3 Phase Times

Inside this Report

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

Stock Island Generating Facility

FMPA Power ResourcesOperations Performance ReportJanuary 2019



Stanton Energy Center

Treasure Coast Energy Center ◆

> St. Lucie Power Station

Cane Island Power Park

TABLE OF CONTENTS

Executive Summary	1
Electric Load	2
Natural Gas	3
Fleet Dispatch and Pool Operations	5
Fleet Performance	7
Industry Benchmarks	8
Monthly Weather	9
Projections for Next Two Months	10
Glossary and Acronyms	13

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 or 407-355-7767.

EXECUTIVE SUMMARY

Lc	ad	Natural Gas	Fleet Dispatch	Fleet Perf (Base	ormance Load)
ARP Peak MW	Load Factor	Average Daily Price per MMBtu	Average Energy Costs per MWh*	EAF	NCF
912	65%	\$3.18	\$26.07	100%	55%

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

January Highlights

- ARP delivered Net Energy for Load was 441 GWhs, which was 5% below the forecast due to slightly milder temperatures. Average temperatures were above normal in Orlando and across most of Florida.
- The average ARP natural gas price was \$3.18 per MMBtu, which is approximately \$0.13 (4%) above budget this \$0.13 difference corresponds to about \$0.99 /MWh. The average energy cost of ARP generation excluding nuclear and purchases was \$26.07 /MWh and the average heat rate of the ARP's generating units (gas, coal and oil) was 7,651 Btu/kWh.
- The ARP's generation mix to supply ARP load and all sales was 73% natural gas, 19% coal, 7% nuclear¹ and 1% FMPP purchases. Natural gas-fired generation (MWhs) produced 23% less output than budgeted, due to reduced sales to the Florida Municipal Power Pool ("FMPP", or "pool") driven primarily by higher than budgeted gas prices.
- The ARP gas fleet heat rate (7,317 Btu/kWh) is among the lowest and the ARP energy generation cost (3.09 cents/kWh or \$30.85 \$/MWh) is the lowest in the state for the calendar year to date through December (one-month data lag).
- The ARP sold 10% of its generation to the FMPP whereas the budget forecast sales to the pool was 11%. This was due to reduced gas generation as a result of lower coal prices and milder winter temperatures. The Pool sales helped the ARP to offset costs by \$0.22 per MWh.
- The ARP's base load units CYTD EAF is 100%. Stanton 1 and 2 both had short outages.
- The ARP supplied 172 MWhs to Bartow and 7,295 MWhs to Winter Park. The non-coincident Peak (NCP) supply for Bartow was 13 MWs. This reduced the ARP rate by \$0.14 / MWh.

¹Nuclear 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 January were above normal in Orlando and across most of the state. ARP delivered Net Energy for Load was approximately 5% below the forecast due to the milder winter temperatures.

The All-Requirements Project (ARP) hourly peak load was 912 MW, which was 16% lower than the budget forecast. The ARP coincident peak occurred on January 29th.

	Budget	Actual	Actual
	Jan-19	Jan-19	Jan-18
ARP Load (GWhs)	463	441	487
ARP Peak (MW)	1,089	912	1,180
Load Factor	57%	65%	55%

Table 1: ARP Actual and Budget Load

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 \$3.26 / MMBtu in January, which represents the market price for delivered gas (Table 2). The actual average natural gas price for the ARP was \$3.18 / MMBtu, which is \$0.13 / MMBtu (4%) below budget (Table 3). Natural gas burn/usage was 26% less than budgeted, due to higher gas prices and relatively lower coal generation prices and less gas generation sold in the pool.

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

	Henry Hub Index	FGT Zone 3 Index	FMPP Dispatch
Natural Gas Market Prices	\$3.07	\$3.03	\$3.26

Natural Gas Usage and Prices

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

Table 5: Natural Gas Price an	id Usage in January	
Budget	Actual	A

	Budget	Actual	Actual
	January 2019	January 2019	January 2018
Natural Gas Cost (\$/MMBTU)	\$3.05	\$3.18	\$3.58
Natural Gas usage (MMBTU)	3,483,039	2,112,720	2,865,645

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

CY 2018 through December	FMPA	FPL	DUKE	TECO
Natural Gas Cost (\$)	\$161,883,388	\$2,938,221,234	\$1,023,687,200	\$505,830,903
Generation from NG (MWH)	5,246,936	91,213,461	28,686,946	16,096,514
Gas Burned (MMBtu)	38,369,183	660,577,429	226,635,902	124,229,756
Gas cost (\$/MCF)	\$4.31	\$4.54	\$4.61	\$4.16
Gas cost (\$/MMBtu)	\$4.22	\$4.45	\$4.52	\$4.07
Heat Rate (Btu/kWh)	7,313	7,242	7,900	7,718
Generated Cost(cents/kWh)	3.09	3.22	3.57	3.14
Savings compared to Others		\$7,133,976	\$25,352,340	\$3,000,908

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

- FMPA's ARP gas fleet heat rate of 7,313 Btu/kWh is among the lowest in the state for the calendar year to date through December (one-month data lag).
- The ARP's energy cost (including pipeline capacity costs) of 3.09 cents/kWh is the lowest in the state for the calendar year to date through December.
- FMPA's Natural gas cost includes the ARP gas cost and the gas cost of OUC assets.

Natural Gas production average

The following chart shows natural gas production in the U.S. over the past several years through December 2019. The total US natural gas production has increased significantly since the middle of 2017, which has been offsetting below average gas storage levels and had helped stabilize pricing. We expect natural gas pricing to decrease slightly in the near future due to the reduced fear of winter conditions and impending LNG exports. FGU is projecting monthly average delivered Natural Gas pricing of around \$3.04 /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 five (5) alerts on the Florida Gas Transmission (FGT) pipeline and none on the Gulfstream (GST) pipeline in January. This means there were moderate 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 23% less than budgeted. This was due to reduced sales to the pool and higher gas prices vs coal prices. The budget forecast sales of 11% of the ARP's generation to the FMPP; the actual sales were 10% which provided a cost offset to the ARP of about \$0.22 /MWh. The Pool generated 72% more from coal-fired units than budgeted.





NOTE: FMPA'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 FMPA.



Chart 4: FMPP Fuel Mix for January 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.

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	2,576,630	367,134	7,018	\$22.98	\$2.05	\$25.03
Coal	970,910	96,592	10,052	\$27.32	\$0.50	\$27.82
Oil	777	56	13,874	\$196.86	\$5.11	\$201.97
Nuclear		36,801				\$10.00
Purchases		1,794				\$27.73
Total/Ave Gen	3,548,317	502,377				\$26.07

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

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 January 2019

Pool Transactions	Cost	Volume (MWh)	Average Price (\$/MWh)	Offset to ARP Costs	Offset to ARP Cost (\$/MWh)
FMPA Fleet Generation	\$12,091,256	463,782	\$26.07		
Sales to FMPP*	\$1,125,020	45,546	\$24.70	\$93,660	
Purchases from FMPP	\$49,739	1,794	\$27.73		
Net Generation to ARP	\$11,015,975	420,030	\$26.23	\$93,660	\$0.22

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

POWER GENERATION FLEET PERFORMANCE

FMPA Fleet Performance

Cane Island Unit 2 tripped on 1/28 due to a failed liquid fuel purge solenoid. The unit also tripped on 1/31 due to a failed PT fuse. Stock Island CT4 had a planned outage to replace SPRINT tubes. Stanton Unit 1 had an outage for deaerator level control issues, loss of feedwater and went offline for a condensate system leak. Stanton Unit 2 had a derate and trip for FD Fan VFD issues and testing, a derate for loss of scrubber module and went offline for a boiler tube leak.

	Capacity*	Heat Rate	Equivalent	Capacity		
Unit	(MW)	(Btu/kWh)	Availability Factor	Factor	Notes	
Treasure Coast	300	7,252	100.0%	72.0%		
Cane Island Unit 4	300	7,398	100.0%	77.8%		
Cane Island Unit 3	240	7,443	100.0%	16.0%		
Cane Island Unit 2	109	14,475	98.9%	0.9%	Trip	
Stanton A	122	7,616	100.0%	12.1%		
Stanton 1	92	10,599	97.7%	59.0%	Outage	
Stanton 2	85	10,313	86.0%	61.0%	Outage/Trip	
St. Lucie	36	10,250	100.0%	98.7%		
Peaking Units**	386	9,642	99.9%	0.1%	Outage	

Table 7. FMPA ARP Generating Fleet Performance – January 2019

*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

INDUSTRY BENCHMARKS

Estimated Monthly Wholesale Cost Comparison

This graph compares the ARP to Duke and FPL after adjusting ARP costs to align with how FPL and DEF recover their costs through rates to enable an "apple-to-apple comparison". Charges do not include transmission service. High gas costs led to average December cost slightly below November cost.





Note: IOUs data from Public Service Commission (PSC) filing with one-month data lag.

MONTHLY WEATHER

The average temperatures in January were above normal in Orlando (Table 8). Rainfall across the central and eastern parts of the state was above normal. The cooling degree days were normal in the Orlando area (Chart 8). Heating degree days were below normal.

Month	Average Temperature	Avg. High	Avg. Low
January-19	60.6	71.1	50.1
January-18	58	68.8	47.2
Historical Average*	60.2	71.2	49.2

Table 8: Temperatures in Central Florida

*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 above normal in February and mostly about normal in March. ARP natural gas usage in March is expected to be higher than the annual ARP budget projections. This is due to an increase in gas generation over the budget forecast as a result of lower gas dispatch pricing.



Chart 9: Weather Forecast - February 2019

Chart 10: Weather Forecast - March 2019



Source: National Centers for Environmental Prediction (NCEP)

Load Projections

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

	Feb	ruary	М	arch
	Peak (MW)	Load (MWhs)	Peak (MW)	Load (MWhs)
FMPA	1,060	406,811	848	427,679
FMPP	2,560	1,155,933	2,383	1,258,890

Table	9.	Load	Pro	iections
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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 even though they have fallen somewhat over the past few weeks.

Table 10. Natural Gas Uses & Flices Flojections	Table 10	. Natural	Gas	Uses	&	Prices	Projections
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Projected Florida City Gate Natural Gas Prices and FMPA Volumes				
	February	March		
\$/MMBTU (current)	\$3.27	\$2.87		
\$/MMBTU (budget)	\$3.22	\$3.13		
MMBTUs required (current projection)	3,049,859	3,415,172		
MMBTUs required (ARP load + Pool Sales)	2,966,657	3,101,359		

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



Note: Vero entitlements included.

FMPP Generator Planned Outages

Table 11. FMPP Scheduled Generator Outages (February 2019 – March 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	3/24/19
Indian River CT A	35 MWs	2/18/19	2/24/19
Cane Island 4	300 MWs	2/23/19	3/8/19
Indian River CT B	35 MWs	2/25/19	3/3/19
Stanton 1	435 MWs	3/1/19	3/28/19
Cane Island 1	35 MWs	3/25/19	3/29/19
Stanton A	650 MWs	3/30/2019	4/13/2019

*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