ESTIMATE OF FUTURE ELECTRICAL DEMAND—JEA

In 2018 the City Council established a special committee to investigate and report on the future of JEA. The Special Committee issued its report on July 25, 2018. Underlying much of the report and subsequence discussions are estimates of future demands for electricity in the JEA service area. Exhibit 5 of the report shows the estimates in graphic form. It is included in the Appendix.

There are four separate estimates displayed in the Exhibit 5. All extend out to 2028. The first projects the 3% historical rate between 1979 and 2006. It essentially establishes a base line. The second is based on the negative growth rate between 2006 and 2017. The third is the growth rate used in the 2006 JEA Integrated Resource Plan and the fourth, the one used in the 2017 Ten Year Site Plan.

The projections made by the first and third estimates are overly optimistic by today's standards. The second estimate projects a continuing decrease while the fourth shows a very small rate of increase. Just which estimate had the greatest influence on the report of the special commission is unclear.

At the June 2019 JEA board meeting, management presented an estimate of an eight percent decline in megawatt hours between 2018 and 2030. There was no explanation offered as to how the new estimate was calculated. However, it is perhaps worth noting that the same exhibit also showed a reported decrease between 2006 and 2018 of eight percent.[1]

A copy of the eight percent estimate exhibit is included in the Appendix.

The purpose for this paper is two-fold. First, it is to see whether there is any reason to assume that JEA is in a "death spiral"—an irreversible trend toward the use of less and less electricity. The second is to present an estimate of future usage based on energy forecasts from the U.S. Energy Information Administration and the Edison Foundation and population forecasts from the Census Bureau and the Florida State University Bureau of Economics and Business Research.

To understand what the actual trend in electricity use in Duval county, the gross usage data, in megawatt hours, need to be broken down into their component parts. The JEA publication "`Annual Disclosure Report for Electric Utility System for Fiscal Year Ended September 30, 2018" contains tables with details about electricity usage from 2009 to 2018. Similar tables in the 2008 annual report have the same information going back to 1999. These tables appear in the Appendix.

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[1] It appears that the 8% figure was reached by excluding from both 2006 and 2018 the sale of electricity to the Florida Power and Light Company from the St. Johns River Power Park.

Usage is divided into two general categories, direct sales (customers in the JEA service area) and "resales" (sales to other utility companies). Direct sales are split into three parts: Residential, commercial and industrial and public street lighting.

Resales also has three parts: Territorial, off-system, and FPL "saleback". "Territorial" refers to sales to utilities, except FPL, that are directly connected to the JEA grid while "off-system" means that the purchasing utility is indirectly connected to JEA through the grid of an intermediate utility. FLP saleback refers to power that the Florida Light and Power company received from the now defunct St. Johns River Power Park.

Between 2009 and 2018, the number of megawatt hours produced by JEA declined by 20%. By this measure it might well be on the road to extinction. However, the details tell a different story.

Residential megawatt hours (MWH) increased by 2.16%. Megawatt hours for commercial and industrial customers stayed about even with a .04% increase. Public street lighting, however, showed a big decrease--50.8 percent. This was the result of a one-off event, namely the installation of LED street lights. Even then, direct sales had an increase of .46%. If only residential, commercial and industrial customers are considered, the increase was 1%.

Where the decrease took place was in what JEA sold elsewhere. In 2009 nearly 23% of all JEA electricity went to "resales," comprised mostly or entirely of other utilities outside the JEA service area. By 2018, the "resales" had declined by nearly 90% from their 2009 level and their share of JEA MWH was only 3.2%. It is likely to fall to .6% by 2019 with the final disappearance of the FPL saleback.

What this suggests is not a "death spiral" but the bursting of a generating capacity bubble. Significant investments had been made in generating plants for the purpose of selling electricity to other utilities. That market peaked in 2010 and then rapidly went downhill. This resulted in the premature scrapping of the St. Johns River Power Park and left JEA with a binding agreement to invest in and pay for unneeded electricity from the yet-to-be completed Vogle nuclear power plant.

No reasons have been advanced for assuming that trends in the use of electricity in Duval County are or will be significantly different from the rest of the country. Accordingly, we have used national data to make an estimate of the expected future demand for electricity in Duval County.

The data comes from the national forecasts published by the Energy Information Administration (part of the U.S. Department of Energy), and the U.S. Bureau of Census. The estimate for the future increase in the population of Duval County come from the Florida State

University Bureau of Economic and Business Research. More detailed information on the sources of information is in the Appendix.

	2018-2050	Average Annual
	24.6%	0.69%
Commercial & Industrial	38.6%	1.03%
Resale	38.0%	1.01%
Total	32.4%	0.88%

Figure 1. Estimated change in Megawatt Hours 2018-2050.

Overall, the number of megawatt hours is predicted to increase by 32.4% between 2018 and 2050, for an annual average increase of .88%. Residential usage trails the overall average with an increase of 24.6%, an annual average of .69%.

The estimate predicts a slight shift in the type of usage. In 2018, for example, residential usage accounted for 43% of total MWHs. By 2050, it is estimated to be 40% with commercial and industrial usage increasing their share.

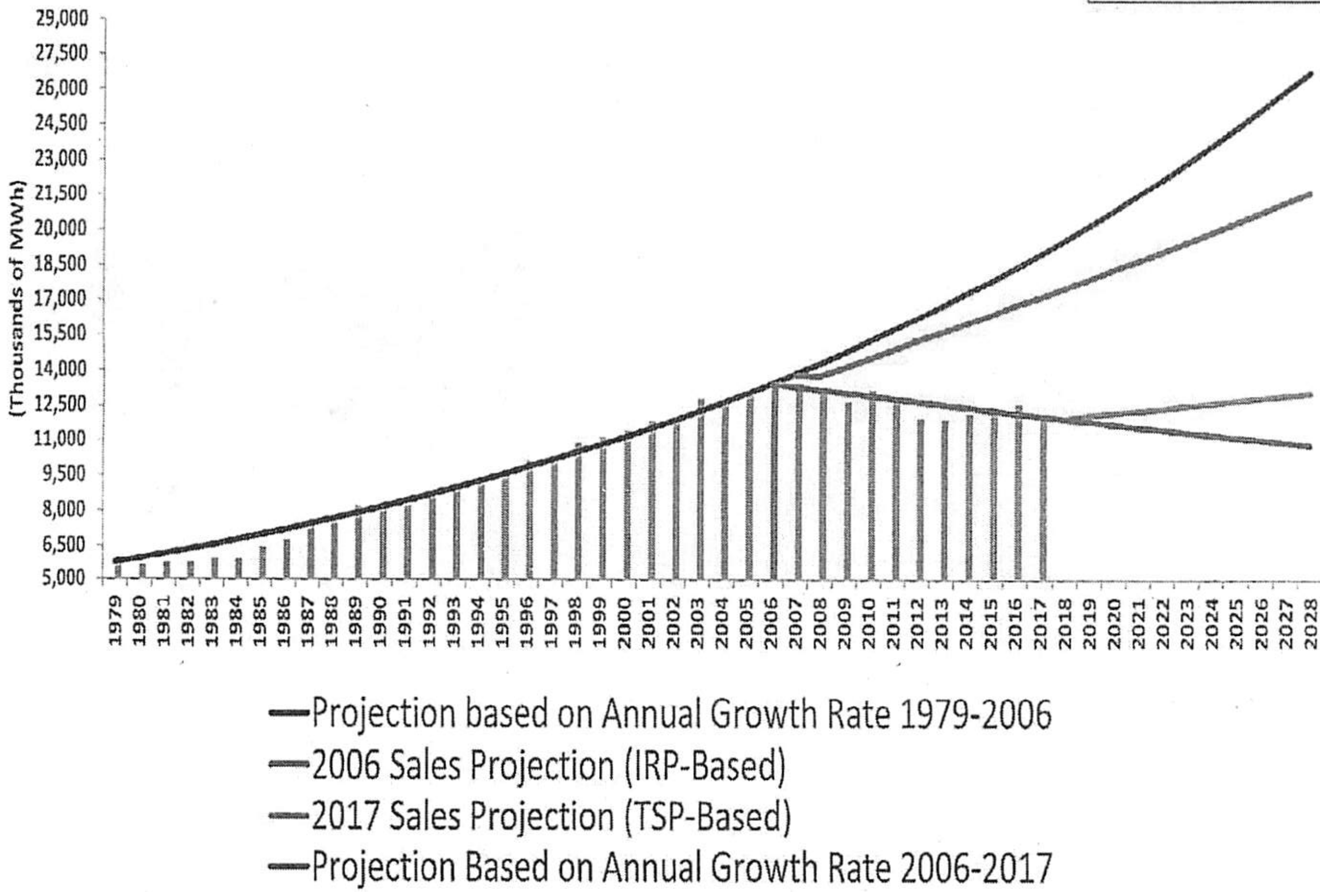
There is nothing in the forecasts that would indicate an approaching disaster. The worst possibility is that JEA rates will have to go up because of the Vogle project. On the other hand, a sale of JEA to a large utility might avoid that cost since there would be offsetting savings from the elimination of general office buildings, general office staff and miscellaneous overhead expenses.

APPENDIX

1. JEA Exhibit 5, presentation to Special Committee.
2. JEA Exhibit showing eight percent decline 2018-28.
3. JEA Megawatt hours 1999-2008.
4. JEA Megawatt hours 2009-2018.
5. JEA Estimated Megawatt hours 2018-2050
6. Bibliography

JEA Electric Sales

Revised to show 10 year projection – May 2018



JEA

IRP = Integrated Resource Plan
TSP = Ten Year Site Plan

PROJECTED IMPACT OF THE NEXT DECADE OF BUSINESS DISRUPTION

	2018 Actual	2030 Projection	Change	Change %
Rates ($ yield per MWh)	62	94	32	52%
Unit Sales (MWh)	12,364,340	11,382,447	(981,893)	(8)%
# of Customers - Energy	466,411	542,502	76,091	16%
Rates ($ yield per kgal)	6.45	7.42	0.97	15%
Unit Sales (kgal)	65,646,920	73,695,324	8,048,404	12%
# of Customers – Water	348,159	416,470	68,311	20%
Total Annual City Contribution	116,620	131,256	14,636	13%
Total JEA Headcount	2,191	2,191	0	0%
Total Long-Term Debt plus Contract Debt ('000)[1]	$5,110,000	$4,834,000	($276,000)	(5)%
Total Maintenance and Other Operating Exp.	$393,657[2]	$737,376	$343,719	87%

[1] JEA Long-term debt in October 2019 2018 [2] Actual Maintenance and Other Operating Exp adjusted to exclude SJRPP

- Customer rates increase 52% in the electric system
- Customer rates increase 15% in the water system
- $276 million of debt repaid, leaving $4.8 billion of direct + contract debt outstanding
  - Contract debt amortizes through 2062, JEA obligation to pay debt service for all contract debt through 2043

JEA MEGAWATT HOURS 1999-2008

	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Change 1999-2008
Sales (MWh):											
Residential	5,363,697	5,478,280	5,650,986	5,542,498	5,389,616	5,438,697	4,896,009	4,895,532	4,621,869	4,513,203	18.84%
Commercial and industrial	7,314,128	7,160,361	7,157,602	6,948,730	6,696,646	6,840,708	6,558,145	6,416,130	6,258,555	6,113,617	19.64%
Public street lighting	116,966	112,760	110,178	107,757	111,483	114,840	111,053	114,427	109,345	83,944	39.34%
TOTAL DIRECT SALES	12,794,791	12,751,401	12,918,766	12,598,985	12,197,745	12,394,245	11,565,207	11,426,089	10,989,769	10,710,764	19.46%
Change year to year	0.34%	-1.30%	2.54%	3.29%	-1.59%	7.17%	1.22%	3.97%	2.60%	NA	
Pct. Of total	78.37%	75.28%	77.43%	77.59%	76.46%	76.90%	76.03%	75.06%	75.40%	73.76%	
Sales for resale											
Territorial	437,870	479,425	522,134	492,716	468,324	435,934	433,343	472,855	470,255	459,129	-4.63%
Off-system	457,421	649,193	593,750	568,442	630,007	374,728	229,554	316,875	176,094	532,274	-14.06%
FP&L saleback	2,635,812	3,059,195	2,649,427	2,577,860	2,656,556	2,912,075	2,983,814	3,006,655	2,939,923	2,818,502	-6.48%
TOTAL RESALE	3,531,103	4,187,813	3,765,311	3,639,018	3,754,887	3,722,737	3,646,711	3,796,385	3,586,272	3,809,905	-7.32%
Change year to year	-15.68%	11.22%	3.47%	-3.09%	0.86%	2.08%	-3.94%	5.86%	-5.87%	NA	
Pct. Of total	21.63%	24.72%	22.57%	22.41%	23.54%	23.10%	23.97%	24.94%	24.60%	26.24%	
Total All	16,325,894	16,939,214	16,684,077	16,238,003	15,952,632	16,116,982	15,211,918	15,222,474	14,576,041	14,520,669	

Data from JEA Annual Reports

JEA MEGAWATT HOURS 2009-2018

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	Change 2009-2018
Sales (MWh):											
Residential	5,414,721	5,108,945	5,328,245	5,243,002	5,086,866	4,877,264	4,806,144	5,444,926	5,707,670	5,300,203	2.16%
Commercial and industrial	6,851,803	6,725,201	6,834,601	6,767,836	6,636,445	6,599,249	6,670,200	6,908,240	6,932,123	6,849,291	0.04%
Public street lighting	59,176	65,721	80,108	89,376	111,325	123,177	122,614	122,402	121,413	120,191	-50.77%
TOTAL DIRECT SALE	12,325,700	11,899,867	12,242,954	12,100,214	11,834,636	11,599,690	11,598,958	12,475,568	12,761,206	12,269,685	0.46%
Change year to year	3.58%	-2.80%	1.18%	2.24%	2.03%	0.01%	-7.03%	-2.24%	4.01%	NA	
Pct. Of Total	96.81%	85.65%	83.93%	84.15%	82.69%	84.16%	83.72%	80.68%	77.24%	77.09%	
Sales for resale:											
Territorial	38,640	150,268	318,297	333,994	337,353	329,922	374,116	394,548	418,867	406,051	-90.48%
Off-system	35,429	150,635	169,037	83,367	136,342	42,286	74,852	99,953	391,559	579,730	-93.89%
FP&L saleback	332,467	1,693,082	1,856,198	1,862,122	2,003,682	1,810,651	1,806,781	2,492,559	2,950,244	2,659,565	-87.50%
TOTAL RESALE	406,536	1,993,985	2,343,532	2,279,483	2,477,377	2,182,859	2,255,749	2,987,060	3,760,670	3,645,346	-88.85%
Change year to year	-79.61%	-14.92%	2.81%	-7.99%	13.49%	-3.23%	-24.48%	-20.57%	3.16%	NA	
Pct. Of Total	3.19%	14.35%	16.07%	15.85%	17.31%	15.84%	16.28%	19.32%	22.76%	22.91%	
TOTAL ALL	12,732,236	13,893,852	14,586,486	14,379,697	14,312,013	13,782,549	13,854,707	15,462,628	16,521,876	15,915,031	-20.00%
Change year to year	-8.36%	-4.75%	1.44%	0.47%	3.84%	-0.52%	-10.40%	-6.41%	3.81%	NA	

Source: 2018 Disclosure Report.

JEA ESTIMATED MEGAWATT HOURS 2018-50

Year	Residential	Commercial & Industrial	Resale	Total	Year Increase
2018	5,473,897	6,851,803	409,536	12,735,236	
2019	5,480,735	7,023,773	416,040	12,920,548	1.46%
2020	5,502,223	7,138,391	420,865	13,061,479	1.09%
2021	5,514,354	7,241,807	425,008	13,181,168	0.92%
2022	5,527,031	7,343,723	429,112	13,299,865	0.90%
2023	5,540,347	7,450,318	433,406	13,424,071	0.93%
2024	5,554,361	7,564,805	438,009	13,557,175	0.99%
2025	5,569,099	7,647,489	441,467	13,658,056	0.74%
2026	5,604,504	7,715,856	444,998	13,765,359	0.79%
2027	5,640,906	7,791,868	448,838	13,881,612	0.84%
2028	5,678,371	7,869,498	452,768	14,000,637	0.86%
2029	5,716,969	7,948,853	456,794	14,122,616	0.87%
2030	5,756,737	7,992,458	459,543	14,208,739	0.61%
2031	5,802,928	8,048,573	462,937	14,314,437	0.74%
2032	5,850,430	8,109,410	466,541	14,426,381	0.78%
2033	5,899,288	8,165,580	470,014	14,534,881	0.75%
2034	5,949,514	8,239,218	474,166	14,662,898	0.88%
2035	6,001,073	8,304,986	478,069	14,784,128	0.83%
2036	6,053,319	8,370,981	482,000	14,906,300	0.83%
2037	6,106,866	8,440,087	486,082	15,033,034	0.85%
2038	6,161,711	8,510,189	490,239	15,162,139	0.86%
2039	6,217,836	8,581,964	494,493	15,294,293	0.87%
2040	6,275,191	8,655,335	498,842	15,429,368	0.88%
2041	6,327,990	8,736,234	503,336	15,567,560	0.90%
2042	6,381,862	8,818,774	507,920	15,708,556	0.91%
2043	6,436,749	8,902,881	512,591	15,852,222	0.91%
2044	6,492,579	8,988,460	517,344	15,998,383	0.92%
2045	6,549,311	9,075,457	522,175	16,146,943	0.93%
2046	6,602,310	9,157,448	526,714	16,286,471	0.86%
2047	6,655,998	9,240,558	531,314	16,427,870	0.87%
2048	6,710,313	9,324,705	535,970	16,570,988	0.87%
2049	6,765,208	9,409,828	540,679	16,715,715	0.87%
2050	6,820,620	9,495,839	545,435	16,861,894	0.87%
% Chg	24.6%	38.6%	33.2%	32.4%	