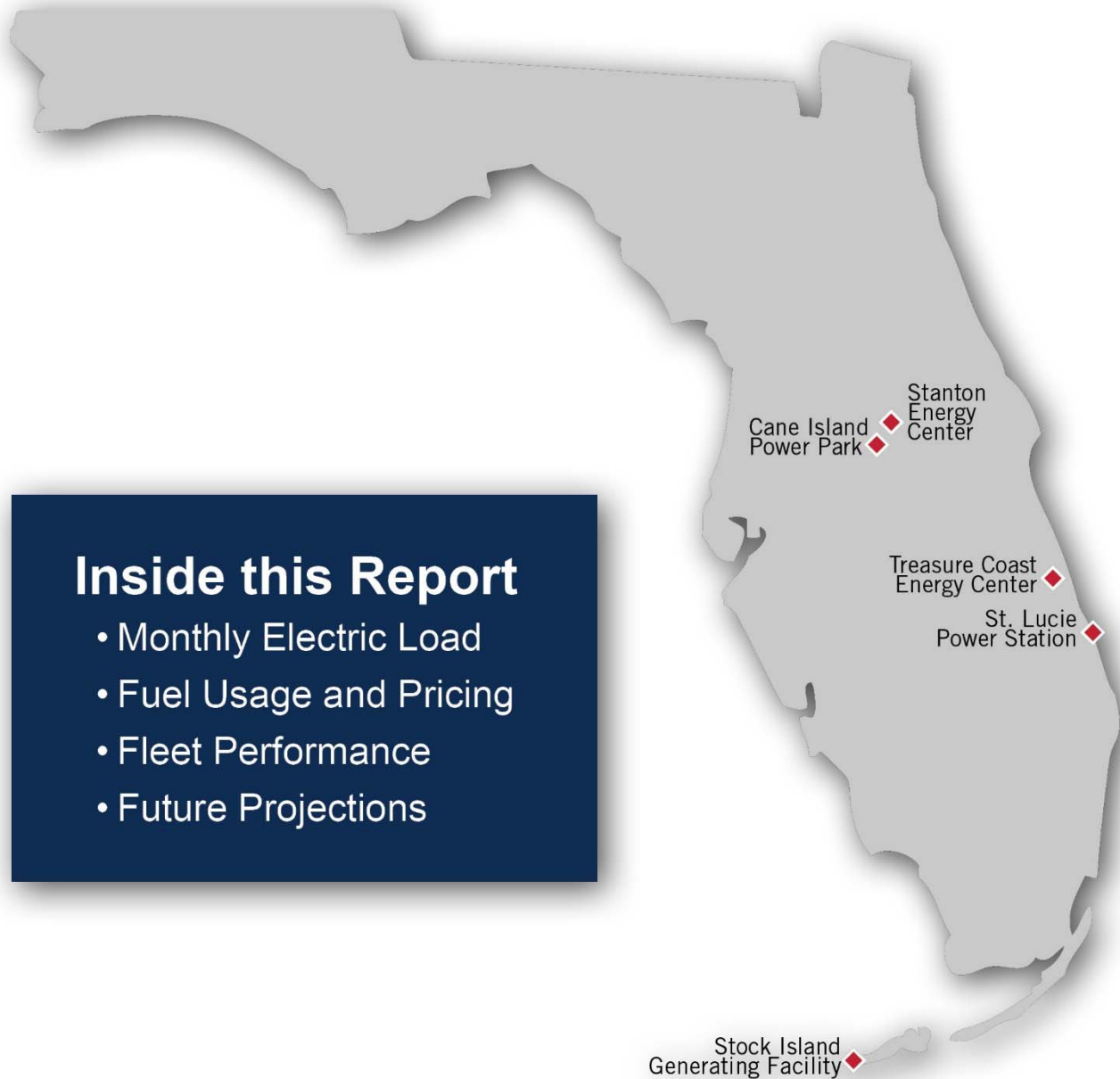


# 3 Phase Times



## Inside this Report

- Monthly Electric Load
- Fuel Usage and Pricing
- Fleet Performance
- Future Projections

FMPA Power Resources  
Operations Performance Report  
March 2019



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## **About this Report**

This monthly report provides information about the All-Requirements Project's (ARP) system peak, hourly loads, resource fuel mix, natural gas usage, natural gas pricing and more performance information. For analysis purposes, results are a comparison of the actual and the budgeted data.

Questions about this report may be directed to FMPA's System Operations Manager, Joe McKinney at [joe.mckinney@fmpa.com](mailto:joe.mckinney@fmpa.com) or 407-355-7767.

# EXECUTIVE SUMMARY

Load		Natural Gas	Fleet Dispatch	Fleet Performance (Base Load)	
ARP Peak MW	Load Factor	Average Daily Price per MMBtu	Average Energy Costs per MWh*	EAF	NCF
900	63%	\$2.67	\$24.26	99%	73%

\*Does not include fixed costs included in FMPP's ARP demand rate.

## March Highlights

- ARP delivered Net Energy for Load was 424 GWhs, which was 1% below the forecast due to mild weather. Average temperatures were above normal in Orlando and across most of Florida, which in a winter/spring month reduces heating load and results in milder overall conditions.
- The average ARP natural gas price was \$2.67 per MMBtu, which is approximately \$0.22 (8%) below budget – this \$0.22 difference corresponds to about \$1.63 /MWh. The average energy cost of ARP generation excluding nuclear and purchases was \$24.26 /MWh and the average heat rate of the ARP's generating units (gas, coal and oil) was 7,408 Btu/kWh.
- The ARP's generation mix to supply ARP load and all sales was 81.7% natural gas, 11.7% coal, 6.6% nuclear<sup>1</sup> and <1% FMPP purchases. Natural gas-fired generation (MWhs) produced 10% more output than budgeted, due to increased sales to the Florida Municipal Power Pool ("FMPP", or "pool") driven primarily by adjusted FMPP outages and lower gas prices.
- The ARP gas fleet heat rate (7,191 Btu/kWh) and the ARP energy generation cost (2.87 cents/kWh or \$28.67/MWh) are among the lowest in the state for the calendar year to date through February (one-month data lag).
- The ARP sold 24% of its generation to the FMPP whereas the budget forecast 13%. This was due to increased gas generation as a result of unit outages. McIntosh 3 and Stanton 1 were offline most of the month. The Pool sales helped the ARP to offset production costs by \$0.35 per MWh.
- The ARP's base load units FYTD EAF is 91.2%. Treasure Coast was offline for a day and Stanton 1 has been offline since March 8 for a planned outage.
- The ARP supplied 56 MWhs to Bartow and 7,430 MWhs to Winter Park. The non-coincident Peak (NCP) supply for Bartow was 7 MWs. This reduced the ARP rate by \$0.14 and \$0.13 respectively.

<sup>1</sup>Nuclear is an Excluded Resource; therefore, from an operations perspective in meeting the ARP total load, a portion of the energy to serve load was from nuclear. However, from a rates perspective, there is no nuclear rate determinant in the ARP.

## ELECTRIC LOAD

The average temperatures in March were above normal in Orlando and across most of the state. ARP delivered Net Energy for Load was approximately 1% below the forecast due to the milder winter temperatures.

The All-Requirements Project (ARP) hourly peak load was 900 MW, which was 6% above the budget forecast. The ARP coincident peak occurred on March 11th, and was a cooling (afternoon) peak.

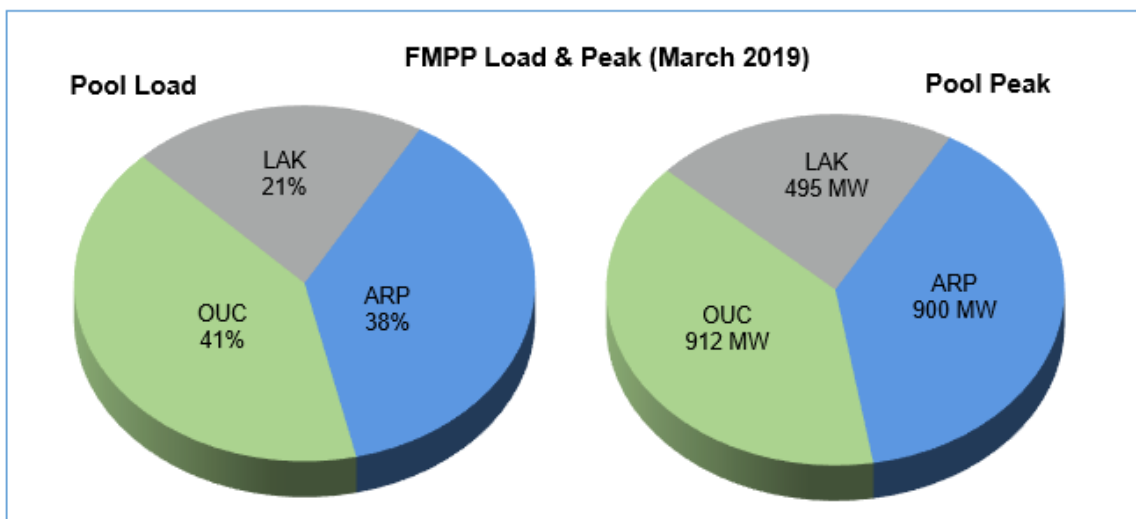
Table 1: ARP Actual and Budget Load

	Budget	Actual	Actual
	Mar-19	Mar-19	Mar-18
ARP Load (GWhs)	428	424	411
ARP Peak (MW)	848	900	846
Load Factor	68%	63%	65%

### Florida Municipal Power Pool Load

The chart below shows the ARP Net Energy for Load (NEL) and peak hourly load in relation to other FMPP member loads and peaks.

Chart 1: FMPP Member Loads and Peaks



Note: Network transmission losses are not included in the Pool load.

# NATURAL GAS

## Natural Gas Market Pricing

The average natural gas price for the FMPP dispatch was \$3.03 /MMBtu in March, which represents the market price for delivered gas (Table 2). The actual average natural gas price for the ARP was \$2.67/MMBtu, which is \$0.22 / MMBtu (8%) below budget (Table 3). Natural gas burn/usage was 14.5% more than budgeted.

Table 2: Monthly Average Platt's Gas Daily Index Prices

	Henry Hub Index	FGT Zone 3 Index	FMPP Dispatch
Natural Gas Market Prices	\$2.90	\$2.85	\$3.03

## Natural Gas Usage and Prices

Natural gas usage is the gas burned at Treasure Coast, Cane Island Units 1 – 4, Oleander 5 and FMPP's share of the Indian River CTs. The natural gas is delivered by FGU and reported by FGU.

Table 3: Natural Gas Price and Usage in March

	Budget March 2019	Actual March 2019	Actual March 2018
Natural Gas Cost (\$/MMBTU)	\$2.89	\$2.67	\$2.62
Natural Gas usage (MMBTU)	2,846,081	3,258,454	2,256,409

Table 4: ARP Natural Gas Price Comparison CY 2019 through End of February

CY 2019 through February	FMPP	FPL	DUKE	TECO
Natural Gas Cost (\$)	\$22,709,161	\$412,001,413	\$179,538,835	\$77,991,273
Generation from NG (MWH)	792,166	11,817,931	5,097,453	2,417,786
Gas Burned (MMBtu)	5,696,375	84,667,828	37,826,484	19,139,636
Gas cost (\$/MCF)	\$4.06	\$4.96	\$4.84	\$4.16
Gas cost (\$/MMBtu)	\$3.99	\$4.87	\$4.75	\$4.07
Heat Rate (Btu/kWh)	7,191	7,164	7,421	7,916
Generated Cost(cents/kWh)	2.87	3.49	3.52	3.23
Savings compared to Others		\$4,907,645.19	\$5,191,941.81	\$2,843,983.28

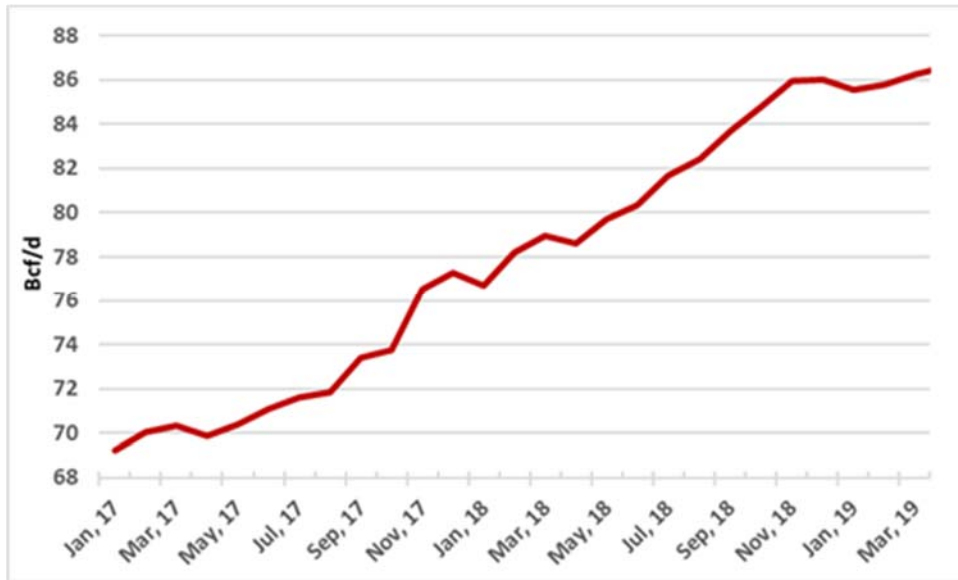
Source: IOUs data from Public Service Commission (PSC) filing

- FMPP's ARP gas fleet heat rate of 7,191 Btu/kWh is the among the lowest in the state for the calendar year to date through February (one-month data lag).
- The ARP's energy cost (including pipeline capacity costs) of 2.87 cents/kWh is the lowest in the state for the calendar year to date through February.
- FMPP's Natural gas cost includes the ARP gas cost and the gas cost of OUC assets as allocated to the ARP.

## Natural Gas production average

The following chart shows natural gas production in the U.S. over the past several years through March 2019. The total US natural gas production has increased significantly since the middle of 2017, with some levelling off over the past few months. This has been offsetting below average gas storage levels and had helped stabilize pricing. We expect natural gas pricing to remain flat in the near future due to impending LNG exports. FGU is projecting monthly average delivered Natural Gas pricing of around \$3.03 /MMBtu for the next several months.

Chart 2: Natural Gas Production Average



Source: U.S. Energy Information Administration (EIA)

## Natural Gas Pipeline Alerts

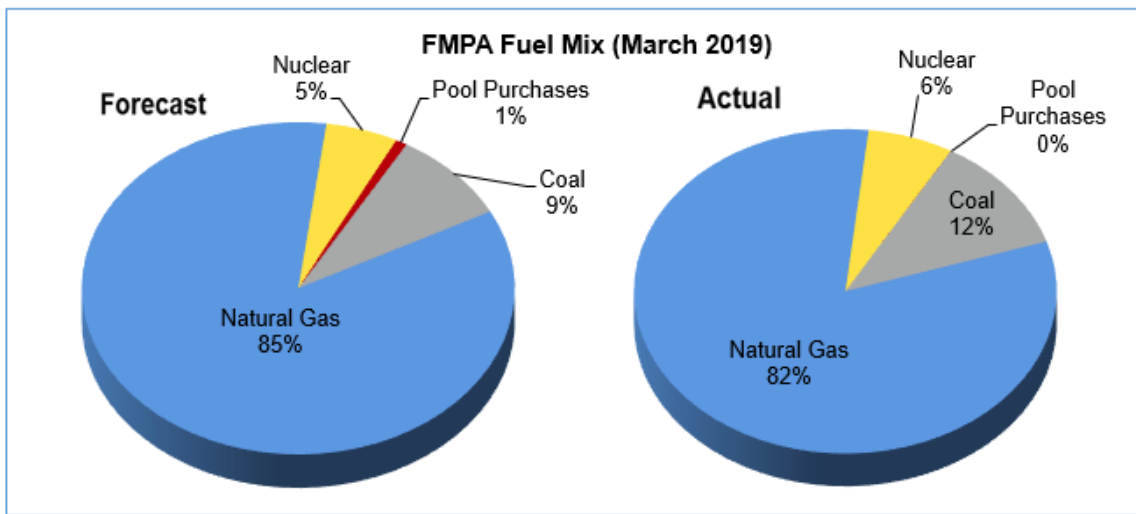
There were no alerts on the Florida Gas Transmission (FGT) or on the Gulfstream (GST) pipeline in March. This means there were no restrictions or constraints on the flow of natural gas to generation facilities. Pipeline alerts typically result from high gas demand caused by hot or cold weather in Florida and usually coincide with higher gas prices.

# FLEET DISPATCH AND POOL OPERATIONS

## Fuel Mix

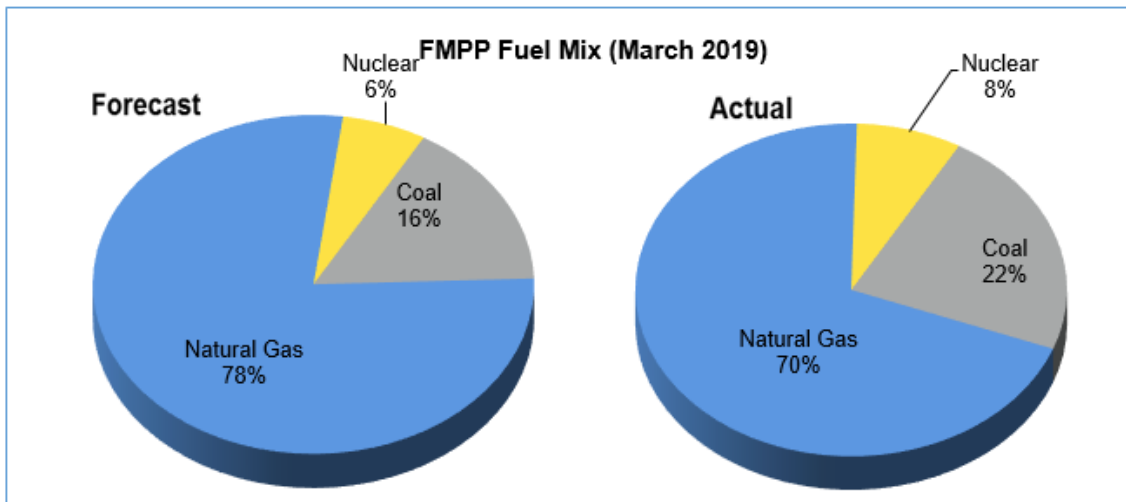
The ARP's natural gas-fired generation (MWhs) was 10% more than budgeted due to FMPP outages and lower gas prices. The budget forecast sales of 13% of the ARP's generation to the FMPP; the actual sales were 24% which provided a production cost offset to the ARP of about \$0.35 /MWh. The Pool generated 44% more from coal-fired units than budgeted.

Chart 3: FMPP Fuel Mix and Purchases for March 2019



NOTE: FMPP's fuel mix represents ARP generation and purchases to serve native load, losses, obligations and sales to the FMPP. Forecasted pool purchases are based on the 4-month forecast prepared by FMPP.

Chart 4: FMPP Fuel Mix for March 2019 (excludes purchases)



## FMPA Fleet Dispatch and Costs

Gas Fuel Burned in all FMPA ARP gas fueled resources is based on FMPP CHP data. Coal Fuel Burned represents the total fuel burned in operating Stanton 1 and 2 including the use of natural gas.

Table 5. ARP Fleet Dispatch Costs per MWh in March 2019

Fleet Operations	Fuel Burned (MMBtu)	Power Produced (MWh)	Heat Rate (Btu/kWh)	Fuel Cost (\$/MWh)	Variable O&M Cost (\$/MWh)	Variable Gen Cost (\$/MWh)
Gas	3,258,655	460,989	7,069	\$21.42	\$2.13	\$23.55
Coal	646,976	66,367	9,748	\$25.14	\$0.50	\$25.64
Oil	1,848	139	13,295	\$214.41	\$5.34	\$219.76
Nuclear	--	37,057	--	--	--	\$10.00
Purchases	--	58	--	--	--	\$30.14
Total/Ave Gen	3,907,480	564,610	--	--	--	\$24.26

## Power Pool Transactions

Net Generation to ARP includes all FMPA ARP fleet generation, plus pool purchases minus pool sales. Net generation, plus nuclear resources comprises all generation and resources necessary to supply ARP load, losses, and the Bartow and Winter Park obligations.

Table 6. ARP Pool Transactions for March 2019

Pool Transactions	Cost	Volume (MWh)	Average Price (\$/MWh)	Offset to ARP Costs	Offset to ARP Cost (\$/MWh)
FMPA Fleet Generation	\$12,796,091	527,495	\$24.26	--	--
Sales to FMPP*	\$2,607,028	125,579	\$20.76	\$139,444	--
Purchases from FMPP	\$1,748	58	\$30.14	--	--
Net Generation to ARP	\$10,190,811	401,974	\$25.35	\$139,444	\$0.35

\*Sales to FMPP include sales to Pool participants and third parties - Revenues are shown in red.



# POWER GENERATION FLEET PERFORMANCE

## FMPA Fleet Performance

TCEC was offline for a day due to two forced outage events, a steam turbine hydraulic leak and a steam turbine differential expansion issue. Cane Island Unit 4 was unavailable 1 hour for a maintenance outage to repair failed combustion drain tubing. Stock Island EP2 was in outage for troubleshooting CT's. Stock Island CT2 was in outage due to a coupling on the shaft for a radial exhaust fan. Stock Island CT4 was in outage for troubleshooting Turbine Compartment Motor 'B'. All units except EP2 are currently available. Stanton 1 was de-rated due to a control valve issue and a planned outage through the end of the month.

Table 7. FMPA ARP Generating Fleet Performance – March 2019

Unit	Capacity* (MW)	Heat Rate (Btu/kWh)	Equivalent Availability Factor	Capacity Factor	Notes
Treasure Coast	300	7,392	96.5%	64.0%	Outage
Cane Island Unit 4	300	7,458	99.9%	74.3%	Outage
Cane Island Unit 3	240	7,220	100.0%	81.4%	0
Cane Island Unit 2	109	0	100.0%	0.0%	0
Stanton A	122	7,658	100.0%	16.0%	0
Stanton 1	112	11,509	20.1%	12.0%	Outage
Stanton 2	102	9,992	100.0%	72.0%	0
St. Lucie	48	10,250	100.0%	98.7%	0
Peaking Units**	386	18,878	77.8%	0.3%	Outage

\*Capacity is Net Summer Capacity from the FMPA 10 Year Site Plan. \*\*Peaking Units include Cane 1, FMPA's share of Indian River CTs, Keys generation and Oleander 5.

Chart 5: Equivalent Availability Factor – FY 2019 YTD

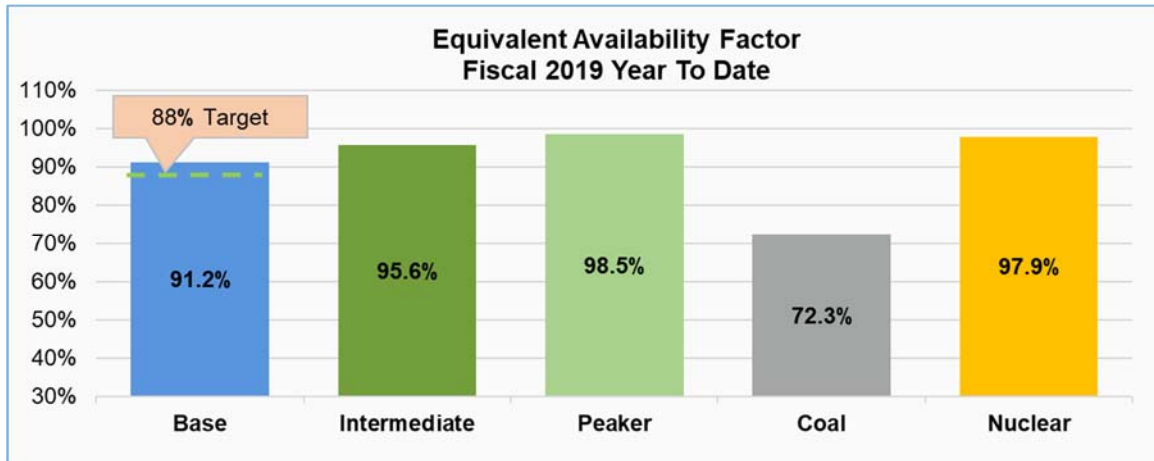
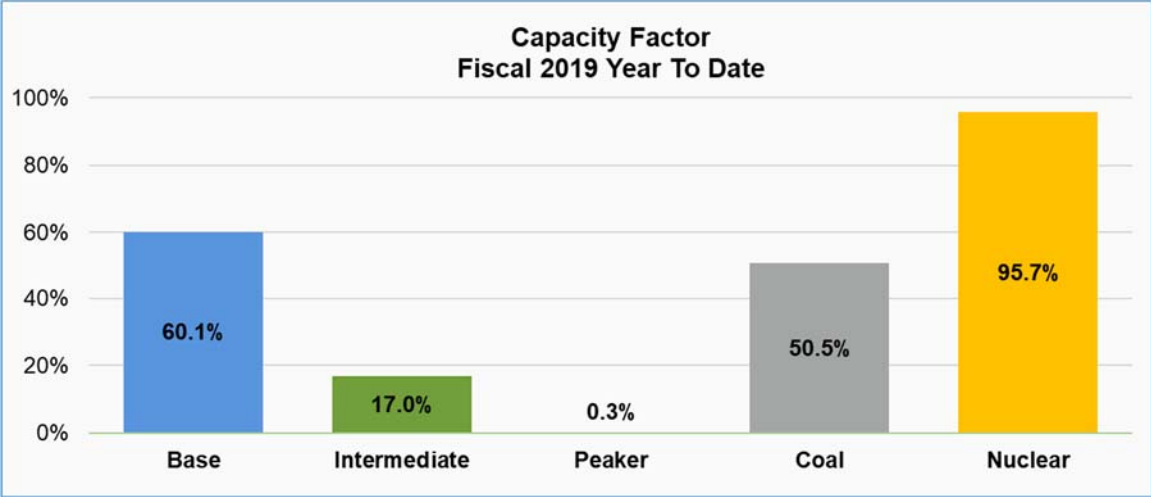


Chart 6: Capacity Factor – FY 2019 YTD



## MONTHLY WEATHER

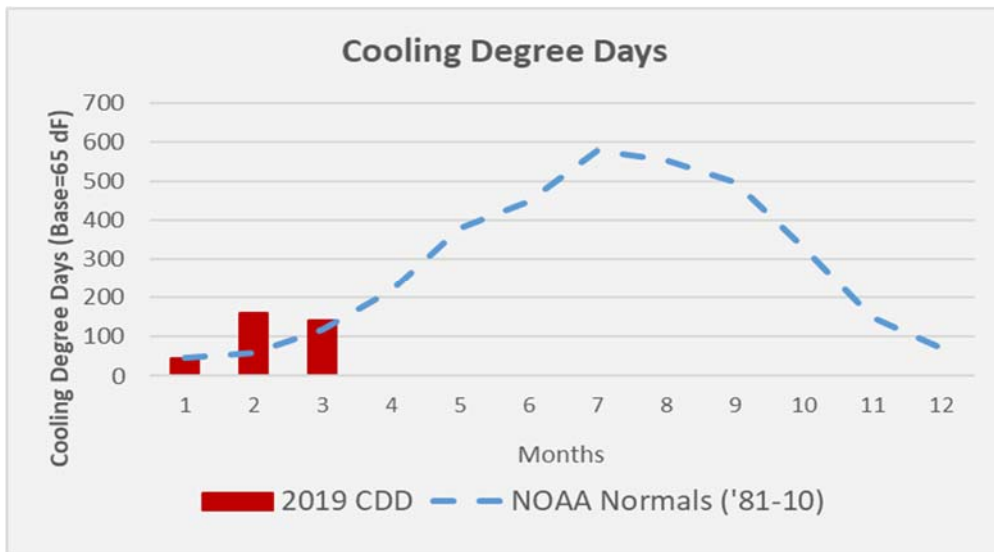
The average temperatures in March were above normal in Orlando (Table 8). Rainfall across most parts of the state was below normal. The cooling degree days were above normal in the Orlando area (Chart 8). Heating degree days were well below normal.

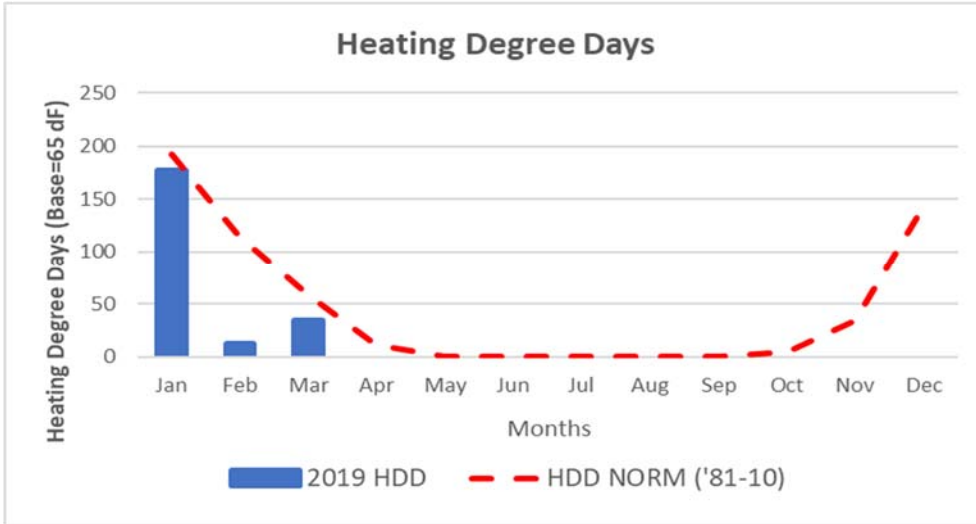
Table 8: Temperatures in Central Florida

Month	Average Temperature	Avg. High	Avg. Low
March-19	68.2	78.8	57.6
March-18	65.1	77.3	52.9
Historical Average*	66.9	78	55.8

\*Historical Average (30 years) Normal data from the National Oceanic and Atmospheric Administration (NOAA) monthly climate report for Orlando.

Chart 8: Cooling and Heating Degree Days in the Orlando Area (MCO)





Source: National Weather Service (NWS)

## PROJECTIONS FOR NEXT TWO MONTHS

### Weather Forecast

Temperatures in Florida are expected to be somewhat below normal in April and May. ARP natural gas usage in April is expected to be slightly higher than the annual ARP budget projections. This is due to an increase in gas generation over the budget forecast as a result of fuel pricing fluctuations, outage changes and the impact of firm sales in May.

Chart 9: Weather Forecast – April 2019

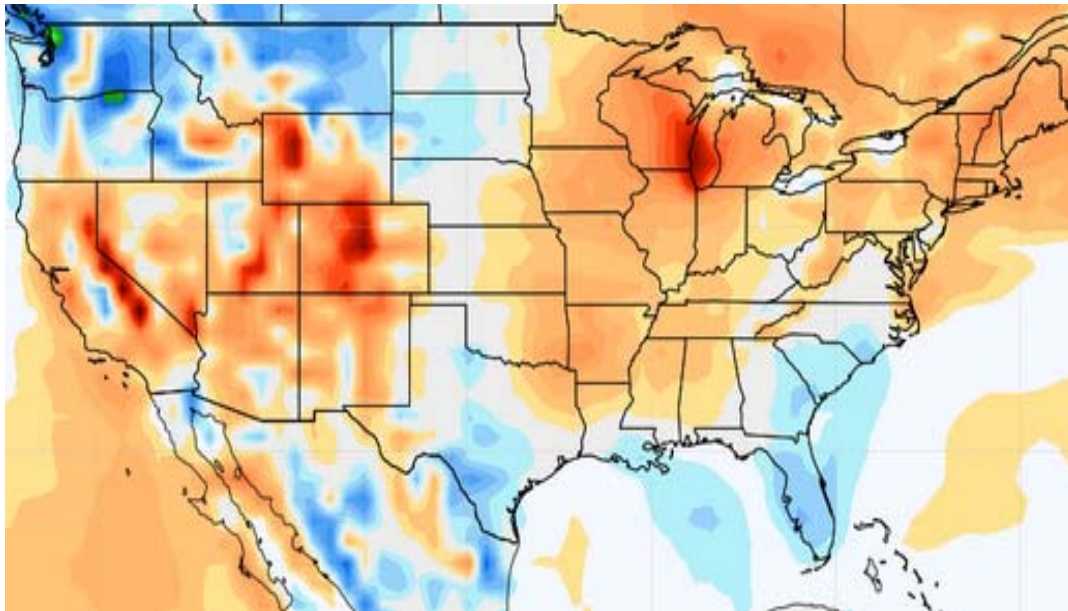
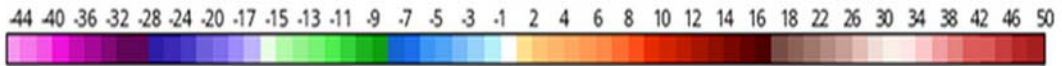
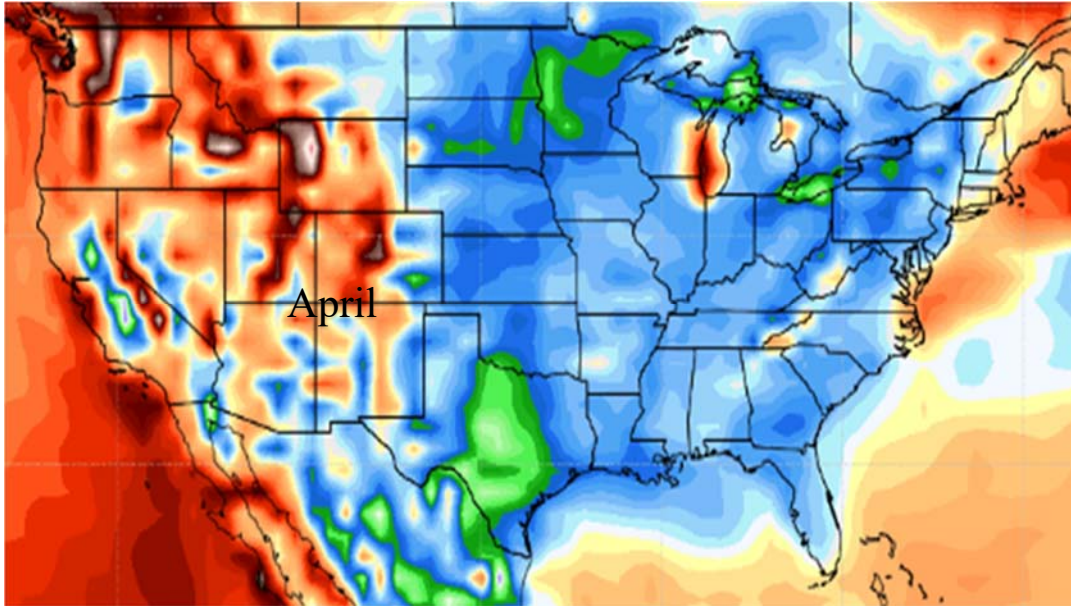


Chart 10: Weather Forecast – May 2019



Source: National Centers for Environmental Prediction (NCEP)

## Load Projections

All load projections are based on the FY 2019 ARP budget load forecast.

Table 9. Load Projections

	April		May	
	Peak (MW)	Load (MWhs)	Peak (MW)	Load (MWhs)
FMPA	956	441,053	1,099	513,851
FMPP	2,751	1,313,419	2,946	1,526,661

## Natural Gas Usage Projections

Natural gas usage and pricing projections are shown in Table 10. We are expecting the actual natural gas prices to be similar to the ARP budget forecast.

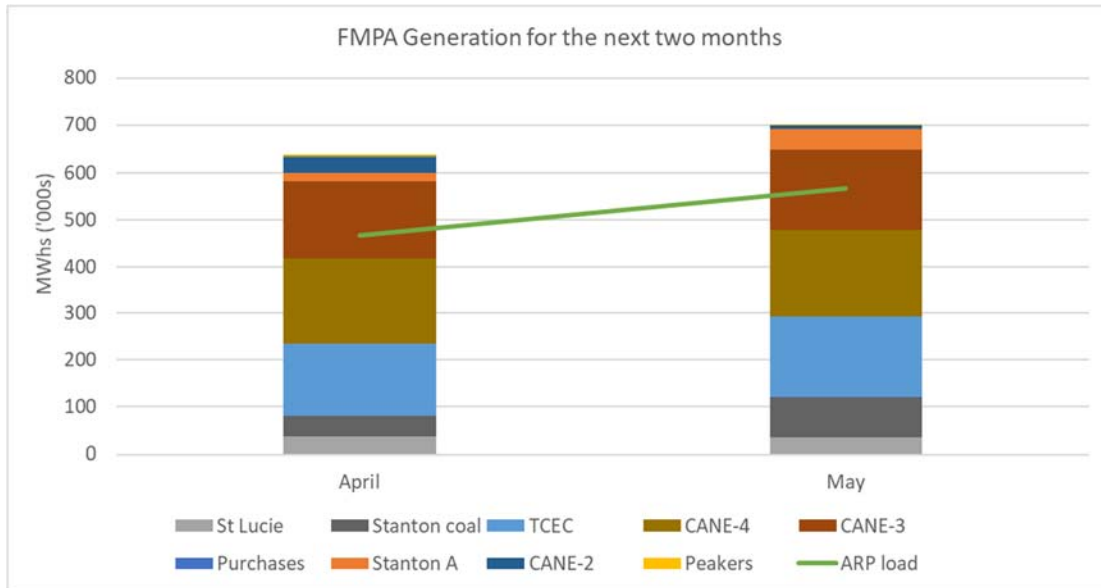
Table 10. Natural Gas Uses & Prices Projections

Projected Florida City Gate Natural Gas Prices and FMPA Volumes		
	April	May
<b>\$/MMBTU (latest projection)</b>	\$2.98	\$2.93
<b>\$/MMBTU (budget projection)</b>	\$2.88	\$3.00
<b>MMBTUs required (latest projection)</b>	3,782,660	4,700,276
<b>MMBTUs required (budget projection)</b>	3,684,048	3,310,418

Note: Natural gas requirement includes gas burned in FMPA shared units, including coal units.

## Fleet Dispatch Projections (Based on current fuel price projections)

Chart 11: FMPA ARP Fleet Dispatch Projections



## FMPA Generator Planned Outages

Table 11. FMPA Scheduled Generator Outages (April 2019 – May 2019)

Generating Unit	Unavailable Capacity	Start Date	End Date
*McIntosh 2 (LAK)	112 MW	04/26/2017	12/31/2019
Larsen 2 (LAK)	14 MWs	1/1/2019	12/31/2019
McIntosh 3 (LAK)	342 MWs	2/9/19	5/31/19
Stanton 1	435 MWs	3/7/19	5/7/19
Cane Island 1	35 MWs	4/16/19	4/19/19
Stanton A	650 MWs	5/7/2019	5/16/2019
Stanton B (OUC)	300 MWs	4/20/19	5/6/19
Treasure Coast	300 MWs	4/27/19	4/28/19
Oleander 5	160 MWs	5/2/19	5/2/19
Indian River CT C	108 MWs	5/20/2019	5/26/2019
Indian River CT D	108 MWs	5/28/2019	6/3/2019

\*McIntosh 2 most likely will not return

## GLOSSARY AND ACRONYMS

**Capacity Factor** – Measures asset utilization. Calculated by taking the average hourly output over a time period and dividing it by the capacity of the unit during that time period. A capacity factor in the 80% range indicates a base load unit, less than 10% range a peaking unit, and in between would be indicative of an intermediate unit.

**CHP** - The Clearinghouse Price (CHP50) is a Member agreed to methodology to price energy that FMPP Members buy and sell to each other. The hourly CHP price is the weighted average of the incremental energy cost of the Pool's highest cost resource/s online subject to exclusions as agreed by the FMPP, that are able to ramp down by 50 MWs in a given hour. CHP 50 may or may not be comprised of more than one unit or transaction.

**Cooling degree days** - Degree-days are derived by comparing the average daily temperature and a base temperature, typically 65 degrees Fahrenheit, the base relied on herein. To the extent the average daily temperature exceeds the base, the difference between that average temperature and the base is the number of cooling degree days for the day in question.

**EIA** – U.S. Energy Information Administration

**Equivalent Availability Factor (EAF):** Measures reliability. Calculated by the amount of time that it is able to produce electricity over a certain period, divided by the amount of the time in the period. As a frame of reference, industry average EAF for combined cycle units has been about 83% on an annual basis.

**FGU** – Florida Gas Utility is a non-profit joint action agency that provides natural gas management services to its municipal utility members.

**FMPP** – Florida Municipal Power Pool, or the Pool for short. FMPP members are FMPA, OUC and Lakeland.

**GWh** – Gigawatt-hour; one billion watt hours.

**Heating degree days** – Degree-days are derived by comparing the average daily temperature and a base temperature, typically 65 degrees Fahrenheit, the base relied on herein. To the extent the average daily temperature is below the base, the difference between that average temperature and the base is the number of heating degree days for the day in question.

**Heat Rate** – Measures the efficiency of the generator. The lower the heat rate, the better. For comparison, a typical heat rate for an automobile is 14,000 BTUs/kWh. FMPA's base load combined cycle fleet is twice as efficient with a heat rate of approximately 7,000 BTUs/KWh.

**Load Factor** – Measures how variable the load is. Calculated by taking the average hourly energy use over a time period (in this report monthly) and dividing it by the peak hourly usage over that time period.

**MMBTU** – One million British Thermal Units, a measure of energy in the form of heat.

**MW** – Megawatt; one million watts, a measure of electrical power, 1MW = 1,341 horsepower.

**MWh** – Megawatt-hour; one million watt hours, a measure of electrical energy, a typical household uses between 1 and 2 MWhs per month.

**TCEC** – Treasure Coast Energy Center