Energy

LIST OF FIGURES

ENERGY TRENDS AND CONDITIONS

INTRODUCTION AND OVERVIEW

The Energy Element includes information about energy use, available energy sources and recommendations to help Northeast Florida become more energy independent. Energy independence is vitally important for national security and economic stability because of our reliance on fuel imported from other nations and sources of energy that have become increasingly scarce and costly to obtain. Ways to achieve energy independence include: conserving energy; using energy efficiently; utilizing renewable and alternative energy sources; and utilizing local resources. It should be noted that there are objectives with no policies in this element. This is the case when it is not yet clear what role NEFRC will have in the implementation of the objective.

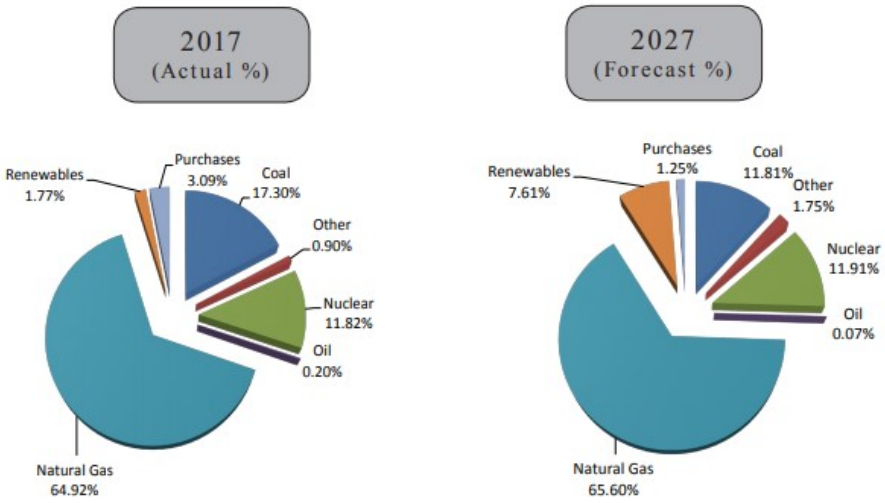
ENERGY IN THE STATE OF FLORIDA

The State of Florida has its concerns and responsibilities toward energy, which stems from the following facts:

a. Florida's energy usage is in part for transportation and electric power generation
b. Florida depends on petroleum, ranking fourth in all states
c. Florida is one of the nation's largest net fossil fuel consumers

As shown in the chart in Figure 1, the main source of energy in Florida is currently natural gas. Natural gas will continue to be Florida's main source of energy in the future.

Figure 1: Florida Energy Consumption Estimates 2017



Source: FRCC 2018 Regional Load & Resource Plan

Energy resources and infrastructure are critical to Northeast Florida's ability to expand, diversify, and compete economically. This energy document is divided into two sections. The first discussion relates to power and electric generation. The second discussion relates to transportation energy.

STRATEGIC ISSUE: POWER ALTERNATIVES AND RESILIENCY

The following discussion provides an overview of energy sources being utilized throughout the region. The energy sources included are electricity and natural gas. These may be considered traditional energy sources. Later discussion relate to other sources including nuclear power and renewable energy.

Electricity

There are nine providers of electricity within Northeast Florida. They are:

Jacksonville Electric Authority (JEA) - JEA is the eighth largest municipally-owned electric utility in the United States in terms of number of customers. JEA's electric service area covers all of Duval County and portions of Clay and St. Johns Counties. JEA's service area covers approximately 900 square miles and serves more than 420,000 electric customers. JEA operates five coal-fired power plants in the Northeast Florida Region.

Florida Power & Light (FPL) – FPL is an investor-owned electric utility company that services portions of Northeast Florida. FPL is the largest electric utility in Florida and

serves approximately 4.5 million customers in Florida. Florida Power and Light operates a steam generation plant in Putnam and St. Johns Counties.

Clay Electric Cooperative - The Clay Electric Cooperative covers most of Clay and Putnam Counties, the southern half of Baker County, and a southwestern portion of Duval County.

Beaches Energy Services - Beaches Energy powers more than 35,000 customers throughout Jacksonville Beach, Neptune Beach, Ponte Vedra, and Palm Valley. The utility has a non-generating power plant at Jacksonville Beach.

Seminole Electric - Seminole Member Cooperative includes Clay Electric Cooperative. The Seminole Generation Station (SGS) Units 1 and 2 are 650 MW coal-fired units located five miles north of Palatka in Putnam County. SGS Unit 3 is a 750 MW coal-fired electrical generating unit located near Units 1 and 2.

Duke Energy Florida – Serves the southwestern portion of Flagler County. Progress Energy merged with Duke Energy in July 2012. The new Duke Energy is the largest regulated utility in the U.S., with approximately seven million customers across six states.

Florida Public Utilities - Florida Public Utilities (FPU) provides natural gas, propane and electric service to homes and businesses throughout Florida. In Northeast Florida, FPU covers the eastern half of Nassau County.

Green Cove Springs Electric Utility - The City of Green Cove Springs began providing electric power to its citizens and the surrounding community in 1907. Now over 100 years later, the Public Power Utility continues to provide service to the City of Green Cove Springs and a surrounding customer base in Clay County. The utility has a non-generating power plant in Green Cove Springs.

Okefenoke Rural Electric Membership Corporation (REMC) - The Okefenoke REMC covers the western half of Nassau County and the northern half of Baker County. REMC is an electric cooperative powering more than 35,000 residential consumer-member, commercial and industrial accounts in southeast Georgia and northeast Florida

Investor-Owned Electric Utilities

Figure 2 depicts the number of customers served by Florida Power and Light, Duke Energy Florida, and Florida Public Utilities Corporation. These are the three investor-owned utilities that operate in the Northeast Florida Region. The numbers included in the table account for customers in the entire service area of the utility corporation, not just in Northeast Florida. Investor-owned utilities are those that generate power and sell. Municipals and cooperatives are non-generating companies that purchase power.

Figure 2: Investor-Owned Utility Customers

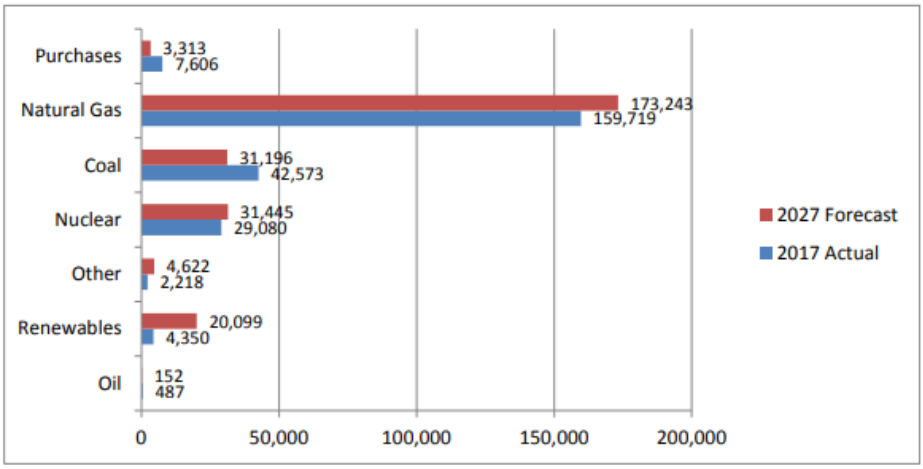
UTILITY	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER	TOTAL
Florida Power & Light Co.	4,338,224	547,908	11,654	4,085	4,901,871
Duke Energy Florida	1,677,197	179,206	2,135	27,029	1,885,567
Florida Public Utilities Co.	24,575	4,409	2	3,006	31,992

Source: Facts and Figures of the Florida Utility Industry, Florida Public Service Commission, 2019

Natural Gas

Northeast Florida utilities get a portion of power from natural gas. The region is dependent on two natural gas distribution systems, the Florida Gas Transmission Pipeline, which traverses Clay, Duval, and Nassau Counties, and the Southern Natural Gas Pipeline, which traverses Baker and Nassau Counties. A municipal and a gas district are located in Putnam County. The Peoples Gas System is an investor-owned company in Nassau, Duval, and Clay Counties. Much of the natural gas supplied to this Region come from the Gulf Coast states. The natural gas pipelines in this Region are energy resources of Regional significance. Natural gas will continue to be an important energy resource for Florida.

Figure 3: State of Florida - Energy Sources



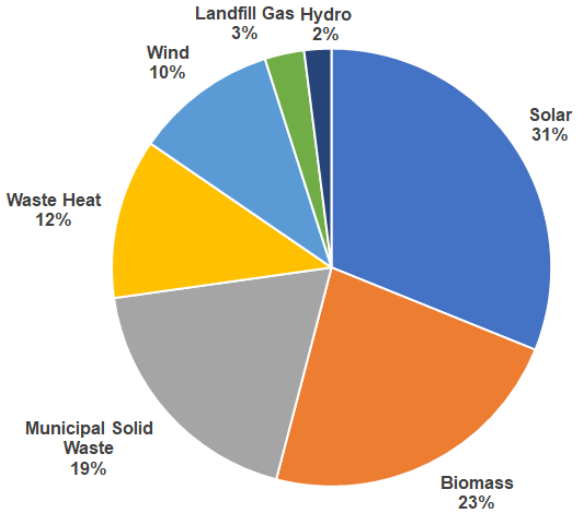
FRCC 2018 Regional Load & Resource Plan

Other Sources of Energy

This section provides an overview of solar, wind, biomass, biofuel, and other renewable energy sources available to utilities in Northeast Florida. While there are other providers and distributors of energy to the Region, JEA and Seminole Electric are the only producers of electricity in this Region. Therefore, when applicable, the following section focuses on

these two utility generators and their programs related to alternative sources. Seminole Electric does not have any alternative fuel sources in this Region.

Figure 4: Renewable Energy Sources in Florida



Source: FPSC's Review of 2018 Ten-Year Site Plans for Florida's Electric Utilities, November 2018

Based on the trends for electric energy sources for Northeast Florida it can be stated that the Region is not diverse in fuel sources and has a disproportionate dependency on coal to generate the Region's electricity. The Region is in its early stages of alternative fuel source development.

There are several alternative energy sources being utilized in Northeast Florida:

Solar - Solar photovoltaic (SV) may be high in price initially and require large installations but there are no fuel costs and the carbon emissions are generally non-existent. A utility must consider the costs and benefits. Recent years have seen increased development of solar generating facilities in Northeast Florida. JEA purchased a power agreement with Jacksonville Solar, LLC to provide energy from a 15.0 MW DC-rated solar farm. JEA expanded universal solar by contracting with eight new solar installations, increasing installed solar by 350 percent, and launched the JEA SolarSmart program that allows customers to choose to have up to 100 percent of their power come from solar. JEA was also recognized by T&D World for leadership in integrating intermittent renewable energy resources without compromising power quality and reliability. JEA also has one of the largest solar PV systems in the Southeast at the Jacksonville International Airport. In addition, JEA has provided incentives for over 400 solar domestic hot water systems. Florida Power & Light is close to completion of a solar generating facility in Baker County, with two more proposed as of August, 2020.

Landfill - This energy source is predominantly methane collected from landfills. JEA owns three internal combustion engine generators that are fueled by the methane gas produced by the landfill. JEA also receives landfill gas from the Northside landfill, which is fed to the Northside Generating Station and is used to generate power at Northside Unit 3.

Wind - JEA purchases 10MW of wind capacity from Nebraska Public Power District (NPPD) and in turn the NPPD buys back the energy at specified on/off peak charges. JEA and other utilities receive federal environmental credits associated with green projects.

Biomass - Biomass is material collected from wood processing, forestry, urban wood waste, agricultural waste, and other plant and biological sources. JEA continues to conduct research and evaluate the feasibility of this energy source.

Nuclear - In March 2008, JEA approved the policy of pursuing nuclear energy partnerships with the goal of providing ten (10%) percent of JEA's power from nuclear sources. In June 2008, JEA entered into a purchase power agreement with the Municipal Electric Authority of Georgia (MEAG) for a portion of MEAG's entitlement to the Vogtle Units 3 and 4, new nuclear units proposed to be constructed at the existing Plant Vogtle located in Burke County, Georgia.

STRATEGIC ISSUE: MOTOR FUEL ALTERNATIVES AND RESILIENCY

The following discussion provides an overview of energy sources being utilized throughout the region for transportation related needs. The energy sources included in the following discussion are petroleum, gasoline, natural gas, biofuels and electric vehicles.

Introduction and Overview

Affordable transportation of people and goods is vital to economic health. When the price of oil rises, the U.S. suffers as costs for transportation, food, and other goods increase. Because 95% of the country's transportation is powered by oil, few options are available when prices jump, causing the nation's welfare to be dependent upon the whims of the global oil market. Supply disruptions, or even the threat of disruption in the Middle East or elsewhere can cause price shifts that cost consumers and industries billions of dollars.

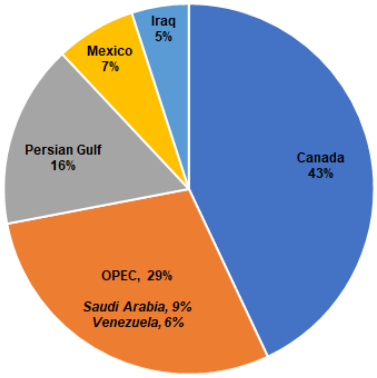
The North Florida Clean Cities Coalition is working to bring more viable alternative fuels and energy-efficient vehicles to this Region. This non-profit organization serves business, government, and non-profit agencies in Baker, Clay, Duval, Nassau, Putnam, and St. Johns

Counties. The Coalition advocates using alternative fuels and advanced vehicle technologies to achieve a triad of missions: reduce dependence on imported petroleum, develop Regional economic opportunities, and improve air quality.

Petroleum

Petroleum provides nearly forty (40%) percent of total U.S. energy demand and the transportation sector uses seventy (70%) percent of all petroleum in the U.S.

Figure 5: Sources of US Oil Imports 2018

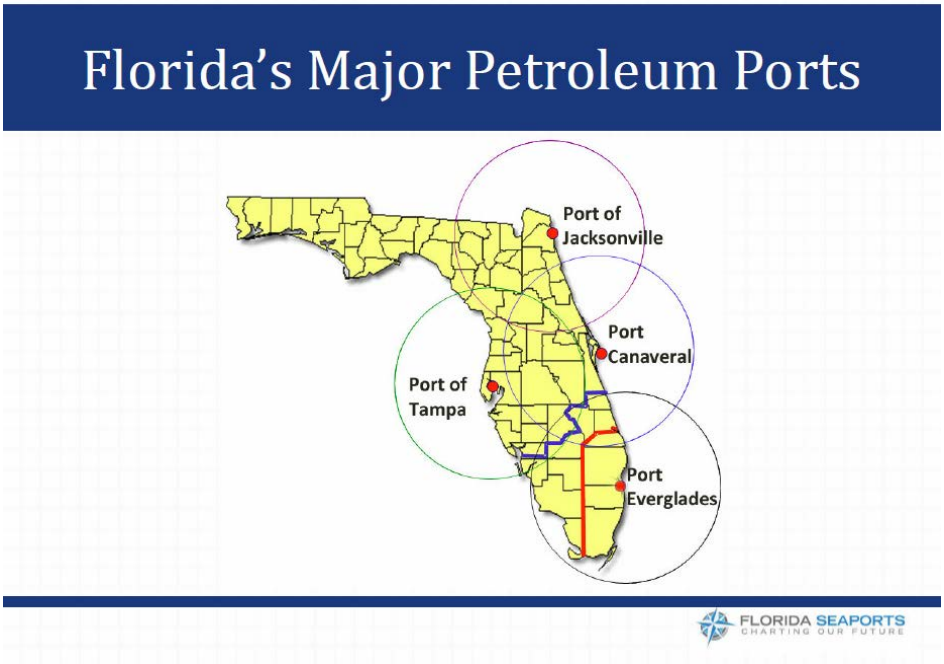


Source: U.S. Energy Information Administration, October 2018

The United States imports a large amount of the oil it consumes. The U.S. imports forty-three percent (43%) of its oil from Canada and twenty-nine percent (29%) from OPEC. The U.S. Government Accountability Office reports that oil production will likely peak by 2040.

The State of Florida has four (4) major petroleum ports that are identified in Figure 6 below. The Port of Jacksonville is one of Florida's major petroleum ports.

Figure 6: Florida's Major Petroleum Ports



Source: Florida's Seaports

Other Sources of Motor Fuels

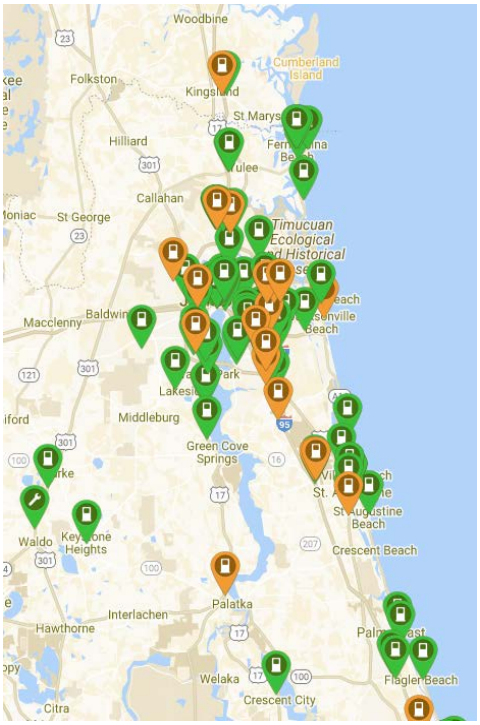
Natural Gas - Natural gas is an attractive transportation fuel because it burns cleaner than other fossil fuels. Natural gas vehicles produce up to thirty (30%) percent less greenhouse gas emissions than comparable gas or diesel vehicles. According to the American Public Transit Association, alternative fuels powered more than half of all U.S. transit buses in 2018. Between 2008-2018, the share of conventional diesel buses dropped from 70% to 42%. According to the U.S. Department of Energy, natural gas powers more than 175,000 vehicles in the United States and roughly 23 million vehicles worldwide. Domestic natural gas production is predicted to grow in the coming decades, reducing the need for natural gas imports. Shale gas is expected to be the largest source of natural gas in the future, accounting for nearly fifty (50%) percent of total U.S. natural gas production in 2035, compared to 16 percent in 2009. Depending on vehicle size and type, natural gas vehicles can provide better fuel efficiency, lower operating costs, and reduced emissions compared to conventional fuels. They emit fewer harmful greenhouse gas pollutants (i.e. carbon dioxide, methane, nitrous oxide and fluorinated gasses).

Biofuels – Biofuels are projected to become a larger portion of the nation's fuel supply in the coming years. Biofuels can be produced from plants, algae, agricultural waste, food waste, municipal solid waste, and other sources. Ethanol and biodiesel are the two most

common types of biofuel produced in the U.S. In this Region, St. Johns County has a biodiesel fuel program. Residents can bring used cooking grease to five collection points to be recycled into biodiesel fuel. At the Federal level, the policy is to look into ethanol. However, this Region does not produce any ethanol as a fuel source.

Electric Vehicles - Electric vehicles (EVs) are becoming more popular nationally due to incentives, advanced motor and battery technologies, higher gasoline prices, and environmental concerns. Electricity prices fluctuate far less than oil prices, so increased reliance on electricity for transportation could help make transportation costs more predictable and reduce the negative economic effects of oil price fluctuations. Electric vehicles themselves have zero emissions, although generating the electricity to power the vehicle may produce emissions. Depending on where the EV is charged, its power will come from a varying mix of coal, natural gas, nuclear and renewable energy. The dominant source of electrical generation in Northeast Florida is dependent on coal. Electric or hybrid vehicles are charged with charging units that can be installed at home, the workplace, or in public areas. Electric vehicle charging stations have become increasingly more visible throughout the region over the past decade. In 2014, there were only eight public charging stations in the region. Since that time, there has been a significant increase in public charging stations located throughout Northeast Florida. Figure 7 depicts the number of public charging stations located in various locations across north and central Florida.

Figure 7: Number of Public Charging Stations



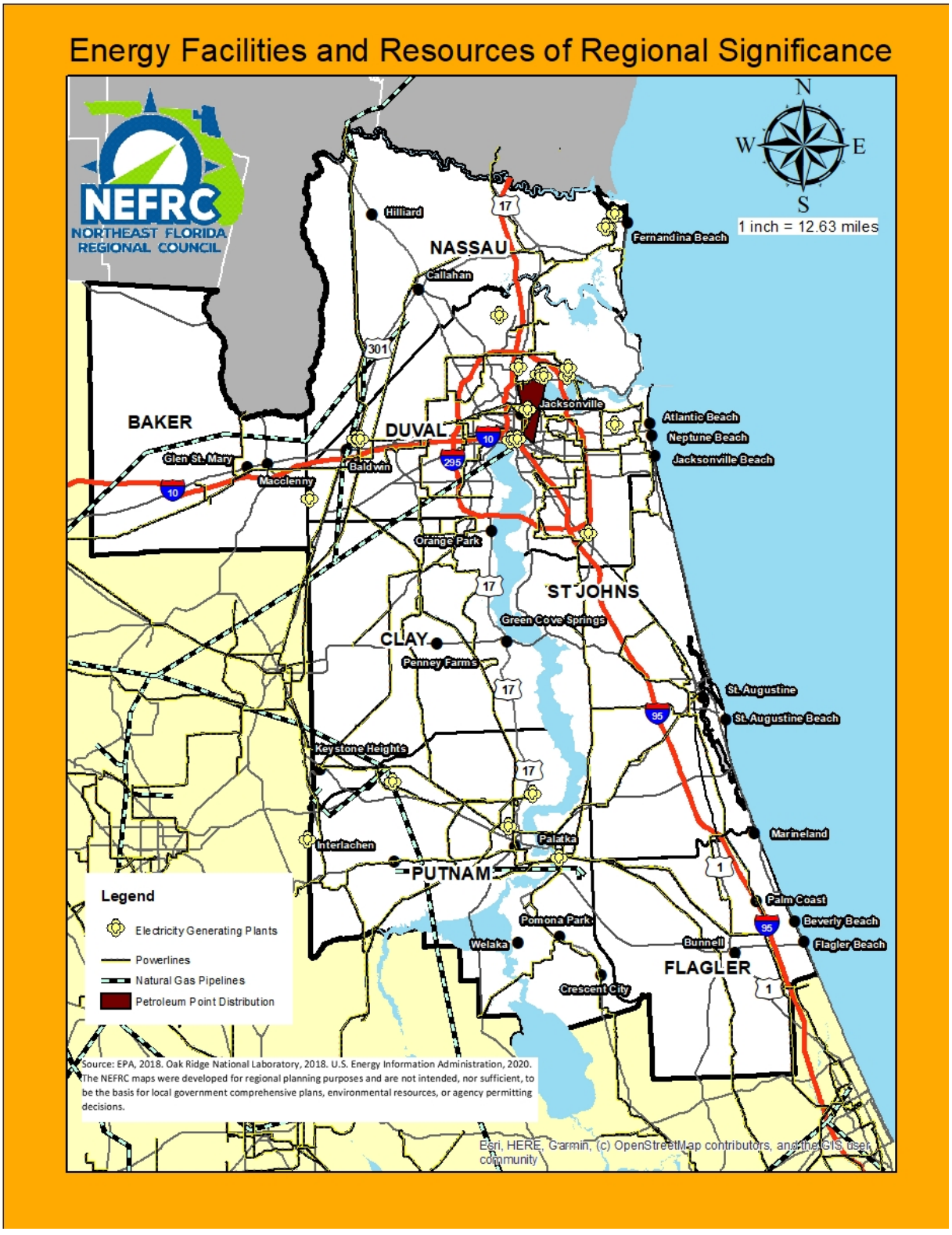
Source: plugshare.com

REGIONALLY SIGNIFICANT RESOURCES AND FACILITIES

The Energy Resources of Regional Significance map shows the natural gas pipelines, the major electric transmission lines as defined by 403.522 F.S., and the power generation plants in the Northeast Florida Region. There are two pipelines, the Southern Natural Gas and the Florida Gas Transmission pipeline. There are six power plants, five JEA plants, all in Duval County and one Seminole Electric Plant in Putnam County. Pipelines, distribution facilities, power generation sites, and major transmission

lines are of Regional significance. The map is just an illustration and may not include all such resources or facilities.

Resources of Regional Significance: Energy Facilities And Resources



GOALS, OBJECTIVES AND POLICIES

Goal: A region that is flexible, innovative and takes full advantage of the diversity of potential energy sources, especially local sources. We will not wait for federal or state guidance or mandates to act if action can benefit the region. We acknowledge that, as a region vulnerable to natural disasters, resiliency and redundancy in energy, both in motor fuel and power, can set us apart from regions that choose not to address these issues that can be of large impact to business and residents.

Pillar: Infrastructure and Growth Leadership

OBJECTIVE: A REGION THAT CAPITALIZES ON ITS REGIONAL STRENGTHS, WHERE ENERGY IS RELIABLE, AVAILABLE, AND ABUNDANT

OBJECTIVE: A FOCUS ON WHAT WORKS FOR NORTHEAST FLORIDA TODAY, WITH STRATEGIES THAT ARE FREQUENTLY RE-EXAMINED TO ADDRESS CHANGE

OBJECTIVE: REDUCED DEPENDENCY ON FOREIGN OIL

OBJECTIVE: PRIORITIZED AND INCENTIVIZED ENERGY INVESTMENTS

OBJECTIVE: A REGION THAT USES A DIVERSITY OF ENERGY SOURCES, INCLUDING RENEWABLES

Policies

Policy 1: NEFRC gathers best practices and connects communities with strategies and practitioners that can help address their issues within the context of the aspirational goals of First Coast Vision. Convening to share experiences and discuss solutions is an important part of this approach.

Pillar: Infrastructure and Growth Leadership, SCP: 187.201(11)F.S.

OBJECTIVE: CONSISTENCY WITH THE STRATEGIC REGIONAL POLICY PLAN

Policy 2: NEFRC considers impacts to resources of regional significance and extra jurisdictional impacts as it reviews consistency with the SRPP. Local governments and proposers of projects should include best available data gathered using professionally

acceptable methodology in support of their proposals, sufficient to determine impacts. Where mitigation is proposed, using strategies outlined in local government policies or plans, the SRPP or a combination is encouraged.

Pillar: Infrastructure and Growth Leadership, SCP: 187.201(15)(a)

ENERGY MEASURES

Northeast Florida Greenhouse Gas *GHG) Emissions 2017 (Metric Tons)

LOCATION	VEHICLES	NATURAL GAS	ELECTRICITY	TOTAL GHG EMISSIONS
Jacksonville, Duval County	5,879,770	869,755	5,107,309	11,856,834
Fernandina Beach, Nassau County	94,730	66,420	140,971	302,121
Palatka, Putnam County	48,504	42,495	203,411	294,410
St. Augustine, St. Johns County	78,824	817	116,828	196,469
Bunnell, Flagler County	33,707	328	26,778	60,813
Green Cove Springs, Clay County	25,544	1,334	31,270	58,148
Macclenny, Baker County	16,609	310	37,246	54,165

Source: https://www.eere.energy.gov/sled/#/

Electricity Sales to Customers

UTILITY PROVIDER	MEGAWATTS
Green Cove Springs (Clay)	108,398
Beaches Energy Services	690,398
JEA (Clay, Duval, St. Johns)	12,325,781
Clay Electric (Baker, Clay, Duval, Flagler, Putnam)	3,316,392
Okefenokee (Baker, Nassau)	167,127
*Florida Power and Light	110,053,141
*Florida Public Utilities	634,763
*Duke Energy Florida	39,144,651

Source: Florida Public Service Commission, 2018 Statistics of the Florida Electric Utility Industry

***Includes customers outside of Northeast Florida**

2018 Northeast Florida Power Generation Site Fuel Sources

JEA

FUEL SOURCE	PERCENTAGE
Natural Gas	48%
Coal	22%
Purchases	18%
Petroleum Coke	12%
Oil	0%

Source: 2018 JEA Annual Report

SEMINOLE ELECTRIC | UNITS 1 & 2 IN PUTNAM COUNTY

FUEL SOURCE	PERCENTAGE
Bituminous Coal and Petroleum Coke	100%

Source: Seminole Ten Year Site Plan