

Greenhouse Gas Emissions in Duval County An Analysis of EPA Data from 2011 to 2020 JEA Edition

By J. Logan Cross

Executive Summary

This is an analysis of annual Greenhouse Gas Emissions data for large facilities in Duval County over a ten-year period. The data used for the analysis were obtained from the Environmental Protection Agency GHGRP database. The analysis revealed JEA is the source of more than 90% of the annual GHG emissions by large facilities in Duval County. The analysis also revealed the utility's coal-fired power plants produce the majority of the utility's GHG emissions. The report includes a discussion of the results and implications of the findings.

Introduction

Many mid to large cities in Florida and nation-wide acknowledged their contribution to global warming and committed to fully operate on renewable energy by 2050. Jacksonville is not one of these cities. Should Jacksonville consider making such a commitment, it is helpful to know more about how the city is contributing to global warming and on what scale. While it is difficult to accurately measure greenhouse gas (GHG) emissions associated with transportation, it is possible to measure GHG emissions associated with energy generation and GHG emissions associated with private industrial operations and production. Such emissions statistics are available through the Environmental Protection Agency (EPA) which requires large facilities that emit 25,000 metric tons or more per year of GHGs to report their emissions on an annual basis. Such EPA data are available to the public for review and analysis purposes. The purpose of this analysis was to obtain and analyze longitudinal GHG emissions data reported to the EPA by large facilities in Jacksonville (Duval County). Preliminary analysis of the data revealed Jacksonville Electric Authority (JEA) facilities accounted for over 90% of the annual GHG emissions by large facilities in Duval County since 2014. Thus, the initial analysis using these data focused on GHG emissions by JEA facilities. The statistics produced by this analysis provide baselines for comparing future emissions statistics and assessing effectiveness of efforts to reduce emissions. The following is a description of the analysis, findings, and implications.

Procedure

The source for the data used in this analysis is the Environmental Protection Agency (EPA). The EPA greenhouse gas emissions database contains annual emissions data submitted by facilities as required by the Greenhouse Gas Reporting Program (GHGRP). These data are available to the public and can be accessed using the EPA FLIGHT online data query tool. For more information about the GHGRP, FLIGHT, and the EPA greenhouse gas database see Appendix A.

The data used for this analysis were submitted during the ten-year period from 2011 to 2020. These data were used because they are most recent and are directly comparable. The unit of measurement is metric tons of carbon dioxide equivalent. These data were analyzed using SAS and Excel. The charts and graphs were created using Excel.

Results

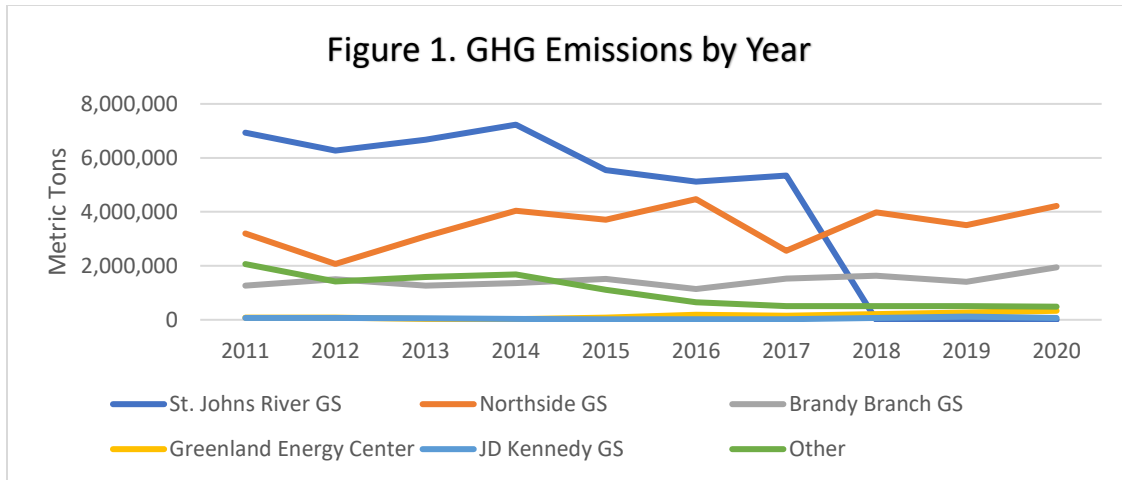
Due to space limitations, the tables presented in this section of the report will include emission statistics for the six-year period from 2015 to 2020. Statistics for the ten-year period from 2011 to 2020 are presented in Appendix C.

Greenhouse Gas Emissions by Facility: The total GHG emissions are presented for each JEA facility and “Other Facilities” are presented by year in Table 1. The table reveals the St. Johns River Generating Station (GS) was the primary emission source up to 2017. There was a 36.7% percent drop in the total annual GHG emissions following 2017 when the St. Johns River GS was decommissioned. This dip in emissions was followed by an uptick in emissions by the Northside and Brandy Branch Generating Stations in 2020. The 2019 dip in GHG emissions for the Northside Generating Station was due its Unit 2 generator being down for a seven-month period. The trendlines associated with these changes in emissions are graphically depicted in Figure 1.

Table 1
Metric Tons of GHG Emissions for Large Facilities in Duval County by Year

FACILITY	YEAR					
	2015	2016	2017	2018	2019	2020
St. Johns River GS	5,541,121	5,121,210	5,348,265	0	0	0
Northside GS	3,713,181	4,470,459	2,563,685	3,986,397	3,503,620	4,215,800
Brandy Branch GS	1,520,067	1,140,312	1,529,662	1,634,163	1,404,919	1,943,794
Greenland Energy Ctr	78,688	186,779	145,750	209,605	268,000	334,330
JD Kennedy GS	17,969	21,604	23,574	62,928	118,961	70,335
Other	1,110,147	651,669	504,071	505,631	509,655	486,056
TOTAL	11,981,173	11,592,033	10,115,007	6,398,724	5,805,155	7,050,315

Source: EPA Greenhouse Gas Reporting Program (GHGRP) Database



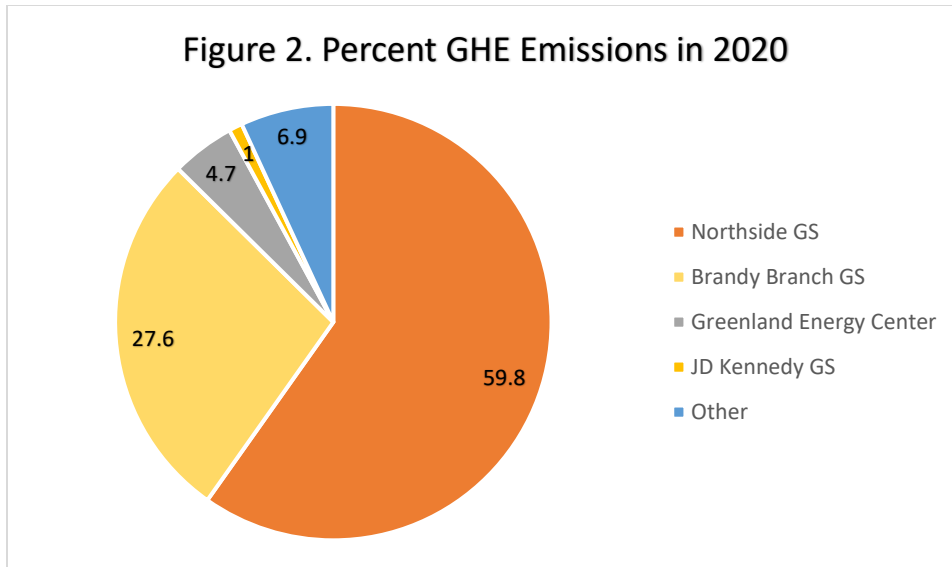
Percentage GHG Emissions by Facility: The percentage of GHG emissions are presented for each JEA facility and “Other Facilities” by year in Table 2. The table reveals the St. Johns River GS accounted for 44 to 53 percent of total emissions up to 2017, while the Northside GS accounted for 25 to 39 percent during that period. From 2018 to 2020 the Northside GS accounted for 60% of the total annual GHG emissions. Similarly, the Brandy Branch Generating Station accounted for less than 16 percent of the total annual GHG emissions up to 2017, then 24 to 28 percent thereafter.

Table 2
Percentage of GHG Emissions for Large Facilities in Duval County by Year

FACILITY	YEAR					
	2015	2016	2017	2018	2019	2020
St. Johns River GS	46.2	44.2	52.9	0	0	0
Northside GS	31	38.6	25.3	62.3	60.4	59.8
Brandy Branch GS	12.7	9.8	15.1	25.5	24.2	27.6
Greenland Energy Ctr	0.7	1.6	1.4	3.3	4.6	4.7
JD Kennedy GS	0.1	0.2	0.2	1	2	1
Other	9.3	5.6	5	7.9	8.8	6.9
TOTAL	100	100	100	100	100	100

Source: EPA Greenhouse Gas Reporting Program (GHGRP) Database

Figure 2 provides a graphic depiction of the relative percentage of GHG emissions by large facilities in Duval County during 2020. It seems to illustrate a disproportionate contribution by the Northside Generating Station.



The aggregate percentage of GHG emissions for JEA by year are provided in Table 3. It illustrates JEA accounted for more than 90% of facility-produced GHG emissions in Jacksonville from 2015 to 2020.

**Table 3
Percentage of GHG Emissions for JEA by Year**

SOURCE	YEAR					
	2015	2016	2017	2018	2019	2020
JEA	90.7	94.4	95	92.1	91.2	93.1
OTHER	9.3	5.6	5	7.9	8.8	6.9
TOTAL	100	100	100	100	100	100

Source: EPA Greenhouse Gas Reporting Program (GHGRP) Database

Though the focus of this analysis was on GHG emissions across the county as a whole, it is informative to examine emissions by region. More information about GHG emissions by zip code areas are presented in Appendix D. This information reveals some zip code areas have high exposure to GHG emissions and merit additional analysis and attention.

Observations

When interpreting the results of this analysis it is important to consider the unit of measurement used to quantify the GHG emissions: metric tons. The statistics in this report reveal JEA facilities emitted millions of tons of GHG emissions in Northeast Florida over decades.

The results of this analysis substantiate JEA is the source of over 90% of the GHG emissions by large facilities in the region. Though the impact of the emissions extend

beyond Northeast Florida, it should be noted some areas of the region of the city received disproportionate, direct exposure to JEA GHG emissions.

The results of this analysis also illustrate the primary source of JEA GHG emissions have been, and continue to be, coal-fired power plants. From 2011 to 2018 the St Johns River and Northside Generating Stations accounted for 73 to 83 percent of the annual GHG emission in Duval County. After the St. Johns River Power Generating Station was decommissioned in 2017 the Northside Generating Station accounted for 62.3%, 60.4%, and 59.8% of the GHG emissions in 2018, 2019, and 2020, respectively. The Northside Generating Station's two coal-fired generating stations, Units 1 and 2, were built in 1966 and 1972, respectively. The technology employed by these units is dated and inefficient by modern standards. The units employ "selective noncatalytic reduction" systems which are minimally effective in mitigating atmospheric pollutants. Should federal pollution rule changes require installation of effective "selective catalytic reduction" systems, the cost of maintaining these units will be substantial. Further, the generating station is located in an environmentally sensitive area which exposes surrounding wetlands to harm from coal ash and liquid waste.

This report will be updated when EPA emissions data for 2021 are available. The JEA energy generation portfolio was unchanged in 2021, so it is likely its 2021 GHG emissions will be similar to those for 2020. Renewable energy comprised 1% of the JEA energy portfolio in 2018, 2019, and 2020. Unless the Northside Generating Station is decommissioned and JEA accelerates its conversion to renewable energy sources, it will be many years before there is another noticeable decline in the GHG emissions trendline.

Summary

The results of this analysis seem to substantiate JEA, and by extension, the City of Jacksonville has been a major source of GHG emissions and contributor to global warming. These emissions occurred over decades with limited efforts to mitigate the impact. While it is easy to blame JEA for the city's contribution to global warming, the utility's citizen owners and their elected representatives bear primary responsibility. JEA has been fulfilling the mandate it was given: Deliver affordable, reliable energy. JEA's charge has not included mitigate damage to the environment, be socially responsible, or address environmental justice. JEA now has new leadership that seems forward-thinking and receptive to citizen input. The Jacksonville City Council has some members who are forward-thinking and are socially minded. While these are reasons for cautious optimism for change, substantial reduction in the city's carbon footprint is unlikely unless regional residents, organizations, and business demand a reduction.

Author

J. Logan Cross is chair of the Sierra Club of Northeast Florida Executive Committee and chair of its Conservation Committee. He also serves as chair of the Resilient Jax Policy Committee. He holds M.ED. and Ph.D. degrees from the University of Georgia. He is now retired following a career in higher education.

Appendix A

The Environmental Protection Agency (EPA) Greenhouse Gas Reporting Program (GHGRP) requires reporting of greenhouse gas (GHG) data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and CO₂ injection sites in the United States. Approximately 8,000 facilities are required to report their emissions annually, and the reported data are made available to the public in October of each year.

The EPA website provides a data query tool named FLIGHT which can be used to retrieve and download GHG emissions data by facility, industry, location, or gas. The link to the EPA GHG database and FLIGHT tool is provided below.

<http://ghgdata.epa.gov/ghgp>

Related Information

All emissions data is presented in units of metric tons of carbon dioxide equivalent using the Global Warming Potential (GWP) from IPCC Annual Report 4.

GHG data for some source categories are not directly comparable between 2010 and subsequent years.

Large Facilities: Facilities that emit 25,000 metric tons or more per year of GHGs.

Appendix B

Large Facilities in Duval County Reporting GHG Emissions to the EPA

The following is a list of large facilities in Duval County that are required to report GHG emissions statistics to the EPA. The facilities are presented by amount of 2020 emissions, largest to smallest. Emissions by these entities will be analyzed and conveyed in a future analysis report.

WestRock CP, LLC - Seminole Mill (Formerly Smurfit-Stone)
Anheuser-Busch LLC
Anchor Glass Container Corporation. - Plant 07
CMC Steel Florida
IFF Chemical Holdings INC
US Gypsum - Jacksonville Plant
Symrise
Trail Ridge Landfill INC
Cedar Bay Generating Co. LP
East Duval SLF (Greenfield Creek)
Gerdau Ameristeel Jacksonville Mill

Appendix C

GHG Emissions Statistics for JEA Facilities from 2001 to 2020

GHG Emissions for Facility by Year

FACILITY	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
St. Johns River GS	6,932,037	6,271,559	6,673,258	7,230,478	5,541,121	5,121,210	5,348,265	0	0	0
Northside GS	3,192,832	2,068,826	3,095,190	4,042,425	3,713,181	4,470,459	2,563,685	3,986,397	3,503,620	4,215,800
Brandy Branch GS	1,269,757	1,506,599	1,271,532	1,359,929	1,520,067	1,140,312	1,529,662	1,634,163	1,404,919	1,943,794
Greenland Energy Ctr	79,316	80,123	30,389	23,927	78,688	186,779	145,750	209,605	268,000	334,330
JD Kennedy GS	66,218	68,205	56,668	27,274	17,969	21,604	23,574	62,928	118,961	70,335
Other	2,065,410	1,415,467	1,586,661	1,680,622	1,110,147	651,669	504,071	505,631	509,655	486,056
TOTAL	13,605,570	11,410,779	12,713,698	14,364,655	11,981,173	11,592,033	10,115,007	6,398,724	5,805,155	7,050,315

Percentage GHG Emissions for Facility by Year

FACILITY	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
St. Johns River GS	50.9	55.0	52.5	50.3	46.2	44.2	52.9	0	0	0
Northside GS	23.5	18.1	24.3	28.1	31	38.6	25.3	62.3	60.4	59.8
Brandy Branch GS	9.3	13.2	10	9.5	12.7	9.8	15.1	25.5	24.2	27.6
Greenland Energy Ctr	0.6	0.7	0.2	0.2	0.7	1.6	1.4	3.3	4.6	4.7
JD Kennedy GS	0.5	0.6	0.4	0.2	0.1	0.2	0.2	1	2	1
Other	15.2	12.4	12.5	11.7	9.3	5.6	5	7.9	8.8	6.9
TOTAL	100	100	100	100	100	100	100	100	100	100

Percentage GHG Emissions for Facility by Year – JEA Only

FACILITY	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
St. Johns River GS	60.1	62.7	60.0	57	51	46.8	55.6	0	0	0
Northside GS	27.7	20.7	27.8	31.9	34.2	40.9	26.7	67.6	66.2	64.2
Brandy Branch GS	11	15.1	11.4	10.7	14	10.4	15.9	27.7	26.5	29.6
Greenland Energy Ctr	0.7	0.8	0.3	0.2	0.7	1.7	1.5	3.6	5.1	5.1
JD Kennedy GS	0.6	0.7	0.5	0.2	0.2	0.2	0.2	1.1	2.2	1.1
TOTAL	100	100	100	100	100	100	100	100	100	100

(continued)

Combined Percentage GHG Emissions for Source by Year

SOURCE	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
JEA	84.8	87.6	87.5	88.3	90.7	94.4	95	92.1	91.2	93.1
OTHER	15.2	12.4	12.5	11.7	9.3	5.6	5	7.9	8.8	6.9
TOTAL	100	100	100	100	100	100	100	100	100	100

Percentage GHG Emissions for Zipcode by Year

ZIPCODE	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
32206	0.6	0.7	0.5	0.2	0.2	0.2	0.2	1.1	2.2	1.1
32226	87.7	83.4	87.8	88.9	85.1	87.7	82.3	67.6	66.2	64.2
32234	11	15.1	11.4	10.7	14	10.4	15.9	27.7	26.5	29.6
32256	0.7	0.8	0.3	0.2	0.7	1.7	1.5	3.6	5.1	5.1
TOTAL	100	100	100	100	100	100	100	100	100	100

Zipcodes Adjacent to Facility Zipcode

ZIPCODE	ADJACENT ZIPCODES
32206	32208, 32209, 32202, 32211, 32277
32226	32218, 32225, 32233, 322228
32234	32220, 32221, 32222, 32068, 32058, 32063
32256	32258, 32257, 32217, 32216, 32224, 32081

Appendix D

Greenhouse Gas Emissions by Region

The percentage of GHG emissions in zip code areas are presented by year in Table 4. Review of the table reveals most of the GHG emissions are released in zip code 32226. This zip code included the St. Johns River and Northside Generating Stations. Notice the decline in percentage of emissions in this area after the St. Johns River GS was decommissioned in 2017.

Table 4
Percentage of GHG Emissions for Zip Code by Year

ZIPCODE	YEAR					
	2015	2016	2017	2018	2019	2020
32206	0.2	0.2	0.2	1.1	2.2	1.1
32226	85.1	87.7	82.3	67.6	66.2	64.2
32234	14	10.4	15.9	27.7	26.5	29.6
32256	0.7	1.7	1.5	3.6	5.1	5.1
TOTAL	100	100	100	100	100	100

Source: EPA Greenhouse Gas Reporting Program (GHGRP) Database

While residents in the 32226 zip code area have the greatest exposure to GHG emissions, adjacent zip code areas are also heavily impacted. Table 5 lists zip code areas adjacent to each JEA facility zip code. The 32218, 32225, 32233, and 322228 zip code areas are heavily exposed to GHG emissions.

Table 5
Zip Code Areas Adjacent to JEA Facility Zip Codes

ZIPCODE	ADJACENT ZIPCODES
32206	32208, 32209, 32202, 32211, 32277
32226	32218, 32225, 32233, 322228
32234	32220, 32221, 32222, 32068, 32058, 32063
32256	32258, 32257, 32217, 32216, 32224, 32081

This information illustrates how some county residents have disproportionate exposure to GHG emissions. Future studies will be conducted to analyze the impact of this exposure on population health and well-being.