halt development of proven reserves in the OCS area.

Florida policymakers should make energy decisions carefully and weigh objections in light of the record. Even with a more proactive drilling policy, Florida may yet be forced to pay hefty prices for energy from the Gulf of Mexico.

Endnotes

¹ Independent Petroleum Association of America. *The Oil Producing Industry in Your State*, 1979 Edition.

² Highway Statistics 1998. Office of Policy Information, USDOT Federal Highway Administration.

³ Estimate based on \$30/tbl oil in late 2000 and historic production figures from these fields.

⁴ Florida Geological Survey: Florida Oil and Gas Monthly Production Report. July 2000.

⁵ See note #3.

⁶ The development of railroads, the Everglades agricultural area, and the water management system of south Florida were promoted through proactive programs of the governor and cabinet sitting as the trustees of the Internal Improvement Trust Fund of the state.

⁷ Based on the value of the dollar in the 1930s and drilling costs at that time, \$50,000 would have bought four or five oil wells.

⁸ A wildcat well is one drilled in an area where little is known about its petroleum potential.

⁹ The Florida legislature created a proactive provision now in Chapter 253.47, Florida Statutes, in a section titled, "Board of trustees may lease, sell, etc., bottoms of bays, lagoons, straits, etc., owned by state, for petroleum purposes" with the passage of Chapter 22858, Laws of Florida in 1945.

¹⁰ State lease 224A for the submerged lands from Apalachicola to north of St. Petersburg was granted to Coastal Petroleum and was dated December 12, 1944.

¹¹ Trustees granted state lease 248 for the submerged lands beneath Lake Okeechobee to Coastal Petroleum Company on May 13, 1944.

¹² The governor's message to the legislature, April 3, 1945, by Gov. Millard F. Caldwell.

¹³ Trustees granted state lease 224B for the submerged lands from St. Petersburg to Naples to Coastal Petroleum Company on March 27, 1946.

¹⁴ Herbert, T.A. and Linda L. Lampl. "Permitting against the Toughest: Getty's East Bay Project." *Drilling*. June 1984, pp. 67-74.

¹⁵ Report of the President: Coastal Caribbean Oils and Minerals, Ltd. March 15, 2000. Coastal Petroleum Company is a subsidiary of Coastal Caribbean Oil and Miner-