A Community Carbon Dioxide Scorecard for Leon County 2001-2017

Version 3.1

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Executive Summary

This document puts in one place information about multiple aspects of carbon dioxide (CO_2) production in Leon County over a 17-year time span. This document can be used to inform planning for a sustainable energy future in Tallahassee/Leon County, and to monitor progress toward objectives and goals adopted as part of a community planning process that is expected to start in 2018. While specific goals have not been set yet, they are likely to be ambitious, with a 17- to 30-year time horizon for approaching or reaching 100% net renewable energy community-wide. (Net 100% renewable energy would mean that enough renewable energy is produced locally to meet all local needs, even if some non-renewable energy has to be used on occasion and some renewable energy is exported.)

CO_2 production due to stationary and mobile sources combined has been essentially stable over the period 2008-2017, while per-capita combined CO_2 production has declined by about 18% over that period. This decline has been due entirely to reductions in CO_2 production from energy used by stationary sources (buildings, homes, etc).

Mobile sources show no change in per capita or per vehicle CO_2 production. They do show an increase in total CO_2 production consistent with increase in population and number of vehicles. Mobile sources account for 46% of the combined total of mobile and stationary CO_2 production in 2017, and stationary sources for 54%.

Total CO_2 production from stationary sources (City of Tallahassee electric and gas, and the Leon County customers of Talquin Electrical Cooperative) rose steadily 2001-2008 and has since fallen to 2001 levels.

Because of efficiency improvements at City of Tallahassee (COT) generating stations and a switch to natural gas as the only fuel, the CO_2 produced per megawatt-hour of electricity

generation fell steadily from 1991 to 2013, has been stable 2014-2018, and is expected to fall again as more solar generating capacity and more efficient generators are brought on line 2018-2020. Talquin Electric Cooperative will also be bringing some photovoltaic generating capacity on line in the near future. The declines in per-capita Leon County CO_2 production due to electricity production are almost entirely attributable to these improvements in generation efficiency.

The City of Tallahassee has also achieved savings through a wide variety of demand reduction interventions with individual commercial and residential customers, and TEC has an active energy audit program.

Commercial customers accounted for 54% of Leon County CO_2 production from electricity and natural gas in 2017, and residential customers for 46%.

CO_2 releases attributable to residential gas use decreased by about 25% on a per-customer basis over the period 2003—2012, and have since remained near 2012 levels.

There have been increases over the period in both summer and winter average temperatures. Warmer winters may account in part for a steady decrease in natural gas use per residential customer. Electricity use has been stable in spite of hotter summers.

Miles driven and gallons of gasoline consumed have risen as population and number of vehicles have risen, with little or no change in miles or gallons per vehicle or per capita.

Ridership on Star Metro peaked in 2011 and has since declined.

The percentage of the Leon County workforce commuting alone in a car is just over 80% throughout the period 2001-2016. About 2.7% of Leon County workers commuted on foot or by bicycle in 2013-15.

Just over 0.5% of new vehicles sold in Florida in 2017 were battery electric or plug-in hybrid vehicles, as against 1.2% nationally and 4.9% in California.

CO_2 emissions are about 88% of all greenhouse gas emissions in Florida. In Leon County, releases of methane from the landfill, and leaks of natural gas from the city's distribution system, produce the equivalent of 2.75% of all accounted-for CO_2 emissions, including those from propane and jet fuel as well as the stationary and mobile sources accounted for in this document.

Contents

Introduction

Purpose: To put in one place information about multiple aspects of carbon dioxide production in Leon County to guide planning by Sustainable Tallahassee and community partners.

Such planning would help us identify a path acceptable to our community and consistent with other sustainability efforts to achieve substantial reductions in production of CO_2 as our part in the global effort to minimize human-caused climate change. This document can be used to monitor progress toward objectives and goals adopted as part of a community planning process. Goals are likely to be ambitious, with a 17- to 30-year time horizon for approaching or reaching 100% net renewable energy community-wide.

Perspective: CO_2 emissions attributable to energy use and decisions by Leon County residents.

Two major domains are included:

Stationary sources (homes, businesses, offices, factories)
Mobile sources (cars, trucks, busses, motorcycles)

The focus of this report is on total CO_2 emissions and factors contributing to those emissions. "Percent of energy from renewable sources" bears an inverse relationship to CO_2 emissions. We believe the focus here should be on reducing net CO_2 production, ideally to zero. CO_2 emissions are about 88% of all greenhouse gas emissions in Florida.

Reductions in CO_2 production can result from **less use of energy to do useful work** (for example, driving fewer miles or resetting thermostats for heating and cooling), from **more efficient use of energy** (for example more efficient light bulbs, electric power generators, or automobiles) and/or from **changes in the mix of energy sources** (e.g. from natural gas to solar)**.** The optimal path for Leon County to reduce CO_2 production over a 17- to 30-year period will include contributions from all three of these approaches, but their relative importance remains to be determined by and for our community.

Time frame: All measures are calculated with as long a baseline as possible (at least ten years), and should be calculated for each new year of data going forward.

Geographic scope: Leon County. This report includes data from both the City of Tallahassee and Talquin Electric Cooperative for uses of electricity. See end-notes for more detail about geographic scope.

Data sources: Data are obtained from a wide variety of publicly available sources: US Energy Information Administration, US Environmental Protection Agency, Florida Department of Transportation, Florida Department of Highway Safety, Florida Department of Revenue, Florida Public Service Commission, City of Tallahassee (annual reports to bondholders and ten-year site plans), Star Metro transit authority in Tallahassee, and various individual staff members in

these agencies. Conversion factors are obtained from websites supported by the US Environmental Protection Agency. See end-notes for more detail on sources.

Organization of this document:

This document addresses three domains: stationary sources (buildings); mobile sources (vehicles); and the combination of these two. As more and more electric vehicles enter service, the distinction between stationary and mobile sources will be less sharp.

Within each of these domains, we first include CO_2 production itself; then intermediate contributors to CO_2 production (for example, number of vehicle miles driven); and then activities by governments or community organizations that contribute to higher or lower CO_2 production (for example, number of home energy audits completed).
Limitations: Some relatively small contributors to greenhouse gas emissions do not have time trend data available, or have only Florida data available: jet fuel, liquid propane gas, and methane and other non-CO_2 greenhouse gasses, as well as some aspects of energy demand reduction and of bicycle infrastructure.

Other greenhouse gasses, and other CO_2 sources

This document does not account for:

- CO_2 emitted elsewhere to produce goods and services used here;
- life cycle CO_2 costs of energy production, infrastructure, and distribution;
- CO_2 and methane releases associated with wastewater treatment;
- any additional industrial emissions of greenhouse gasses.

Jet fuel use accounts for 16% of fossil fuel energy used in Florida. Its use is concentrated in the top 10 Florida airports, which account for 95% of passengers. Tallahassee's airport accounts for just under half of a percent (0.42%) of Florida passengers. If Leon County's share of statewide jet fuel use is also 0.42%, then in 2017 CO_2 from jet fuel would be the equivalent of 1.57% of Leon County CO2 production. This value is tabulated in the report only for the most recent year, as too many assumptions are required to make estimates for earlier years.

The Florida Department of Environmental Protection estimated that for the state in 2010, greenhouse gasses other than CO_2 (methane, sulfur and nitrogen oxides, and hydrofluorocarbons) accounted for 12% of CO_2-equivalents released. The non-CO_2 sources include releases from wastewater treatment and landfills, refrigerants, natural gas distribution systems, and burning of wood for fuel and in wildfires. Of these, only landfill sources and leaks of natural gas during distribution are accounted for here.

Leon County reported to the US EPA that the Leon County Landfill produced 84,700 tons of CO2-equivalents of methane in 2016 (down from 116,145 in 2010). This is about 2.75% of total CO_2 produced in Leon County that year – see Table below. The natural gas distribution system releases natural gas to the atmosphere equivalent to 4500 tons of CO_2 per year. Production of

greenhouse gases other than CO_2 (methane and nitrous oxide) at our power plants is about one tenth of one percent of CO_2 production associated with electricity production and is not accounted for here.

The City of Tallahassee assesses a Public Service Tax of 10% on the value of propane sold in the city. In 2017 $157,000 was collected. Applying the average retail price per gallon of propane in Florida during 2017 ($2.39), and the value of 12.7 pounds of CO_2 released per gallon of propane used, we estimate that propane sold in the city contributed 4172 tons of CO_2 to the atmosphere, or 0.13% of the total. The volume of fuel taxed fell from 940,283 gallons in 2014 to 657,009 gallons in 2017. This is consistent with a general Florida trend to less propane use over the period.

The following Table accounts for CO_2 equivalents of methane released from the Leon County landfill, natural gas (methane) released from the City's natural gas distribution system, CO_2 from burning propane sold in the City of Tallahassee, and CO_2 released from Leon County's share of jet fuel, as well as for CO_2 from energy used by mobile and stationary sources. Methane, propane and jet fuel sources shown here are not addressed in the remainder of the document.

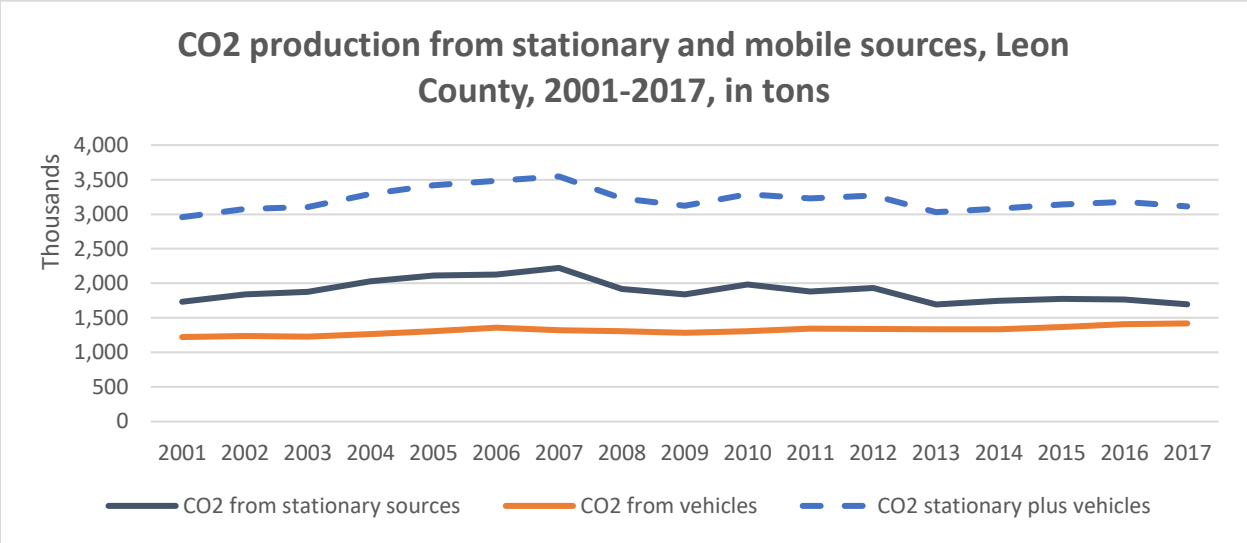
Table. CO_2 produced in Leon County, and percentage by category, in short tons, 2017

	Tons of CO_2 in 2017	% of total
Commercial electric City of Tallahassee	734,057	22.4
Commercial gas City of Tallahassee	107,844	3.3
Residential electric City of Tallahassee	504,705	15.4
Residential gas City of Tallahassee	28,953	0.9
Residential electric Talquin Electric Co-op	242,401	7.4
Commercial electric Talquin Electric Co-op	88,417	2.7
Mobile sources (cars, trucks, buses etc)	1,419,781	43.4
Propane (sold in Tallahassee)	4,172	0.1
Jet fuel (0.42% of state total)	50,996	1.6
Methane from Leon Co landfill and city gas utility (CO_2e)	89,240	2.7
Total	3,240,776	

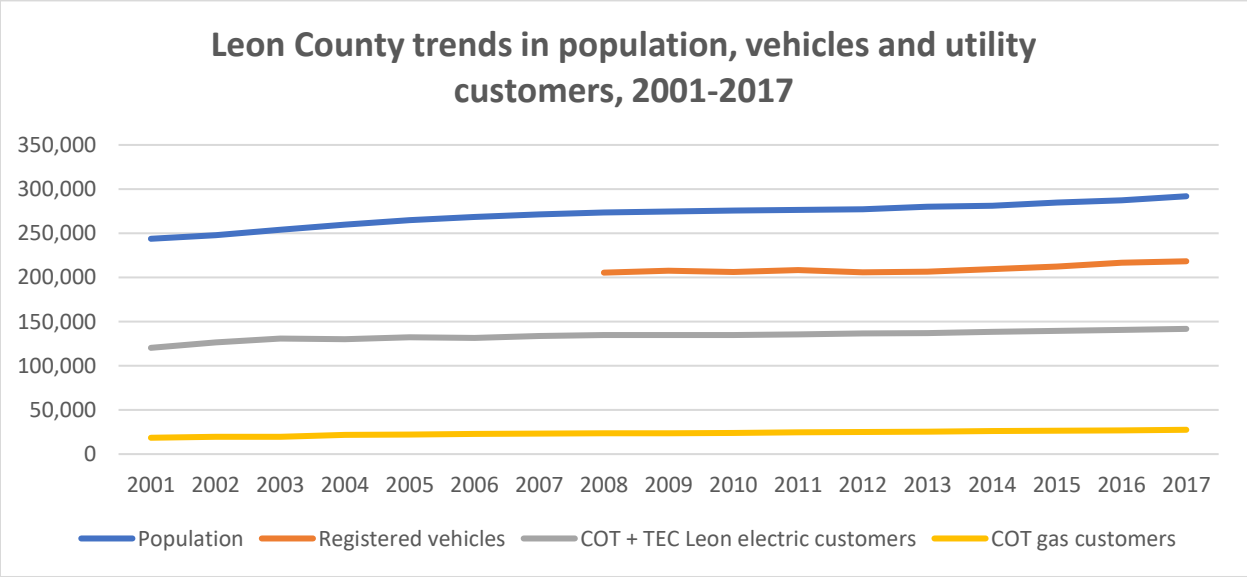
Stationary and mobile sources combined.

CO_2 production

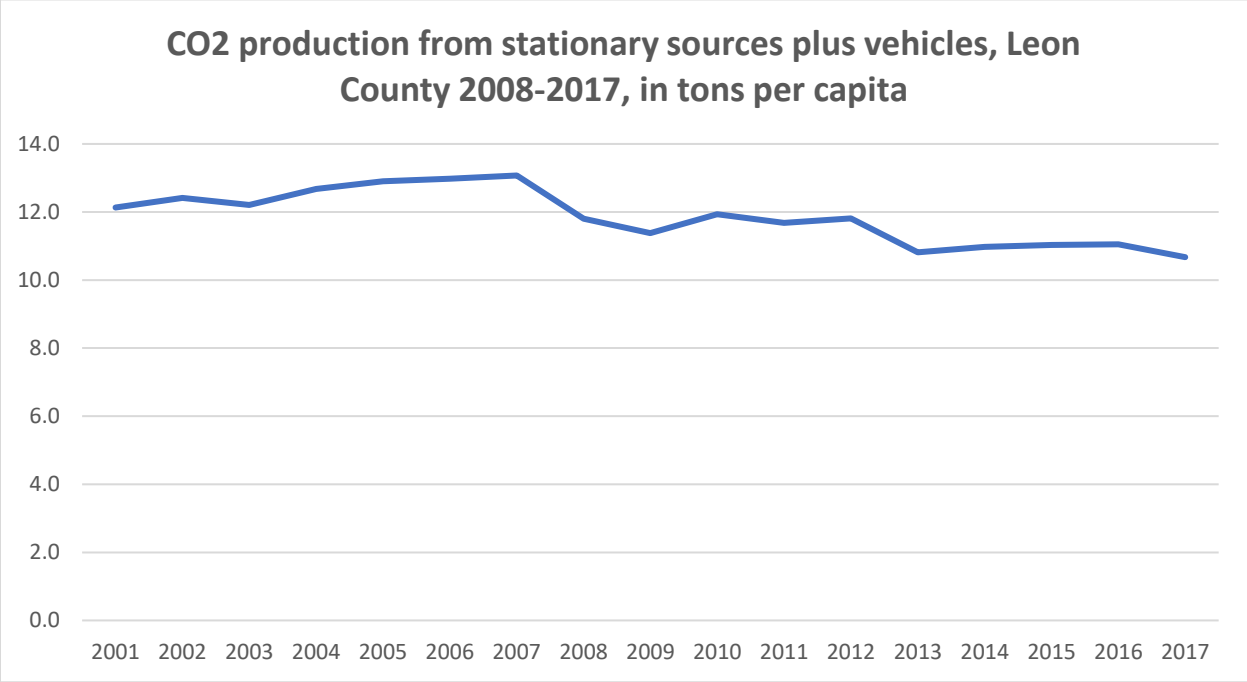
Total annual CO_2 emissions attributable to Leon County residents and businesses (sum of CO_2 totals for stationary and mobile sources) peaked in 2007 and has been essentially stable since 2008, with a falling trend from stationary sources and a rising trend from mobile sources.



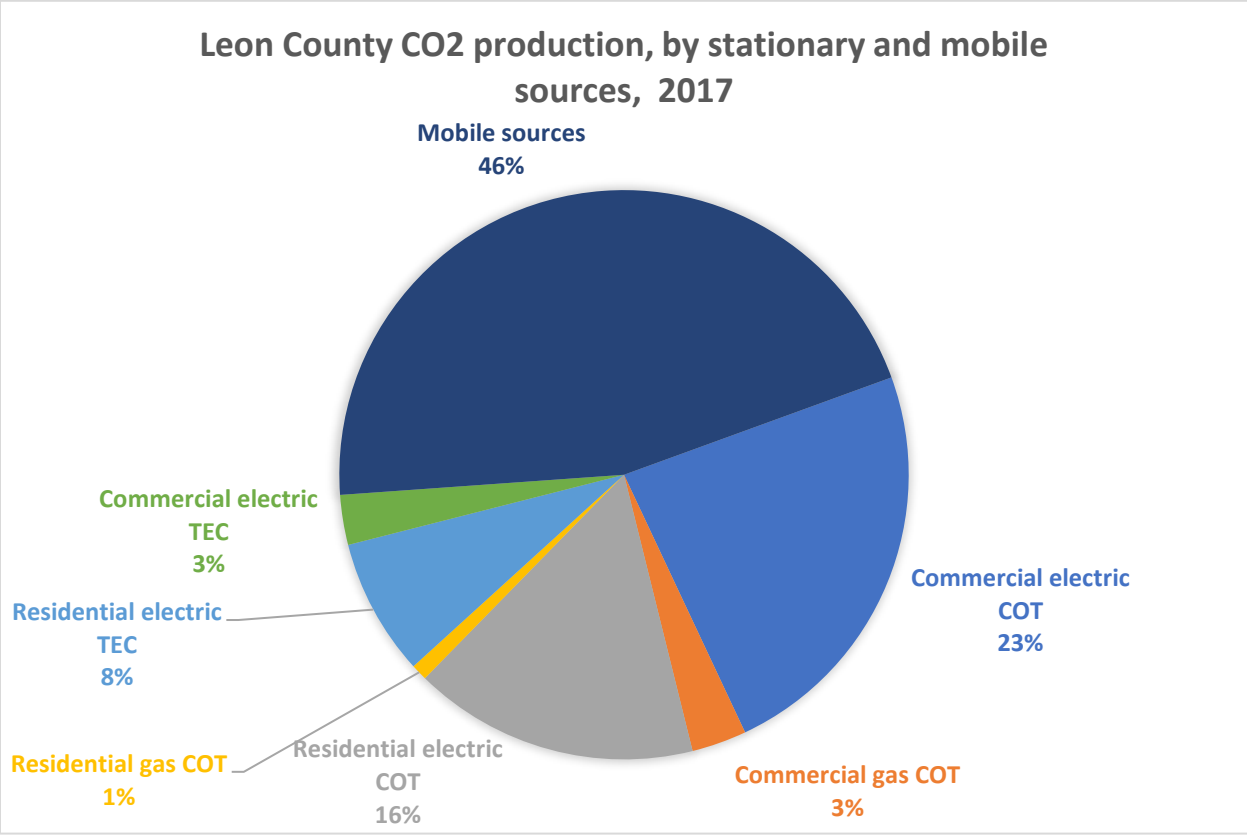
Meanwhile the population of Leon County, the number of electrical customers, the number of natural gas customers, and the number of vehicles have all been steadily increasing.



Adjusted for population growth, the trend in total CO_2 production from stationary and mobile sources combined has been downward from 2008 through 2013, and essentially flat since then. Cumulative decline is about 18%, from 13.1 to 10.7 tons per capita per year. No further decline since 2013, however.



When mobile sources and stationary sources are combined, mobile sources account for 46% of CO_2 production in 2017.

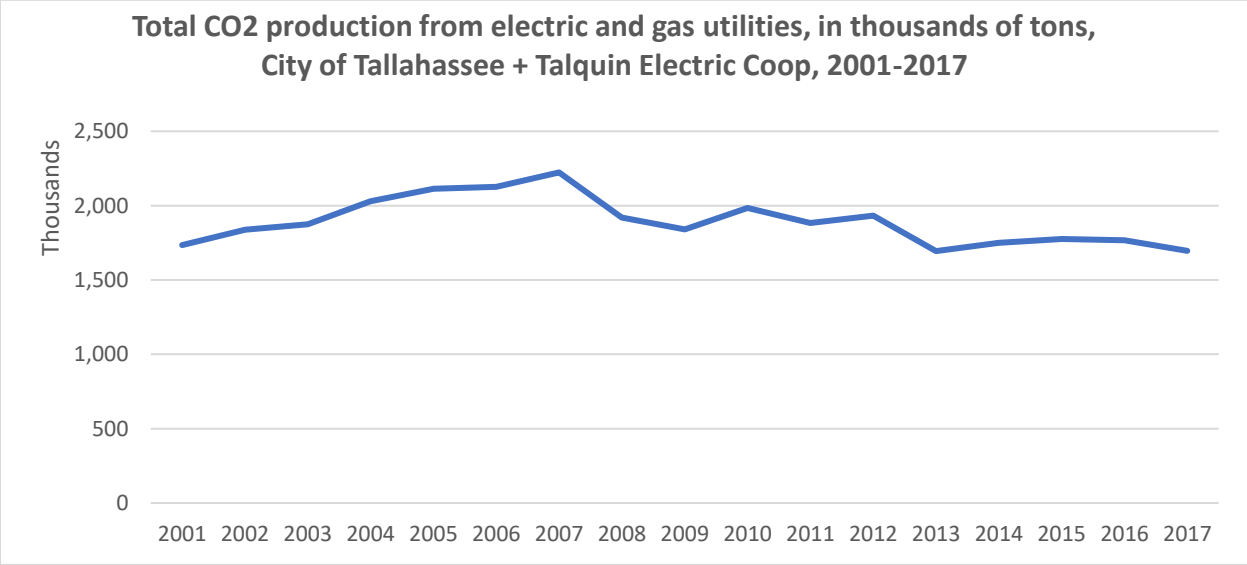


Stationary sources

CO_2 production

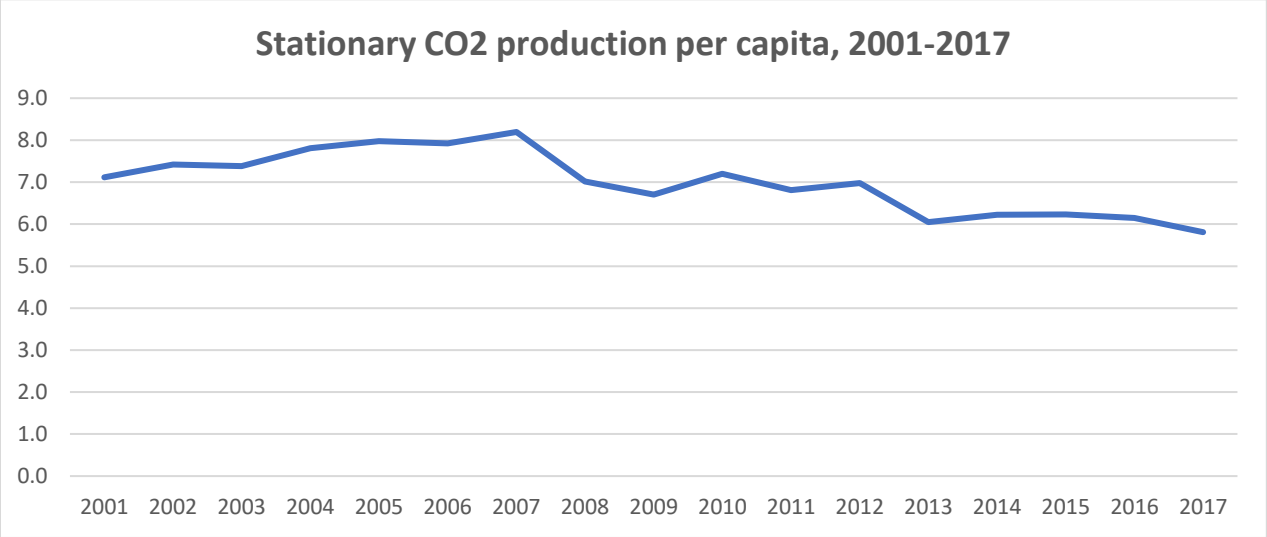
Stationary sources have a fixed location, including houses, office buildings, schools, stores, and factories.

Total CO_2 production from stationary sources in Leon County (Tallahassee city utility plus Talquin Electric) peaked in 2007, fell through 2013, and has been quite stable 2013 to 2017.



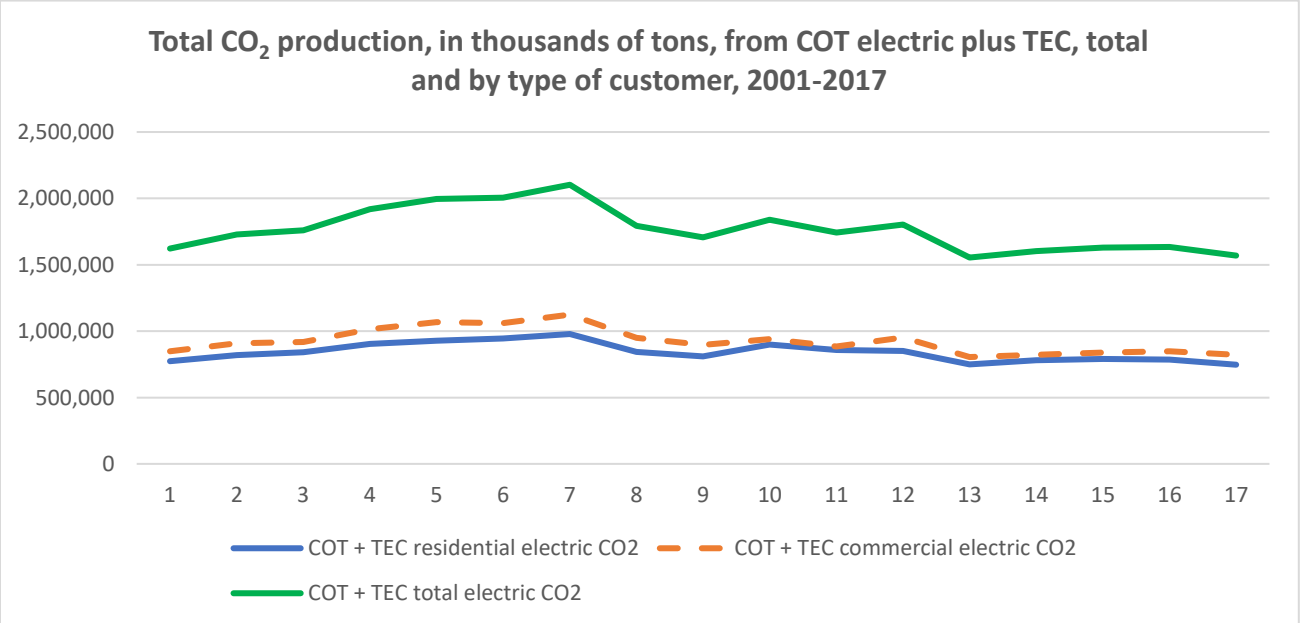
The decline from 2007 – 2013 in total CO_2 mostly reflects a shift from other fossil fuels to natural gas by the City of Tallahassee utility for electricity generation and installation of more efficient electric generating equipment by the City, but also stable or declining per-customer energy use by electric customers and residential gas customers (see below).

On a per-capita basis, CO_2 production from stationary sources (city gas and electric and TEC electric) is down 29% since 2007 (8.2 to 5.8 tons per capita), but stable since 2013.

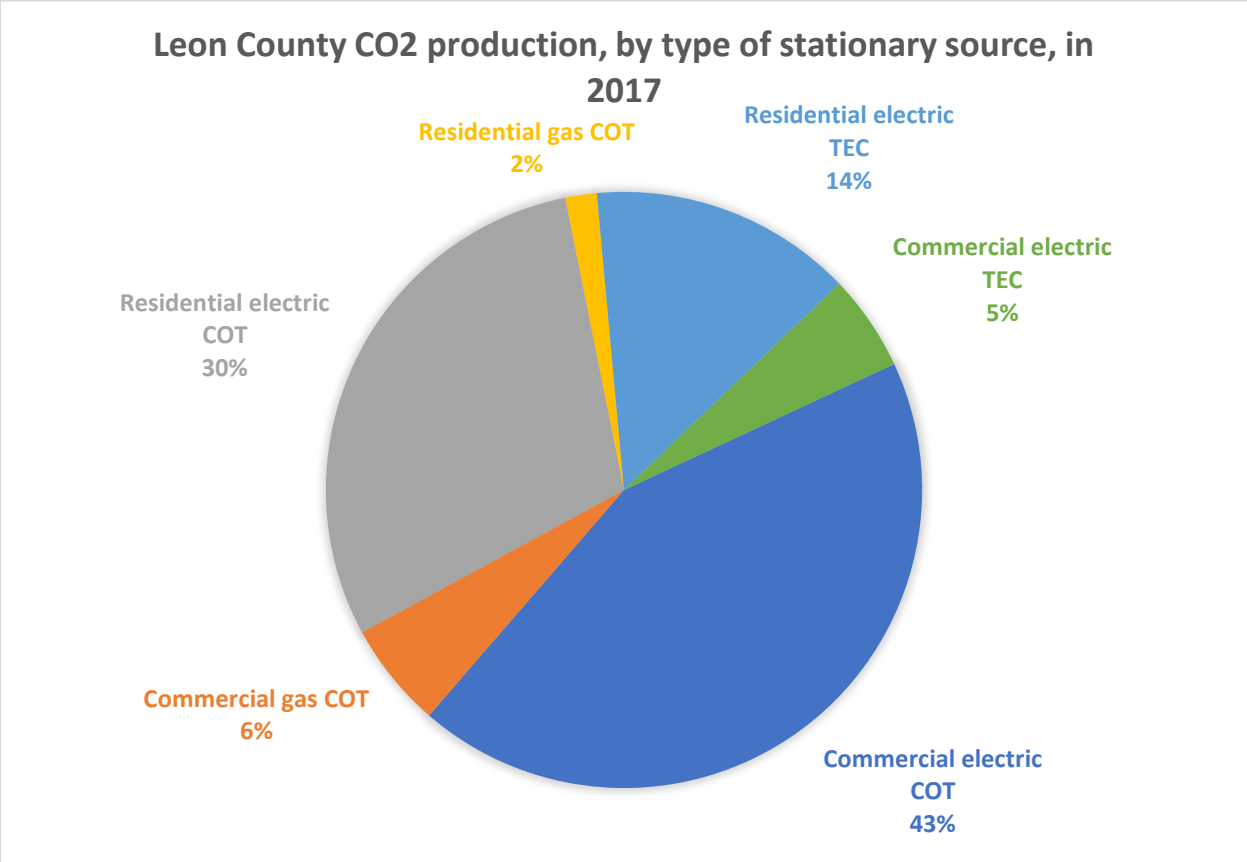


This decline in per-capita CO_2 production reflects reduced energy use per customer, a shift from electricity to natural gas at the customer level, and decreased CO_2 production per MWh of electricity produced by the city utility.

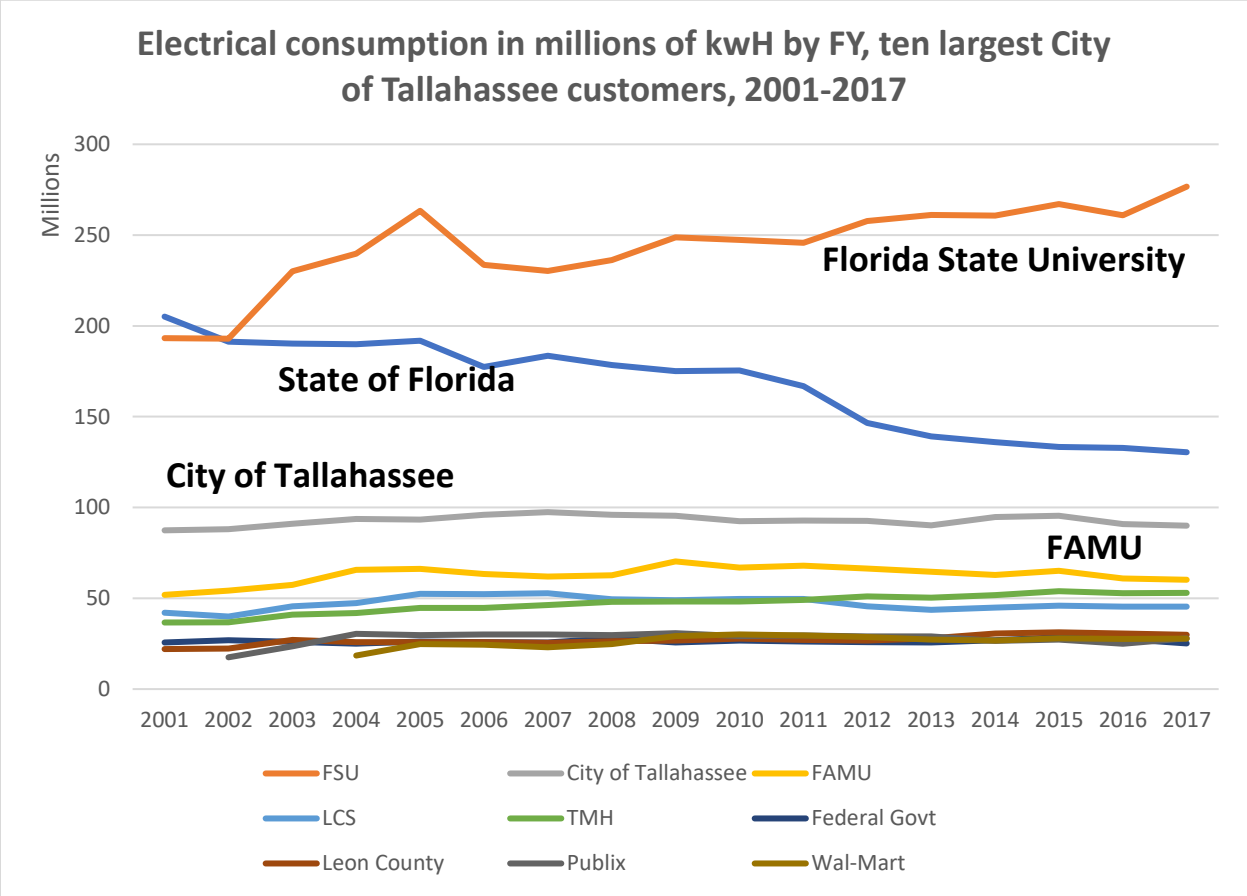
Commercial and residential electricity customers each account for close to half of total CO_2 production from electricity.



For the COT utility in 2017, commercial electrical customers (43%) account for more of total stationary source CO_2 production than residential electrical customers (30%); the reverse is true for the TEC (14 vs 5%). Commercial customers account for somewhat more CO_2 production (54%) than residential customers (46%). Electricity use accounts for much more Leon County CO_2 production (92%) than does natural gas use (8%).



The ten biggest electric customers together used 29% of the Tallahassee utility's electricity in 2017. FSU alone accounted for 10.6%, and Florida state government for 5%.



Note: These consumption data do not account for the number of square feet in each customer's establishment. FSU, FAMU and Tallahassee Memorial Healthcare have steadily added buildings and square feet, while the number of square feet of state-owned office space in Tallahassee has gone down.

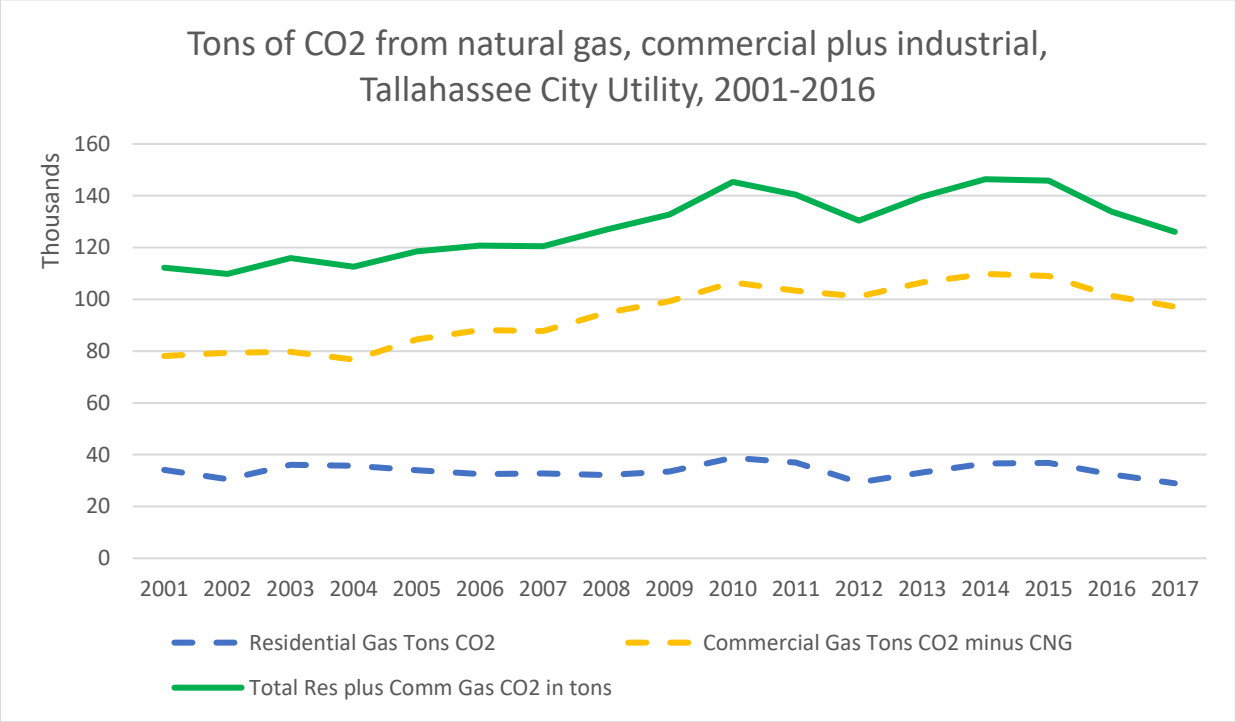
Total electrical energy consumption in kWh, and percentage of total electricity consumption, for ten biggest Tallahassee electric customers, FY 2017.

Customers	*Energy in kWh*	*Percent of total retail sales*
Florida State University	276,691,044	10.59%
State of Florida	130,425,060	4.99%
City of Tallahassee	89,937,800	3.44%
Florida A & M University	60,199,226	2.30%
Tallahassee Memorial Hosp	52,955,069	2.03%
Leon County Schools	45,353,839	1.74%
Leon County Government	29,877,589	1.14%
Publix Markets	27,958,806	1.07%
Wal-Mart	27,770,664	1.06%
Federal Government	25,063,919	0.96%
TOTAL	**766,233,015**	**29.33%**

Together, the ten biggest customers used over 29 % of all electricity used by Tallahassee customers.

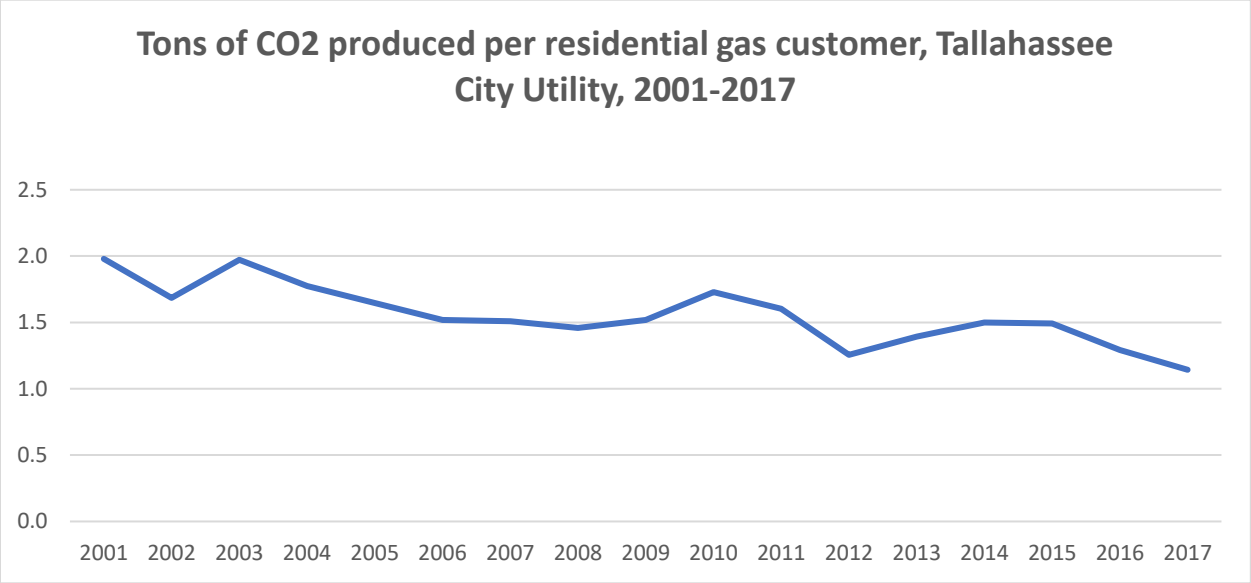
The National High Magnetic Field Laboratory at FSU would be the fifth-largest customer if it was listed separately from FSU, and the rest of FSU would still be #1. Annual electricity consumption by the Mag Lab has been stable over the last ten years.

Total CO_2 releases attributable to stationary natural gas use by both commercial and residential gas customers show little overall change since 2010. CO2 releases due to commercial customers predominate, and increased by 38% from 2004 to 2010 while those due to residential customers were stable. Both show a downward trend in 2016 and 2017.



Numbers of residential and commercial natural gas customers have increased over time. About 10 miles of gas distribution pipelines are added per year.

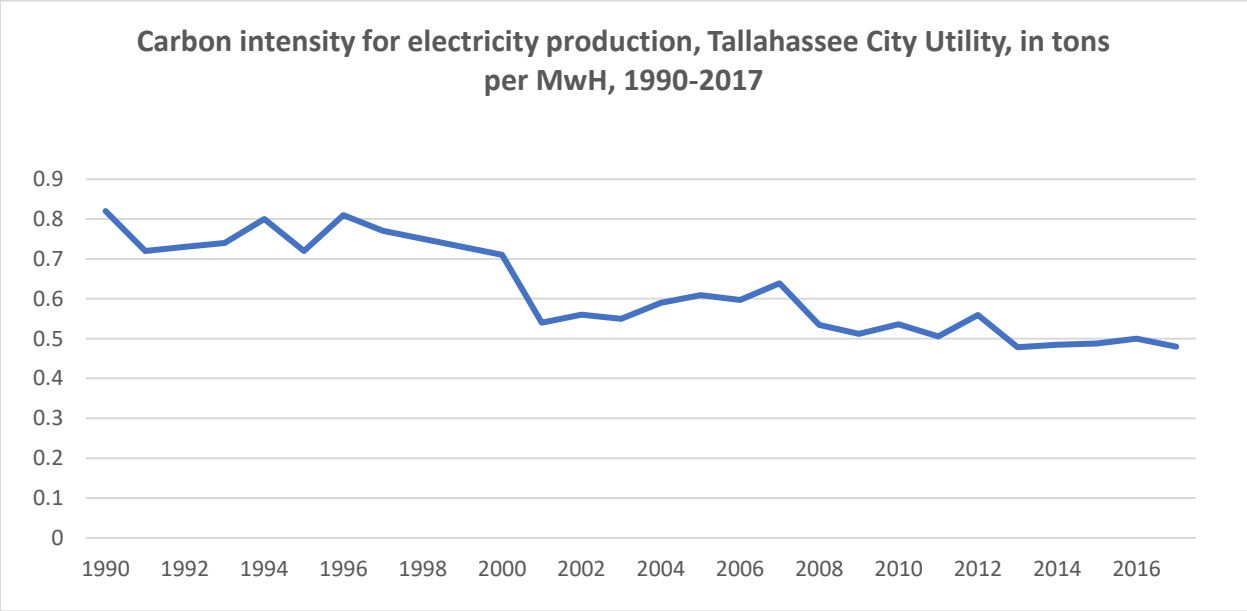
CO_2 production per residential gas customer declined by about ~25% from 2001 to 2012, and has since remained near 2012 levels.



Warmer winters in recent years may be contributing to lower natural gas usage (see heating degree data later in this document). Newer natural gas customers may be less likely to use gas for heat, and new construction is likely more efficient to heat.

Intermediate measures:

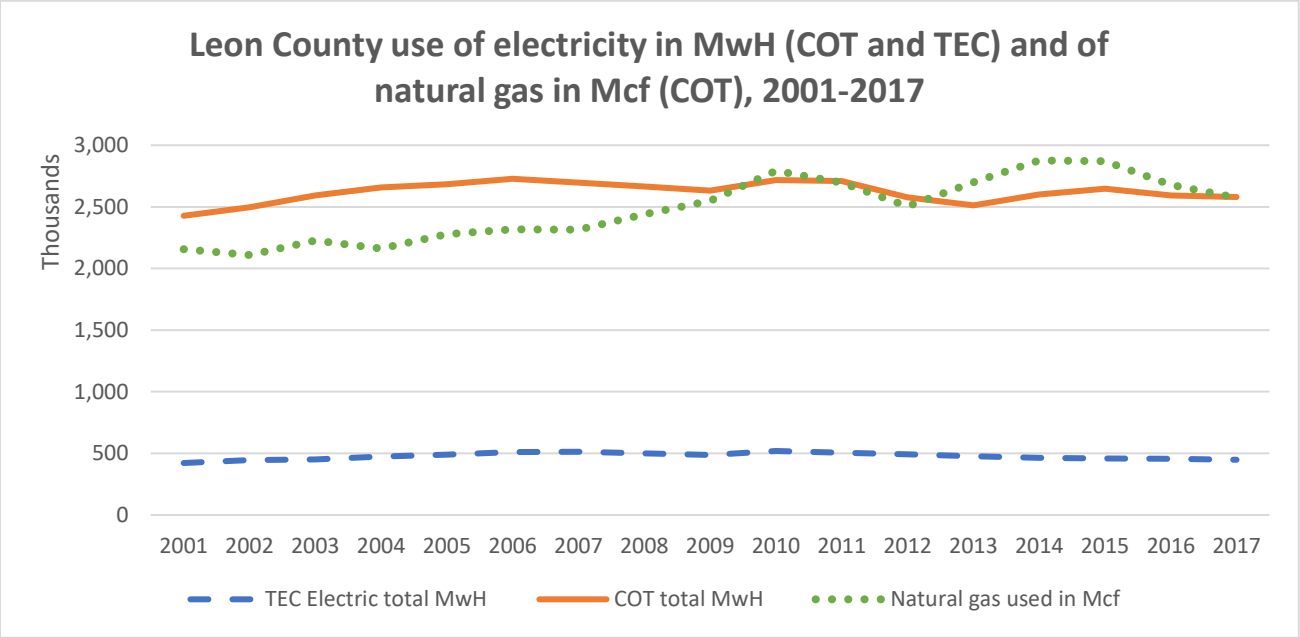
There have been steady declines in the Tallahassee City Utility's carbon intensity for electric generation over a 25-year period, though the rate of decline has been less in recent years.



City utility carbon intensity will decline further as additional large photovoltaic arrays at the Tallahassee airport are brought on-line and newer generating equipment is installed, 2018-2020.

Talquin Electric Cooperative buys almost all its electricity from the Seminole Electric Co-op; just over half of this electricity comes from burning coal. The carbon intensity of Talquin Electric Cooperative's electricity production will change somewhat as TEC brings photovoltaic capacity on-line in 2018.

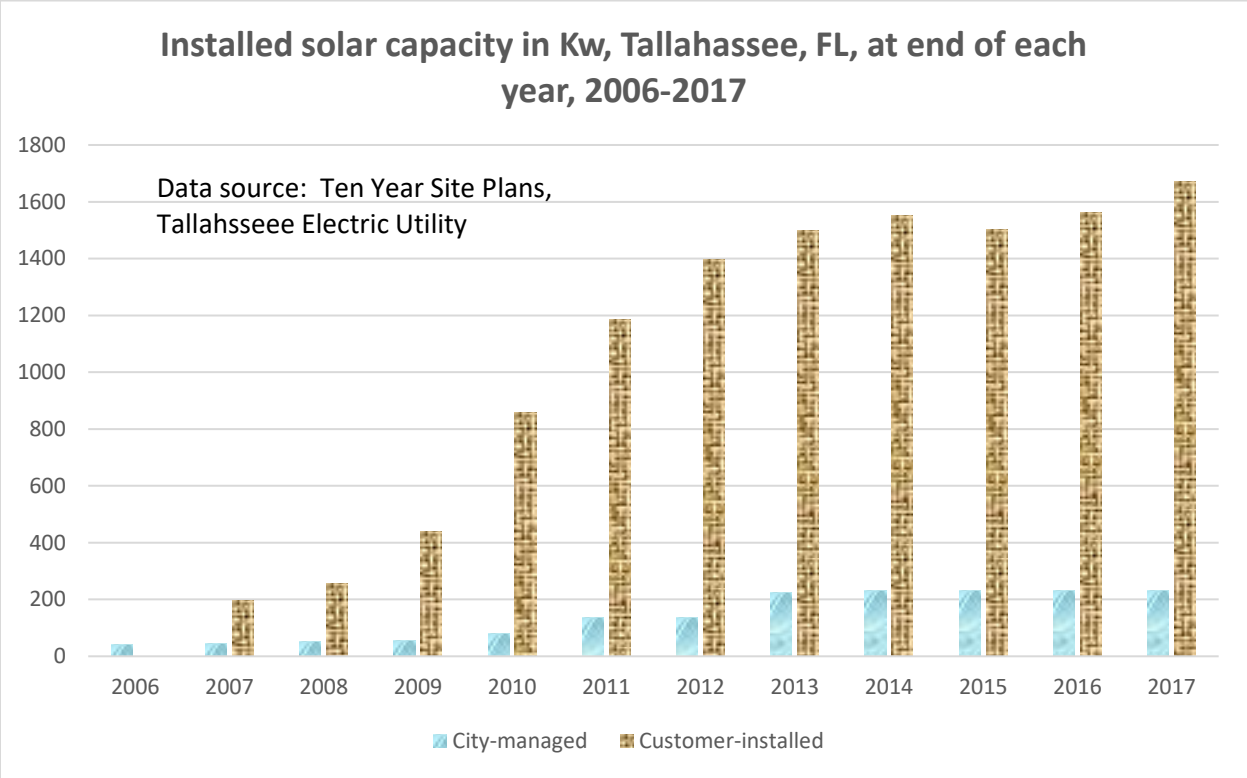
COT and TEC electrical energy distribution have been essentially flat since 2006, while COT natural gas distributed has risen.



CO_2 production from natural gas is simply proportional to the amount used, while CO_2 production from electricity is the product of amount used (seen here in MWh) and carbon intensity (tons of CO_2 released per MWh distributed).
An Mcf of natural gas is 1000 cubic feet. A ton is 2000 pounds.

Inputs – determinants of CO2 production from stationary sources

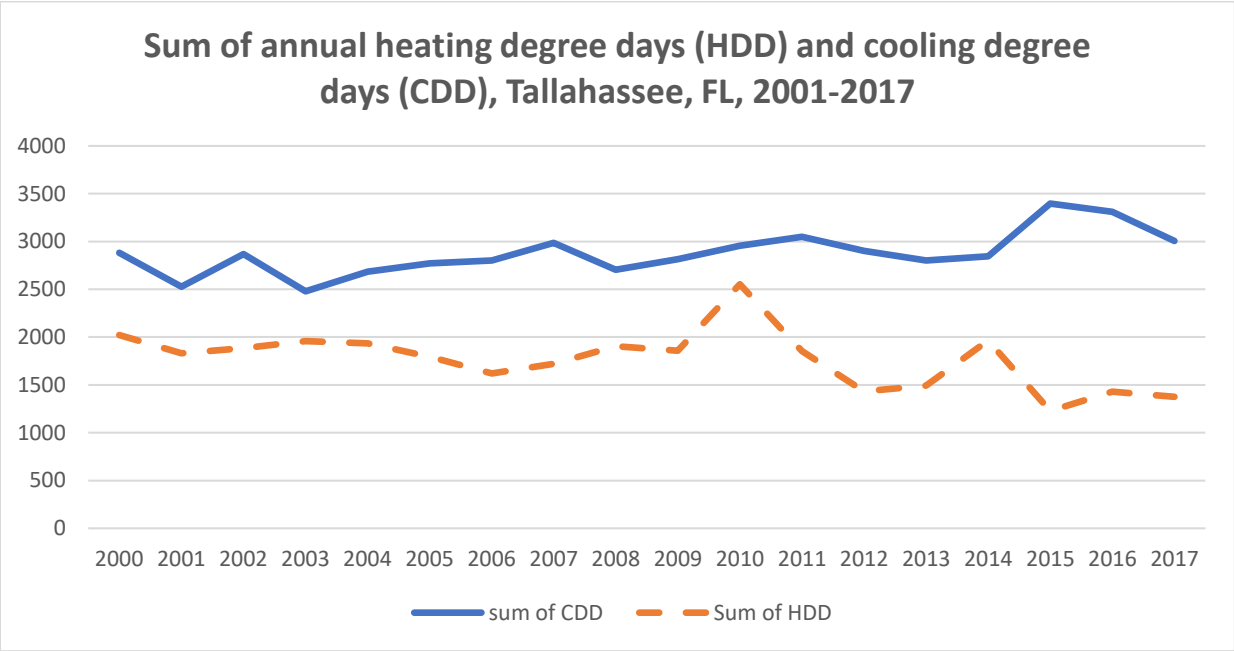
Total on-site photovoltaic generating capacity (measured in kilowatts) installed in the Tallahassee utility area rose steadily from 2006 to 2013, with less further change since 2013. It was approximately 1900 kW, or 1.9 mW, in 2016.



In 2017 Leon County customers of Talquin Electric Cooperative have approximately 420 kW of photovoltaic capacity in place. Talquin Electric Coop is also planning utility-owned solar generation.

In late 2017, the capacity to deliver up to 20 megawatts (MW) of AC power from photovoltaic panels to city electric customers went into production at the City's solar farm located at the airport, and another 40 MW will follow a year or two later. The initial 20 MW array constitutes about a 15-fold increase in local solar generation capacity and will be able to supply about 1.4% of COT utility's electrical energy.

Over the entire period 2000 to 2017, Tallahassee has had a gradual increase in the number of cooling degree days (in blue) and a gradual decrease in the number of heating degree days (in orange). However, the annual number of cooling degree days has fallen somewhat after a peak in 2015.



Adding up "Degree-days" is a way to summarize demand for heating and cooling. Each day is assigned a number of degree-days according to how much its average temperature is above or below 65 degrees. Here we tabulate the annual total of heating degree-days, and of cooling degree-days.

Hot summer afternoons contribute strongly to cooling degree days and require peak amounts of electrical energy for air conditioning. Cold winter days, especially mornings, contribute strongly to heating degree days and put peak demands on both the electrical and natural gas utilities.

COT Electricity Demand Side Management -- the cumulative effect of ten years' activities to help or incentivize customers to reduce energy usage is annual savings of 79,000 MWh of electricity use going forward.

Counts of demand reduction activities taken by the COT utilities

Activity	2015	2016	2017
# of Residential Energy Audits	6,699	6,011	4,823
Energy Star Appliance Rebates	3,667	2,809	2,680
Homes served by Neighborhood Reach	1,232	1,132	1,251
Gas Appliance Conversion Rebates	1,010	1,022	1,147
High Efficiency HVAC Rebates	840	787	740
Water Heater Rebates	702	692	660
Ceiling Insulation Grants	776	638	481
Energy Efficiency Loans	447	479	421
Commercial Energy Audits	215	161	107
Energy Star New Home Rebates	75	110	153
Variable Speed Pool Pump Rebates	52	52	60
Participants in Nights & Weekends	1,933	2,095	1,912

Estimated annual energy savings per year resulting from COT demand reduction activities, 2008-2016.

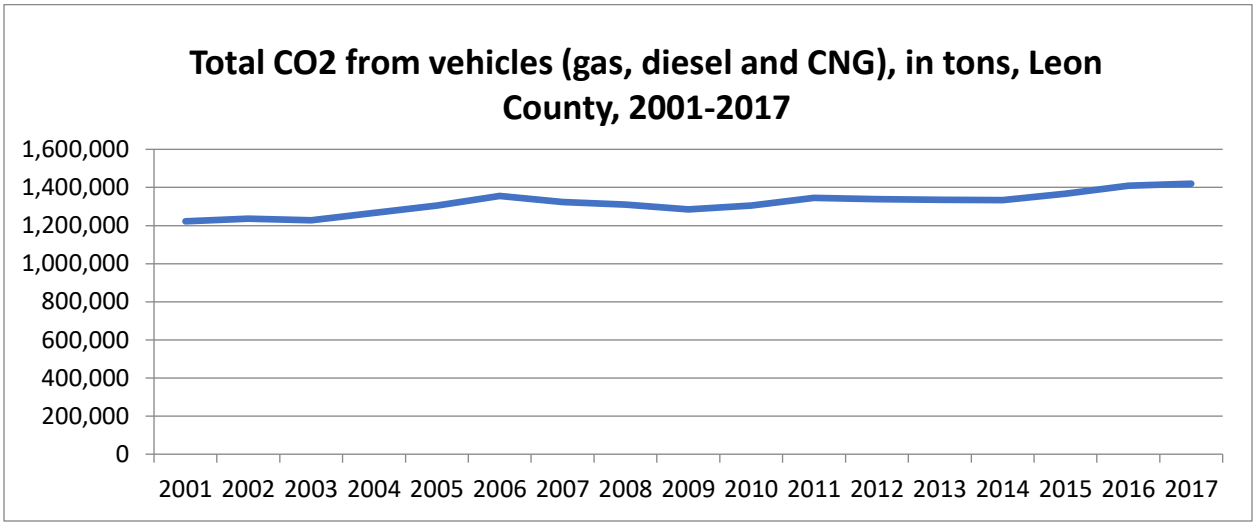
Calendar Year	Incremental Energy Savings (MWh)
2008	6,193
2009	9,228
2010	12,110
2011	8,798
2012	7,190
2013	8,527
2014	8,559
2015	6,454
2016	6,029
2017	5,969

TEC also has an active energy audit program.

Mobile sources:

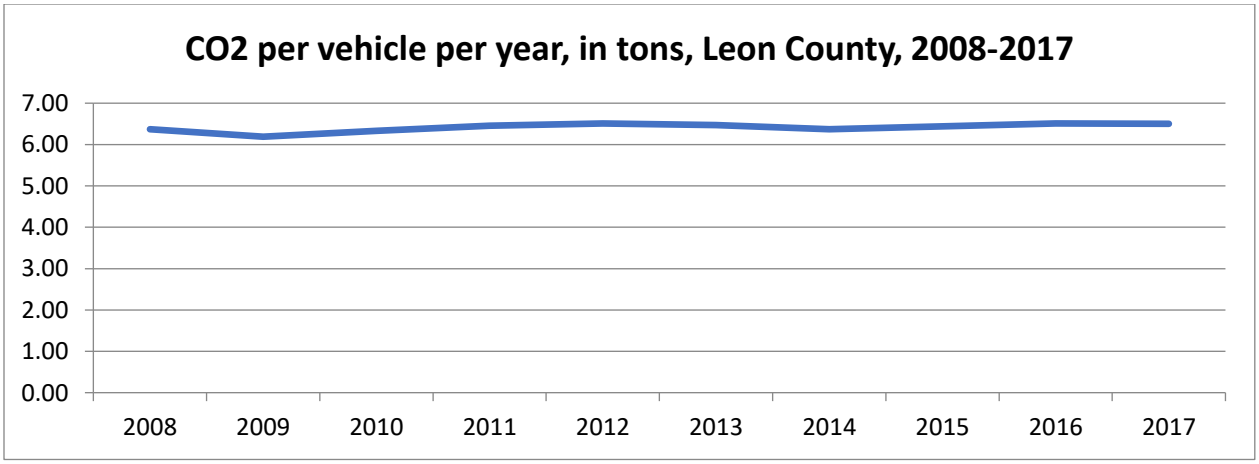
CO2 production

Overall CO_2 production attributable to Leon County motor vehicles using gasoline, diesel, and compressed natural gas has been increasing steadily since 2001, reflecting increases in population and number of vehicles.



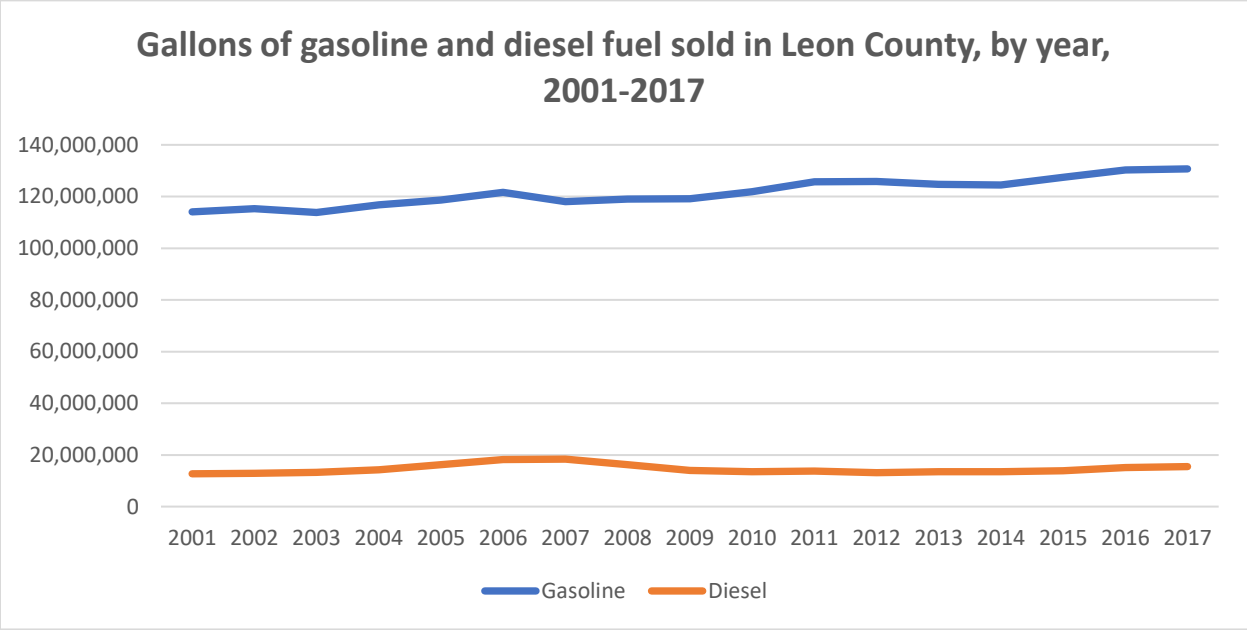
Natural gas sold by the Tallahassee city utility for conversion to Compressed Natural Gas (CNG) for vehicles increased from 146,700 ccf in 2013 to 1,299,000 in 2017, when CNG accounted for 0.56% of CO_2 production by Leon County vehicles.

CO_2 produced per vehicle (whether gasoline, diesel or CNG) per year has been steady through 2017.

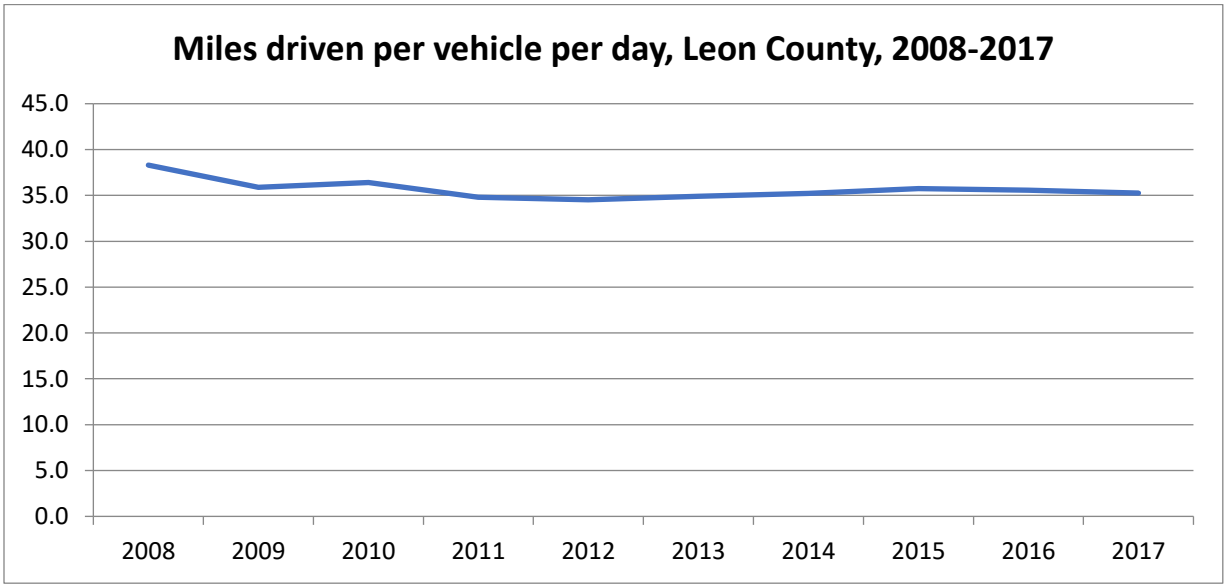


Intermediate measures

Sales of gasoline in Leon County have been increasing steadily 2001-2017, while diesel sales have been flat since 2009. Gasoline sales did not increase 2016- 2017.

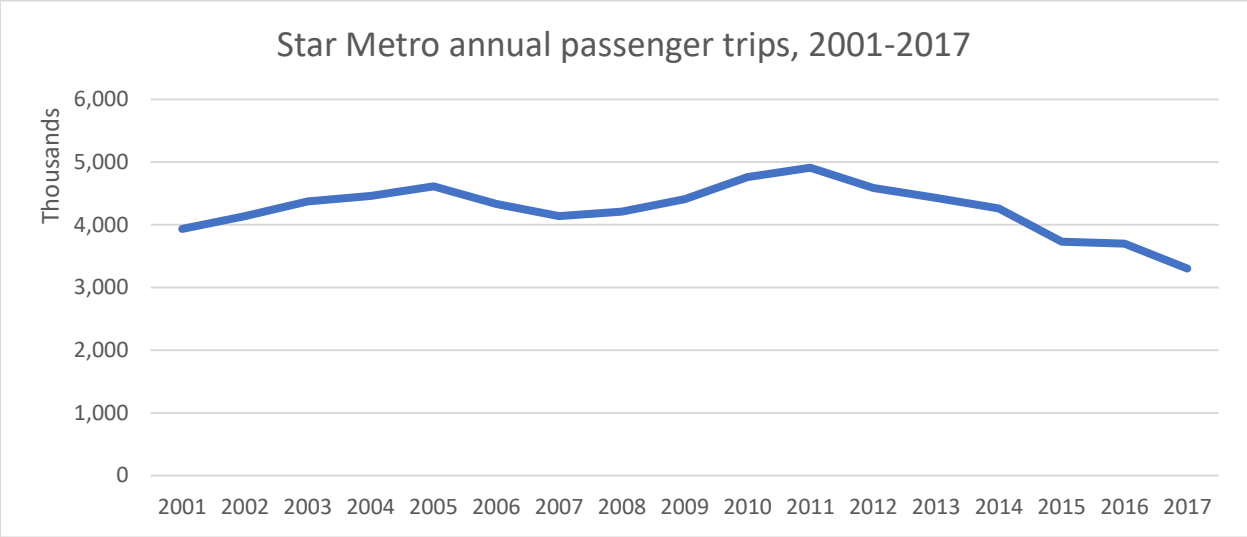


Miles driven per registered vehicle per day in Leon County are very stable.

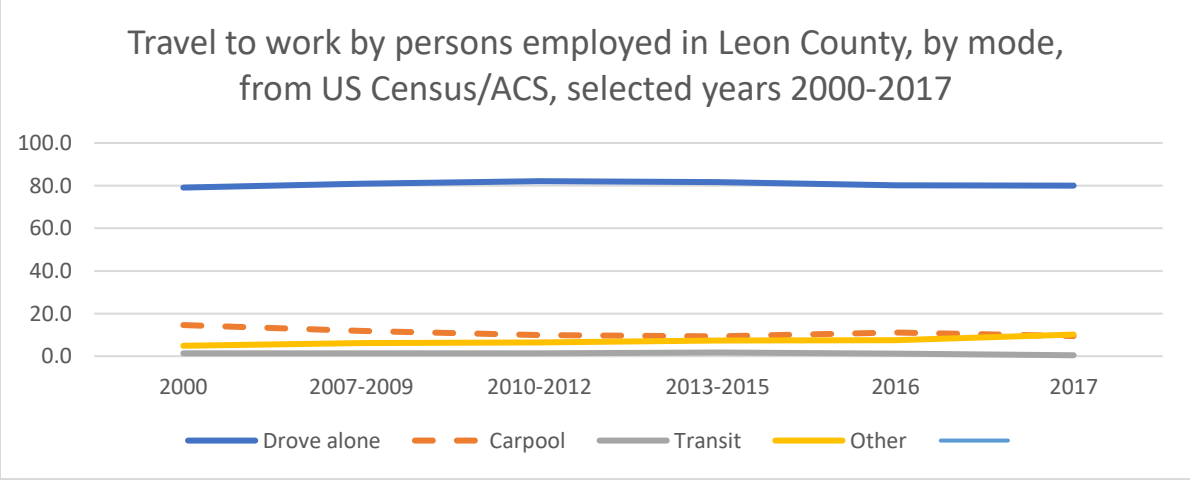


Inputs

StarMetro annual passenger trips peaked in 2011, fell for several years, stabilized in 2016, and fell again in 2017. Many other transit systems in Florida have seen declines over the same period. The initial decline in 2012 coincided with large changes in the route system, but most of those changes were reversed by 2016.

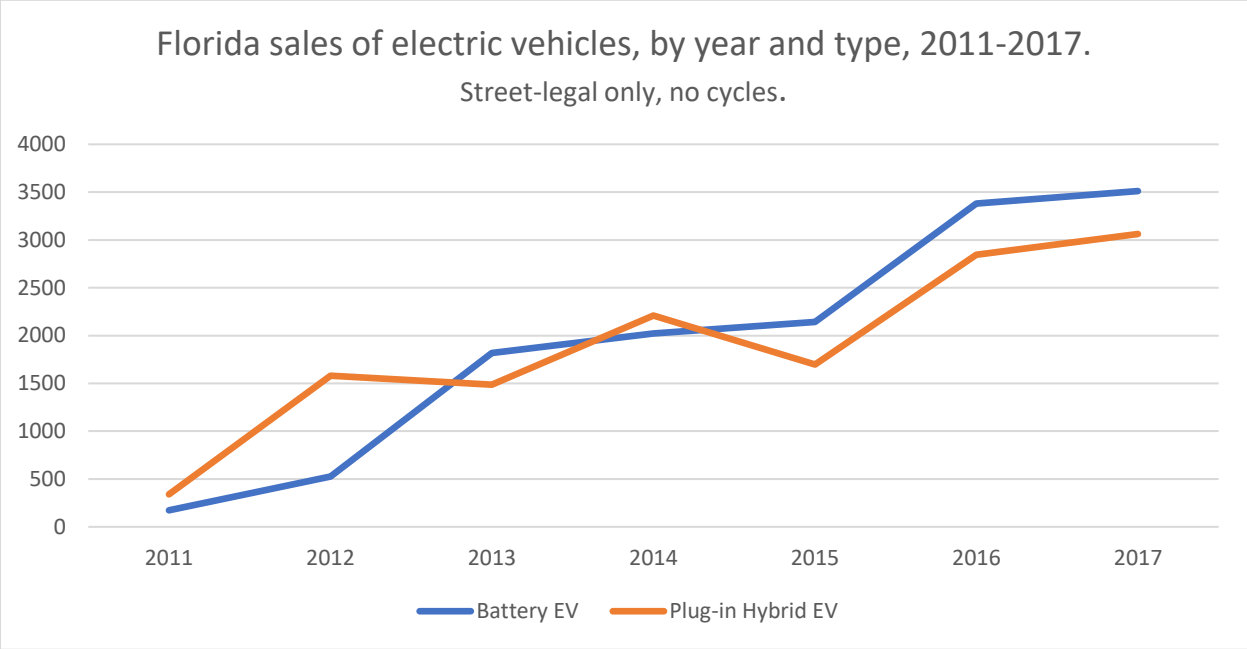


80% of commuters in Leon County travel to work alone in their cars, and this is stable over the period. The percentage who carpool decreased between 2000 and 2017.



Walking or bicycling to work increased from 2.0% in 2000 to 2.7% in 2013-15.

Florida market share for Battery Electric Vehicles and Plug-in Hybrid Electric Vehicles together reached 0.52% in 2017. The rate of increase in sales was less for 2016-2017 than for 2015-2016.



Market share for these vehicles was 4.93% in California in 2017, and 1.19% nationally.

Tallahassee is investing in protected and buffered bike lanes and marked bike boulevards, to deepen existing networks of conventional bike lanes, streets with sharrow lane markings, and trails. Better bicycle infrastructure is expected to lead to more cycling. In late 2017 a dockless bike share program was introduced in Tallahassee.

Tallahassee/Leon County bicycle infrastructure in place, 2015-17, in miles

	End of 2015	End of 2016	End of 2017
Protected bike lanes	0	1.3	1.3
Buffered bike lanes	0	4.8	6.3
Conventional bike lanes	136	136	137
Marked bike boulevards	0	1.2	1.2
Off-street paved trails or paths (in city)	28	28	33
Off-street natural surface trails or paths (in city)	85	85	85
Shared lane markings	23	24	24
Public bike parking spaces	1000	1010	1010
Grade separated crossings	0	1	1
Number of bikes in bike-share fleet	0	0	170
Number of bike-share rides taken	0	0	538

Data sources, assumptions and conversion factors

Commercial CO_2 production estimates include some releases attributable to manufacturing activities in Leon County where the manufactured products leave the county. Leon County imports far more in the way of manufactured goods and food than it exports. The net CO_2 cost of these imported goods is not accounted for.

Information about jet fuel and liquid gas in Florida as a whole:
US Energy Information Administration's State Energy Data System (SEDS) at
https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_use/total/use_tot_FLcb.html&sid=FL

Converting MWh of electricity generation at City of Tallahassee power plants to CO_2 produced: year-specific carbon intensity figures provided by COT.

Converting MWh of electricity supplied to Leon County customers by Talquin Electric Cooperative:
Proportions of electricity generated from coal, natural gas, and renewables as supplied by TEC, and apply national averages for CO_2 production from those various fuel sources to the estimated amount of TEC electrical power used in Leon County. We use proportions from 2015 and assume they have been unchanged 2001 -- 2017.

City staff indicate that 11% of the City of Tallahassee's natural gas is sold to customers outside the county. We have applied a percentage of 89% to both commercial and residential gas sales to estimate gas sold to Leon County customers.

Talquin Electric Cooperative (TEC) has approximately 1500 commercial meters in Leon county and approximately 2200 commercial meters outside it; thus 40.5% of commercial meters are in Leon and we assume 40.5% of power used and CO_2 generated for commercial customers are in Leon. TEC has approximately 24,700 residential meters in Leon county (50.2%) and approximately 24,500 residential meters outside of Leon County. We assume that 50% of TEC's residential electrical consumption and CO_2 production is for Leon County customers.

We assume that the number of vehicles registered in Leon County is the same fraction of vehicles actually domiciled in Leon County over time, 2008 to 2016, so that changes in usage of motor fuel can be correlated to changes in number of vehicles registered.

Motor vehicles registered:
July counts from https://www.flhsmv.gov/resources/driver-and-vehicle-reports/vehicle-and-vessel-reports-and-statistics/

We assume that motor fuel sold in Leon County is a good approximation of motor fuel used, and that this approximation is stable over the period 2008-2016.

Total gallons of gasoline and of diesel fuel sold in Leon County each year:
Florida Department of Revenue. Search for certgallonsNN.xls, where NN is the last two digits of the year of interest.

Number of miles driven, by year, in Leon County:
Florida Department of Transportation. Go to http://www.fdot.gov/planning/statistics/mileage-rpts/ and click on Annual Reports.

Annual numbers of passengers, vehicle miles, and passenger miles for Star Metro (and Taltran) for 2001-2015:
Florida Department of Transportation's Florida Transit Information System (FTIS) web site, ftis.org.

Counts of electric and plug-in-hybrid vehicles sold in Florida:
Auto Alliance website at https://autoalliance.org/energy-environment/zev-sales-dashboard

Tabular data about bicycle infrastructure:
Tallahassee-Leon County Growth Management Department staff.

Data on mode of travel to work:
From US Census and American Community Survey operated by US Census.

Information about MWh of electricity sold and CCF (a CCF is a hundred cubic feet) of natural gas sold by the City of Tallahassee utility, by year, by type of customer:
Each year's Annual Report to Bondholders. That is also the source for numbers of commercial and residential customers. These are available at http://www.talgov.com/transparency/arbh.aspx

Information about MWh of electricity sold by Talquin Electric Cooperative, and number of customers, by year, for commercial and residential customers:
Florida Public Service Commission annual documents entitled Statistics of the Florida Electric Utility Industry, accessible from http://www.psc.state.fl.us/Publications/Reports#

Installed photoelectric capacity by year in Tallahassee:
City of Tallahassee utility Ten-Year Site Plan documents. The 2012 document is posted at the URL http://www.talgov.com/Uploads/Public/Documents/you/learn/library/documents/tysp_cotu_2012.pdf and similar documents from other years can be obtained by substituting the correct year in the URL. Recent data for the Leon County portion of Talquin Electric Coop's service area were obtained from planning staff at TEC.

Heating and cooling degree days for Tallahassee:
Bizee Degree Days website http://www.degreedays.net operated by Weather Underground using US National Weather Service data.

Non-CO_2 greenhouse gas estimates for Florida in 2010:
Table ES-1 in FINAL Florida Greenhouse Gas Inventory and Reference Case Projections 1990-2025, Center for Climate Strategies for Florida Department of Environmental Protection, accessed January 10, 2018 at www.climatestrategies.us/library/library/download/938