Florida Power & Light Company, 215 S. Monroe St., Suite 810, Tallahassee, FL 32301

ORIGINAL

FPL

VIA HAND DELIVERY

March 23, 1998

Ms. Blanca S. Bayo
Florida Public Service Commission
Director, Division of Records and Reporting
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850

980000

Dear Ms. Bayo:

In accordance with Chapter 186 Section 186.801 (Ten Year Site Plans) of the Florida Statutes, enclosed for filing are twenty-five (25) copies of Florida Power & Light Company's Ten Year Power Plant Site Plan. As we are filing our Site Plan ahead of the April 1, 1998 required date, schedules 1-10, various maps, and other information that Staff has requested in supplemental filings in previous years are unavailable at this time. All of this information will be filed in an Appendix to FPL's 1998 Site Plan. The Appendix, which is a separate document, will be filed by April 1, 1998.

If you have any questions, please do not hesitate to contact me at (305) 552-3643.

Sincerely,

Samuel S. Waters
Director, Regulatory Affairs

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Ten Year Power Plant Site Plan

1998-2007

ORIGINAL

FPL

Ten Year Power Plant Site Plan

1998-2007

Submitted To:

Florida Public
Service Commission

Miami, Florida
April, 1998

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OVERVIEW OF THE DOCUMENT

Chapter 186 of the Florida Statutes requires that each electric utility in the State of Florida with a minimum existing generating capacity of 250 megawatts (MW) must annually submit a ten year power plant site plan. This plan includes an estimate of the utility's electric power generating needs, a projection of how those needs will be met, and a disclosure of information pertaining to the utility's preferred and potential power plant sites. This information is compiled and presented in accordance with rules 25-22.070, 25-22.071, and 25-22.072 of the Florida Administrative Code (FAC).

This ten year site plan document is based on Florida Power & Light Company's (FPL) 1997 planning analyses and the forecasted information presented in this plan addresses the 1998 - 2007 time frame.

It should be recognized by all concerned that ten year power plant site plans are long-term planning documents and should be viewed in this context. A ten year power plant site plan submitted by an electric utility contains tentative information, especially for the latter years of the ten year time horizon, and is subject to change at the discretion of the utility. Much of the data submitted is preliminary in nature and is presented in general manner. Specific and detailed data will be submitted as part of the Florida site certification process or through other proceedings and filings which have been established for the review of such data.

This document is organized in the following manner:

Chapter I - Description of Existing Resources

This chapter provides an overview of FPL's current generating facilities. Also included is data on other FPL resources including its transmission system.

Chapter II - Forecast of Electric Power Demand

FPL's load forecasting methodology is presented in Chapter II.

Chapter III - Projection of Incremental Resource Additions

This chapter outlines FPL's projected resource additions, especially new power plants, as determined in FPL's latest planning analyses.

Ten Year Power Plant Site Plan

1998-2007

Submitted To:

Florida Public
Service Commission

Miami, Florida
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List of Figures and Tables

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This chapter outlines FPL's projected resource additions, especially new power plants, as determined in FPL's latest planning analyses.

Chapter IV - Environmental and Land Use Information

This chapter discusses various environmental information as well as preferred and potential site locations for additional electric generation facilities.

Note: The information presented in this 1998 Site Plan document is supplemented by additional data which is found in the Appendix. This Appendix, which is a separate document, contains a number of tables, maps, and other information.

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Executive Summary

Florida Power & Light Company's (FPL) 1998 Ten Year Power Plant Site Plan primarily addresses how FPL currently plans to meet its projected incremental resource needs for the 1998-2007 time period.

FPL's total capacity for the 1998-2007 time period will significantly increase as is shown in Table ES 1 below. This table also shows the resulting Summer and Winter reserve margins for FPL over the ten year time horizon.

Projected Capacity Changes and Reserve Margins for FPL [1]

Year		Net Capacity Changes (MW) Summer	Net Capacity Changes (MW) Winter	FPL Reserve Margin Summer	FPL Reserve Margin Winter
1998	Changes to existing plants	209	0	19%	26%
1999	Changes to existing plants	105	113	21%	20%
2000	Changes to existing plants	(127)	(61)	18%	17%
2001	Changes to existing plants	0	10	17%	15%
2002	Ft. Myers Expansion & Changes to existing purchases	828	1062	21%	19%
2003	Changes to existing purchases	0	(9)	19%	17%
2004	Sanford Expansion	914	1076	23%	21%
2005	Changes to existing purchases	(10)	(10)	20%	18%
2006	Martin Combined Cycle No. 5 & Changes to existing purchases	286	315	19%	17%
2007	Martin Combined Cycle No. 6	419	448	19%	17%
	TOTALS =	***2624***	***2944***		

Note:
(1) Additional information about these capacity changes and resulting reserve margins is found in Chapter III of this document.

Table ES.1

After first accounting for FPL's approved demand side management (DSM) activities, planned changes to existing generating units (unit upgrades, enhancements, and fuel conversions) and scheduled changes in the delivered amounts of purchased power, FPL projects that additional resources will be needed starting in the year 2002.

As shown in Table ES 1, FPL currently plans on supplying these additional resources through expansion and repowering projects at both its existing Ft. Myers and Sanford plant sites, followed by the addition of two new combined cycle power plants at its existing Martin plant site. These planned capacity additions are dependent upon securing natural gas supplies to these sites which are both sufficient for fueling the electrical capacity involved and economically attractive.

FPL believes that this planned increase in capacity will allow FPL to continue to maintain system reliability and integrity, while continuing to provide electricity at a reasonable cost.

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CHAPTER I

Description of Existing Resources

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I. Description of Existing Resources

FPL's service area contains approximately 27,650 square miles and has a population of approximately 6.8 million people. FPL served an average of 3,615,485 customers in thirty-five counties during 1997. These customers were served from a variety of resources which include FPL-owned fossil and nuclear generating units, non-utility-owned generation, demand side management, and interchange/purchased power.

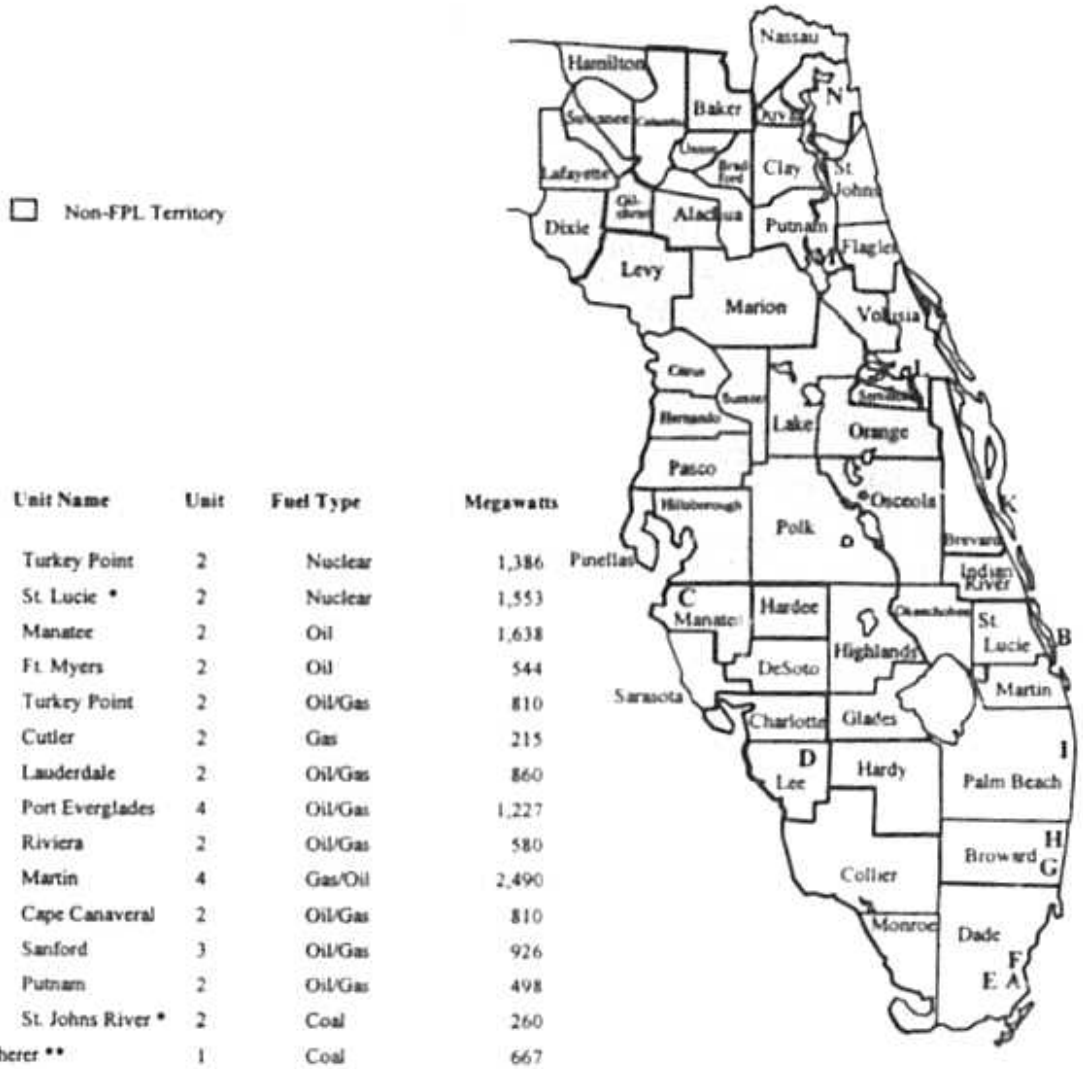
I.A. FPL-Owned Resources

The existing FPL generating resources are located at thirteen generating sites distributed geographically around its service territory and also include partial ownership of one unit located in Georgia and two units located in Jacksonville. The current generating facilities consist of four nuclear steam units, three coal units, six combined cycle units, twenty-one fossil steam units, forty-eight gas turbines, and five diesel units. The location of these units is shown on Figure I.A.1.

The bulk transmission system is composed of 1,107 circuit miles of 500 KV lines (including 75 miles of 500 KV lines [two 37-1/2 mile lines] between Duval Substation and the Florida-Georgia state line, which are jointly owned with Jacksonville Electric Authority) and 2,509 circuit miles of 230 KV lines. The underlying network is composed of 1,565 circuit miles of 138 KV lines, 712 circuit miles of 115 KV lines, and 178 circuit miles of 69 KV transmission lines. Integration of the generation, transmission, and distribution system is achieved through FPL's 478 substations.

The existing FPL system, including generating plants, major transmission stations, and transmission lines, is shown on Figure I.A.2. In addition, Figure I.A.3 shows FPL's interconnection ties with other utilities.

Capacity Resources



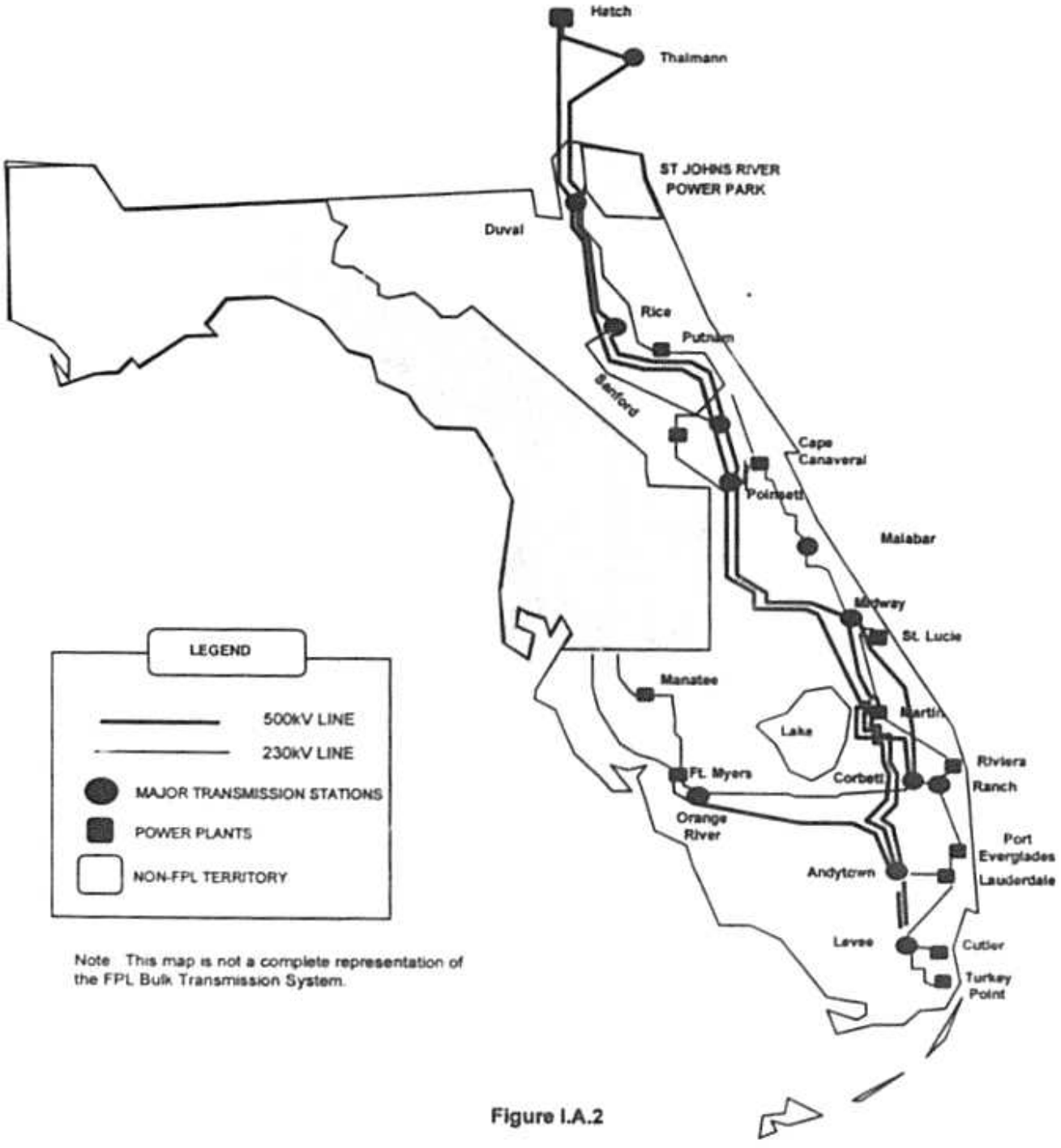
	Unit Name	Unit	Fuel Type	Megawatts
A	Turkey Point	2	Nuclear	1,386
B.	St. Lucie *	2	Nuclear	1,553
C.	Manatee	2	Oil	1,638
D.	Ft. Myers	2	Oil	544
E.	Turkey Point	2	Oil/Gas	810
F.	Cutler	2	Gas	215
G.	Lauderdale	2	Oil/Gas	860
H.	Port Everglades	4	Oil/Gas	1,227
I.	Riviera	2	Oil/Gas	580
J.	Martin	4	Gas/Oil	2,490
K.	Cape Canaveral	2	Oil/Gas	810
L.	Sanford	3	Oil/Gas	926
M	Putnam	2	Oil/Gas	498
N.	St. Johns River *	2	Coal	260
Scherer **		1	Coal	667
Peaking Units				1,952
FPL Generation				**16,416**

** Represents FPL's ownership share. St. Lucie nuclear: 100% unit 1, 85% unit 2. St. Johns River: 20% of two units*

*** The Scherer unit is located in Georgia and is not shown on this map*

Figure I.A.1

FPL Substation and Transmission System Configuration



Note This map is not a complete representation of the FPL Bulk Transmission System.

Figure I.A.2

FPL Interconnection Diagram

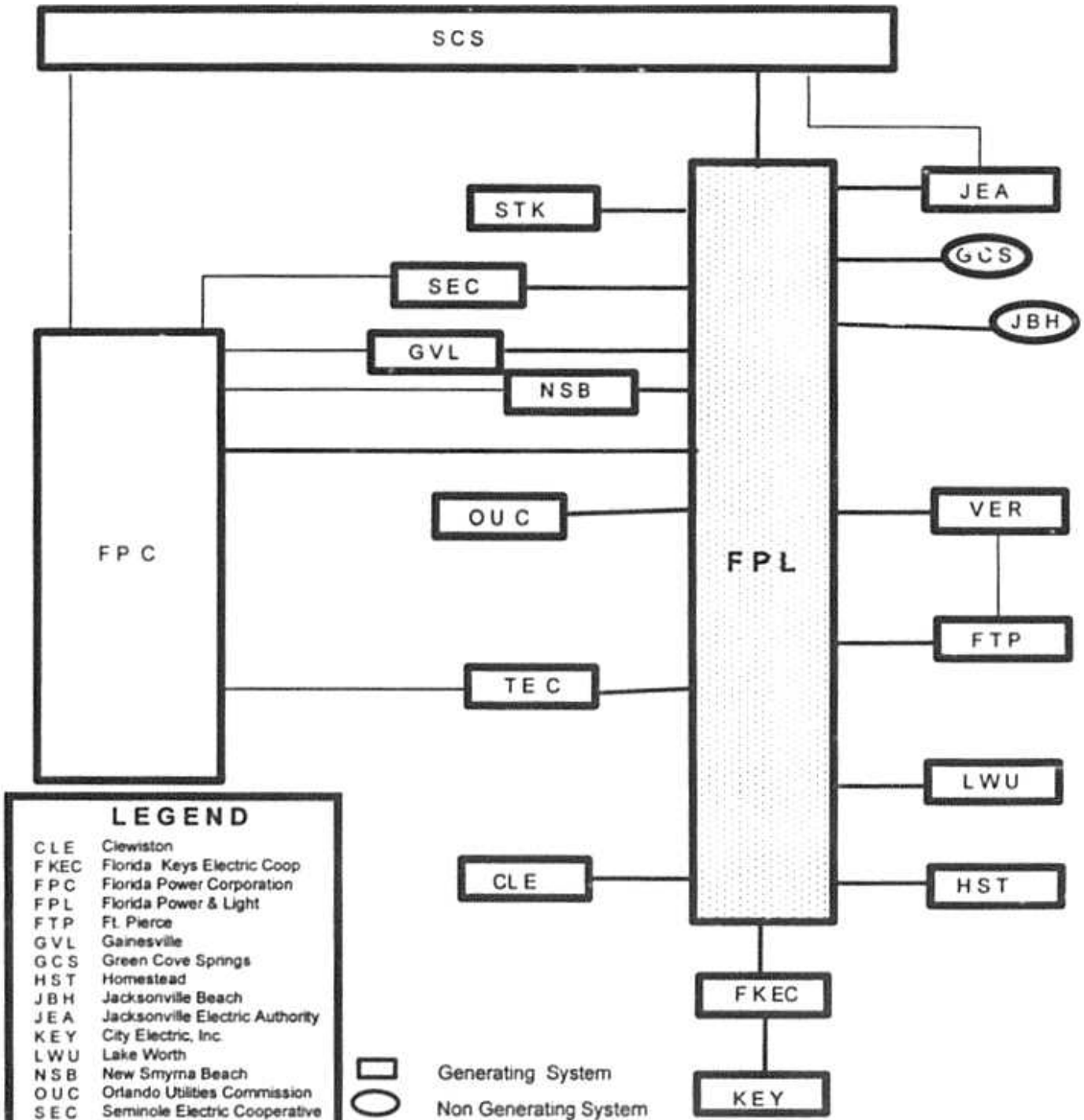


Figure I.A.3

I.B Non-Utility Generation

Non-utility generation is an important part of FPL's resource mix. FPL currently has contracts with ten cogeneration/small power production facilities to purchase firm capacity and energy. These facilities are shown in Table I.B.1. In addition, FPL has contracts for purchases of as-available energy (non-firm) from several cogeneration facilities and small power production facilities, as shown in Table I.B.2.

A cogeneration facility is one which simultaneously produces electrical and thermal energy, with the thermal energy (e.g., steam) being used for industrial, commercial, or cooling and heating purposes. A small power production facility is one which does not exceed 80 MW (unless it is exempted from this size limitation by the Federal Incentives Act of 1990) and uses as its primary energy source (at least 50%) solar, wind, waste, geothermal, or other renewable resources.

Cogeneration/Small Power Production Facilities Operating Under Firm Contracts in 1997

Project	*County*	*Fuel*	*MW Capacity*	*In-Service Date*	*End Date*
Bio-Energy	Broward	Landfill Gas	10.0	8/1/89	12/31/04
Broward South	Broward	Solid Waste	50.6	6/1/91	07/31/09
			1.4	1/1/93	12/30/26
			1.5	1/1/95	12/30/26
			0.6	1/1/97	12/30/26
Broward North	Broward	Solid Waste	45.0	4/1/92	12/30/26
			7.0	1/1/93	12/30/26
			1.5	1/1/95	12/30/26
			2.5	1/1/97	12/30/26
Royster Mulberry	Polk	Waste Heat	8.0	4/1/92	03/31/02
			1.0	12/1/95	03/31/02
Cedar Bay Generating Co.	Duval	Coal (CFB)	250.0	1/25/94	1/31/25
Indiantown Cogen., LP	Martin	Coal (PC)	330.0	12/22/95	12/31/25
Palm Beach SWA	Palm Beach	Solid Waste	42.0	4/1/92	3/31/10
Florida Crushed Stone	Hernando	Coal (PC)	110.0	4/1/92	10/31/05
			11.0		10/31/05
			12.0		10/31/05
Osceola (1)	Palm Beach	Bagasse/Wood	55.9	(3)	(3)
Okeelanta (2)	Palm Beach	Bagasse/Wood	70	(3)	(3)

Notes:

(1) Off-Line since 9/14/97. Delivered 251,066 MWH to FPL in 1997

(2) Off-Line since 9/15/97 Delivered 314,326 MWH to FPL in 1997

(3) FPL has filed suit against the Okeelanta and Osceola Partnerships in Palm Beach County Circuit Court. The lawsuit seeks a declaratory judgment that the Partnerships failed to accomplish commercial operations by January 1, 1997, as required by the power purchase contracts with the Partnerships, and, as a result, FPL is relieved of all further obligations, including capacity payments, under the contracts. FPL has proposed to pay into a court-authorized escrow account the disputed capacity payments pending a final determination by the court. In addition, the amount of capacity, which the Osceola Partnership has attempted to declare remains subject to dispute.

Table I.B.1

As-Available Energy Purchases From Non-Utility Generators in 1997				
Project	*County*	*Fuel*	*In-Service Date*	*Energy (MWH) Delivered to FPL in 1997*
US Sugar-Bryant	Palm Beach	Bagasse	2/80	22,074
US Sugar-Clewiston	Hendry	Bagasse	2/84	2,173
Downtown Government Center	Dade	Natural Gas	7/86 (1)	0 (1)
Tropicana	Manatee	Natural Gas	2/90	6,346
Lee County Resource Recovery	Lee	Solid Waste	7/94	193,949
Georgia Pacific	Putnam	Paper By Product	2/94	2,934
Note: (1) Off-Line since September 1994.				

Table I.B.2

I.C. Demand Side Management (DSM)

In 1997, FPL obtained approval from the Florida Public Service Commission (FPSC) to revise FPL's DSM programs. The revised programs began to be implemented in early 1998. These revised programs allow FPL to continue to offer cost-effective DSM options to its customers and also meet the DSM goals established by the Commission in October 1994. In addition to these revisions to existing programs, FPL began implementation of a new program, BuildSmart, in late 1997.

FPL's current DSM plan continues what has been FPL's practice since 1978 of encouraging cost-effective conservation and load management. FPL's DSM efforts through 1997 have resulted in a cumulative summer peak reduction of approximately 2,450 megawatts at the generator and an estimated cumulative annual energy saving of 4,500 gigawatt-hours at the generator.

FPL's DSM Plan offers to customers six residential DSM programs and eight commercial/industrial DSM programs. In addition, FPL continued its commitment to research and development activities through the Conservation Research and Development program, as well as through other research and development projects and activities. FPL expects that its current DSM programs will meet FPL's DSM Goals at least through the year 1999. New DSM Goals are scheduled to be established in 1999. FPL's DSM Plan is detailed in Section III C.

I.D. Purchased Power

Purchased power remains an important part of FPL's resource mix FPL has a contract to purchase 914 MW of coal-fired generation from the Southern Company up to the year 2010 In addition, FPL has contracts with the Jacksonville Electric Authority (JEA) for the purchase of 383 MW of coal-fired generation from the St John's Power Park Unit Nos 1 and 2 Table I D 1 presents the Summer and Winter MW resulting from these purchased power contracts

FPL's Purchased Power MW [1]

Year	UPS		SJRPP		Total	
	Winter	Summer	Winter	Summer	Winter	Summer
1997 [2]	913	913	383	383	1296	1296
1998	914	914	383	383	1297	1297
1999	914	914	383	383	1297	1297
2000	914	914	383	383	1297	1297
2001	914	914	383	383	1297	1297
2002	914	914	383	383	1297	1297
2003	914	914	383	383	1297	1297
2004	914	914	383	383	1297	1297
2005	914	914	383	383	1297	1297
2006	914	914	383	383	1297	1297
2007	914	914	383	383	1297	1297
2008	914	914	383	383	1297	1297
2009	914	914	383	383	1297	1297
2010	914	0	383	383	1297	383

Notes:

(1) "Total" reflects total resource entitlements resulting from agreements between FPL, Southern Companies, and JEA

(2) Values for 1997 are actual

Table I.D.1

CHAPTER II

Forecast of Electric Power Demand

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II. Forecast of Electric Power Demand

20-Year forecasts of sales, net energy for load (NEL), and peak loads are developed on an annual basis for long-term planning work at FPL. These forecasts are a key input to the models used to develop the Integrated Resource Plan. The following pages describe how these forecasts are developed for each component of the long-term forecast: sales, NEL, and peaks.

II.A. Long-Term Sales Forecasts

Long-term forecasts of electricity sales are developed for each revenue class for the forecasting period of 1998-2017. The results of these sales forecasts are presented in the Appendix. Both end-use models and econometric techniques are employed to produce the forecasts. The methodology used to develop sales forecasts for each jurisdictional revenue class is outlined below.

1. Residential Sales

The residential sales forecast is developed using the Residential End-Use Energy Planning Model (REEPS). REEPS is an integrated end-use/econometric forecasting model developed by the Electric Power Research Institute (EPRI).

The Model

REEPS forecasts electricity sales in the residential sector by simulating acquisitions and energy usage of 9 major residential appliances (space heater, central air-conditioner, room air-conditioner, water heater, range, first refrigerator, second refrigerator, freezer, and dishwasher), plus residual electricity use.

Using a sample of households representative of the full residential customer population, probabilistic choice models are used to determine the stock of appliances in each dwelling based on household characteristics, prices, and other factors. Efficiency and usage equations determine energy consumptions of each appliance. Electricity consumption is aggregated across all households to produce total residential sales.

For the base year, appliance saturations and electricity sales are calibrated to actuals. REEPS then simulates the additions of new appliance stock in new homes, and changes in appliance stock in existing homes, to produce a twenty-year forecast. For each forecast year, forecasts of household characteristics, energy prices, weather and geographic variables, and conservation policies serve as model inputs to influence trends in appliance stock, efficiency, and utilization. These forecasts are

used as explanatory variables in the choice and efficiency equations to determine the saturations and efficiencies of new housing appliance stock along with replacement and new acquisitions of appliances in existing housing. Likewise, usage equations determine energy consumption for the appliance stock in place, based on demographic and price forecasts. For each forecast period, appliance electricity consumption is aggregated across all households to produce a forecast of electricity sales.

In addition to forecasting residential electric sales, REEPS household level results are aggregated to produce other forecasts. These include:

- Total residential energy usage from all fuel sources,
- Appliance saturations,
- Appliance efficiencies (relative to the base year), and
- Average electricity/fuel use per appliance.

All forecasting results can be broken down by home vintage (new and existing), fuel type (electricity, natural gas, and oil/propane) and house-type (single family, small and large multi-family, and mobile home).

Model Input

For the 1997 Integrated Resource Plan, REEPS version PC 2.0 was adapted to FPL's service territory. The following key inputs were used in FPL's implementation of REEPS:

- FPL household appliances and demographics (1995 Home Energy Survey),
- Residential customer forecast,
- Price forecasts of residential electricity, gas, and oil,
- Forecasts of household income and household size,
- Weather data for Miami, West Palm Beach, Daytona, and Ft. Myers, and
- Appliance average electricity use for the base year.

Data from FPL's 1995 Home Energy Survey of Residential Customers (HES) were used to characterize FPL's existing residential customers. Results from the survey provided base-year appliance saturations for the 9 REEPS appliances, housing information on square footage and housing type, and demographic information on household size, household income, and geographic distribution.

The 20-year residential customer forecast, discussed earlier, was separated into four housing types

using ratios for single-family detached, single-family attached (small), single-family attached (large), and mobile homes taken from the 1995 HES. Forecasts of residential electric prices are determined using current residential electric rates with growth rates taken from FPL's official forecast of real average price of electricity. Applying the growth rates in FPL's official fuel forecast to current natural gas and oil prices creates forecasts of future residential natural gas and propane prices.

The existing household income distribution is determined from the 1995 HES. Growth in household income is determined from the residential customer forecast and WEFA, Inc.'s economic forecast of Florida real personal income. Base-year household size is determined from the 1995 HES and is forecasted using the trend from the forecast of FPL population per residential customer.

Estimates of appliance electricity consumption are taken from a conditional demand analysis of the 1990 HES data set.

The Forecast

After REEPS is calibrated to actual 1996 residential sales, the model produces a forecast of residential electricity sales for 1998-2017.

2. Commercial Sales

The commercial end-use model, COMMEND, developed by EPRI, is used to forecast long-term commercial sales.

The Model

COMMEND forecasts commercial energy requirements by building type, end-use, and fuel type. COMMEND calculates energy requirements by determining the product of the following four factors:

- Commercial floor space by building type,
- End-use saturations and fuel shares by end-use and building type,
- Energy use index (EUI) values, which give energy use per square foot for space in each building type that is served by an end-use and fuel, and
- Utilization of equipment relative to the base year levels.

This product represents the projected energy requirements for a particular end-use and a particular building type. The total of all of the end-use values for a building type are then summed to produce a projection of total energy requirements for that building type. Adding sales across all building types produces the overall commercial sales.

In the base year (1990), the end-use data estimates are calibrated to produce estimated sales by building type. Additional calibration is required to scale these estimates up to system sales, including non-building uses. Modeling the changes in each of the four components listed below produces commercial sales forecasts:

- Forecasts of floor stock are modeled using employee-per-square foot relationships,
- Fuel shares are forecast using multinomial logit models, based on equipment costs and equipment operating costs,
- Changes in EUI's occur as newer, more efficient buildings are constructed. Marginal EUI's are entered into the model based on economic conditions, building vintage, and a decay function, and,
- Changes in equipment utilization, relative to the base year, are modeled using short-run fuel price elasticities for all end-uses and weather response elasticities for heating and cooling.

Model Input

To adapt COMMEND to the FPL service territory, estimates are needed of the total floor stock of commercial buildings served by FPL, saturations of end-uses by fuel type within those buildings, and EUI values by end-use by building type. 14 building types and 10 end-uses are used in COMMEND to characterize FPL's commercial sector:

Building Types	End-Uses
1. Large Office	1. Air-Conditioning
2. Small Office	2. Heating
3. Large Retail	3. Ventilation
4. Small Retail	4. Water Heating
5. Restaurant	5. Refrigeration
6. Grocery	6. Cooking
7. Hotel/Motel	7. Outside Lighting
8. Elementary/Secondary School	8. Inside Lighting
9. College/Vocational	9. Office Equipment
10. Hospital	10. Miscellaneous
11. Other Health	
12. Warehouse	
13. Refrigerated Warehouse	
14. Miscellaneous Commercial	

Base year floor stock is estimated using information from the 1986 and 1990 Commercial/Industrial Customer Surveys. Forecasts of future construction are developed using the COMMEND floor stock model. The forecasting equations utilize an employee-per-square foot relationship. Employment forecasts consistent with forecasts of Florida non-agricultural employment are developed for various industries to be used in the forecast equations for each building type.

End-use saturation data come from the 1986 and 1990 Commercial/Industrial Customer (C/I) Surveys. EUI values are also based on the C/I Surveys. Marginal share and EUI values for new construction are based on the subset of the C/I Survey results that are for recently constructed buildings.

The Forecast

Base-year sales from the model were calibrated to actual FPL commercial sales. The model then produces a forecast of commercial electricity sales for 1998-2017.

3. Industrial Sales

Industrial sales were forecasted through a linear multiple regression model using Florida manufacturing employment, a "dummy" variable for recessions, and the price of electricity as the explanatory variables. Since this revenue class consists of manufacturers, employment in this sector was an important indicator of economic activity in the sector, translating into sales for the revenue class.

4. Other Public Authority Sales

An auto-regressive (AR) model was developed to forecast sales for this class. The forecast goes out five years and is held constant after that point. Cooling Degree Days, plus an AR and a moving average (MA) term, are used as explanatory variables.

5. Street & Highway Sales and Railroad & Railways Sales

The forecast of Street & Highway sales was developed using a regression model with Florida population, a "dummy" variable for the years 1983-97, and an AR term. The forecast for the first five years is from the short-term forecast. Then the growth rate from the long-term model was applied to develop a long-term forecast.

The forecasts for Railroads & Railways are held constant since there are no new plans for expansion.

6. Resale Sales

Resale (Wholesale) customers are composed of municipalities and/or electric cooperatives. These customers differ from jurisdictional customers in that they are not the ultimate users of the electricity they buy. Instead, they resell this electricity to their own customers.

There are four classes of Resale customers: Partial Requirements (PR), Full Requirement (FR), Aggregate Billing Partial Requirements Service Agreement (ABPRSA), and Contracts. PR customers usually have some generating capacity and buy the balance of their energy requirements from FPL or some other utility. FR customers, on the other hand, have no generating capacity and rely fully on FPL for their generating needs. The ABPRSA class consists of Seminole Electric Cooperative's 30 points-of-delivery who receive power from Seminole's own generation and the balance of their energy requirements from FPL.

Long-term contracts exist with City Electric, Inc. of Key West, the Florida Keys Electric Cooperative, and Metro-Dade County. Metro-Dade County also sells 60 MW to Florida Power Corporation through FPL's transmission lines. Line losses are also reported as wholesale sales from FPL.

PR Customers

Each PR customer's kWh consumption was forecasted using State Space or Box-Jenkins modeling techniques. FPL's Wholesale Markets department provides assumptions regarding new or existing PR customers who may be leaving the FPL system.

Seminole FR Customers

Presently, FPL's only Seminole FR customer is Fort Winder. The forecast of sales to Ft. Winder was based on an exponential smoothing model. In the long-term, sales to Ft. Winder were trended based on the short-term forecast results. Ft. Winder's share of Seminole's sales was assumed to be fully provided by FPL.

Seminole ABPRSA Customers

Currently, Seminole's service obligation is 498 MW. In FPL's 1997 planning work, it was projected to increase to 846 MW in 1999, 853 MW in 2000, and 869 MW starting in 2001 through the end of the forecasting period. This obligation, along with the forecast of Seminole's Total Sales within FPL's service territory, were the two critical components of FPL's sale to Seminole's ABPRSA forecast.

Load Duration Curve (LDC) analysis was used to forecast FPL's Resale sales to the ABPRSA class. First, 1994 - 1995 hourly loads for the ABPRSA class were analyzed and used to calculate monthly LDC's. Data prior to 1994 were excluded due to dramatic changes in Seminole's load resulting from their Direct Serve Load which began in 1994.

Forecasted LDC's for the ABPRSA class were then derived (for 1998 through 2007) from the actual

1994-1995 monthly LDC's. The forecast LDC's were assumed to have the same shapes as the actual average 1994-1995 LDC's for the ABPRSA class. The forecast LDC's were shifted, based on the regression model results, to account for the forecast growth in Seminole's sales.

The area under each forecast LDC represented the ABPRSA customer's sales for the month. The level of Seminole's service obligation for the appropriate year was superimposed onto each monthly curve. The area between the LDC and the service obligation was calculated to obtain monthly energy purchases from FPL by the ABPRSA class. A short-term and a long-term forecast of resale sales to the ABPRSA class were thus obtained.

Contract Rate

There are three customers in this class: the Florida Keys Electric Cooperative, City Electric, Inc. of Key West, and Metro-Dade County. Sales to the Florida Keys are forecasted using an exponential smoothing model. Sales to City Electric, Inc. of Key West are based on assumptions regarding their contract demand and expected load factor. Metro-Dade County sells 60 MW to Florida Power Corporation. Line losses are billed to Metro-Dade under a wholesale contract. The forecast is calculated based on assumptions about line losses, their capacity factor, and the number of hours in a particular month.

Seminole Total Sales

A multiple regression model was created to explain the historical variation of Seminole's annual energy needs within FPL's service territory as a function of real GDP, FPL Population, and a dummy variable to account for Seminole's Direct Serve Load. The health of the national economy indirectly affects the local economies served by Seminole, and, thus, the cooperative's electric sales. Population increases result in more electric customers and greater use of electricity.

Total Sales

Sales forecasts by revenue class are summed to produce a total sales forecast. After an estimate of annual total sales is obtained, applying an expansion factor generates a forecast of annual net energy for load (NEL).

II.B Net Energy for Load

1. Annual NEL Forecast

An annual econometric model is developed to produce a Net Energy for Load (NEL) forecast. The key inputs to the model are price of electricity, heating & cooling degree-days, average total customers, and Florida Non-Agricultural Employment. Once an annual NEL forecast is obtained using the above-mentioned model, the results are then compared to the NEL generated using the total sales forecast for reasonability. The sales by class are then adjusted to match the NEL from the annual NEL model.

2. Monthly NEL Forecast

The monthly NEL forecast is also generated for the entire long-term forecasting period of 1998-2017. The following steps are used to produce the monthly NEL forecast.

a. An econometric model is developed using monthly data to capture the seasonality of monthly NEL. The model is developed using the price of electricity, heating & cooling degree-days, equipment saturation, real per capita income, and an AR term as explanatory variables.

b. This model forecasts out to five years and provides the ratios of monthly NEL to annual NEL. These ratios are then applied to annual NEL forecasted values for later years to break them down into monthly values.

The forecasted NEL values for 1998-2007 are presented in the Appendix.

II.C. System Peak Forecasts

In recent years, the absolute growth in FPL system load has been associated with a larger customer base, varying weather conditions, continued economic growth, changing patterns of customer behavior (including an increasing stock of electricity consuming appliances), and more efficient heating and cooling appliances. The Peak Forecast models were developed to capture these behavioral relationships.

The forecasting methodology of Summer and Winter system peaks is discussed below. The forecasted values for these seasonal peak loads for the years 1998-2007 are presented in Tables III.B.2 and III.B.3 as well as in the Appendix.

1. System Summer Peak

The Summer peak forecast is developed using an econometric model. Key variables included in the model are the total number of FPL Summer customers, the price of electricity, a trend term, and a weather term. The weather term is the product of saturation of air conditioning equipment and temperature.

2. System Winter Peak

Like the system Summer peak model, this model is also an econometric model. The Winter Peak forecast is a function of the number of Winter customers, the minimum temperature on the peak day, a dummy variable to capture the effects of larger homes, and heating degree-hours for the prior day as well as for the morning of the Winter peak day.

3. Monthly Peak Forecasts

Monthly peaks for the 1998-2017 period are forecasted to provide information for the scheduling of maintenance for power plants and fuel budgeting. The forecasting process is the same as for the monthly NEL forecast.

a. Develop the historical seasonal factor for each month by using ratios of historical monthly peaks to seasonal peak (Summer = April-October, Winter = November-March).

b. Apply the monthly ratios to their respective seasonal peak forecast to derive the peak forecast by month. This process assumes that the seasonal factors remain unchanged over the forecasting period.

II.D. The Hourly Load Forecast

Forecasted values for system hourly load for the period 1998-2017 are produced using a System Load Forecasting "shaper" program. This model uses sixteen years of historical FPL hourly system load data to develop load shapes for weekday, weekend, and holiday days. These daily load shapes are ranked and used with forecasted monthly peaks, NEL, and calendars in developing an hourly forecast. The model allows calibration of hourly values where the peak is maintained or where both the peak and minimum load-to-peak ratio is maintained.

CHAPTER III

Projection of Incremental Resource Additions

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III. Projection of Incremental Resource Additions

III.A. FPL's Resource Planning:

FPL has developed an integrated resource planning (IRP) process in order to determine when new resources are needed, what the magnitude of the needed resources are, and what type of resources should be added. The timing and type of potential new power plants, the primary subject of this document, is determined as part of this work. This section discusses how FPL applied this process in its 1997 planning work.

Four Fundamental Steps of FPL's Resource Planning:

There are 4 basic "steps" which are fundamental to FPL's resource planning. These steps can be described as follows:

Step 1: Determine the magnitude and timing of FPL's resource needs.

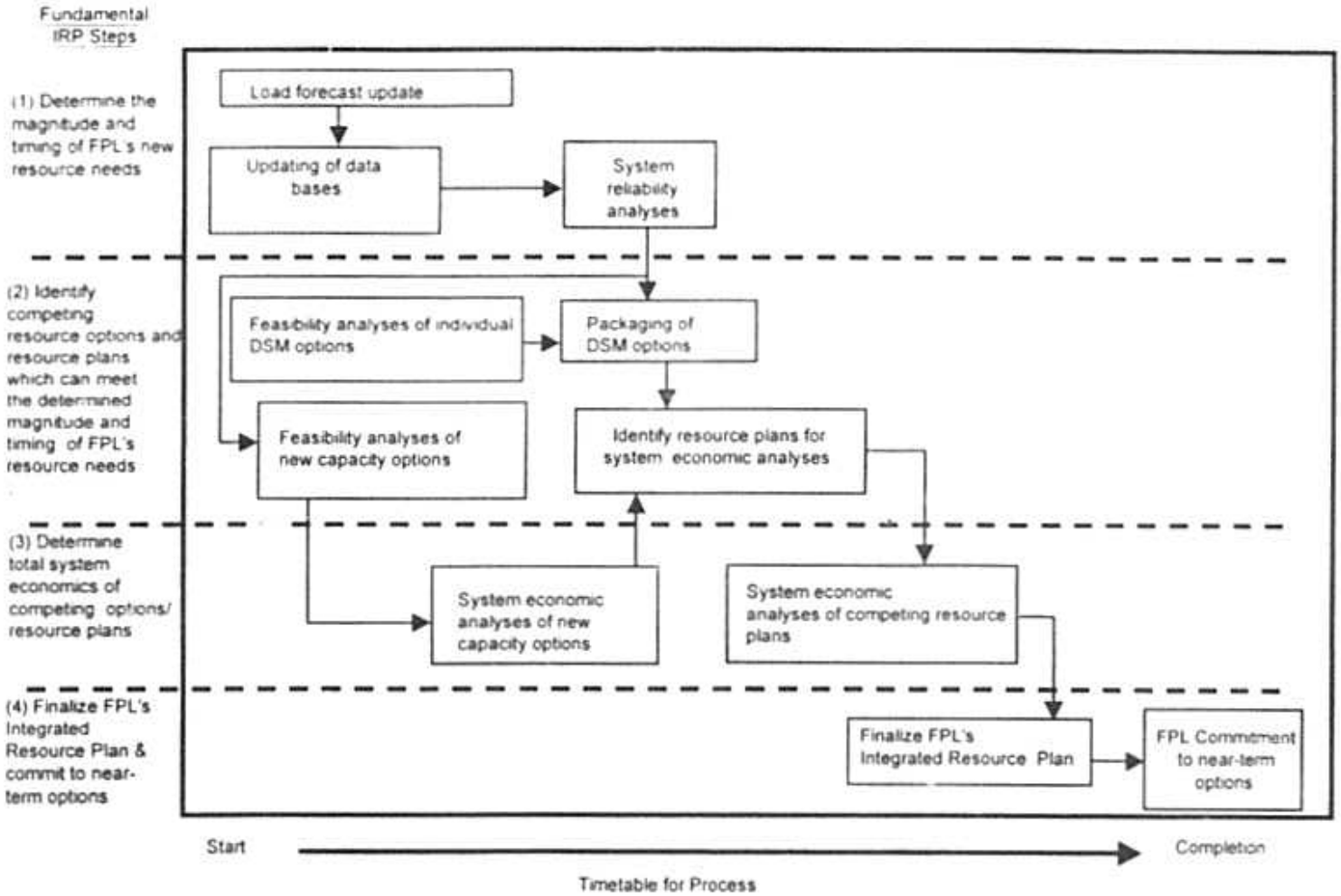
Step 2: Identify which resource options and resource plans can meet the determined magnitude and timing of FPL's resource needs (i.e., identify competing options and resource plans).

Step 3: Determine the economics for the total utility system with each of the competing options and resource plans), and,

Step 4: Select a resource plan and commit, as needed, to near-term options.

Figure III.A.1 graphically outlines these 4 steps.

Overview of FPL's IRP Process



(Normal time period approx. 6-7 months)

Figure III.A.1

Step 1: Determine the Magnitude and Timing of FPL's Resource Needs:

The first of these four resource planning steps – determining the magnitude and timing of FPL resource needs – is essentially a determination of how many megawatts (MW) of load reduction, new capacity, or a combination of both load reduction and new capacity options are needed. Also determined in this step is when the MW are needed to meet FPL's planning criteria. This step is often referred to as a reliability analysis for the utility system.

Step 1 starts with an updated load forecast. Several databases are also updated in this first fundamental step, not only with the new information regarding load forecasts, but also with other information as well. This information is used in many of the fundamental steps in resource planning. Examples of this new information include delivered fuel price projections and current financial and economic assumptions. In 1997, FPL's DSM MW goals were added to the reliability analysis database as an "already-committed-to" resource [1]. Therefore, the 1997 reliability analyses were primarily concerned with identifying the timing and magnitude of needed new capacity options.

The first place much of this updated information is used is in the analyses which provide the desired result of the 1st fundamental step: the determination of the magnitude and the timing of FPL's resource needs. This determination is accomplished by system reliability analyses which are typically based on a dual planning criteria of a minimum Summer reserve margin of 15% and a maximum loss-of-load probability (LOLP) of 0.1 days/year. These criteria are commonly used throughout the utility industry. In addition to these two reliability criteria which FPL has traditionally utilized, FPL also used a third reliability criterion in 1997: a 15% Winter reserve margin criterion. This third criterion was used in FPL's 1997 planning work due to concern regarding reserves available during extreme Winter peak loads [2].

Historically, two types of methodologies, deterministic and probabilistic, have been employed in system reliability analyses. The calculation of excess firm capacity around the annual system peak (reserve margin) is the most common deterministic method and this relatively simple calculation can be performed on a spreadsheet. It provides an indication of how well a generating system can meet its native load during peak periods. However, deterministic

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[1] This represents a modification to FPL's basic IRP process. However, FPL's DSM Goals for the years 1994 through 2000 were directly derived from the application of FPL's basic IRP process in late 1993/early 1994.

[2] FPL will continue to monitor this concern and make appropriate adjustments as needed to provide reliable service.

methods do not take into account probabilistic events such as unit availability, unit size (i.e. two 50 MW units with a 90% availability are more valuable in regard to utility system reliability than is one 100 MW unit with a 90% availability), and the value of being part of an interconnected system.

Therefore, probabilistic methodologies have been used to provide additional information on the reliability of a generating system. There are a number of probabilistic methods that are being used to perform system reliability analyses. Of these, the most widely used is loss-of-load probability or LOLP. Simply stated, LOLP is an index of how well a generating system will be able to meet its demand (i.e., a measure of how often load will exceed available resources). In contrast to reserve margin, the calculation of LOLP looks at the daily peak demands for each year, while taking into consideration such probabilistic events as the unavailability of individual generators due to scheduled maintenance or forced outages.

LOLP is expressed in units of "number of times per year" that the system demand could not be served. The standard for LOLP accepted throughout the industry is a maximum of 0.1 day per year. This analysis requires a more complicated calculation methodology than does reserve margin analysis.

The end result of the first fundamental step of resource planning is a projection of how many MW are needed to maintain system reliability and of when the MW are needed. This information is used in the second fundamental step: identifying resource options and resource plans which can meet the determined magnitude and timing of FPL's resource needs.

Step 2: Identify Resource Options and Plans Which Can Meet the Determined Magnitude and Timing of FPL's Resource Needs:

The initial activities associated with this second fundamental step of resource planning generally proceed concurrently with the activities associated with Step 1. FPL's Power Generation Business Unit initially analyzes new capacity options. During this step, feasibility analyses of new capacity options are carried out to determine which new capacity options appear to be the most competitive on FPL's system. These analyses also establish capacity size (MW) values, projected construction / permitting schedules, and operating parameters and costs. The individual new capacity options are then "packaged" into different resource plans which are designed to meet the system reliability criteria. In other words, resource plans are created by combining individual capacity options so that the timing and magnitude of

FPL's new resource needs are met. The creation of these competing resource plans is typically carried out using dynamic programming techniques.

Therefore, at the conclusion of the second fundamental resource planning step in 1997, a number of different combinations (i.e., resource plans) of new capacity options of a magnitude and timing necessary to meet FPL's resource needs (which would be needed after the DSM MW goals were assumed to be met) were identified. These resource plans were then compared on an economic basis.

Step 3: Determining the Total System Economics:

At the completion of the fundamental steps 1 & 2, the most viable new capacity options have been identified, and these capacity options have been combined into a number of resource plans. The stage is set for comparing the system economics of these resource plans. FPL combines the new capacity options into resource plans and performs the economic analyses of those plans using the EGEAS (Electric Generation Expansion Analysis System) computer model from Stone & Webster Management Consultants, Inc.

The economic analyses of the competing resource plans focus on total system economics. The standard basis for comparing the economics of the competing resource plans is the competing resource plans' impact on FPL's electricity rate levels with the intent of minimizing FPL's levelized system average rate (i.e., a Rate Impact Measure or RIM methodology). However, since in 1997 the DSM goals through the year 2003 were taken as "a given", the economic analyses were comparisons of competing capacity options. Since a utility's total kwh sales do not vary when comparing new capacity options, the capacity options which yield the lowest cost also yield the lowest rates. Therefore, for the 1997 resource planning work, these resource plans were compared on the basis of lowest cost (i.e., cumulative present value of revenue requirements.)

At the conclusion of the analyses carried out in Step 3, a determination of FPL's preferred resource plan was made.

Step 4: Finalizing FPL's 1997 Resource Plan:

The results of the previous three fundamental steps' activities were evaluated by FPL management and a decision was made as to what FPL's 1997 resource plan would be. This plan is presented in the following section.

III.B. Incremental Resource Additions

FPL's projected incremental resource additions/changes for 1998 through 2007 are depicted in Table III.B.1. These additions/changes will result from a variety of actions including: upgrades to existing units (which are achieved as a result of plant component replacements during major overhauls), capacity enhancements (due to overpressurization, overfiring, and/or the addition of inlet air chillers), scheduled changes in the delivered amounts of purchased power, projected expansion and repowering of existing units, and projected construction of new units.

As shown in Table III.B.1, the bulk of the capacity additions are made up of the following items: the expansion and repowering of capacity at FPL's Ft. Myers site in 2002, a similar expansion and repowering of capacity at FPL's Sanford site in 2004, and the construction of two new combined cycle units at FPL's Martin site in 2006 and 2007, respectively.

In regard to the first of these major capacity additions, the Ft. Myers expansion and repowering in 2002, FPL's system generation reliability analyses showed that no new capacity additions to FPL's system were needed until 2003 when using FPL's traditional dual reliability criteria of 15% Summer reserve margin and 0.1 days per year Loss-of-Load Probability. However, as was previously mentioned, FPL also utilized a 15% Winter reserve margin criterion due to concern about available reserves during winter peak loads. The use of this reliability criterion resulted in a 2002 need for capacity.

In addition, FPL's system transmission reliability analyses showed that either new transmission capacity or approximately 400 MW of new generation capacity was needed in Southwest Florida by January, 2002, to alleviate potential electrical reliability problems which could occur in the area during winter peak loads. Consequently, FPL evaluated both the construction of a new 500 KV transmission line, which would link the Lee/Collier county

area with Florida's east coast by January, 2002, and the addition of new generation in the same area by January, 2002

The addition of new generating capacity at FPL's Ft Myers site is the most attractive alternative. This capacity expansion project consists of the repowering of the two existing steam units at Ft Myers. The project makes use of the current steam capacity and existing turbine set. Approximately 837 MW of new generating capacity will result from the project. The expansion project is an attractive one for three basic reasons.

First, since the project will add such a significant amount of incremental generating capacity to the Lee/Collier county area by the needed January, 2002 date, it avoids the need (and the significant cost) of constructing a new 500 KV transmission line across the state. Second, in addition to supplying incremental generating capacity, the expansion and repowering project will both greatly improve the efficiency (i.e., heat rate) of the 540 MW that already exist at the site plus allow this capacity to be fueled by natural gas. This efficiency gain and fuel conversion for these existing MW result in a significant economic advantage for this option. Third, the expansion project will allow FPL to meet the 15% Winter reserve margin criterion it utilized in its 1997 planning work. Selection of the new transmission capacity alternative would not allow FPL to meet this criterion. Consequently, FPL currently plans on proceeding with the expansion and repowering project at the Ft Myers site with the intent to have the project completed by January, 2002.

This project is dependent upon securing a firm natural gas supply to the site which is both sufficient for fueling the electrical capacity involved and economically attractive. However, in the event FPL is unable to secure this gas supply, the Ft Myers expansion project would have to be replaced by another option. Since such a replacement option would almost certainly not be located in the Lee/Collier county area, the new 500 KV transmission line from Florida's east coast would then be needed to address the regional transmission concern. (For this reason, Table III.E.I shows the addition of this new transmission line.)

In regard to FPL's generation plans if the Ft Myers expansion project is rendered impractical by an inability to secure an acceptable natural gas supply, the Sanford expansion project would then likely be advanced from 2004 to 2002. (The Sanford project is very similar in scope to that planned for Ft Myers and is expected to be similar in regard to its economic attractiveness.) There would also be a corresponding advancement forward in time of the in-service dates of the Martin 5 and 6 units which follow Sanford.

One or more additional combined cycle units at as-yet-undetermined sites would also be needed after the two Martin units came in-service

	Projected Changes in FPL's Capacity [1]	*Summer MW*	*Winter MW*
1998	Existing Unit Upgrades [2]	156	---
	Capacity Enhancements [3]	53	—
1999	Capacity Enhancements [3]	102	59
	Existing Unit Upgrades [2]	3	54
2000	Manatee Units converted to Orimulsion	(198)	(100)
	Existing Unit Upgrades [2]	---	13
	Capacity Enhancements [3]	71	26
2001	Manatee Units converted to Orimulsion	---	(100)
	Capacity Enhancements [3]	---	110
2002	Firm Capacity Purchase [4]	(9)	—
	Ft Myers Expansion [5]	837	1062
2003	Firm Capacity Purchase [4]	—	(9)
2004	Sanford Expansion [6]	914	1076
2005	Firm Capacity Purchase [4]	(10)	(10)
2006	Martin Combined Cycle No. 5 [7]	419	448
	Firm Capacity Purchase [4]	(133)	(133)
2007	Martin Combined Cycle No. 6 [7]	419	448
	Totals =	*2624*	*2944*

Notes:

(1) Note that this table addresses only construction and purchase alternatives (i.e. it does not show planned DSM additions). The DSM goal MW additions are shown in Table III.C.1.

(2) Additional capability which is expected to be achieved as a result of plant component replacements during major overhauls.

(3) Additional capability from various existing FPL units due to overpressurization, overfiring, addition of chillers etc.

(4) Net of Southern Purchase Contract changes, QF Purchases and changes to those purchases.

(5) Projected expansion and repowering of FPL's existing two steam units at the Ft. Myers site (subject to adequate fuel availability/price at the site).

(6) Projected expansion and repowering of two of FPL's existing steam units at the Sanford site (subject to adequate fuel availability/price at the site).

(7) New combined cycle unit at the Martin site.

Table III.B.1

Table III.B.2
Florida Power & Light Company
Forecast of Capability, Demand and Scheduled Maintenance At Time Of Summer Peak

(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
					---------Additional Resources 4/ ----------							
Year	Total Installed 1/ Capability MW	Total Peak 2/ Demand MW	DSM 3/ MW	Firm Summer Peak MW	Firm Import MW	QF MW	Total Additional Resources MW	Margin Before Maintenance 5/ MW	Margin Before Maintenance 5/ % of Peak	Scheduled Maintenance MW	Margin After Maintenance 6/ MW	Margin After Maintenance 6/ % of Peak
1998	16,625	17,086	1,240	15,846	1,297	1,010	2,307	3,086	19	0	3,086	19
1999	16,730	17,172	1,385	15,787	1,297	1,010	2,307	3,250	21	0	3,250	21
2000	16,603	17,504	1,519	15,985	1,297	1,010	2,307	2,925	18	0	2,925	18
2001	16,603	17,822	1,654	16,168	1,297	1,010	2,307	2,742	17	0	2,742	17
2002	17,440	18,129	1,800	16,329	1,297	1,001	2,298	3,409	21	0	3,409	21
2003	17,440	18,469	1,946	16,523	1,297	1,001	2,298	3,215	19	0	3,215	19
2004	18,354	18,818	1,995	16,823	1,297	1,001	2,298	3,829	23	0	3,829	23
2005	18,354	19,170	1,995	17,175	1,297	991	2,288	3,467	20	0	3,467	20
2006	18,773	19,532	1,995	17,537	1,297	858	2,155	3,391	19	0	3,391	19
2007	19,192	19,901	1,995	17,906	1,297	858	2,155	3,441	19	0	3,441	19

1/ Capability additions and changes (unit upgrades) projected to be in-service by June 1st are considered to be available to meet Summer peak loads which are forecasted to occur during August of the year indicated. All values are Summer net MW

2/ These forecasted values reflect the Most Likely forecast without DSM.

3/ The MW shown represent cumulative load management capability plus incremental conservation from 1/97 - on. They are not included in total additional resources but reduces the peak load upon which Reserve Margin calculations are based.

4/ Additional Resources include firm purchases from units, IPP's and Qualifying Facilities (QF)

5/ Margin Before Maintenance = Col 2 + Col 9 - Col 5. % = Col 10/Col 5 * 100

6/ Margin After Maintenance = Col 2 + Col 9 - Col 12 - Col 5. % = Col 13/Col 5 * 100

Table III.B.3
Florida Power & Light Company
Forecast of Capability, Demand and Scheduled
Maintenance At Time of Winter Peak

(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
					---Additional Resources 4/---							
Year	Total Installed 1/ Capability MW	Total Peak 2/ Demand MW	DSM 3/ MW	Firm Winter Peak MW	Firm Import MW	QF MW	Total Additional Resources MW	Margin Before Maintenance 5/ MW	% of Peak	Scheduled Maintenance MW	Margin After Maintenance 6/ MW	% of Peak
1997/98	17,257	16,613	1,085	15,528	1,297	1,010	2,307	4,036	26	0	4,036	26
1998/99	17,370	17,845	1,392	16,453	1,297	1,010	2,307	3,224	20	0	3,224	20
1999/00	17,309	18,230	1,494	16,736	1,297	1,010	2,307	2,880	17	0	2,880	17
2000/01	17,319	18,622	1,568	17,054	1,297	1,010	2,307	2,572	15	0	2,572	15
2001/02	18,381	19,027	1,652	17,375	1,297	1,010	2,307	3,313	19	0	3,313	19
2002/03	18,381	19,426	1,734	17,692	1,297	1,001	2,298	2,987	17	0	2,987	17
2003/04	19,457	19,823	1,812	18,011	1,297	1,001	2,298	3,744	21	0	3,744	21
2004/05	19,457	20,223	1,812	18,411	1,297	991	2,288	3,334	18	0	3,334	18
2005/06	19,905	20,630	1,812	18,818	1,297	858	2,155	3,242	17	0	3,242	17
2006/07	20,353	21,044	1,812	19,232	1,297	858	2,155	3,276	17	0	3,276	17

1/ Capability additions and changes (unit upgrades) projected to be in-service by January 1st are considered to be available to meet Winter peak loads which are forecast to occur during January of the second year indicated. All values are Winter net MW.

2/ These forecasted values reflect the Most Likely forecast without DSM.

3/ The MW shown represent cumulative load management capability plus incremental conservation. They are not included in total additional resources but reduce the peak load upon which Reserve Margin calculations are based.

4/ Additional Resources include firm purchases from units, IPP's and Qualifying Facilities (QF).

5/ Margin Before Maintenance = (Col 2 + Col 9 - Col 5. % = Col 10)/Col 5 * 100

6/ Margin After Maintenance = (Col 2 + Col 9 - Col 12 - Col 5. %= Col 13)/Col 5 * 100

Tables III.B.2 and III.B.3 respectively show the projected Summer and Winter reserve margins for the FPL system with the capacity additions/changes detailed in Table III.B.1. As shown in these reserve margins calculations, FPL projects sufficient reserves to easily maintain reserve margins above 15% in both Summer and Winter through at least 2007.

III.C. Demand Side Management (DSM)

The projected DSM resource contribution in FPL's 1997 planning cycle was defined by the FPSC-approved DSM Goals resulting from the Goals docket. In November, 1995, FPL received FPSC approval of a DSM Plan to meet these goals. The DSM Plan explained the individual DSM programs which FPL intended to utilize to meet its goals. In November, 1997, FPL received approval to revise its DSM programs in order to continue to offer cost-effective programs to its customers. A description of FPL's DSM programs is given below.

1. FPL's DSM Programs

FPL's approved DSM programs can be summarized as follows:

Residential Conservation Service

An energy audit program designed to assist residential customers in understanding how to make their homes more energy-efficient through the installation of conservation measures/practices.

Residential Building Envelope

A program designed to encourage the installation of energy-efficient ceiling insulation in residential dwellings that utilize whole-house electric air-conditioning.

Duct System Testing and Repair

A program designed to encourage demand and energy conservation through the identification of air leaks in whole-house air conditioning duct systems and by the repair of those leaks by qualified contractors.

Residential Air Conditioning

A program designed to encourage customers to purchase higher efficiency equipment including central and window/wall units.

Residential Load Management (On Call)

A program designed to offer load control of major appliances/household equipment to residential customers.

BuildSmart

A program designed to encourage the design and construction of energy-efficient homes that cost-effectively reduce FPL's coincident peak load and energy consumption.

Business Energy Evaluation

A program designed to encourage energy efficiency in both new and existing commercial and industrial facilities by identifying DSM opportunities and providing recommendations to the customer.

Commercial/Industrial Heating, Ventilating, and Air Conditioning

A program designed to encourage the use of high-efficiency heating, ventilating, and air conditioning (HVAC) systems in commercial/industrial facilities. Includes air-and water-cooled chillers, DX units, thermal energy storage, window/wall units, and several ventilation measures.

Commercial/Industrial Efficient Lighting

A program designed to encourage the installation of energy-efficient lighting measures in commercial/industrial facilities.

Off-Peak Battery Charging

A program designed to shift the demand of commercial/industrial customers' battery-charging applications from on-peak to off-peak time periods.

Business Custom Incentive

A program designed to encourage commercial/industrial customers to implement unique energy conservation measures or projects not covered by other FPL programs.

Commercial/Industrial Load Control

A program designed to reduce peak demand by controlling customer loads of 200 kw or greater during periods of extreme demand or capacity shortages. (This program has been closed to new potential participants)

Commercial/Industrial Building Envelope

A program for commercial/industrial customers which is designed to encourage the installation of energy-efficient building envelope measures such as window treatments and roof/ceiling insulation.

General Service Load Management (Business On Call)

A program designed to offer load control of central air conditioning units to small non-demand-billed commercial/industrial customers.

2. Research and Development

FPL's DSM Plan contains extensive research and development activities. Historically, FPL has performed extensive DSM research and development, and FPL will continue such activities not only through its Conservation Research and Development Program, but also through individual research projects. Such efforts are an integral part of FPL's strategy to achieve the aggressive DSM Goals established for FPL. These efforts will examine a wide variety of technologies which build on prior FPL research where applicable and will expand the research to new and promising technologies as they emerge.

2.a. Conservation Research and Development Program

FPL's Conservation Research and Development Program is designed to evaluate emerging conservation technologies to determine which are worthy of pursuing for program development and approval. FPL has researched a wide variety of technologies and from that research has been able to develop new programs such as BuildSmart, Commercial/Industrial Building Envelope, and Off-Peak Battery Charging.

The technology assessment and product development process is on-going, and the following technologies are currently being evaluated: cooling tower enhancements, desiccant-enhanced air conditioning systems, motors/motor controller/motor lubricants, HVAC enhancements, building envelope technologies, appliance technologies, and UV-filtration and energy management technologies.

2.b. Marketing Conservation Research & Development Program

This program is designed to allow FPL the flexibility to test alternative incentive and/or marketing strategies for existing DSM programs.

2.c. Research & Development Projects

Demand Load Control Research Project This is a pilot project designed to offer voluntary load control to Dade and Broward GSD and GSLD rate customers that have air conditioning and/or other controllable equipment that can be equipped with FPL's load control equipment.

Residential Thermal Energy Storage Project This research project is intended to determine the technical feasibility of a program to encourage residential customers to cool their homes with thermal energy storage.

Cool Communities Research Project This research project is designed to evaluate emerging conservation technologies and practices associated with residential structures to determine which are worthy of pursuing for program development and approval. The project will quantify savings from lightened roof color and tree shading of homes.

Residential Heat Pump Water Heating Research Project. The research project is intended to evaluate improvements to heat pump water heating technology and equipment, their application, installation costs, customer acceptance, as well as demand and energy savings.

C/I Dehumidification Research & Development Project. This research project is designed to evaluate the potential reduction impact of ASHRAE Standard 62-1989 on HVAC demand and energy consumption and identify dehumidification technologies that may be employed cost-effectively in different commercial and industrial building types.

Natural Gas End-Use Technology Research and Development Projects This research and development project is designed to determine Florida-specific operating characteristics of 4 natural gas end-use technologies: gas heat pumps, gas engine-driven chillers, gas water heating, and gas desiccant-cooling.

C/I Daylight Dimming Research Project. This research and development project is designed to assess the viability and feasibility of daylight dimming technology and to compare the demand and energy reductions and cost differentials of daylight dimming systems to conventional lighting systems. In addition, this project will attempt to discover and overcome potential barriers for the technology, quantity the cost-effectiveness of the technology, test acceptance of the technology with architectural and engineering consultants, qualitatively assess customer acceptance of the technology, and conduct market research to determine target markets and expected penetrations.

Commercial/Industrial New Construction Research Project. The objective of this project is to identify opportunities in the commercial/industrial new construction market which would provide cost-effective measures beyond that required by the Florida Energy Efficiency Code.

Green Pricing Research Project. This research project is designed to test FPL customer responses to a Green Pricing initiative. In this initiative, FPL will solicit voluntary contributions from customers to be used to purchase, install, maintain, and operate photovoltaic (PV) modules on FPL's system.[3,4]

C/I Solar Desiccant Research Project. This project is design to evaluate the potential demand and energy savings associated with, and the cost-effectiveness of, hybrid solar desiccant dehumidification systems combined with a traditional cooling system.[4]

2.d. Real-Time Pricing

Although not part of FPL's approved DSM Plan, FPL continues to research new conservation/efficiency options such as Real-Time Pricing. This option is a four-year, experimental service offering for large C/I customers designed to evaluate customer load response to hourly marginal cost-based energy prices provided on a day-ahead basis.

[3,4] Please refer to section III F for additional information regarding FPL's efforts with renewable energy.

3. DSM Summary

FPL's DSM Plan of vigorous research and development, plus aggressive program implementation, is a well-balanced, comprehensive plan that is intended to achieve FPL's DSM goals as approved by the FPSC. The combined total residential and commercial/industrial MW reduction values from FPL's approved DSM Goals are presented in Table III.C.1.

FPL's Approved MW Reduction Goals for DSM

Year	Cumulative Summer MW	Cumulative Winter MW
1994	111	86
1995	292	227
1996	439	329
1997	585	429
1998	740	530
1999	896	626
2000	1,051	722
2001	1,206	818
2002	1,361	914
2003	1,517	1,010

Table III.C.1

III.D. Non-Utility Generation Additions

FPL has no incremental firm capacity purchase contracts from non-utility generating facilities which are scheduled to begin operation in the 1998-on timeframe.

Tables I.B.1 and I.B.2 present the currently contracted cogeneration/small power production facilities which are addressed in FPL's resource planning.

III.E.Transmission Plan

The 1998-2007 transmission plan will allow for the reliable delivery of the required capacity and energy for FPL's retail and wholesale customers. The following table presents FPL's future addition of 230 KV and 500 KV proposed bulk transmission lines.

List Of Proposed Power Lines

1998-2007

Line Ownership	Terminals From	Terminals To	Line Length Circuit Miles	Commercial In-Service Date (Mo/Yr)	Nominal Operating Voltage (kV)
FPL	Laudania	Greynolds	3.00	Jun-98	230
FPL	Andytown	Pennsuco	8.50	Dec-98	230
FPL	Dade	Levee	3.00	Jun-99	230
FPL	Broward	Yamato	2.50	Jun-99	230
FPL	Collier	Orange River	36.00	Dec-99	230
FPL	Broward	Ranch	4.50	Jun-00	230
FPL	Flagami	Turkey Point	1.80	Jun-00	230
FPL	Broward	Corbett	1.75	Jun-01	230
FPL	Laudania	Greynolds	6.70	Jun-01	230
FPL	Broward	Corbett	12.00	Jun-06	230
FPL	Corbett (1)	Orange River	114.00	Dec-01	500
FPL	Conservation	Levee	36.00	Jun-07	500

Note:

(1) The Corbett to Orange River line proposed to be completed by December 2001 is currently budgeted but may be postponed/cancelled due to the proposed expansion of generation capacity at FPL's existing Ft Myers Site Please refer to section III G for additional information

Table III.E.1

In addition, there will be transmission facilities needed to connect FPL's projected capacity additions to the system transmission grid These "directly associated" transmission facilities for the projected capacity additions at FPL 's existing Ft Myers Sanford, and Martin sites are described below

III.E.1. Directly Associated Transmission Facilities at Ft. Myers

The work required to integrate the Ft Myers capacity expansion with the FPL grid is as follows

I. SUBSTATION:

1. Build two collector buses with 3 breakers each to connect 3 CTs on each one Add another breaker to one of these collector buses to connect the start-up transformer
2. Add the six main step-up transformers (200 MVA/each), one for each CT
3. Add the start-up transformer
4. Add a three breaker bay in the 230 kV substation to connect one of the collector buses and a new line to Calusa
5. Add a three breaker bay in the 230 kV substation to connect the other collector bus and a new line to Orange River
6. Add a two breaker bay at Orange River 230 kV substation to connect the new line from Ft. Myers
7. Add a two breaker bay at Calusa 230 kV to connect the new line from Ft Myers
8. Replace breakers 3 and 36 (rated 37 6 kA) on bay 9N (see diagram below) with new ones rated 63 kA
9. Add relay and other protective equipment at Ft Myers, Orange River, and Calusa substations

II. TRANSMISSION:

1. Build a new 230 kV line from Ft Myers to Orange River (approximately 2 57 miles) similar to the existing circuits which are bundle 2-1431 ACSR 2580 Amps (1028 MVA) each
2. Build a new 230 kV line from Ft Myers to Calusa (approximately 1 58 miles) using 1431 ACSR conductor rated 1600 Amps (637 MVA)

FT. MYERS EXPANSION AND REPOWERING PROJECT

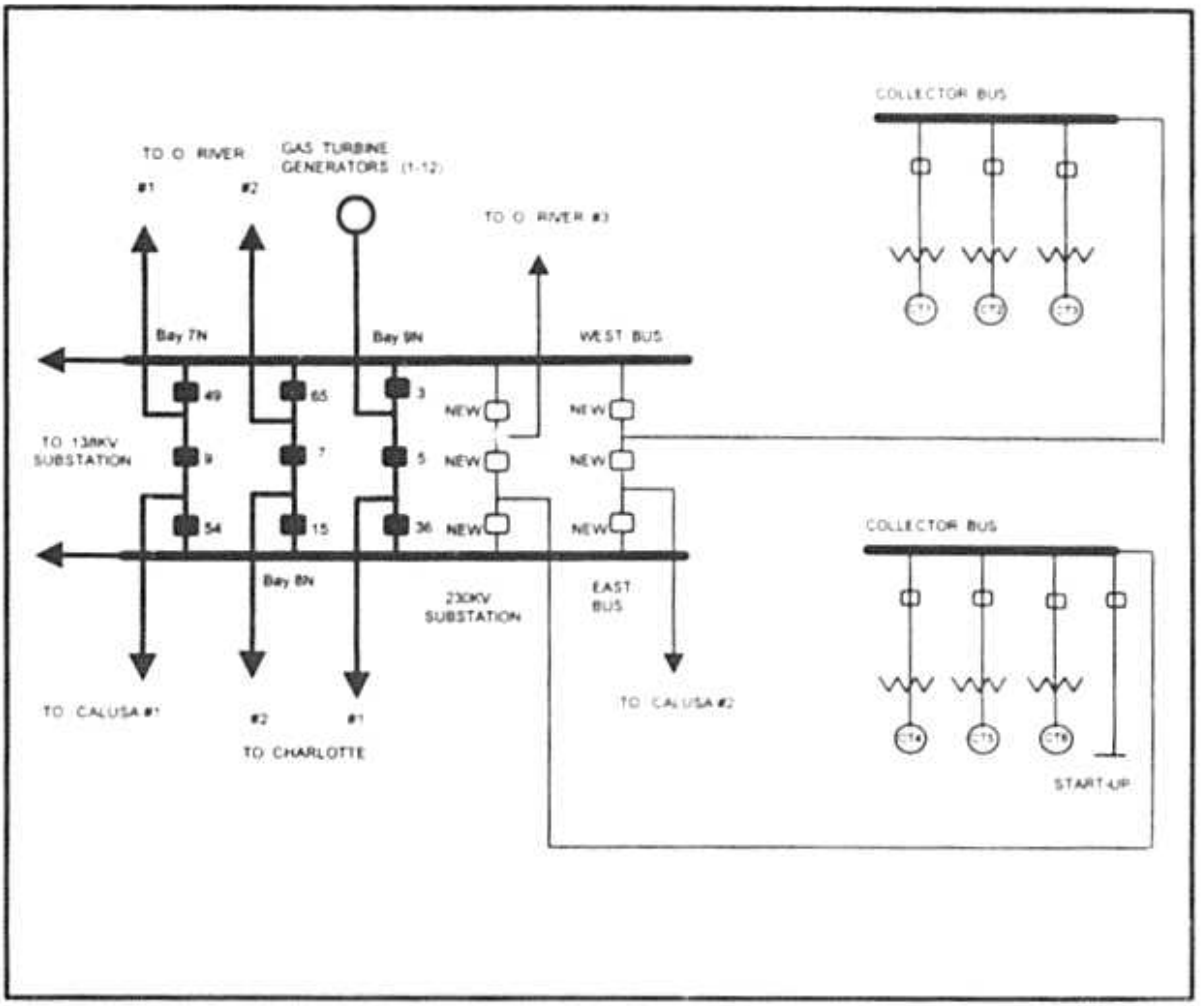

Figure III.E.1

III.E.2. Directly Associated Transmission Facilities at Sanford

The work required to integrate the Sanford capacity expansion with the FPL grid is as follows:

I. SUBSTATION:

1. Build two collector buses with 3 breakers each to connect 3 CTs on each one. Add another breaker to one of these collector buses to connect the start-up transformer
2. Add the six main step-up transformers (200 MVA/each) one for each CT
3. Add the start-up transformer
4. Build a new substation with 2-three breaker bays and 1- two breaker bay as shown in diagram to connect both collector buses and new transmission lines
5. Move the Volusia #2 line terminal from the existing yard to the new 230 kV yard
6. Add a three breaker bay at Poinsett 230 kV substation to connect the new lines from Sanford
7. Add relay and other protective equipment at Sanford and at Poinsett substations

II. TRANSMISSION:

1. Build two new 230 kV lines from Sanford to Poinsett (approximately 60 miles each) with conductor rated for 1600 Amps
2. Add Protection and Control equipment for new lines
3. Upgrade the Cape Canaveral - I. River 230 kV line to 1500 Amps

SANFORD EXPANSION AND REPOWERING PROJECT

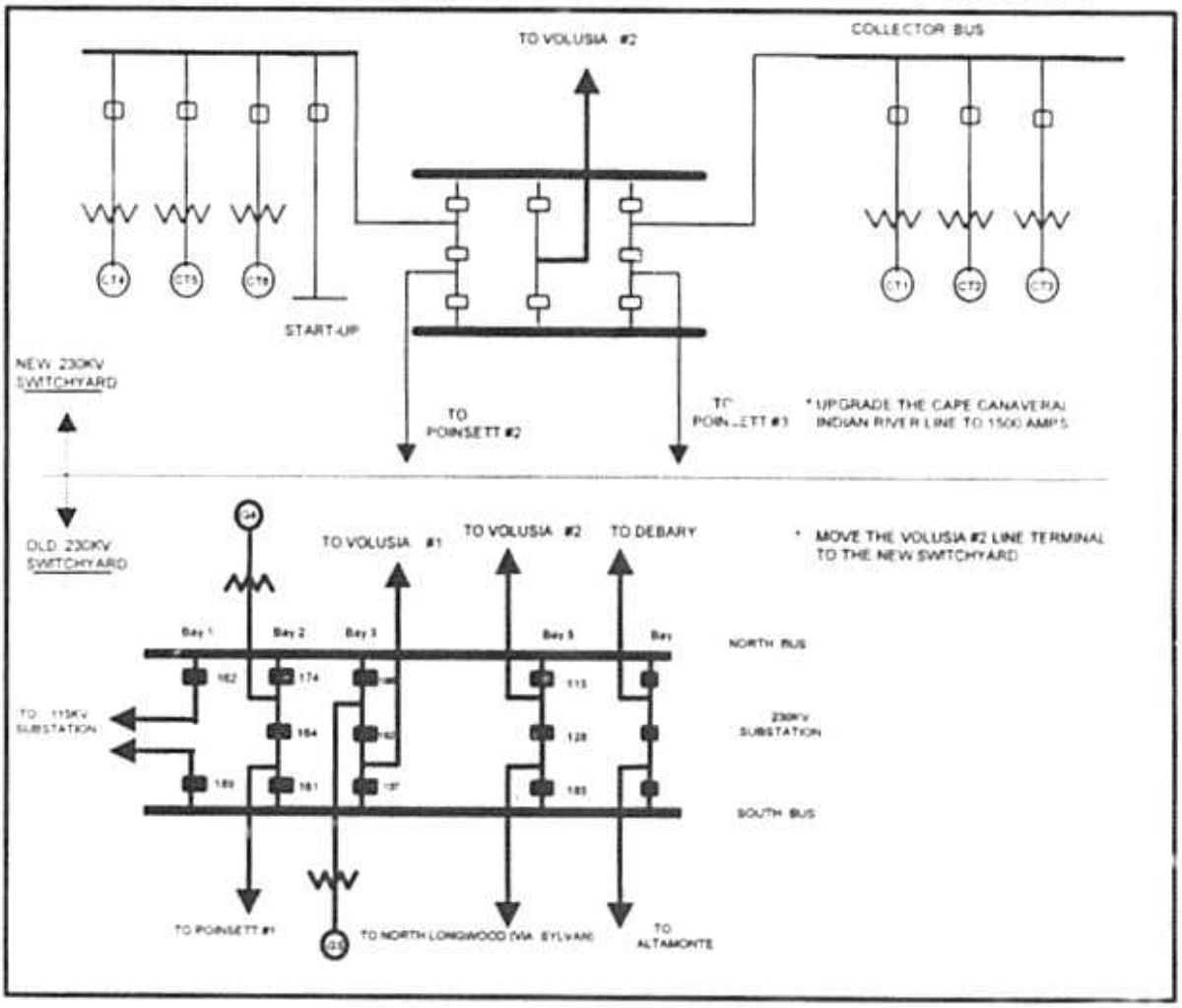

Figure III.E2

III.E.3. Directly Associated Transmission Facilities at Martin

The work required to integrate the incremental capacity projected to be added at Martin with the FPL grid is as follows:

I. SUBSTATION

1. Build two collector buses with three single breakers each to connect the CTs, the ST units and the start-up transformers.
2. Add the 4 main step-up transformers (2-400 MVA and 2-200 MVA) one for each CT and one for each ST unit.
3. Add the start-up transformers.
4. Add bus breaker in bay #4 to connect the Martin #5 collector bus in between this new breaker and breaker 154.
5. Add a new two-breaker bay (bay #3) to connect the Martin #6 collector bus.
6. Add relay and other protective equipment.
7. Split the 230 kV bus in order to reduce fault current levels in the switchyard. This will effectively separate units 3 and 4 from the new units 5 and 6. The 500/230 kV autotransformer #1 will remain connected to the units 3 and 4 switchyard and the new autotransformer #2 will connect the units 5 and 6 switchyard to the 500 kV bus.
8. Add the second 500/230 kV autotransformer and connect it to breaker 80 on the 230 kV side which is tied to the switchyard for units 5 and 6.
9. Add a single phase 230/500 kV, 500 MVA transformer to be used as a spare for either autotransformer.
10. Add relays and other protective equipment.

II. TRANSMISSION

1. Construct two string buses to connect the collector and main switchyards.
2. Uprate the Pratt & Whitney - Indiantown 230 kV circuit from 2020 Amps to 2520 Amps.
3. Uprate the Pratt & Whitney - Ranch 230 kV circuit from 2020 Amps to 2520 Amps.

MARTIN EXPANSION PROJECT

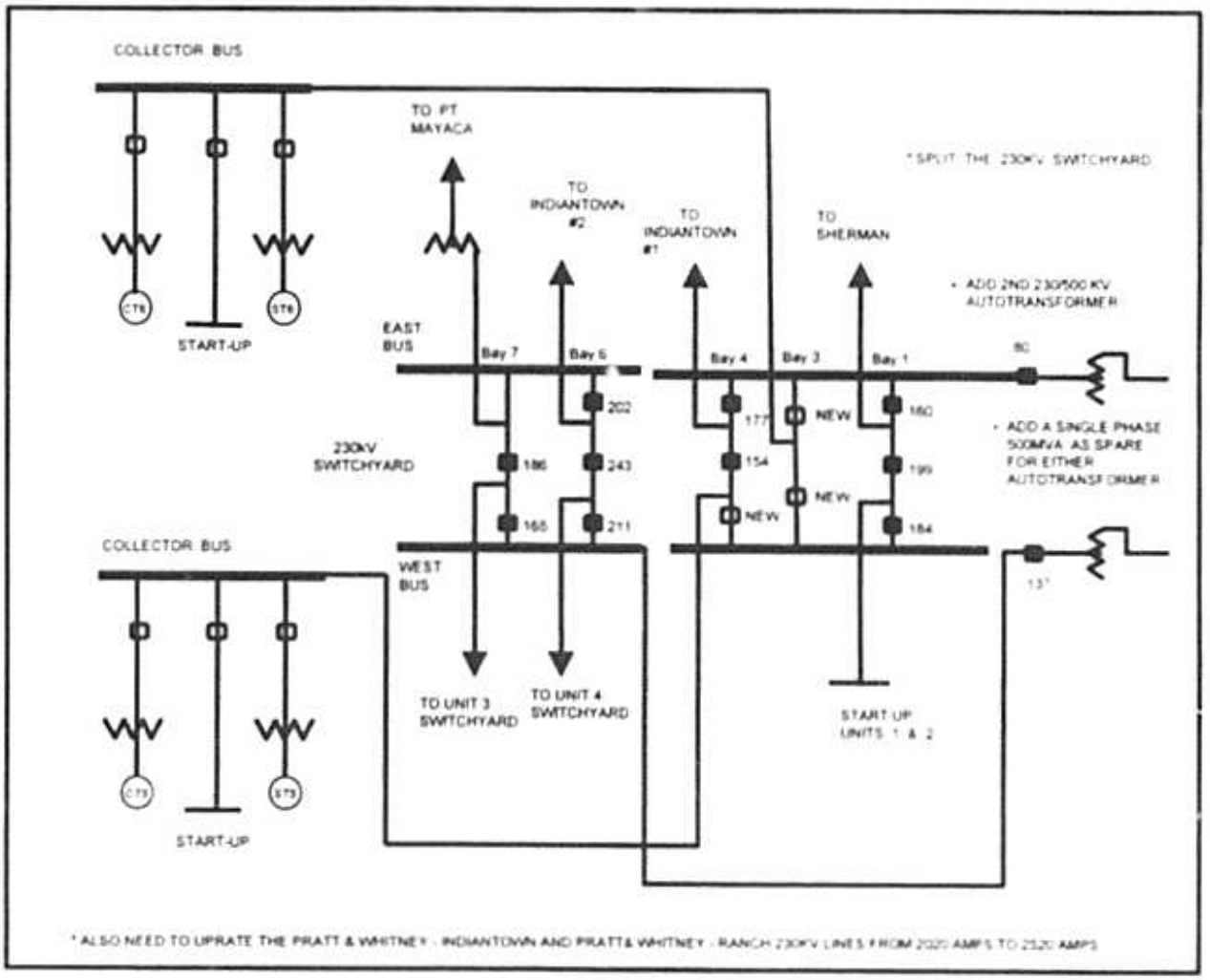

Figure III.E.3

III.F. Renewable Resources

FPL has been the leading Florida utility in regard to examining ways to utilize renewable energy technologies to meet its customers' current and future needs. FPL has been involved since 1976 in renewable energy research and development and in facilitating the implementation of various renewable technologies.

In terms of renewable technology research and development, FPL assisted the Florida Solar Energy Center (FSEC) in the late 1970's in demonstrating the first residential solar photovoltaic (PV) system east of the Mississippi. This PV installation at FSEC's Brevard County location was in operation for over 15 years and provided valuable information about PV performance capabilities on both a daily and annual basis in Florida. FPL later installed a second PV system at the FPL Flagami substation in Miami. This 10 kilowatt (KW) system was placed into operation in 1984. The testing of this PV installation was completed and the system was removed in 1990 to make room for substation expansion.

FPL's newest PV R&D project is a thin-film PV test facility located at the FPL Martin Plant site. The FPL PV test facility is used to test new thin-film PV technologies (and others as they become available for demonstration) and identifies design, equipment, or procedure changes necessary to accommodate direct current PV facilities into the FPL system. The site has a potential generating capacity of up to 100 KW.

In terms of utilizing renewable energy sources to meet its customers' needs, FPL initiated the first and only utility-sponsored conservation program in Florida designed to facilitate the implementation of solar technologies by its customers. FPL's Conservation Water Heating Program, first implemented in 1982, offered incentive payments to customers choosing solar water heaters. Before the program was recently ended (due to the fact that it was not cost-effective), FPL paid incentives to approximately 48,000 customers who installed solar water heaters.

In the mid-1980's, FPL introduced another renewable energy program. FPL's Passive Home Program was created in order to broadly disseminate information about passive solar building design techniques which are most applicable in Florida's climate. Complete designs and construction blueprints for 6 passive homes were created by 3 Florida architectural firms with the assistance of the FSEC and FPL. These designs and blueprints were available to customers at a low cost. During its existence, this program was popular and received a U.S. Department of Energy award for innovation. The program was eventually phased out due to a revision of the

Florida Model Energy Building Code. This revision was brought about in part by FPL's Passive Home Program and the revision incorporated into the Code one of the most significant passive design techniques highlighted in the program: radiant barrier insulation.

In early 1991, FPL received approval from the Florida Public Service Commission to conduct a research project to evaluate the feasibility of using small PV systems to directly power residential swimming pool pumps. This research project was completed with mixed results. Some of the performance problems identified in the test may be solvable, particularly when new pools are constructed. However, the high cost of PV, the significant percentage of sites with unacceptable shading, as well as customer satisfaction issues remain as significant barriers to wide acceptance and use of this particular solar application.

More recently, FPL has been analyzing the feasibility of using PV in another, potentially much larger way. FPL has designed an approach which would not require all of its customers to bear PV's high cost, but which would allow customers who were interested in facilitating the use of renewable energy a means to do so. FPL's approach is to allow customers to make voluntary contributions into a separate fund, which FPL would then use to make PV purchases in bulk quantities. PV will be installed at one or more central sites and deliver PV-generated electricity directly into the FPL grid. Thus, when sunlight is available at this site(s), the PV-generated electricity will displace an equivalent amount of fossil fuel-generated electricity.

FPL's approach, which has been termed Green Pricing, was initially discussed with the FPSC in 1994. The concept was then formally presented to the FPSC as part of FPL's DSM Plan in January, 1995. FPL received approval from the FPSC in June, 1997, to proceed with Green Pricing. Implementation is scheduled to begin in 1998.

Finally, FPL has also facilitated renewable energy usage by providing information to, and signing agreements with, developers of renewable energy projects (facilities which burn bagasse, waste wood, municipal waste, etc.). Firm capacity and energy, and as-available energy, have been purchased by FPL from these developers. (Please refer to Tables I.B.1 and I.B.2.)

III.G. FPL's Fuel Mix and Fuel Price Forecasts

1. FPL's Fuel Mix

Until the mid–1980's, FPL relied primarily on a combination of oil, natural gas, and nuclear energy to generate electricity. In 1986, coal was first added to the fuel mix, allowing FPL to meet its customers' energy needs with a more diversified mix of energy sources. Additional coal resources have been added with the acquisition (76%) of Scherer Unit # 4. Further diversification of FPL's fuel mix is scheduled to be provided in 2000 with the conversion of Manatee Unit Nos. 1 and 2 to Orimulsion.

2. Fuel Price Forecasts

FPL's long-term oil price forecast assumes that worldwide demand for petroleum products will grow moderately throughout the planning horizon. Non-OPEC crude oil supply is projected to increase as new and improved drilling technology and seismic information will reduce the cost of producing crude oil and increase both recovery from existing fields and new discoveries. However, the rate of increase in non-OPEC supply is projected to be slower than that of petroleum demand, resulting in an increase in OPEC's market share throughout the planning horizon. As OPEC gains market share, prices for petroleum products are projected to increase.

FPL's natural gas price forecast assumes that domestic demand for natural gas will grow moderately throughout the planning horizon, primarily due to increased requirements for electric generation. Domestic natural gas production will increase as new and improved drilling technology and seismic information will reduce the cost of finding, developing, and producing natural gas fields. The rate of increase in domestic natural gas production is assumed to be slower than that of demand, with the balance being supplied by increased Canadian and liquified natural gas (LNG) imports. As demand for natural gas in Florida grows, it is anticipated that based on natural gas users' commitments, the Florida Gas Transmission pipeline system will be augmented/expanded and/or a new pipeline will be constructed to meet the growth in demand.

CHAPTER IV

Environmental and Land Use Information

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IV. Environmental and Land Use Information

IV.A. Protection of the Environment

FPL operates in a sensitive, temperate / sub-tropical environment containing a number of distinct ecosystems with many endangered plant and animal species. Population growth in our service area is continuing, which heightens competition for air, land, and water resources which are necessary to meet the increased demand for generation, transmission, and distribution of electricity. At the same time, residents and tourists want unspoiled natural amenities, and the general public has an expectation that large corporations such as FPL will conduct their business in an environmentally responsible manner.

Over the years FPL has gained national recognition for its commitment to meeting its customers' energy needs in harmony with the environment. For example, in 1983, FPL won the U.S. Department of the Interior Conservation Service Award and received the Florida Audubon Society Corporate Service Award in 1986. In 1996, FPL finished as first runner-up for the prestigious U.S. Coast Guard's William M. Benkert Award for demonstrating "tremendous vision and dedication to excellence in marine environment protection." FPL's environmental protection philosophy is an integral part of how it conducts business and formal corporate policies have been established to protect the environment.

IV.B. FPL's Environmental Statement

To reaffirm its commitment to conduct business in an environmentally responsible manner, FPL developed an environmental statement in 1992 to clearly define the Company's position. This statement reflects how FPL incorporates environmental values into all aspects of the Company's activities and serves as a framework for new environmental initiatives throughout the Company. The FPL environmental statement further establishes a long-term direction of environmental responsibility for the Company. FPL's environmental statement is:

> **It is the Company's intent to continue to conduct its business in an environmentally responsible manner. Accordingly, Florida Power & Light Company will:**

- Comply with the spirit and intent, as well as the letter of, environmental laws, regulations and standards.
- Incorporate environmental protection and stewardship as an integral part of the design, construction, operation, and maintenance of our facilities.
- Encourage the wise use of energy to minimize the impact on the environment.
- Communicate effectively on environmental issues.
- Conduct periodic self-evaluations, report performance, and take appropriate actions.

IV.C Environmental Management

In order to implement the Environmental Statement, FPL established an environmental management system to direct and control the fulfillment of the organization's environmental responsibilities. A key component of the system is an Environmental Assurance Program which is discussed below. Other elements include written environmental policies and procedures, delineation of organizational responsibilities and individual accountabilities, allocation of appropriate resources for environmental compliance management (which includes reporting and corrective action when non-compliance occurs), environmental incident/emergency response, environmental risk assessment/management, environmental regulatory development and tracking, and environmental management information systems.

IV.D. Environmental Assurance Program

FPL's Environmental Assurance Program consists of activities which are designed to evaluate environmental performance, verify compliance with Company policy as well as with legal and regulatory requirements, and communicate results to corporate management. The principal mechanism for pursuing environmental assurance is the environmental audit. An environmental audit may be defined as a management tool comprising a systematic, documented, periodic, and objective evaluation of the performance of the organization and of the specific management systems and equipment designed to protect the environment. The environmental audit's primary objectives are to: 1) facilitate management control of environmental practices, and, 2) assess compliance with

existing environmental regulatory requirements and Company policies

IV.E. Environmental Communication and Facilitation

FPL is involved in many efforts to enhance environmental protection through the facilitation of environmental awareness and public education. Some of FPL's 1997 environmental outreach activities are noted on the table below.

1997 FPL Environmental Outreach Activities

Site	Activity	# Participants
St. Lucie Plant	Turtle Beach Nature Trail Visitation	3,212
Riviera Plant	Manatee Awareness Activities	35,000
St. Lucie Plant	Turtle Walk Participation	1,144
St. Lucie Plant	FPL Energy Encounter	39,178
(Not applicable)	Inquiries - 800 environmental information line	281
Martin Plant	Barley Barber Swamp Visitation	4,000

Table IV.E.1

IV.F. Preferred And Potential Sites

Based upon its projection of future resource needs, FPL has identified preferred and potential sites for future generation additions. These preferred and potential sites are discussed in separate sections below.

IV.F.1. Preferred Sites

FPL has identified three preferred sites: the existing Ft. Myers plant site, the existing Sanford plant site, and the existing Martin plant site. These three sites are currently the most likely locations for the capacity additions which FPL projects to make during the 1998 – 2007 period. (Please see Table III.B.1). These 3 sites are discussed below in the order in which they are currently projected to be utilized during the next 10 years. However, identification of a site as a preferred site does not represent a firm commitment by FPL to construct a new power plant or add incremental generating

capacity at that site

Preferred Site #1: Fort Myers Plant, Lee County

The site is located on the 480-acre FPL Fort Myers property. Current facilities on the site include two steam electric generating units (nominally 160 MW and 400 MW, respectively) and a bank of 12 simple-cycle combustion turbine peaking units. The site has direct access to a four-lane highway, State Road (SR) 80, and barge access is available. The nearest town is Tice which is approximately 4 miles west of the site. The City of Ft. Myers is approximately 8 miles west of the site. The Ft. Myers site has been listed as a potential site in previous FPL Ten Year Power Plant Site Plans.

FPL envisions adding new capacity by replacing the existing oil-fired Units # 1 and # 2 with 6 advanced natural gas-fired combustion turbines and 6 heat recovery steam generators (HRSGs). This type of steam generation replacement is commonly called "repowering". Repowering the existing two units in this manner will produce approximately 837 additional MW during Summer conditions, and approximately 1,062 additional MW during Winter conditions, beyond what is currently projected for these units. The output capability of the existing bank of 12 combustion turbines at the site will be unaffected by the repowering project.

a) and b) U.S. Geological Survey (USGS) Map and Proposed Facilities Layout Map

A USGS map of the Ft. Myers plant site, plus a map of the general layout of the proposed generating facilities at the site, are found in the Appendix.

c) Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found in the Appendix. It is pertinent to note that several designations on the current South Florida Water Management District Florida Land Use, Cover, and Forms Classification System (FLUCCS) appear to be in error, or to require some clarification. For example, the freshwater marsh identified toward the western boundary of the site is actually FPL's 33-acre evaporation / percolation pond. Similarly, while there are scattered mangroves along the shore, the central mangrove area shown is not

mangrove but is the FPL switchyard for that site. The improved pasture shown towards the east of the site is currently the location of a tree nursery.

d) Existing Land Uses of Site and Adjacent Areas

The land on the site is primarily dedicated to industrial use with surrounding grassy and landscaped areas. There is the previously mentioned 33-acre evaporation/percolation pond on the site. A portion of the site is leased to a landscape nursery.

Lee County operates a small manatee viewing area (approximately 5 acres) on FPL property to the east side of the discharge canal where it adjoins the Orange River south of SR 80. This manatee viewing area provides public viewing and education about the species. FPL leases the property to the county for a nominal amount.

The adjacent land uses are light commercial and retail to the south of the property and some residential areas located toward the west. Mixed scrub with some hardwoods and wetlands, plus agricultural land, can be found to the east and further to the south. The Caloosahatchee National Wildlife Refuge is located across the Caloosahatchee River, northwest of the power plant.

e) General Environmental Features On and In the Site Vicinity

1) Natural Environment

The site is adjacent to the south bank of the Caloosahatchee River near the confluence of the Orange River and the Caloosahatchee. Much of the site is no longer in its original natural condition. However, a scattering of mangroves can be found along the river shoreline. Some mixed scrub with some hardwoods and wetlands can be found to the east and further to the south. Other than the occasional congregation of manatees noted below, FPL is not aware of any significant environmental features on the site or in the vicinity.

2) Listed Species

Construction and operation of new units at the site are not expected to affect any rare, endangered, or threatened species. The only known listed species associated with the site

are the West Indian Manatees *(Trichechus manatus* Federal and State listed as Endangered*)* which are attracted to the warmed waters in the vicinity of the site discharge and can be found congregating in the area during cool weather

The Florida Natural Areas Inventory (FNAI) reports the presence of the Eastern Indigo Snake *(Drymarchons corais couperi* Federal and State listed as Threatened) and Tricolored Heron *(Egretta tricolor* State listed as a Species of Special Concern) within a two-mile radius of the site

3) Natural Resources of Regional Significance Status

No Natural Resource of Regional Significance is identified on the plant site in the Southwest Florida Regional Strategic Policy Plan

4) Other Significant Features

FPL is not aware of any other significant features of the site

f) Design Features and Mitigation Options

The preferred design option for the Ft Myers site is the repowering of the two existing oil-fired boilers with natural gas-fired combustion turbines and heat recovery steam generators (HRSGs) Advanced combustion turbines can be installed on the existing facility property and make effective use of existing transmission facilities and infrastructure Steam developed in the new HRSGs will be directed to the existing steam turbines

The expansion and repowering of Ft Myers is dependent upon securing a firm natural gas supply to the site which is both sufficient for fueling the electrical capacity involved and economically attractive If FPL is unable to secure such a natural gas supply, then FPL will consider other alternatives These alternatives are discussed in Section III B

Mitigation options being considered in the repowering of the existing Ft Myers facility include the capture and reuse of plant process water and rainwater, the use of combustion technology that is inherently low in air pollutant emissions, and the cessation of oil barge traffic on the

Caloosahatchee River

g) Local Government Future Land Use Designations

The Local Government Future Land Use Plan designates the major portion of the site as Public Facilities and a small area as Resource Protection. Since there are no significant environmental resources on the site, and the Resource Protection designated area appears to be the location of a current tree nursery, FPL believes that this designation is in error.

h) Site Selection Criteria and Process

For the past several years, many of FPL's existing power plant sites have been considered potentially suitable sites for new, expanded, or repowered generation. The Ft. Myers plant has been selected as a preferred site due to a combination of electrical transmission and system load factors, plus economic considerations. These factors and considerations are discussed in Section III.B. Environmental issues were not a deciding factor in FPL's site evaluation since none of the existing preferred and potential sites exhibit significant environmental sensitivity or other environmental issues. All of these sites are considered permittable.

i) Water Resources

The available surface water source is the Caloosahatchee River and the available groundwater source is the shallow aquifer.

j) Geological Features of Site and Adjacent Areas

The geology underlying the Fort Myers Plant consists of Quaternary Holocene and Pleistocene undifferentiated materials. The upper part of these undifferentiated materials consists of fine-to-medium-grained quartz sand with varying percentages of shell and clay. Hardpan frequently occurs at the base of the quartz sands. The lower section consists of shell beds with interbedded limestones. Underlying the undifferentiated materials are the Pliocene Tamiami Formation, the Miocene Hawthorn formation, Oligocene Suwanee Limestone, the Eocene

Crystal River and Williston formations, the Avon Park Limestone, and the Lake City Limestone

Several stratigraphic units can be differentiated based upon shallow borings drilled on the plant property. Sand with some heterogeneous fill material related to past site construction activity covers most of the surface. It is underlain by layers of clayey sand and clay to a depth of approximately 23 feet. These units mantle a thicker clay unit with numerous shell fragments that occurs from 15 feet to about 55 feet below the surface. A silty sand with a trace of clay was encountered at 55 feet near the termination depth of one deep boring on the site.

The water table at the site occurs at levels from just under the surface to about 5 feet below grade. Locally, the Surficial aquifer and surface water will generally flow toward the Caloosahatchee River. However, at the site, the intake and discharge canal will affect groundwater near the power block area. A drainage canal that borders the plant property on the west will affect groundwater flow along the western portion of the waste treatment area.

k) Projected Water Quantities for Various Uses

It is estimated that 150 gallons per minute (gpm) will be needed for industrial processing water for uses such as boiler makeup, service water, and inlet fogger makeup. For industrial cooling (once-through cooling water), no significant increase is projected in the current 433,000 gpm usage rate. Other facility water uses may include irrigation, potable use, etc. The total volume of these uses is estimated to be about 5 gpm.

l) Water Supply Sources by Type

For industrial processing, FPL anticipates that groundwater and, possibly, reuse water from municipal sources may be available. For cooling water, FPL envisions continuing to use its existing allocation from the Caloosahatchee River.

m) Water Conservation Strategies Under Consideration

A plan to treat and recycle equipment wash water, boiler blowdown, and equipment area runoff for use as service water would reduce ground water consumption. FPL would anticipate this site being designed and classified as a wastewater zero-discharge site following a repowering conversion.

n) Water Discharges and Pollution Control

Heated water discharge will be dissipated using the existing once-through cooling water system and possibly a small cooling tower. Non-point source discharges are not anticipated to be an issue because surface water runoff is planned to be collected and reused. Treating and recycling equipment wash water, boiler blowdown, and equipment area runoff will minimize industrial discharges.

o) Fuel Delivery, Storage, Waste Disposal, and Pollution Control

A combustion turbine-based repowering project at the Ft. Myers site would require a natural gas pipeline to be installed. A third party gas transmission company would permit, install, and operate such a facility. Virtually no waste is associated with natural gas firing.

p) Air Emissions and Control Systems

A natural gas-fired facility would generally have air pollutant emissions which are substantially lower than emissions from the current oil-fired boilers. While several technologies are available for nitrogen oxide (NOx) emissions control, the most appealing candidate for the Ft. Myers site would be a dry-low-NOx combustion turbine design type. In these type devices, combustion is staged in order to reduce the formation of combustion-derived oxides of nitrogen. Sulfur dioxide and particulate emissions are intrinsically low due to the lack of sulfur and solids in natural gas fuel. Carbon monoxide and volatile organic compound emissions can each be controlled via the use of efficient combustion rather than through the use of add-on control devices. Carbon dioxide emission rates associated with burning natural gas are below those of other liquid or

solid fuels. While the Ft Myers plant site is located within 100 kilometers of a Class I area (Everglades National Park), the reduction in emissions associated with repowering is expected to improve the air quality in the area as compared to current levels. Combined cycle/ combustion turbine facilities have been permitted at several locations throughout the state of Florida including near Class I areas. Dry-low-NOx combustor systems have been repeatedly demonstrated to be the Best Available Control Technology (BACT) for the control of NOx emissions for this technology pursuant to the requirements of the Clean Air Act.

q) Noise Emissions and Control Systems

Lee County has a noise ordinance which limits noise at the receiving property line to 75 decibels. Noise emissions from the Ft Myers project are not anticipated to approach this level based upon demonstrated noise control at a similar natural gas-fired facility (the Lauderdale plant) in Broward County.

r) Status of Applications

Permit applications have not yet been prepared since the site is still under evaluation by FPL. FPL is currently exploring permitting options.

Preferred Site #2: Sanford Plant, Volusia County

The site is located on the 1,718-acre FPL Sanford property just west of Lake Monroe on the north bank of the St. Johns River in Volusia County. Current facilities on the site include three steam electric generating units (one with a nominal rating of 160 MW and two with nominal ratings of 400 MW). The site is within the city limits of Debary and the community of Debary is located approximately two miles to the northwest. The town of Deland is approximately 4 miles west of the site. The site has direct access to a four-lane highway, SR 17-92, and barge access is available. The Sanford site has been listed as a potential site in previous Ten Year Power Plant Site Plans.

FPL envisions adding new capacity by replacing the existing oil and gas-fired Units # 3 and # 4 with

6 advanced natural gas-fired combustion turbines and 6 heat recovery steam generators (HRSGs). This type of steam generation replacement is commonly called "repowering". Repowering Units # 3 and # 4 in this manner will produce approximately 914 additional MW during Summer conditions, and approximately 1,076 additional MW of generation during Winter conditions, beyond what is currently projected for these units. The existing 390 MW Unit # 5 at Sanford would be unaffected by the repowering project.

a) and b) U.S. Geological Survey (USGS) Map and Proposed Facilities Layout Map

A USGS map of the Sanford plant site, plus a map of the general layout of the proposed generating facilities at the site, are found in the Appendix.

c) Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found in the Appendix.

d) Existing Land Uses of Site and Adjacent Areas

A large part of the property is covered by the 1,100-acre closed-cycle cooling pond which occupies almost all of the northern portion of the site. The remainder of the site is primarily rangeland and the power plant facilities. There are 3 small houses located on the property on Barwick Road that are currently used for storage purposes.

The surrounding land use is largely cropland and pasture. To the east of the plant there is a small residential area and some commercial/industrial land use. There are some residential areas mixed in with the agricultural areas located between the site and the St. John's River to the west. To the south is the St. Johns River and residential homes and commercial/industrial businesses are located along the south side of the river.

e) General Environmental Features On and In the Site Vicinity

1) Natural Environment

Small, scattered wooded areas can be found on the site. There are two small areas of wetland marsh on the site and a few acres of wetland forest along the riverbank. There are some wooded areas on the site, primarily upland coniferous forest. Forested and non-forested wetlands can be found to the west, adjacent to the river. River and wetland areas towards the northwest are designated as part of the Wekiva River Aquatic Preserve and Wekiva River State Preserve.

2) Listed Species

One bald eagle (*Haliaeetus leucocephalus*. Federal and State listed as Threatened) nest has been found on the site. Bald eagles have also nested in the Lake Monroe area. There are a number of other eagle nests in the vicinity of the site, primarily along the river. The Florida Natural Areas Inventory (FNAI) reports several Scrub Jay populations *(Aphelocoma coerulescens*. Federal and State listed as Threatened) located in scrub vegetation to the northwest of the site. West Indian Manatees *(Trichechus manatus*. Federal and State listed as Endangered*)* have also been found in this area.

3) Natural Resources of Regional Significance Status

There are no Natural Resources of Regional Significance on the site.

4) Other Significant Features

FPL is not aware of any other significant features of the site.

f) Design Features and Mitigation Options

The preferred design option for the Sanford site is the repowering of two existing oil-and gas-fired boilers with natural gas-fired combustion turbines and heat recovery steam generators (HRSGs). Advanced combustion turbines can be installed on the existing facility property to make effective use of existing transmission facilities and infrastructure. Steam produced in the new HRSGs will be directed to two of the existing steam turbines. It is recognized that the

natural gas supply that currently exists is too small to handle the volumes of gas that would be required for a repowering of the facility. Therefore, a larger gas supply line will be necessary. Natural gas-fired facilities represent one of the cleanest, most efficient technologies currently available for capacity additions to FPL's system.

Mitigation options being considered in the expansion and repowering project at Sanford include the capture and reuse of plant process water and rainwater, the use of combustion technology that is inherently low in air pollutant emissions, and the significant reduction of oil barge traffic on the St. Johns River.

g) Local Government Future Land Use Designations

The site is designated as Industrial Utilities in the Local Government land use plan. The city is currently updating its Land Use Plan. It is expected that the name, but not the expected use designation, may change. Land use designation of the surrounding area is primarily agricultural. There is an area of Public Institution around Lake Monroe to the southeast and a small area of mixed use to the west along Barwick Road.

h) Site Selection Criteria and Process

The Sanford plant has been selected as a preferred site due to a combination of electrical transmission, site, and system load factors. Environmental issues were not a deciding factor in FPL's site evaluation since none of the existing preferred and potential sites exhibit significant environmental sensitivity or other environmental issues. All are considered permittable.

Additionally, there are unique circumstances with the plant's existing equipment which made them particularly amenable to replacement with upgraded units – specifically, the side-by-side presence of a 400 MW steam turbine generating unit and a 160 MW steam turbine generating unit. The proximity of these two units to each other affords the opportunity to install 6 combustion turbine units and 6 HRSGs, and to cascade the steam produced in the HRSGs first to the 400 MW unit, then to the 160 MW unit.

i) Water Resources

For surface water supply, the available water resource is the St. John's River and / or the on-site cooling pond, which is periodically refilled from the St. John's River. For groundwater supply, the available resource is the shallow aquifer.

j) Geological Features of Site and Adjacent Areas

The near-surface geology of Volusia County, like that of most of north central Florida, is represented by late Tertiary and Quaternary geologic units. Soils in the vicinity of the plant include unconsolidated Pleistocene to Recent sands, with intervening beds of shells and clay. These deposits form the reservoir for the Surficial aquifer in the county. Deposits of Pliocene or Miocene clay with some sand underlie the aquifer. These low-permeability units serve to confine groundwater under pressure in the underlying porous limestone formations of Eocene age. These formations are part of the principal hydrologic unit referred to as the Floridan aquifer. This aquifer, the top of which generally occurs through the region at or below 100 feet, is the major source of potable groundwater in Volusia County. Two faults, one trending north-to-south, the other trending east-to-west, intersect two miles north of the site. Downward displacement of the fault is hypothesized as being approximately 60 to 100 feet.

k) Projected Water Quantities for Various Uses

FPL has estimated that 150 gallons per minute (gpm) would be required for industrial processing purposes (boiler makeup, service water, inlet foggers, etc.). Note that Unit # 3 currently takes its cooling water directly from the St. John's River, while Unit # 4 currently takes its cooling water directly from the on-site FPL cooling pond. The additional cooling water needs for the proposed repowering scenario are expected to be negligible over what is currently used.

FPL would also evaluate alternative sources of water to meet the expected needs of the site. It is anticipated that the existing off-site wells and the existing once-through cooling water system and cooling pond would continue to be used in a repowering situation.

l) Water Supply Sources by Type

The available surface water supply source is the St. Johns River. The shallow aquifer is an available groundwater source for service water and boiler water.

m) Water Conservation Strategies Under Consideration

A plan to treat and recycle equipment wash water, boiler blowdown, and equipment area runoff for use as service water would reduce groundwater consumption. FPL would anticipate this site being designed and classified as a wastewater zero-discharge site following a repowering conversion.

n) Water Discharges and Pollution Control

Heated water discharge will be dissipated using the existing once-through cooling water system and, possibly, a small cooling tower. Non-point source discharges are not anticipated to be an issue because surface water runoff is planned to be collected and reused. Industrial discharges will be minimized by treating and recycling equipment wash water, boiler blowdown, and equipment area runoff.

o) Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The expansion and repowering project at the Sanford site would require a larger natural gas pipeline to be installed. A third party gas transmission company would permit, install, and operate such a facility. Virtually no waste is associated with natural gas firing.

p) Air Emissions and Control Systems

A natural gas-fired facility would generally have air pollutant emissions which are substantially lower than emissions from the current oil-fired boilers. While several technologies are available for nitrogen oxide (NOx) emissions control, the most appropriate candidate for the Sanford site

would be a dry-low-NOx combustion turbine design type. In these types of devices, combustion is staged in order to reduce the formation of combustion-derived oxides of nitrogen. Sulfur dioxide and particulate emissions are intrinsically low, due to the lack of sulfur and solids in natural gas fuel. Carbon monoxide and volatile organic compound emissions can each be controlled via the use of efficient combustion, rather than through the use of add-on control devices. Combustion turbine/combined cycle facilities have been permitted at several locations throughout the state of Florida. Dry-low-NOx combustor systems have been repeatedly demonstrated to be the Best Available Control Technology (BACT) for the control of NOx emissions for this technology pursuant to the requirements of the Clean Air Act.

q) Noise Emissions and Control Systems

Noise emissions from the project are not anticipated to be significantly different from current levels at the existing plant. FPL will install appropriate sound attenuation devices such as insulation on high-energy piping systems in order to ensure that sound levels do not exceed allowable levels. Similar natural gas-fired facilities (the Lauderdale plant in Broward County and the Martin plant in Martin County) have been constructed and operated without exceeding allowable noise levels.

r) Status of Applications

Permit applications have not yet been prepared since the site is still under evaluation by FPL. FPL is currently exploring available permitting options.

Preferred Site #3: Martin Plant, Martin County

The Martin site is located approximately 40 miles northwest of West Palm Beach, 5 miles east of Lake Okeechobee, and 7 miles northwest of Indiantown in Martin County, Florida. The site is bounded on the west by the Florida East Coast Railway (FEC) and the adjacent South Florida Water Management District (SFWMD) L-65 Canal, on the south by the St. Lucie Canal (C-44 or Okeechobee Waterway), and on the northeast by SR 710 and the adjacent CSX Railroad.

The Martin site was identified in 1987 as a preferred location for development of coal gasification/combined cycle electric generation facilities and subsequent Ten Year Power Plant Site Plans have continued to identify this site as a "preferred site"

The existing 2,490 MW of generating capacity at FPL's Martin plant occupies a portion of the approximately 11,300-acre Martin Site which is wholly owned by FPL. The site includes a 6,800-acre cooling pond (6,500 acres of water surface and 300 acres of dike area) and approximately 300 acres for the existing power plant units and related facilities.

Two additional combined cycle units, Units # 5 and # 6, are currently projected as being potential additions to the site. These units would be natural gas-fired. Unit # 5 is currently projected to begin operation in 2006 with Unit # 6 operation beginning in 2007. Each new unit would add 419 MW additional Summer MW and 448 additional Winter MW. [5]

a) and b) U.S. Geological Survey (USGS) Map and Proposed Facilities Layout Map

A USGS map of the Martin plant site, plus a map of the general layout of the proposed generating facilities at the site, are found in the Appendix.

c) Map of Site and Adjacent Areas

An overview map of the site and adjacent areas is also found in the Appendix.

d) Existing Land Uses of Site and Adjacent Areas

A major portion of the site consists of a 6,800-acre cooling pond. The existing power plant

[5] Ultimately, coal gasification facilities may be constructed and operated to supply coal-derived gas to Units # 3 and # 4 and/or Units # 5 and # 6, if economically justified. The retrofit to coal gasification / combined cycle will not produce additional megawatts, so it is not discussed further in this document. Up to 1,300 acres could potentially be used for Units # 5 and # 6 to accommodate the associated coal handling, coal storage, by-product handling, and storage facilities which would be constructed if coal gasification is implemented. In such a case, natural gas and/or distillate fuel oil could serve as backup fuels.

facilities are located on approximately 300 acres. To the east of the power plant there is an area of mixed pine flatwood with a scattering of small wetlands. To the north of the reservoir there is a 1200-acre area which has been set aside as a mitigation area. There is peninsula of wetland forest on the west side of the reservoir, the Barley Barber Swamp, which encompasses 400 acres and is preserved as a natural area. There is also a 10 kilowatt (KW) photovoltaic energy facility at the south end of this site.

e) General Environmental Features On and In Site Vicinity

1) Natural Environment

As noted above, the Barley Barber Swamp is located on the site. There is also a 1200-acre mitigation area in the northern area of the site where wetlands and uplands have been restored. Along the south and west sides of the cooling pond is an area where the vegetation has been allowed to return to its natural state in order to serve as a wildlife corridor. FPL has preserved a Florida Panther corridor along the west side of the cooling pond. There are pine flatwoods and small scattered wetlands to the east of the plant.

2) Listed Species

Construction and operation of new units at the site are not expected to affect any rare, endangered, or threatened species. There are two active Bald Eagle (*Haliaeetus leucocephalus*; Federal and State listed as Threatened) nests that have been on the site for many years. The FNAI database notes a record of Eastern Indigo Snakes (*Drymarchon coralis couperi*; Federal and State listed as Threatened) in the Barley Barber Swamp. A number of other Bald Eagle nests and sightings of Eastern Indigo Snakes are reported by the FNAI database within a two-mile radius of the site. Infrequent sightings of Florida Panther have been made in the site area.

3) Natural Resources of Regional Significance Status

The Treasure Coast Regional Planning Council lists the "FPL Preserve", including the Barley Barber Swamp, as a Significant Regional Facility. Natural communities such as uplands and wetlands are also generically listed as Resources of Regional Significance.

4) Other significant features

FPL is not aware of any other significant features of the site

f) Design Features and Mitigation Options

The Martin site presents several opportunities to add additional generating capability. The projected option is to add four additional combustion turbines and four heat recovery steam generators (HRSGs) which will comprise the Martin # 5 and # 6 units. Natural gas delivered via pipeline is envisioned as the fuel type. Natural gas-fired facilities represent one of the cleanest, most efficient technologies currently available.

Mitigation options being considered in the addition of this capacity at the existing Martin site include the capture and reuse of plant process water and rainwater. The facility already encompasses several preserved areas where wildlife is abundant.

g) Local Government Future Land Use Designations

Local government future land use designation for the site is Public Utilities. Designations for the surrounding area are primarily Agricultural. There are also limited areas of Agricultural Ranchette, Industrial, and a small Commercial area designation. To the southeast of the property, fronting on the St. Lucie Canal, there is an area designated for Public Conservation.

h) Site Selection Criteria and Process

For the past several years, a number of FPL's existing power plant sites have been considered as potentially suitable sites for new, expanded, or repowered generation. The Martin plant has been selected as a preferred site due to a combination of site and location factors.

One of the primary factors considered in power plant siting has been the availability of existing transmission and infrastructure. The availability of land, water, transmission facilities, and existing infrastructure all contribute to the selection of this site as "preferred" from a practical and

an economic perspective. In addition, the site has already been determined by the Governor and Cabinet, serving as the Siting Board, to have an "ultimate site capacity" to accommodate up to 1,600 MW of combined cycle units fueled by natural gas, fuel oil, or coal-derived gas produced at the site. Units # 5 and # 6 would be included in this "ultimate site capacity"

i) Water Resources

Surface water resources currently used at the Martin facility include the cooling pond which takes its water from the St. Lucie canal. The available groundwater resource is the shallow aquifer which is used as a source for potable water and for service water for Units #1 and #2. Both of these sources are projected to be available for future site expansion.

j) Geological Features of Site and Adjacent Areas

FPL's Martin Site is underlain by approximately 13,000 feet of sedimentary rock strata. The basement complex in this area consists of Paleozoic igneous and metamorphic rocks about which little is known due to their great depth.

Overlying the basement complex to the ground surface are sedimentary rocks and deposits that are primarily marine in origin. Below a depth of about 400 feet these rocks are predominantly limestone and dolomite. Above 400 feet the deposits are largely composed of sand, silt, or clay. The deepest formation in Martin County on which significant published data are available is the Eocene Age Avon Park. Limited information is available from wells penetrating the underlying Lake City formation. The published information on the sediments comprising the formations below the Avon Park Limestone in western Martin County is based on projections from deep wells in Okeechobee, St. Lucie, and Palm Beach counties.

k) Projected Water Quantities for Various Uses

The estimated additional quantity of water required for industrial processing is 130 gallons per minute (gpm) for uses such as boiler water, service water, and inlet fogger supply. FPL operates on-site water treatment systems for each of these uses. Industrial cooling water will be supplied from the on-site 6,700-acre cooling pond. Makeup water for the pond is taken from the St. Lucie

canal. The current makeup water quantity to the cooling pond (approximately 4,800 gpm) is expected to be adequate for the proposed expansion. Water quantities needed for other uses such as irrigation and potable water are estimated to be approximately 5 gpm.

l) Water Supply Sources by Type

Potential future phases of the project will utilize the existing on-site cooling pond as the source of cooling water and as a heat sink for the dissipation of cooling water heat. The cooling pond operates as a "closed cycle" system in which heated water from the generating units loses its heat as it is circulated within the pond and back around to the plant intake. Makeup water to the pond is withdrawn from the St. Lucie Canal as needed to replace net evaporation and seepage losses from the pond. Such needs will comply with the existing agreement between FPL and the South Florida Water Management District (SFWMD) regarding allocation of cooling water to the pond and with SFWMD's regulations for consumptive water use.

To avoid impacts to the surficial aquifer, FPL and SFWMD have agreed that the process water for Units # 3 and # 4 will be obtained initially from the cooling pond. Upon completion of Units # 5 and # 6, process water for the facility will be obtained solely from the Floridan aquifer via approximately 1,500-foot deep wells.

m) Water Conservation Strategies Under Consideration

A plan to treat the boiler blowdown and other equipment wash water, then recycle it for use as service water, will reduce both the ground and surface water consumption.

n) Water Discharges and Pollution Control

Heated water discharges will be dissipated in the cooling pond. Non-point source discharges are not an issue since there are none at this facility. Industrial discharges will be minimized by treating and recycling equipment wash and ash sluice wastewaters, boiler blowdown water, and equipment area runoff.

o) Fuel Delivery, Storage, Waste Disposal, and Pollution Control

The site is already serviced by multiple fuel delivery facilities. However, the addition of future natural gas-fired combined cycle units would require an enlargement of the existing pipeline(s), the installation of a new pipeline, or the addition of another natural gas pipeline compressor station. There are currently two natural gas supply lines into the facility, as well as an oil pipeline, which serve the existing steam boilers and combined cycle generating units.

p) Air Emissions and Control Systems

FPL's plans for up to 1,600 MW of combined cycle/coal gasification combined cycle development (Units # 3 - # 6) were subject to "New Source Review" under Federal and state Prevention of Significant Deterioration (PSD) regulations. This review required these units to meet New Source Performance Standards (NSPS) and that Best Available Control Technology (BACT) be selected to control emissions of those pollutants emitted in excess of applicable PSD significant emission rates. The primary purpose of BACT analysis is to minimize the allowable increases in air pollutants and thereby increase the potential for future economic growth without significantly degrading air quality.

Air emission rates will be limited to levels far below NSPS requirements. In addition, BACT determination was established for the following pollutants: sulfur dioxide (SO_2), sulfuric acid mist (H_2SO_4), nitrogen oxides (NO_x), particulates (PM_{10} and TSP), carbon monoxide (CO), volatile organic compounds (VOC), lead, beryllium, mercury, and inorganic arsenic. By stipulation, the Department of Environmental Protection (DEP) has determined final BACT for Units # 3 and # 4 firing natural gas and oil. Emission limitations and conditions concerning development of subsequent units at the site reflect a preliminary BACT determination for those phases to support certification of ultimate site capacity and shall be determined finally upon review of supplemental applications.

For sulfur dioxide, carbon monoxide, volatile organic compounds, fluorides, lead, beryllium, mercury, and arsenic emissions from the combined cycle Units # 3 and # 4, BACT has been determined to be of efficient design and operation of the fuel combustor in the combustion

turbine and the use of low sulfur fuels, either natural gas or low sulfur oil (0.5 percent sulfur, maximum; 0.3 percent, annual average). The most effective control strategy (BACT) for particulates and sulfuric acid mist is inlet air filtering, low sulfur fuels, clean combustion, and steam injection.

For nitrogen oxide emissions, BACT for Units # 3 and # 4 has been determined to be the use of dry-low-NO_x combustors capable of achieving emissions of 25 parts-per-million (ppm) when burning natural gas and 65 ppm when burning oil, limiting oil-firing to an annual aggregate of 2,000 hours for the four combustion turbines comprising Units # 3 and # 4, and limiting allowable NO_x emissions from Units # 3 and # 4 to a total of 3,108 tons per year.

For proposed new Martin Units # 5 and # 6, FPL projects similar emission levels to those listed above for Units # 3 and # 4 (recognizing that continual technological improvements make it likely that even lower emission rates will be possible by the time these units are commissioned).

q) Noise Emissions and Control Systems

A field survey and impact assessment of noise expected to be caused by unit construction at the site indicated that construction noise will be below current noise levels at the residences nearest the site.

r) Status of Applications

A Site Certification application was filed in December, 1989, for the construction and operation of the 1,600 MW Martin Coal Gasification Combined Cycle project under the Florida Electrical Power Plant Siting Act.

On June 15, 1990, the Public Service Commission issued a Determination of Need Order for proposed Martin Units # 3 and # 4. This determination of need applies only to the first phase of the Project, or 832 MW of combined cycle generation. The Siting Board issued a Land Use Order on June 27, 1990. The Certification Hearing was held on November 5-7, 1990. As mentioned earlier, on February 12, 1991, the Governor and Cabinet, serving as the Siting

Board, approved the construction and operation of natural gas-fired combined cycle Units # 3 and # 4 and determined that the Martin Site has ultimate site capacity to accommodate up to 1,600 MW of combined cycle units fueled by natural gas, fuel oil, or coal-derived gas produced at the site. No further certification action has taken place regarding the additional units proposed for the site.

IV.F.2. Potential Sites

Four FPL-owned sites are identified as the most likely potential sites for future generation after the three preferred sites just discussed. These four sites are considered the next most likely potential sites due to considerations of space, infrastructure, and accessibility to fuel and transmission facilities. These sites are located in DeSoto, Brevard, Palm Beach, and Broward Counties. These sites are suitable for different capacity levels and technologies, and they will remain as potential sites pending future decisions on how best to meet the timing and magnitude of FPL's future capacity needs.[6]

Each of these potential sites offers advantages and disadvantages relative to engineering considerations and/or costs associated with the construction and operation of feasible technologies. In addition, each potential site has different characteristics which could require further definition and attention. For purposes of estimating water usage amounts, it is assumed that a natural gas-fired combined cycle unit would be the technology of choice for any capacity additions at the sites.

Permits are presently considered to be obtainable for all four sites, assuming measures can be taken to mitigate any particular site-specific environmental concerns. None of the sites exhibit any significant environmental constraints. The potential sites are briefly discussed below. (Note: The order in which the sites are discussed below does not reflect a relative ranking of these sites.)

[6] As has been described in former Ten-Year Power Plant Site Plans, FPL also considers a number of other sites as possible sites for future generation additions. These include the remainder of FPL's existing generation sites as well as non-FPL-owned sites located in Hardee, DeSoto, Highlands, Glades, and Hendry Counties.

Potential Site #1: DeSoto Site, Desoto County

This 13,468-acre site, located in north central DeSoto County, is largely owned by FPL. Highway access to the site is by a two-lane arterial highway, US 17. The site is located adjacent to an abandoned rail line. There are currently no existing power plant facilities on the site.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Desoto site is found in the Appendix.

b) and c) Land Uses and Environmental Features

The site is located near the Peace River. Existing land use is predominantly agricultural with crop and pastureland over the majority of the site. Remnants of non-forested wetlands, surrounded by shrub and brushland, are scattered throughout the site. There are also small areas of hardwoods, mostly oaks, along small streams and closer to the river. Adjacent land uses consist of citrus operations and pasture land with remnants of forests and brush, again largely along water courses.

d) and e) Water Quantities and Supply Sources

FPL has projected an average water use of up to 130 gallons per minute (gpm) for industrial processing (boiler makeup and service water needs). In addition, it is estimated that up to 4,800 gpm will be needed for industrial cooling purposes. Water needs for other uses, such as domestic, irrigation, etc., are estimated at 5 gpm.

It is expected that all water needs for the DeSoto site would be met using groundwater as the source. However, FPL would evaluate all available alternative sources of water to meet the expected needs of the site, including, among others, the use of shallower aquifers (surficial and intermediate), nearby surface waters, or reclaimed wastewater.

FPL is aware that this site is located within the Southern Water Use Caution Area (SWUCA)

established by the Southwest Florida Water Management District (SWFWMD). Since any new withdrawals from the Floridan aquifer within the SWUCA will be greatly restricted in the future, this plant site would require careful planning and early coordination with the SWFWMD. As such, FPL would need to evaluate alternative sources of water to meet the expected needs of the site including, among others, the use of shallower aquifers (surficial and intermediate), reclaimed waste water, and the transfer of existing water use permits.

Potential Site #2: Cape Canaveral Plant, Brevard County

The site is located on the FPL Cape Canaveral property in unincorporated Brevard County. The city of Port St. John is located less than a mile away. The site has direct access to a four-lane highway, US 1, and barge access is available. A rail line is located near the plant. The existing facility consists of two 400 MW (nominal) steam boiler type generating units.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Cape Canaveral plant site is found in the Appendix.

b) and c) Land Uses and Environmental Features

This site is located on the Indian River. The land is primarily dedicated to industrial use with surrounding grassy areas and a few acres of remnant pine forest. The land adjacent to the site is dedicated to light commercial and residential use. There are no significant environmental features on the site.

d) and e) Water Quantities and Supply Sources

FPL projects that an increase of up to 260 gpm would be required for industrial processing use (boiler makeup, service water, etc.). It is expected that industrial cooling water needs could be met using the current 550,000 gpm once-through cooling water quantity. For industrial processing, FPL would use existing on-site wells. For industrial cooling, the Indian River would

continue to be utilized

Potential Site #3: Riviera Plant, Palm Beach County

This site is located on the FPL Riviera Plant property in Riviera Beach, Palm Beach County. The site has direct access to a four-lane highway, US 1, and barge access is available. A rail line is located near the plant. The facility currently houses two operational 300 MW (nominal) steam boiler generating units and one retired 50 MW generating unit.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Riviera plant site is found in the Appendix.

b) and c) Land Uses and Environmental Features

The land on the site is primarily covered by the existing generation facilities with some open maintained grass areas. There is a small manatee viewing area on the site which is operated seasonally by FPL. Adjacent land uses include port facilities and associated industrial activities as well as light commercial and residential development. The site is located on the Intracoastal Waterway near the Lake Worth Inlet.

d) and e) Water Quantities and Supply Sources

Additional industrial processing water needs are estimated to be up to 40 gpm. Industrial cooling water needs are estimated to be up to 54,000 gpm using the existing once-through cooling water system. The existing municipal water supply would be used for industrial processing water if additional generating capacity is placed at Riviera. For once-through cooling water, FPL would continue to use Lake Worth as a source of water.

Potential Site #4: Port Everglades Plant, Broward County

This site is located on the 94-acre FPL Port Everglades plant site in Port Everglades, Broward County. The site has convenient access to SR 84 and Interstate 595. Currently, direct barge access is not available. A rail line is located near the plant. The existing plant consists of 4 steam boiler generating units: two 200 MW (nominal) and two 400 MW (nominal) sized units.

a) U.S. Geological Survey (USGS) Map

A USGS map of the Port Everglades plant site is found in the Appendix.

b) and c) Land Uses and Environmental Features

The land use on the site is primarily industrial. The adjacent land uses are port facilities and associated industrial activities, oil storage, cruise ships, and light commercial.

d) and e) Water Quantities and Supply Sources

FPL estimates that up to 130 gpm of industrial processing water would be required for uses such as boiler makeup, fogger usage, and service water. FPL would expect to use the existing municipal water supply for industrial process water. For cooling water, FPL would anticipate that the existing 320,000 gpm once-through cooling seawater source would continue to be used.