Energy Policy 2019 Annual Update



Table of Contents

Introduction	3
2019 Outcomes	3
2019 Major Activities and Highlights	4
2019 Annual Update Infographic	4
Community Energy Use	7
Community Carbon Emissions	8
Energy Efficiency	10
Electricity Supply	12
Resource Mix	12
Distributed Generation	14
Reliability and Demand Response	14
Community Economics and Partnerships	15
Rates	17
Looking Ahead	19
Programs	21
Thank You	22

Introduction

This report provides an update of 2019 activities and results related to the Fort Collins Energy Policy. The Energy Policy vision is: *"Fort Collins is a leader in the transition to sustainable and resilient local energy systems to serve the community's 2050 carbon neutral future."* The Energy Policy and Climate Action Plan seek to achieve 20% carbon reduction below 2005 levels by 2020, 80% by 2030 and carbon neutral by 2050. The policy reflects Fort Collins' energy values of reliability, affordability, safety, greenhouse gas emission reduction, pollution prevention, environmental stewardship and energy independence.

Looking ahead to 2030 and beyond, the Energy Services Division will be shifting the design and implementation of customer programs with three co-optimized outcomes:

- Carbon Reduction
- Customer Load Shaping
- Grid Flexibility

The overall goal is to improve the energy productivity of buildings while improving occupant comfort, safety and health, as well as enhancing the purpose and performance of the activities taking place in buildings. In other words, to use energy more productively and efficiently, not simply to use less energy.

2019 Outcomes

- Residential and commercial electricity use per person has decreased by 16% since 2005 and community natural gas use per person decreased by 3%. Community petroleum use per person has also decreased by 13%. Total energy use (electricity, natural gas and petroleum) has gone up by only 15% since 2005, despite a population increase of 28%.
- Efficiency programs and strategies saved approximately 42,000,000 kilowatt-hours (kWh), or 2.8% of the community's annual usage, which is equivalent to the annual electric use of 5,600 Fort Collins homes.
- Fort Collins buildings were 4% more efficient than in 2005 while building square footage increased by 21%.
- Community carbon emissions from electricity are down 17% from 2005.
- Electricity from non-carbon resources accounted for 33% of total resources, with 19% from hydro, 11% from wind energy and 3% from solar energy. Fossil fuel energy comprised 67% of electricity sources.
- Efficiency and renewable programs generated over \$45 million in local economic benefits through reduced utility bills, direct rebates and leveraged investment, supporting an estimated 230 jobs in the region.
- Electric reliability remained high at 99.9966%, with an average system outage of only 18 minutes.

2019 Major Activities and Highlights

- Fort Collins Utilities implemented Time-of-Day (TOD) rates for all residential electric customers in October 2018. Analysis after one year of implementation showed that 65% of customers saved money on their electric bill with TOD and 33% paid less than \$5 more per month. Additionally, there was an estimated 16,775,000 kWh reduction in electric use.
- Utilities, Solaris Energy and Namasté Solar completed the *Solinator Garden*, a 2,700 solar panel installation with 1,000 kW capacity that combines a pollinator garden and renewable energy installation (*pictured on report cover*).
- Utilities and the City of Fort Collins Sustainability department launched the Our Climate Future effort to update the Energy Policy, Climate Action Plan and Road to Zero Waste. It is the first Fort Collins City planning effort to lead with equity and strives to better align the three plans to achieve carbon mitigation, equity and resilience goals.

2019 Annual Update Infographic

Each year, Utilities provides an update on the progress and activities related to the Energy Policy. In 2019, the annual update included an infographic *(see Figure 1 on next page)*.





We can lead in ENERGY EFFICIENCY and RENEWABLES with HIGH RELIABILITY, AFFORDABLE BILLS and AWARD-WINNING PROGRAMS.

The Energy Policy reflects Fort Collins' values of reliability, affordability, safety, greenhouse gas emissions reduction, pollution prevention, environmental stewardship and energy independence. It is aligned with the Climate Action Plan (CAP) goals of 20% carbon reduction below 2005 levels by 2020, 80% by 2030 and carbon neutral by 2050. Read the full annual report at *fcgov.com/what-we-do*.



OUR IMPACT

Residential Efficiency Savings: 72M kWh





Energy Efficiency

Customer electricity savings from efficiency programs totaled 42M kWh (2.8% of the community's annual use), equivalent to taking 5,600 homes' electric use off the grid.

Did you

Know?

It is cheaper to

save electricity with efficiency

is to buy more

electricity

(6.2 cents).

(<u>3.4 cents</u>) than it

X 100

The average residential customer uses about 620 kWh per month (or 7,400 kWh per year).

Reliability

With 99.9966% reliability, most residents did not experience an outage.

Community Economics

Customer projects generated more than \$45M in local economic benefits through reduced utility bills, direct rebates and leveraged investments, and also supported 230+ JOBS.

Peak Usage

With Peak Partners, customers reduced demand by **1,600 kW** during **peak** times.

LOOKING FORWARD

We are community-owned and together we can reach our goals.

Join the thousands of other residents and businesses taking action.

You are part of the solution. Get engaged at fcgov.com/climatefuture.

Electricity Carbon Emissions



Electricity Supply



Local Renewables

Installed **337** new renewable energy systems, adding 3,600+ kW, a 26% increase in total

capacity from 2018.



1.4% of electricity came from local renewables.

NON-SUMMER

Time-of-Day Rates

65% of residential customers showed a decrease in annual electric bills with TOD pricing.

> The average monthly bill was \$1.38 lower.

Community Energy Use

Community energy use (electric, natural gas and petroleum) has increased by 15% since 2005, while the population has increased by 28% from 132,000 to 169,000 residents. Per capita community energy use decreased by 17% from 2005 levels for electricity, 3% for natural gas and 13% for petroleum *(see Table 1)*. Total energy use per capita decreased by 10%. In 2019, absolute electricity use has also begun to decline and was 2% lower than in 2018. Community electricity use per capita went from 11,011 kWh in 2005 to 9,184 kWh in 2019 *(see Figure 2)*. For residential and commercial electricity use (not including electricity uses such as streetlights or distribution losses), electricity use per capita has decreased by 16% since 2005.

Metric/Indicator	2019 Value	% change from 2018	% change from 2005
Total Energy (kBtu)	21,285,104,384	+4%	+15%
Electricity	5,294,119,319	-2%	+6%
Coal	2,948,382,348	+2%	-19%
Non-Carbon	1,733,547,246	-4%	+45%
Natural Gas	8,973,516,525	+9%	+23%
Petroleum	7,017,468,541	+2%	+11%
Diesel	528,283,641	+32%	+117%
Gasoline	6,489,184,900	+1%	+7%
Per Capita (kBtu)	125,987	+3%	-10%
Electric	31,336	-3%	-17%
Natural Gas	53,115	+8%	-3%
Petroleum	41,537	+2%	-13%

Table 1. Community Energy (Total and Per Capita) Consumption in 2005, 2018 and 2019

Energy use per capita has shown mostly downward trends since 2005, with more variation for natural gas use per capita (see Figure 3). View comparisons to 2005 per capita residential and commercial electricity consumption on the Community Energy Use dashboard at fortcollins.clearpointstrategy.com/environmental-health-2/community-electricity-use-per-capita/.



Figure 2. Fort Collins Community Per Capita Electricity Use





Community Carbon Emissions

In 2019, carbon emissions from electricity were 17% below 2005 levels, with a goal to be 20% below by 2020 (*see Figure 4*). Carbon emissions reductions come from influenced areas (such as Platte River Power Authority renewable energy) and direct areas (such as energy efficiency and roof top solar), which counteract emissions from growth and weather (*see Figure 5*).





*2020 numbers are projections.

Figure 5. Drivers of Change for Carbon Emissions from Electricity





Utilities is also a member-owner of Platte River Power Authority (PRPA). As such, Fort Collins reports the ownership share of PRPA's carbon emissions. This value differs from the operational share of emissions, which only account for electricity consumed by Fort Collins residents and businesses. The ownership share includes emissions associated with the generation of electricity that is sold to other utilities. In 2019, ownership share emissions were 1,427,330 metric tons, a reduction of 18% below the 2005 baseline year.

Energy Efficiency

In 2019, customer electric savings from efficiency programs and strategies totaled 41,819,000 kWh (*see Table 2*), which is equivalent to 2.8% of the community's annual retail electricity consumption. The 2019 goal to achieve savings of 2% of the community's annual electricity use was exceeded (*see Figure 6*). It is cheaper to save electricity with energy efficiency at \$0.034 per kWh, compared to the wholesale blended cost of electricity at \$0.062 per kWh.

Program	Participation	First year customer gross	Cost of saved energy
	(audits & projects)	electric savings (MWh)	(\$ per kWh levelized)
Appliance Recycling	415	479	\$0.010
Behavioral Efficiency	58,000	12,174	\$0.046
Building Code	663	1,035	\$0.009
Business/Multi-family	419	11,738	\$0.033
Efficiency			
Conservation Corps	406	174	\$0.106
Consumer Products	278	40	\$0.279
Appliances			
Consumer Products Store	6,106	1,752	\$0.008
Discounts			
Design Assistance	1	103	\$0.052
Energy Outreach Colorado	14	121	\$0.050
Home Efficiency	1,084	546	\$0.145
Online Store	220	144	\$0.191
Peak Partners	515	93	NA
Time of Day*	68,000	13,420	\$0.005
Total	136,121	41,819	\$0.034

Table 2. Energy Efficiency Program Savin
--

*Efficiency savings at an 80% discount to avoid duplicative counting from behavioral changes.



Figure 6. Annual Efficiency Savings

*2020 numbers are projection assuming the policy target is met each year.

Cumulative savings from energy efficiency programs since 2002 totaled 216,000,000 kWh of avoided operational electricity use in 2019 (*see Figure 7*). Without efficiency programs, community electricity use would be 14% higher. Comparatively, wind and solar energy sources generated 218,000,000 kWh (or 14% of Utilities operational electricity use in 2019), meaning that Utilities has saved nearly as much electricity through efficiency programs as is generated from wind and solar. This has helped keep our electricity consumption increase to only 6% since 2005, even with a growing population and increased building stock.



Figure 7. Cumulative Electricity Savings from Efficiency Programs

Energy use in buildings went from 12,267,000,000 kBtu in 2005 to 14,268,000,000 kBtu in 2019, an increase of 16%. However, building square footage has gone from 164,219,000 ft² in 2005 to 198,749,000 ft² in 2019, a 21% increase. This means that buildings in 2019 were 4% more efficient than in 2005, using 72 kBtu per ft² instead of 75 kBtu per ft² (see Figure 8).

Figure 8. Natural Gas and Electricity Use per Square Foot



Electricity Supply

Resource Mix

The Energy Policy states specific goals for the electric resource mix, which include:

- Less than 60% of electricity from fossil fuels by 2020
- Minimum of 20% of electricity from wind and solar by 2020
 - Minimum of 2% of electricity from local renewables by 2020

In 2018, the City of Fort Collins adopted a 100 % renewable electricity goal by 2030. This resolution also included existing hydro-electricity resources in the definition of renewable (also known as non-carbon or non-fossil).

In 2019, Utilities moved toward these goals with 67% from fossil fuels (includes coal, natural gas, and regional purchases), 19% from hydro and 14% from wind and solar (with 1.4% from local renewables) (see Figure 9 and Table 3). Additionally, 33% of electricity supply came from non-carbon resources. Wind and solar energy source have steadily increased from only 2% in 2005 (see Figure 10).

Note: There is a slight decrease in the percent of electricity from renewable resources in 2019 because of a planned sale of wind power. Utilities is still on track to achieve over 20% of electricity from wind and solar by 2020.

Figure 9. 2019 Operational Electricity Resource Mix



Table 3. Operational Electricity Resource Mix 2005, 2018 and 2019

	20	05	20:	18	20	19
	MWh	%	MWh	%	MWh	%
Fossil Fuels	1,127,732	76	1,085,774	67	1,067,270	67
Hydro	319,594	22	295,428	19	290,411	19
Wind	31,499	2	182,075	12	167,186	11
Solar	0	0	49,187	3	50,477	3
Total*	1,458,857		1,588,528		1,551,618	

*Totals may not add to 100% due to rounding.

Figure 10. Wind and Solar Energy Percentage of Total Electricity



*2020 number is a projection based on planned projects.

Distributed Generation

Distributed generation capacity has increased from 1,222 kW in 2005 to 17,722 kW in 2019 (see *Figure 11*). This is from residential and commercial solar rebate programs, solar purchase power agreements and community solar. There were 337 new renewable energy installations in 2019, adding over 3,600 in kW capacity. Utilities has an additional 15,000 kW of utility-scale solar operated by Platte River Power Authority (PRPA).



Figure 11. Fort Collins Distributed Generation Capacity

View information about all solar installations in the OpenData Solar Installations dataset at opendata.fcqov.com/Environmental-Health/Solar-Installations/3ku5-x4k9.

Reliability and Demand Response

Reliability remained high in 2019 with an uptime of 99.9966% and an average system outage time of 18 minutes (*see Table 4*). Fort Collins also remained among the topmost reliable utilities for duration and frequency of outages based on standards set by the American Public Power Association (APPA) (*see Figure 12*).

Table 4. 2019 Reliability Metrics

DATE	ASAI	CAIDI	SAIDI	SAIFI	MAIFI
12/31/2019	99.9966	70.8	17.7	0.25	0.12

View metrics on the Electric System Average Interruption Duration Index (SAIDI) in Minutes dashboard at <u>fortcollins.clearpointstrategy.com/economic-health/electric-system-average-interruption-duration-index-saidi-in-minutes/</u>.



Figure 12. Fort Collins Reliability Comparison to Other Utilities

Peak Partners, a demand response portfolio of programs, allowed us to reduce peak loads in 2019 by up to 1,600 kW, with a capacity to reduce peak loads by 4,200 kW. Peak Partners offers wi-fi enabled thermostats (including a partnership with Nest and Honeywell) and water heater controllers to help residential customers reduce their energy demand at peak times. Modifications were made to the program in 2018 to proactively help customers shift load with the TOD rate. Early results indicate over 400 MWh per year of shifted load, with customers saving an average of \$48 per year. Peak Partners also works with commercial customers to use building automation features that reduce electricity demand during monthly peak events.

Community Economics and Partnerships

Through efficiency and renewable projects in the community, Utilities has generated over \$45 million in local economic benefits through reduced utility bills, direct rebates and leveraged investment. Investing in energy efficiency and solar job sectors supported an estimated 230 more jobs in our community than investing in other job sectors (*see Table 5**). According to the <u>Clean Jobs Colorado 2019 Report</u>, there are an estimated 3,686 clean energy jobs in the Fort Collins-Loveland Metro Area, and Colorado ranks among the top ten states in the U.S. for jobs in wind, bioenergy and overall renewable energy.

*Calculations from American Council for an Energy-Efficiency Economy Fact Sheet: <u>'How Does</u> <u>Energy Efficiency Create Jobs?'</u>

Energy Efficiency	Dollar Amount (\$M)	Notes
Leveraged Investment (2019)	\$4.4	Incentives are typically 1/2 of project cost
Prior Year Utility Cost Savings (2002-2018)	\$17.5	Direct customer bill savings
Direct Incentives (2019)	\$4.4	Annual incentives in 2019
Annual Utility Cost Savings (2019)	\$3.8	Annual savings for 2019
Indirect and Induced Benefits (2019)	\$4.4	50% multiplier on incentives and investment
Energy Services Expenditures (2019)	-\$5.9	Annual utilities expenditures
Total Energy Efficiency (\$M)	\$28.6	
Renewables		
Leveraged Investment (2019)	\$9.6	Actual costs minus incentives
Prior Year Utility Cost Savings (2005-2018)	\$1.7	Direct customer bill savings
Direct Incentives (2019)	\$0.6	Annual incentives in 2019
Annual Utility Cost Savings (2019)	\$0.5	Annual savings for 2019
Indirect and Induced Benefits (2019)	\$5.1	50% multiplier on incentives and investment
Energy Services Expenditures (2019)	-\$0.8	Annual utilities expenditures
Total Renewables (\$M)	\$16.8	
Total	\$45.3	

EE Jobs Analysis	EE Path	Business as Usual Path
Jobs per \$M	20	17
2019 Investment (\$M)	\$8.8	\$8.8
Gross Jobs	179	153
Net Jobs	26	
Cumulative annual shift in utility bill spending (\$M)	\$21.3	\$21.3
Jobs per \$M	17	10
Gross Jobs	368	211
Net Jobs	157	
Net EE Jobs	184	
Solar Jobs Analysis	Solar Path	Business as Usual Path
Jobs per ŚM	20	17
2019 Investment (\$M)	\$10.2	\$10.2
2019 Investment (\$M) Gross Jobs	\$10.2 208	\$10.2 177
2019 Investment (\$M) Gross Jobs Net Jobs	\$10.2 208 31	\$10.2 177
2019 Investment (\$M) Gross Jobs Net Jobs Cumulative annual shift in utility bill spending (\$M)	\$10.2 208 31 \$2.2	\$10.2 177 \$2.2
2019 Investment (\$M) Gross Jobs Net Jobs Cumulative annual shift in utility bill spending (\$M) Jobs per \$M	\$10.2 208 31 \$2.2 17	\$10.2 177 <i>\$2.2</i> 10
2019 Investment (\$M) Gross Jobs Net Jobs Cumulative annual shift in utility bill spending (\$M) Jobs per \$M Gross Jobs	\$10.2 208 31 \$2.2 17 38	\$10.2 177 <i>\$2.2</i> 10 22
2019 Investment (\$M) Gross Jobs Net Jobs Cumulative annual shift in utility bill spending (\$M) Jobs per \$M Gross Jobs Net Jobs	\$10.2 208 31 \$2.2 17 38 16	\$10.2 177 <i>\$2.2</i> 10 22
2019 Investment (\$M) Gross Jobs Net Jobs Cumulative annual shift in utility bill spending (\$M) Jobs per \$M Gross Jobs Net Jobs Net Solar Jobs	\$10.2 208 31 \$2.2 17 38 16 47	\$10.2 177 <i>\$2.2</i> 10 22

Utilities collaborates with many partner organizations to achieve these community impacts and Energy Policy goals. Partners in 2019 included, but were not limited to:

- Platte River Power Authority (PRPA) and other owner municipalities (Loveland Water and Power; Longmont Power and Communications; and Estes Park Light and Power)
- Energy Outreach Colorado
- Colorado Energy Office
- Xcel Energy's Partners in Energy
- Colorado State University
- Bloomberg Philanthropies
- Our Climate Future partners

Rates

In 2019, Utilities residential rates were 28% lower than the average Colorado utility residential rate (\$72.25 compared to \$100.33) and 24% lower than the average Colorado municipal utility residential rate (\$72.25 compared to \$95.12). Residential rates also ranked as the third lowest residential rates among Colorado municipal utilities *(see Figure 13),* while providing high-quality programs in business energy efficiency, residential energy efficiency and renewable energy.



Figure 13. Colorado Association of Municipal Utilities Residential Survey

View comparisons of rates on the Utilities How We Compare webpage at <u>fcqov.com/electric-rates-comparisons.</u>

The Time-of-Day (TOD) rate structure also benefited both customers and utility operations in 2019. An analysis after one year with TOD pricing found the following results:

- 65% of residential accounts showed a decrease in annual electric bills compared to the prior rate structure (*see Figure 14*).
- Average monthly bill was \$1.38 lower with TOD pricing.
- Overall revenue collected for the residential class was lower by 2.3% on TOD.
- Overall energy consumption was 1.9% lower, or 16,775 megawatt-hours (MWh), which also decreased wholesale electricity expenditures.
- Reduced electricity use from TOD saved over 15,800 metric tons of carbon emissions, equivalent to 0.8% of the 2018 community carbon inventory.
- On-peak hour electricity use was 7.5% lower than in the previous year.

Our blended retail rate increases also reflect increases in the wholesale rate over time (see *Figure 15*).





More information from the February 11, 2020 Council work session presentation can be found here.



Figure 15. Fort Collins Utilities Blended Retail Rate and Wholesale Rate

Looking Ahead

By the end of 2020, Utilities (in collaboration with PRPA) will add 20 MW of solar with 2 MW of battery storage and 225 MW of wind (with 165 MW delivered to the cities). Utilities is also currently working to align the Energy Policy and the Climate Action Plan to further integrate activities to achieve 80% carbon reduction below 2005 levels by 2030, as well as important equity and resilience goals. Looking ahead to 2030 and beyond, the Energy Services Division will be shifting the design and implementation of customer programs with three co-optimized outcomes:

- Carbon Reduction
- Customer Load Shaping
- Grid Flexibility

The overall goal is to improve the energy productivity of buildings while improving occupant comfort, safety and health as well as enhancing the purpose and performance of the activities taking place in buildings. In other words, to use energy more productively and efficiently, not simply to use less energy.

For over 100 years, Utilities have been matching the production of electricity to the aggregate load shape of the demand. As we proceed to increase the amount of variable renewable electricity sources, such as wind and solar, we will need to also begin shaping and flexing the demand load to align with the supply. This transition will take years, with both electricity supply, demand and storage working together to achieve a reliable, affordable and clean energy system.

All energy programs are, in effect, shaping the amount and timing of electricity use (shaping load), impacting greenhouse gas emissions by increasing or decreasing use and associated sources (carbon) and have the potential for active management (grid flexibility). From energy codes to efficiency retrofits to distributed solar to batteries and electric vehicles, they all can align to the updated triad of outcomes for carbon reduction, load shaping and grid flexibility.

Utilities is aligning with the Department of Energy's Grid-interactive Efficient Buildings (GEB) *(see Figure 16)* strategy which aims to advance the role buildings can play in energy system operations and planning by optimizing across distributed energy resources (DERs), such as efficient design, flexible loads, energy generation and storage.



Figure 16. Key Characteristics of Grid-interactive Efficient Buildings (GEB)

More information about the Department of Energy's Grid-interactive Efficient Buildings can be found at energy.gov/eere/buildings/grid-interactive-efficient-buildings.

The GEB strategy drives towards greater affordability, efficiency, resiliency and reliability, recognizing that:

- Building end uses can be dynamically managed to reduce energy cost, consumption, help meet grid needs and minimize electricity system costs, while meeting occupants' comfort and productivity requirements.
- Technologies such as photovoltaics (PV), electrochemical and thermal energy storage, combined heat and power (CHP), electric vehicles (EVs), other DERs and microgrids can be co-optimized with buildings to provide greater value and resiliency to both utility customers and the electricity system.
- The value of energy efficiency, demand response and other services provided by behindthe-meter DERs can vary by building type, location, hour, season and year.

A key part of this strategy includes utilizing efficient building design and operational strategies coupled with smart technologies (sensors, actuators, controllers, etc.) and highly efficient building equipment for building energy management. The vision of GEB is the integration and continuous optimization of DERs for the benefit of the buildings' owners, occupants and the electric grid.

Programs

Ongoing Utilities programs to reduce carbon, shape load and provide grid flexibility include:

- Business Energy Efficiency
 - Efficiency Works (for businesses and multi-family residences)
 - Integrated Design Assistance Program
 - Building Energy and Water Scoring
- Residential Energy Efficiency
 - Epic Homes (for single-family owner- and renter-occupied residences)
 - Appliance Rebates
 - o Consumer Product Rebates
 - Refrigerator and Freezer Recycling
 - o Home Energy Reports
 - Larimer County Conservation Corps
- Renewable Energy
 - Commercial and Residential Solar Rebates
 - Community Solar
- Demand Response
 - o Peak Partners
- Building Code and Compliance

View more information about the Energy Policy and programs at <u>www.fcgov.com/what-we-do</u>.

Thank You

We would like to share our thanks to the hundreds of contractors, consultants, residents and business partners that make our programs successful.

If you have any questions about the Energy Policy or this report, please contact us at <u>energyservices@fcgov.com</u>.