



**City of Winston Salem**

**2017**

**Sustainability Summary Report**

**City of Winston-Salem Office of Sustainability**

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## City-Wide Highlights FY17-18

- Reporting and Disclosure
- Beginning of Climate Action Plan research
- Social Media use

### Executive Summary

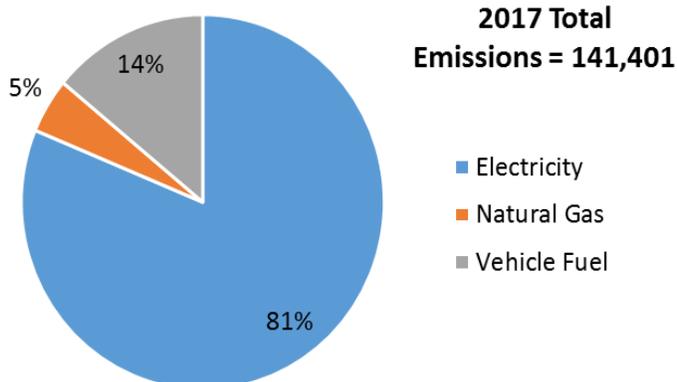
In the most recent fiscal year, the City of Winston-Salem has continued its efforts towards becoming a more sustainable community. Like last year, these efforts include reporting to the Leading STAR Community Indicators and the CDP, formerly the Carbon Disclosure Project. Both of these reporting tools help us measure our environmental impact in the community on an annual basis.

We have also begun research into the possible creation of a Climate Action Plan. This research has included analyzing climate action plans of other cities and counties in our state, region, and the country in order to help us create a comprehensive outline.

This has also been the first year that the Office of Sustainability has ventured to use City of Winston-Salem social media accounts to increase awareness of efforts being made. The Office has begun making regular weekly posts on Twitter and occasionally on Facebook.

Additionally, the Office of Sustainability has continued to track municipal greenhouse gas emissions on an annual basis. This inventory, as in previous year, was conducted using Local Government Operations Protocol with a baseline year of 2008. Emissions were calculated for the following sources:

- Electricity (kWh) used by select sectors of municipal government operations,
- Fuel (gallons) used by city-owned or leased vehicles,
- Natural gas (therms) used by select sectors of municipal government operations, and
- Carbon Dioxide per square foot (CO<sub>2</sub>/ft<sup>2</sup>) in municipal buildings



In the most recent year, total emissions from local government operations was 141,401 tons of CO<sub>2</sub>. This is down 2.13% from the previous year's emissions, and 8.5% from baseline emissions in 2008. Once again, electricity use by municipal operations was the biggest contributor to emissions, making up 81% of emissions as seen in the figure to the left.

**Figure 1:** 2017 CO<sub>2</sub> emissions from local government operations (tons)

## Reporting and Disclosure Tools

The Office of Sustainability has continued to report to two online platforms annually, the STAR Indicator program and CDP, formerly the Carbon Disclosure Project. We have reported to the STAR Indicator program since 2016, and to CDP since 2015.

### STAR COMMUNITIES

#### *LEADING STAR COMMUNITY INDICATORS*

We are continuing our reporting to the STAR Indicators program annually. The number of communities reporting to this platform has remained just under 50. In North Carolina, the only other participating communities in this platform are Durham and Cary. The goal of this reporting tool is to be able to track annual trends from 21 metrics relating to the larger STAR Communities framework.

#### *STAR COMMUNITY PROGRESS*

The first step was taken in the last year towards the City of Winston-Salem incorporating more STAR Community measures into the decision-making process. A recommendation support was submitted to the Community Development/Housing/General Government Committee in December 2017 showing how we might align certain STAR measures with the previously established goals of the Strategic Plan released by the Mayor and City Council in May 2017. The goal of the recommendation plan was to show that STAR measures already aligned with city goals and presented a more sustainable way of achieving those goals.

### CDP REPORTING

While the Office of Sustainability has been reporting greenhouse gas and climate adaptation and mitigation efforts to CDP since 2015, our data has only been public since 2017. This reporting system is a global disclosure system that enables companies, cities, states, and regions to measure and manage their environmental impacts. Over 500 cities worldwide participate in this disclosure system.

## Climate Action Plan

Research began in fall 2017 to see what other communities in our state, region and across the country are doing or planning on doing regarding climate adaptation and mitigation efforts. While this research has not yet led to the creation of a Climate Action Plan for the City of Winston-Salem, we hope it will help inform any future efforts towards the creation of such a plan.

## Social Media

Recently the Office of Sustainability has begun using social media to boost awareness of sustainability and the Office itself among citizens. It became apparent to the employees of the Office of Sustainability that awareness levels were low in the community when it came to the topic of sustainability. To bring more attention to these matters, they began using the City's

Twitter and Facebook accounts to spread awareness and show that the City of Winston-Salem supports sustainability efforts. Through Twitter, the Office created the hashtag #sustainableWSNC to bring attention to the tweets that specifically addressed the topic.

## Municipal Greenhouse Gas Emissions

### TOTAL CO<sub>2</sub> EMISSIONS

**Table 1.** Total CO<sub>2</sub> emissions from internal operations in tons

	<b>Electricity</b>	<b>Natural Gas</b>	<b>Vehicle Fuel</b>	<b>Total</b>
<b>2008</b>	131,897	3,625	19,015	<b>154,537</b>
<b>2009</b>	126,850	8,050	18,294	<b>153,194</b>
<b>2010</b>	122,560	7,300	20,532	<b>150,392</b>
<b>2011</b>	121,291	6,800	20,507	<b>148,598</b>
<b>2012</b>	122,000	6,980	20,853	<b>149,833</b>
<b>2013*</b>	114,786	6,065	19,075	<b>139,926</b>
<b>2014</b>	116,032	6,113	19,409	<b>141,554</b>
<b>2015</b>	118,902	5,500	19,010	<b>143,412</b>
<b>2016</b>	118,727	6,033	19,717	<b>144,477</b>
<b>2017</b>	114,911	6,690	19,800	<b>141,401</b>

Since 2008, total GHG emissions reduction for municipal operations equals 8.5%

\*2013 is the year the LJM Coliseum was sold to Wake Forest University. After the sale, the City of Winston-Salem was no longer responsible for the emissions of the Coliseum, accounting for a portion of this significant decrease in emissions.

Total GHG Emissions were 141,400 tons in 2017 --- a 3,000 ton reduction compared to 2016. As you can see from Table 1, the reduced electricity use was the primary contributor to the GHG reduction, as the other two categories saw increases in emissions. While it was expected that the emissions would increase in 2017 due to increased building square footage, this was actually the first decrease in total emissions since 2013. This decrease continues on trend of having emissions reductions from the 2008 baseline year.

To maintain consistency with previous reports, the calculations for the total carbon dioxide emissions from internal operations assumed a multiplier of 2.1 pounds of CO<sub>2</sub> emitted for each kWh consumed, which was used in the original 2008 greenhouse gas report assuming additional coal was required for each marginal kWh consumed. If this data is compared to another city's data, then the same multipliers must be used. This multiplier was used instead of the one from Duke Energy. The published multiplier from Duke Energy in 2016 Duke's published multiplier in 2016 was 0.97 lbs/kWh based on 35% coal, 35% nuclear, 29% natural gas and 1% hydro/solar

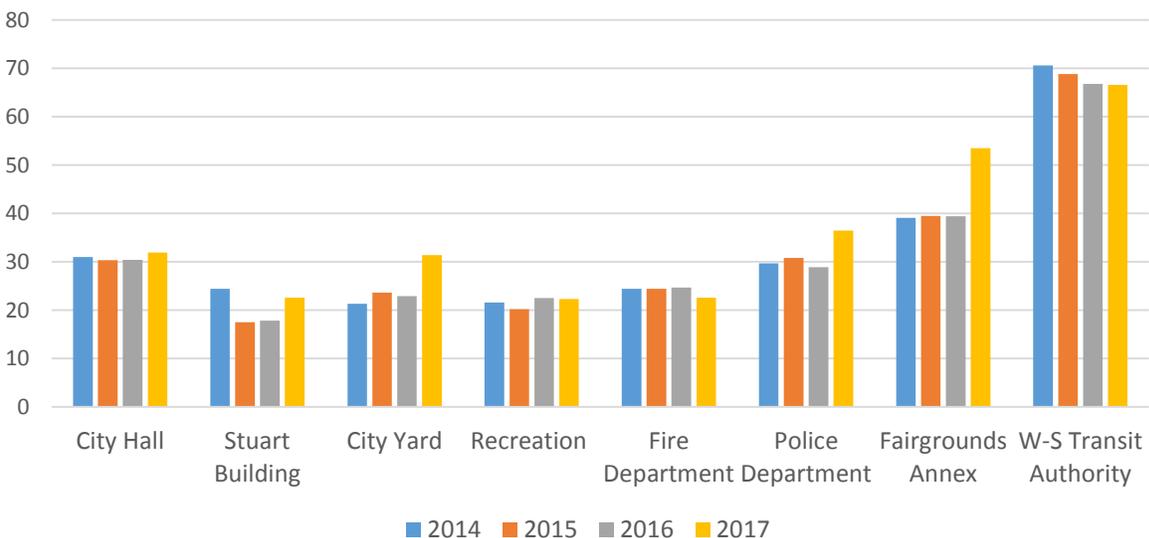
generation. Utilizing Duke’s current lbs/kWh multiplier would decrease total GHG emissions below 80,000 tons. Duke expects the multiplier to decrease by 2030 to 0.71 lbs/kWh.

### CO<sub>2</sub> PER SQUARE FOOT

This measure is only in its second year of reporting for our city. It is becoming more and more popular for reporting platforms such as STAR Communities and CDP. Looking more closely at our city operations, Utilities and DOT operations cause over 80% of GHG emissions due to water/sewer pumping, street lighting, etc. where there is no relationship to square footage. Entertainment areas are dominated by electric energy that is not utilized within buildings. The total CO<sub>2</sub> per square foot can best be broken down among several department categories with several specific buildings that are summarized below. The average CO<sub>2</sub> per square foot for the City’s buildings is approximately 32 lbs/square foot, though it would be less than 17 lbs/square foot using Duke’s current multiplier.

**Table 2.** Pounds of CO<sub>2</sub> per square foot in city buildings in 2017

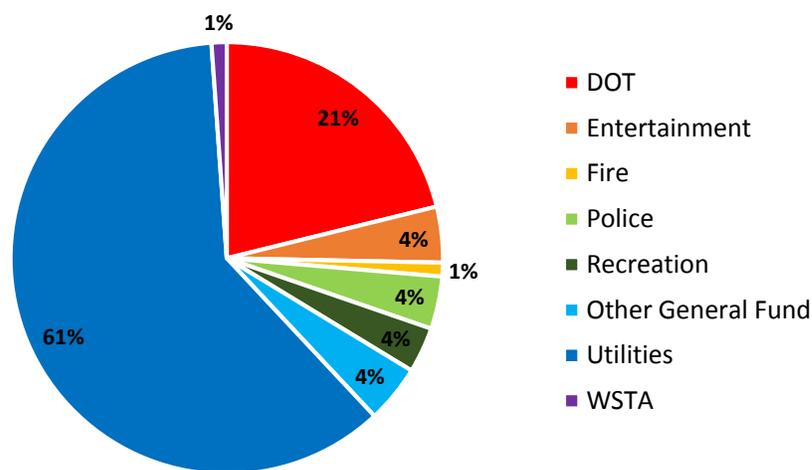
	Electricity (kWh)	Natural Gas (Therms)	Annual CO <sub>2</sub> Emissions (Tons)	Square Footage	Pounds of CO <sub>2</sub> per SF
<b>City Hall</b>	985,423	16,029	1,134	71,125	31.9
<b>Stuart Building</b>	1,636,654	0	1,718	152,315	22.6
<b>City Yard</b>	2,014,712	54,484	2,453	156,350	31.4
<b>Recreation</b>	2,164,612	42,288	2,535	227,362	22.3
<b>Fire Department</b>	1,125,149	24,925	1,336	118,343	22.6
<b>Police Department</b>	4,304,545	53,471	4,851	266,363	36.4
<b>Fairgrounds Annex</b>	2,416,234	60,129	2,910	108,847	53.5
<b>W-S Transit Authority</b>	1,242,218	31,140	1,497	44,970	66.6
<b>TOTAL</b>	15,889,547	282,466	18,435	1,145,675	32.2



**Figure 2:** Pounds of CO<sub>2</sub> Per Square Foot in City Buildings

## Electric Energy Use

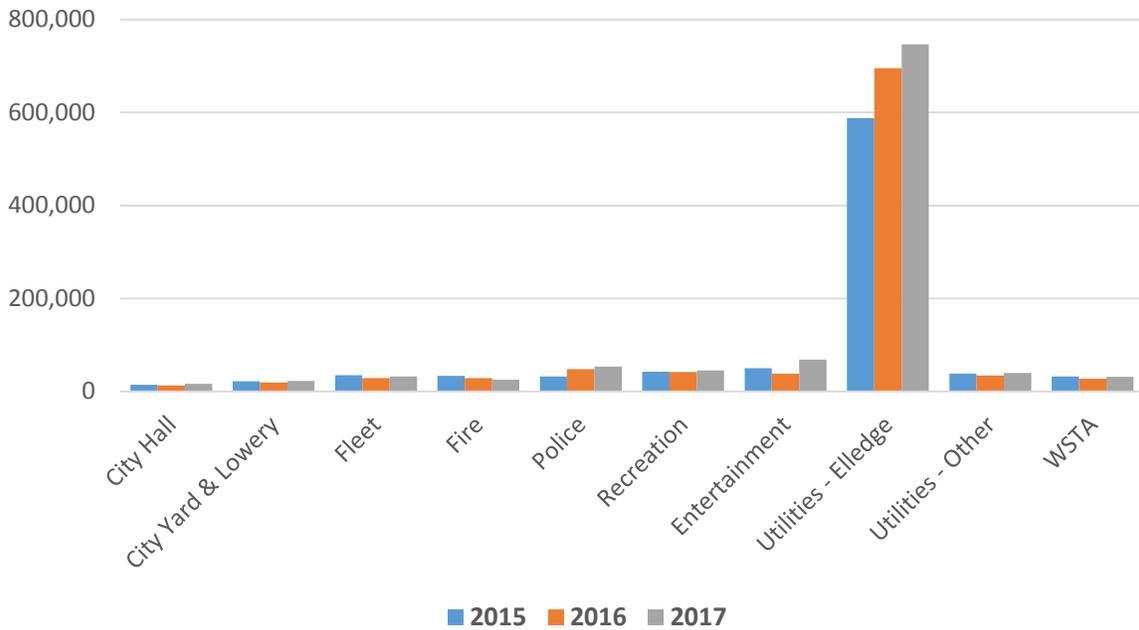
The City purchased 3,634,000 (3%) fewer kilowatt-hours (kWh) in 2017 than in 2016. The biggest reduction in electricity use came from Utilities, specifically from wastewater treatment operations at the Elledge treatment plant. In total, Utilities reduced total electric consumption by 6% which saved over 4,500,000 kWh. Electric use increased at the city's Police (due to additional square footage), Entertainment & Recreation facilities which combined to offset some of Utilities' electric reductions. Electric use in 2018 is expected to increase minimally across the City except at the Muddy Creek wastewater treatment plant where upgrades will be completed in mid-2018. The breakdown of how much electricity is used by department can be seen in the figure below.



**Figure 3:** Electricity use summary for 2017 by department

## Natural Gas Use

Natural Gas consumption was 11% greater in 2017 compared to 2016. The Bio-Solids Dryer located at the Elledge wastewater treatment plant consumed 70% of all natural gas required for City operations & increased usage by 7% in 2017. Most departments increased usage, except for the Fire Department which saw a 10% decrease. This decrease from Fire can be partially attributed to Stations 7 and 9 being closed for remodeling. The City's total usage minus utilities was 293,000 therms which was 50,000 therms higher than 2016. Departments with significant increases include Entertainment's usage increased by 30,000 therms and Police by 6,000 therms. Natural gas use in 2018 is expected to increase at the Muddy Creek wastewater treatment plant in the second half of 2018, while gas use should remain relatively flat in 2018 and in the future for the remaining city operations.



**Figure 4:** Natural gas use summary for 2017 by department

### Conclusion

The City of Winston-Salem Office of Sustainability aims to find ways to make our city and community a more sustainable place. Through actions like annual reporting, research and social media use the office works to boost awareness and measure the annual impact of these efforts. Additionally, the Office of Sustainability tracks annual greenhouse gas emissions from municipal operations. This year, total emissions was reduced 2.13% percent from the previous year and 8.5% from the baseline year. We hope to see this trend continue in future measurements.