



City of Winston Salem

2019

Sustainability Summary Report

City of Winston-Salem Office of Sustainability

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City-Wide Highlights

- Decrease in CDP reporting assessment
- #RecycleRight NC Social Media Campaign
- Community Sustainability Program Committee begins meeting
- Increase in local government operations annual greenhouse gas emissions

Executive Summary

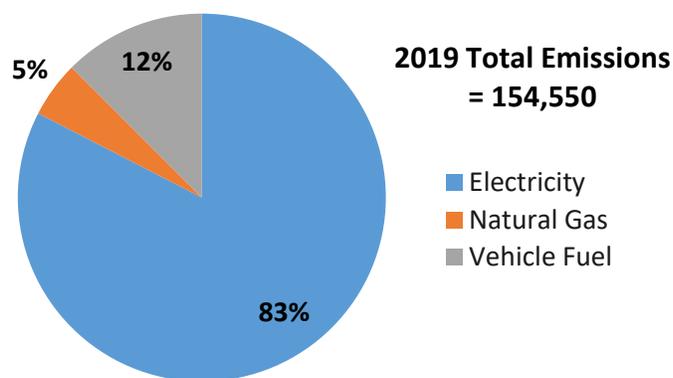
In 2019, the City of Winston-Salem continued its efforts towards creating a more sustainable community. The office reported to the CDP, formerly the Carbon Disclosure Project, for the fifth year straight and began pursuing a LEED for Cities and Communities certification. These reporting tools help us measure our environmental impact in the community on an annual basis.

The Office of Sustainability regularly posts to Twitter and Facebook to increase awareness and to educate the public on sustainability topics and issues. We have seen a popular response to these posts from the public.

City Council passed a resolution to reconvene the Community Sustainability Program Committee in an advisory capacity in May 2019. In June of 2019, the newly re-established Community Sustainability Program Committee officially began meeting on a bimonthly basis.

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

- Electricity (kWh) used by select facilities of municipal government operations,
- Fuel (gallons) used by city-owned or leased vehicles,
- Natural gas (therms) used by select facilities of municipal government operations, and
- Carbon Dioxide per square foot (CO₂/ft²) in municipal facilities.



In 2019, total emissions from local government operations were 154,550 tons of CO₂. Emissions are up 1.1% from 2018 emissions, but show virtually no change compared to the 2008 baseline data. Once again, electricity use by municipal operations was the principal contributor to emissions, making up almost 83% of emissions as seen in Figure 1.

Figure 1: Total Greenhouse Gas Emissions

Keep Winston-Salem Beautiful

Keep Winston-Salem Beautiful division is in charge of organizing and running many programs annually that involve litter prevention and community beautification. Below in Table 4 is a summary of the participation of each of these events and programs.

Table 1: KWSB programs

| Event/Program | Attendance | Details |
|------------------------|------------|--|
| Great American Cleanup | 746 | 9,710 lbs of litter collected |
| Big Sweep | 674 | 14,782 lbs of litter collected |
| Community Roots Day | 350 | 300 trees planted in 2 miles |
| Flower Bulbs | 50 | 4,000 bulbs provided and planted |
| Flower Bed | 100 | 20,000 plants/shrubs/flower/bulbs planted in 37 beds |
| Clean and Green | 34 schools | 21,575 lbs of litter collected, 191 trees planted, 6,240 plants/shrubs/flowers/bulbs planted |
| Adopt-A-Street | 59 groups | 5,000 lbs of litter collected in 50 miles of roadway |
| Adopt-A-Stream | 13 groups | 1,000 lbs of litter collected in 10 miles of streams |
| Adopt-A-Park | 28 groups | 4,000 lbs of litter collected in 200 acres |
| Miscellaneous cleanups | 250 | 5,000 lbs of litter collected |

Keep Winston-Salem Beautiful updated online capabilities by making the clean-up reports accessible on the respective adoption webpages. The division hopes that this will increase responsiveness from groups participating in cleanups throughout the year.

Recycling

The Recycle Today program is the division of the City of Winston Salem responsible for recycling services. Recycle Today is in the seventh year of single stream recycling after switching from dual stream in 2012. For collection services, the city contracts with waste management. Table 5 shows the totals for recycle collections in the 2019 calendar year by commodity.

Table 2: Recycle tons collected 2019

| Month | Tons Collected | Marketable Tons |
|--------------|----------------|-----------------|
| January | 1406 | 1262 |
| February | 1095 | 984 |
| March | 1076 | 966 |
| April | 1168 | 1049 |
| May | 1219 | 1095 |
| June | 1243 | 1116 |
| July | 1266 | 1137 |
| August | 1228 | 1103 |
| September* | 1099 | 747 |
| October | 1223 | 831 |
| November | 1075 | 731 |
| December | 1304 | 886 |
| Total | 14402 | 11907 |

The asterisk on the month of September denotes the month when the updated contamination rate went into effect. In late July and early August of 2019, the Office of Sustainability requested that Waste Management conduct a recycling audit to look at how much of the total recycling tonnage collected from the residential curbside collection program was refuse or contamination. Waste Management analyzed collections from two different days, one collected during the red recycle routes and one collected during the blue recycle routes. Based on the analysis, it was determined the updated contamination rate was 32% rather than 10.2%. However, this percentage varies on a monthly basis, and it is estimated that the contamination rate for the calendar year was closer to 20%.

The total tons of recycling collected in 2019 has shown a slight decrease from the 2018 calendar year. As a percentage of the refuse collected, which is the total of recycling tonnage and garbage collection, the average for 2019 is 23.2%. When the amount of contamination is considered, the percentage of recycling drops to 19% of the overall residential waste stream.

Reporting and Disclosure Tools

The Office of Sustainability is consistently utilizing online reporting tools to track progress in certain sustainability-related areas. We recently gained access to the LEED for Cities and Communities platform from the US Green Building Council (USGBC) and will be utilizing this platform in the future. We have continued to report to the CDP, formerly the Carbon Disclosure Project, since 2015.

LEED FOR CITIES AND COMMUNITIES

In 2019, the first round of participants completed the newly updated LEED for Cities and Communities program through the US Green Building Council (USGBC). While Winston-Salem was not among these participants, it is expected to be completed in 2020. Compared to the STAR Communities framework, which was previously used by the Office of Sustainability, the LEED for Cities platform is more general and allows more flexibility in measuring our own data. The LEED for Cities framework consists of seven categories consisting of prerequisites and credit opportunities. The detailed framework with associated point values can be found in Appendix A.

The certification levels possible for us to achieve are consistent with the general LEED rating system used for buildings. Those certification levels are as follows:

- 40-49 is Certified
- 50-59 is Silver
- 60-79 is Gold
- 80-100 is Platinum

CDP REPORTING

The Office of Sustainability has been reporting greenhouse gas and climate adaptation and mitigation efforts to CDP since 2015, with our data becoming public in 2016. This reporting system is a global disclosure system that enables companies, cities, states, and regions to measure and manage their environmental impacts. Over 700 cities worldwide participate in this disclosure system, about 200 more than reported in 2018. Two-hundred and seven of the cities reporting around the world are from North America, 21 more than 2018. Our recent reporting earned us a score of C on a scale

ranging from D- to A. This score puts us in the 'Awareness' band. The score did decrease from the previous year, when we earned a B. Part of the reason for this is due to certain changes in the questionnaire. There were new sections and questions added that were not asked in 2018, some of which were left blank. Appendix A shows a graphic representation of our score.

Social Media Efforts

The Office of Sustainability has begun using social media to boost awareness of sustainability among citizens. Awareness of sustainability was low in the community as well as the efforts of the Office of Sustainability. The Office of Sustainability began using the city's Twitter and Facebook accounts to spread awareness and demonstrate that the City of Winston-Salem supports sustainability efforts. Through Twitter, the Office created the hashtag #sustainableWSNC to identify the tweets that specifically address the topic.

In the fall of 2019, beginning September 11 and ending October 8, the Office of Sustainability participated in the #RecycleRightNC recycling social media campaign to help spread awareness of correct recycling practices. This campaign was coordinated by the North Carolina Department of Environmental Quality Division of Environmental Assistance and Customer Service (DEACS). DEACS provided images and suggested posts for communities across North Carolina to share via social media in an effort to standardize recycling education statewide and reduce confusion for recyclers.

Below is a short list of some of the more popular posts from that campaign:

- Bagging your recyclables? Time to quit! This is the number 1 contaminant in recycling facilities. When plastic bags enter the recycling system, they tangle gears and shut down the sorting machines. So leave those recyclables loose and free in your curbside bins! #RecycleRightNC
- A common question we get is about which lids and caps to keep on and which to throw out. The graphic below should help clear this up! Screw caps include all plastic bottles, while the lids applies to glass. Aluminum cans can have lids off or keep lids on as long as they are pushed inside so as to not be a hazard to anyone handling the items. #RecycleRightNC
- Confused about which plastics can be recycled? Now you know — bottles, tubs, jugs and jars are what to put in the recycling bin. When in doubt, throw it out! #RecycleRightNC

Community Sustainability Program Committee

2019 was the first year the Community Sustainability Program Committee began meetings. In September 2018, City Council recommended the Office of Sustainability re-establish the Community Sustainability Program Committee to advise on the development and implementation of sustainability goals in the city. This committee previously functioned from 2008 until 2013. .

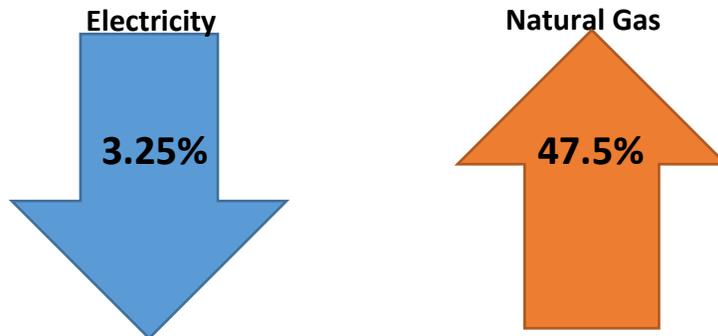
The committee's tasks are:

- Advise on current priorities set forth by the Office of Sustainability
- Generate a work plan for future goals
- Produce an annual report
- Oversight of BEE CITY USA activities and initiatives

Municipal Greenhouse Gas Emissions

TOTAL CO₂ EMISSIONS

Emissions from 2008 to 2019



Total greenhouse gas emissions from the baseline year of 2008 to 2019 are virtually the same. When broken down by emissions source, however, there has been a decrease in electricity use and an increase in natural gas use, as illustrated above. From 2018 to 2019, total GHG emissions increased from 152,873 tons in 2018 to 154,550 tons, or 1.1%, due primarily to the increase in electricity consumption in waste water collection and treatment with a secondary contribution from the new Union Station and Winston Lake Pool.

In 2020, we expect to see a decrease in total GHG emissions because of the COVID-19 pandemic. As a result of the public health crisis, a majority of employees were working from home, and therefore less overall energy and natural gas were being used in city facilities and less fuel was being used by city vehicles. However, it is important to remember that as the city adds new facilities, GHG emissions will also increase.

To maintain consistency with previous reports, calculations assume 2.1 pounds of CO₂ emitted for each kWh consumed. The original 2008 GHG report used this multiplier under the assumption that additional coal was burned to produce each additional kWh (per ICLEI recommendations). Duke Energy's published multiplier in 2005 was 1.29 lbs/kWh, and it dropped to 0.96 lbs/kWh in 2017 as Duke Energy's generation replaced coal with natural gas. The utility's energy generation in 2017 was 35% coal, 35% nuclear, 29% natural gas & 1% hydro/solar generation. Duke Energy expects the multiplier in 2030 to be reduced to 0.71 lbs/kWh as natural gas continues to replace coal-fired generation. Utilizing their current multiplier would decrease total GHG emissions over 80,000 tons. When comparing Winston-Salem's data to another city's data, then the same multipliers must be used by all cities.

| | Electricity | Natural Gas | Vehicle Fuel | Total |
|-------------|-------------|-------------|--------------|----------------|
| 2008 | 131,897 | 3,625 | 19,015 | 154,537 |
| 2009 | 126,850 | 8,050 | 18,294 | 153,194 |
| 2010 | 122,560 | 7,300 | 20,532 | 150,392 |

| | | | | |
|-------------------------|---------|-------|--------|----------------|
| 2011 | 121,291 | 6,800 | 20,507 | 148,598 |
| 2012 | 122,000 | 6,980 | 20,853 | 149,833 |
| 2013¹ | 114,786 | 6,065 | 19,075 | 139,926 |
| 2014 | 116,032 | 6,113 | 19,409 | 141,554 |
| 2015 | 118,902 | 5,500 | 19,010 | 143,412 |
| 2016 | 118,727 | 6,033 | 19,717 | 144,477 |
| 2017 | 114,911 | 6,690 | 19,800 | 141,401 |
| 2018 | 125,832 | 7,721 | 19,320 | 152,873 |
| 2019 | 127,604 | 7,626 | 19,320 | 154,550 |

Table 3: CO2 emissions from City Operations by sector

CO₂ PER SQUARE FOOT

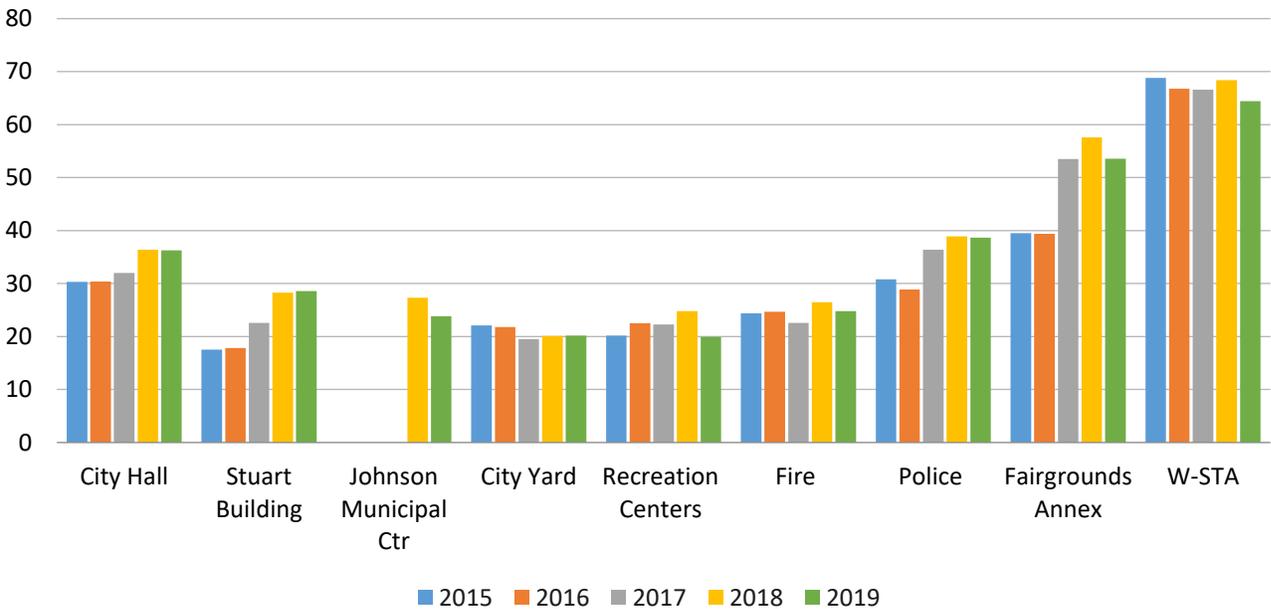
Analyzing our city operations, City/County Utilities and WSDOT cause over 80% of GHG emissions. Contributing factors include water/pumping, street lighting, and traffic signals, where there is no relationship to square footage. Entertainment areas such as the annex and fairgrounds are dominated by electric energy that is not utilized within buildings. The total CO₂ per square foot can be broken down among several department categories with specific buildings that are summarized in Table 3 below. The average CO₂ per square foot for the city's buildings is approximately 33 lbs/square foot. Figure 2 shows how each facility's CO₂ per square foot has changed over five years. Note that the Joycelyn V. Johnson Municipal Services Center only has one year's worth of data because it was not a city-owned facility prior to 2018.

Table 4: Pounds of CO2 per square foot in select facilities

| | Electricity (kWh) | Natural Gas (Therms) | Annual CO₂ Emissions (Tons) | Square Footage | Pounds of CO₂ per SF |
|------------------------------|--------------------------|-----------------------------|---|-----------------------|--|
| City Hall | 1,099,144 | 22,036 | 1,291 | 71,125 | 36.3 |
| Stuart Building | 2,073,894 | 0 | 2,178 | 152,315 | 28.6 |
| Johnson Municipal Ctr | 724,004 | 6,011 | 797 | 67,000 | 23.8 |
| City Yard | 1,252,224 | 42,383 | 1,578 | 156,350 | 20.2 |
| Recreation Centers | 1,935,316 | 37,741 | 2,266 | 227,362 | 19.9 |
| Fire Department | 1,212,731 | 31,429 | 1,468 | 118,343 | 24.8 |
| Police Department | 4,553,814 | 59,554 | 5,151 | 266,363 | 38.7 |
| Fairgrounds Annex | 2,586,908 | 32,056 | 2,915 | 108,847 | 53.6 |
| W-S Transit Authority | 1,163,503 | 36,523 | 1,448 | 44,970 | 64.4 |
| TOTAL | 16,601,538 | 267,733 | 20,181 | 1,212,675 | 31.5 |

¹ 2013 is the year the LJVM 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 decrease in emissions.

Figure 2: Pounds of CO2 per square foot from 2015-2019 per facility



Electric Energy Use

Electric use for city operations increased from 119.8 million kWh's to 121.5 million kWh's (+1.4%) from 2018 to 2019. Utilities operations accounted for most of this increase with an additional two million kWhs consumed through the wastewater collection and treatment process. Other energy use increases came from recent upgrades and re-opening of certain facilities, such as fire stations 7 and 9 which were upgraded and reoccupied, Union Station which ended construction and became occupied, and Corpening Plaza reopening.

City facilities where there were decreases in energy use include the 6th/Cherry/Trade Street parking deck, street lights, entertainment facilities and Winston-Salem Transit Authority facilities. The decreases at the parking deck and in street lights were due to LED light installations. The city continues to see decreasing electricity use and increased savings trends due to LED upgrades. LED installations alone were responsible for a reduction of almost 300,000 kWh, and savings of \$539,430 in 2019. When combined with 2018 data, total reductions due to LED light replacements and upgrades is nearly 750,000 kWh. The total amount saved from street light and DOT parking upgrades in two years is \$676,015. Installations of LEDs in other facilities in the future is suggested for further energy and financial savings.

Electricity use since 2014 (electricity baseline)

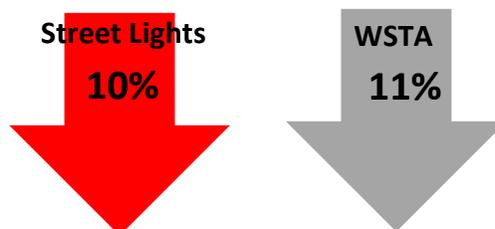
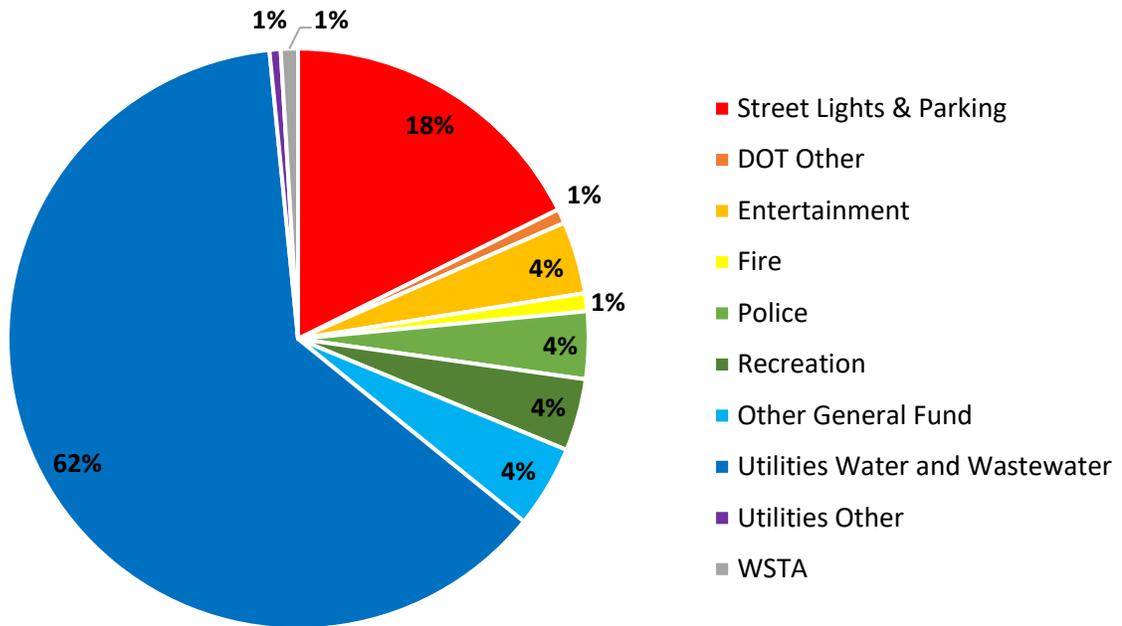


Figure 3: Electricity use from City Operations by sector



Natural Gas Use

Natural Gas consumption was 1.2% less in 2019 compared to 2018. Like in 2018, the City/County Utilities accounts for 66% of usage due to the bio-solids dryer at the Elledge Wastewater Treatment Plant. Most departments decreased usage or had similar usage to 2018, meaning that the increase of natural gas usage comes almost solely from the bio-solids dryer.

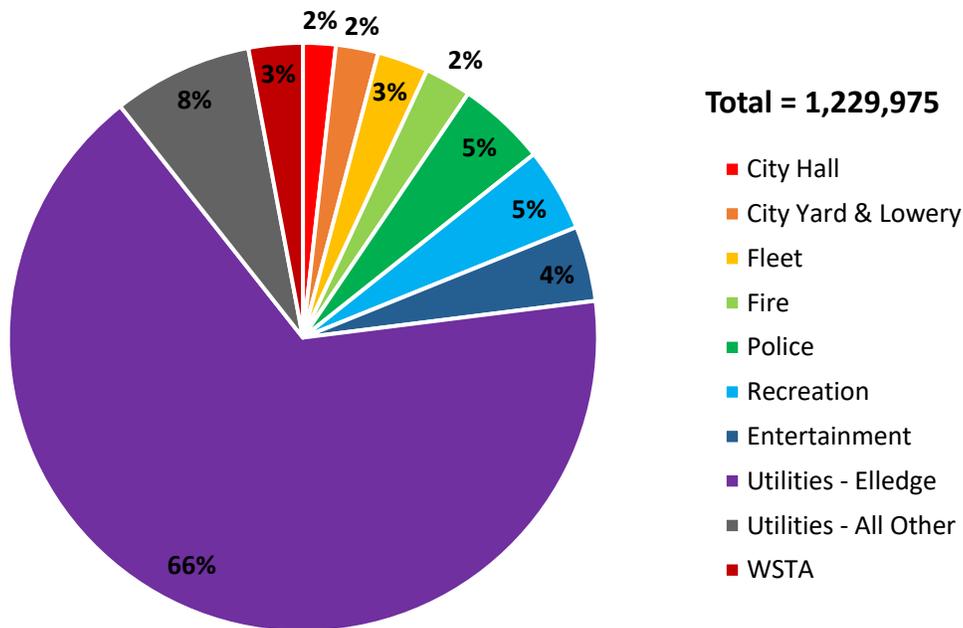


Figure 4: Natural gas use summary in 2019 by department in therms

Degree Days

A tracking tool often used to evaluate the performance of either new equipment or major upgrades to heating and cooling systems within the City of Winston-Salem is known as degree-days. The two primary uses for degree-days in buildings are:

- to estimate energy consumption and carbon dioxide emissions due to space heating and cooling for new build and major renovations
- for on-going energy monitoring and analysis of existing buildings based on historical data

Simply translated, degree-days are calculated from the difference between a reference base temperature and the average temperature of the day. When we are below that base, energy, along with greenhouse gas, is being generated for heating (a heating degree-day). When we are above a base temperature of 60 degrees we are producing cooling which produces energy and greenhouse gases for cooling (a cooling degree-day).

Both cooling and heating degree days decreased in 2019 compared to 2018. This returns both levels closer to what they were in 2017. See Figure 5 below for the summary of heating and cooling degree days since the baseline year of 2008.

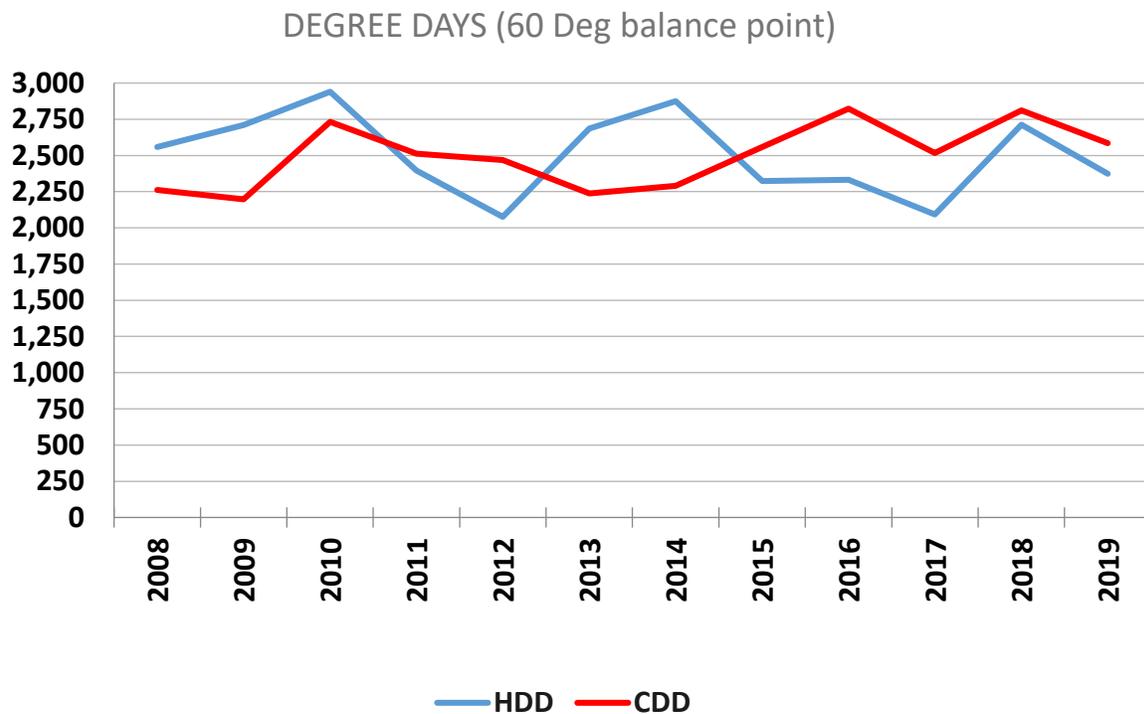


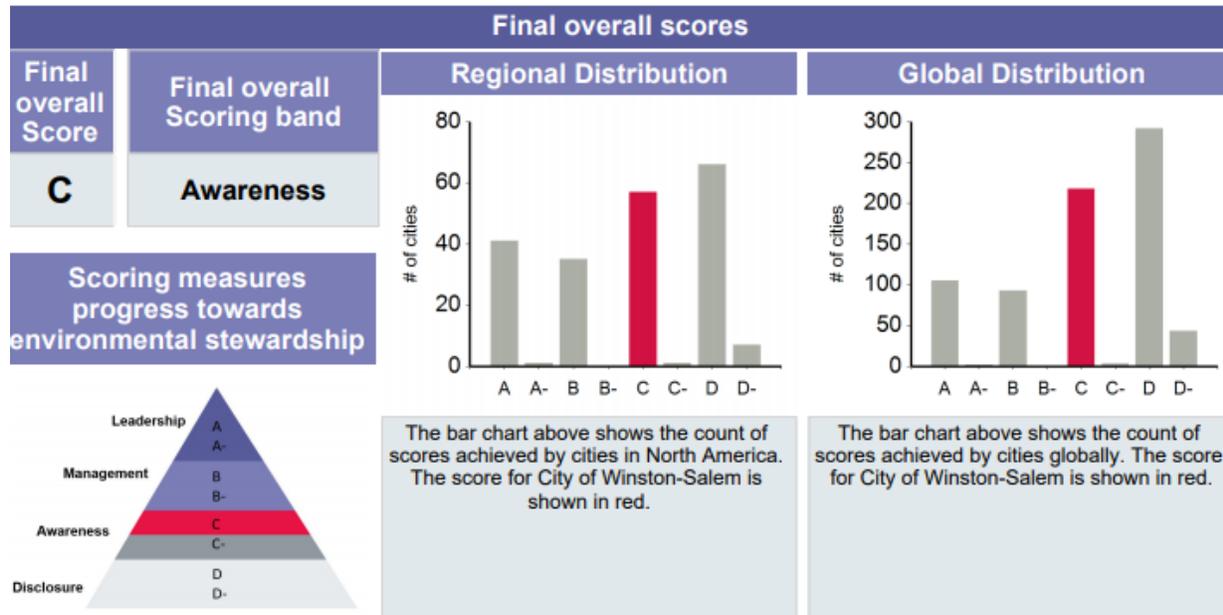
Figure 6: Heating and cooling degree days overtime at a 60 degree balance point

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 and social media use, and with recommendations from the Community Sustainability Program Committee, 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. With certain commitments made to programs like Climate Mayor which state the city's support of emissions reduction efforts, it is necessary to measure these emissions so we can work to reduce them. This year, total emissions increased by 1.1% from the previous bringing us to virtually the same tonnage reported in the 2008 baseline year. The increase in emissions from 2018 to 2019 is primarily from the increase in electricity consumption in waste water collection and treatment operations and secondarily from the new Union Station and Winston Lake Pool operations. The Office will continue efforts with assistance from the Community Sustainability Program Committee to reinvigorate sustainability programming.

Appendix A

Figure 7: CDP score summary



Appendix B

Figure 8: LEED for Cities Scorecard (continues to next page)

| Y | | | ? | | | N | | | Cities Communities | |
|---|---|---|---|--|--|---|--------------|--------------|---------------------------|--|
| | 0 | 0 | 0 | INTEGRATIVE PROCESS | | | POSSIBLE: 5 | POSSIBLE: 5 | | |
| | | | | Credit | Integrative Planning and Leadership | | 1 | 1 | | |
| | | | | Credit | Green Building Policy and Incentives | | 4 | 4 | | |
| | 0 | 0 | 0 | NATURAL SYSTEMS AND ECOLOGY | | | POSSIBLE: 9 | POSSIBLE: 9 | | |
| | | | | Prereq | Ecosystem Assessment | | REQUIRED | REQUIRED | | |
| | | | | Credit | Green Spaces | | 2 | 2 | | |
| | | | | Credit | Natural Resources Conservation and Restoration | | 2 | 2 | | |
| | | | | Credit | Light Pollution Reduction | | 1 | 1 | | |
| | | | | Credit | Resilience Planning | | 4 | 4 | | |
| | 0 | 0 | 0 | TRANSPORTATION AND LAND USE | | | POSSIBLE: 15 | POSSIBLE: 15 | | |
| | | | | Prereq | Transportation Performance | | 6 | 6 | | |
| | | | | Credit | Compact, Mixed Use and Transit Oriented Developm | | 2 | 2 | | |
| | | | | Credit | Access to Quality Transit | | 1 | 1 | | |
| | | | | Credit | Alternative Fuel Vehicles | | 2 | 2 | | |
| | | | | Credit | Smart Mobility and Transportation Policy | | 2 | 2 | | |
| | | | | Credit | High-Priority Site | | 2 | 2 | | |
| | 0 | 0 | 0 | WATER EFFICIENCY | | | POSSIBLE: 11 | POSSIBLE: 11 | | |
| | | | | Prereq | Water Access and Quality | | REQUIRED | REQUIRED | | |
| | | | | Prereq | Water Performance | | 6 | 6 | | |
| | | | | Credit | Integrated Water Management | | 1 | 1 | | |
| | | | | Credit | Stormwater Management | | 2 | 2 | | |
| | | | | Credit | Smart Water Systems | | 2 | 2 | | |
| | 0 | 0 | 0 | ENERGY AND GREENHOUSE GAS EMISSIONS | | | POSSIBLE: 30 | POSSIBLE: 30 | | |
| | | | | Prereq | Power Access, Reliability and Resiliency | | REQUIRED | REQUIRED | | |
| | | | | Prereq | Energy and Greenhouse Gas Emissions Performan | | 14 | 18 | | |
| | | | | Credit | Energy Efficiency | | 4 | 4 | | |
| | | | | Credit | Renewable Energy | | 6 | 6 | | |
| | | | | Credit | Low Carbon Economy | | 4 | - | | |
| | | | | Credit | Grid Harmonization | | 2 | 2 | | |

| | | | | | | |
|---|---|---|---|--|--------------|--------------|
|  | 0 | 0 | 0 | MATERIALS AND RESOURCES | POSSIBLE: 10 | POSSIBLE: 10 |
| | | | | Prereq Solid Waste Management | REQUIRED | REQUIRED |
| | | | | Prereq Waste Performance | 4 | 5 |
| | | | | Credit Special Waste Streams Management | 1 | 1 |
| | | | | Credit Responsible Sourcing for Infrastructure | 2 | 2 |
| | | | | Credit Material Recovery | 1 | - |
| | | | | Credit Smart Waste Management Systems | 2 | 2 |

| | | | | | | |
|---|---|---|---|---|--------------|--------------|
|  | 0 | 0 | 0 | QUALITY OF LIFE | POSSIBLE: 20 | POSSIBLE: 20 |
| | | | | Prereq Demographic Assessment | REQUIRED | REQUIRED |
| | | | | Prereq Quality of Life Performance | 6 | 6 |
| | | | | Credit Trend Improvements | 4 | 4 |
| | | | | Credit Distributional Equity | 4 | 4 |
| | | | | Credit Environmental Justice | 1 | 1 |
| | | | | Credit Housing and Transportation Affordability | 2 | 2 |
| | | | | Credit Civic and Community Engagement | 2 | 2 |
| | | | | Credit Civil and Human Rights | 1 | 1 |

| | | | | | | |
|---|---|---|---|-------------------|-------------|-------------|
|  | 0 | 0 | 0 | INNOVATION | POSSIBLE: 6 | POSSIBLE: 6 |
| | | | | Credit Innovation | 6 | 6 |

| | | | | | | |
|--|---|---|---|--------------------------|-------------|-------------|
|  | 0 | 0 | 0 | REGIONAL PRIORITY | POSSIBLE: 4 | POSSIBLE: 4 |
| | | | | Credit Regional Priority | 4 | 4 |

| | | | | | | |
|----------|----------|----------|----------|--------------|------------|------------|
| 0 | 0 | 0 | 0 | TOTAL | 110 | 110 |
|----------|----------|----------|----------|--------------|------------|------------|

| | | | |
|-----------|--------|-------|------------|
| 40-49 | 50-59 | 60-79 | 80+ Points |
| CERTIFIED | SILVER | GOLD | PLATINUM |