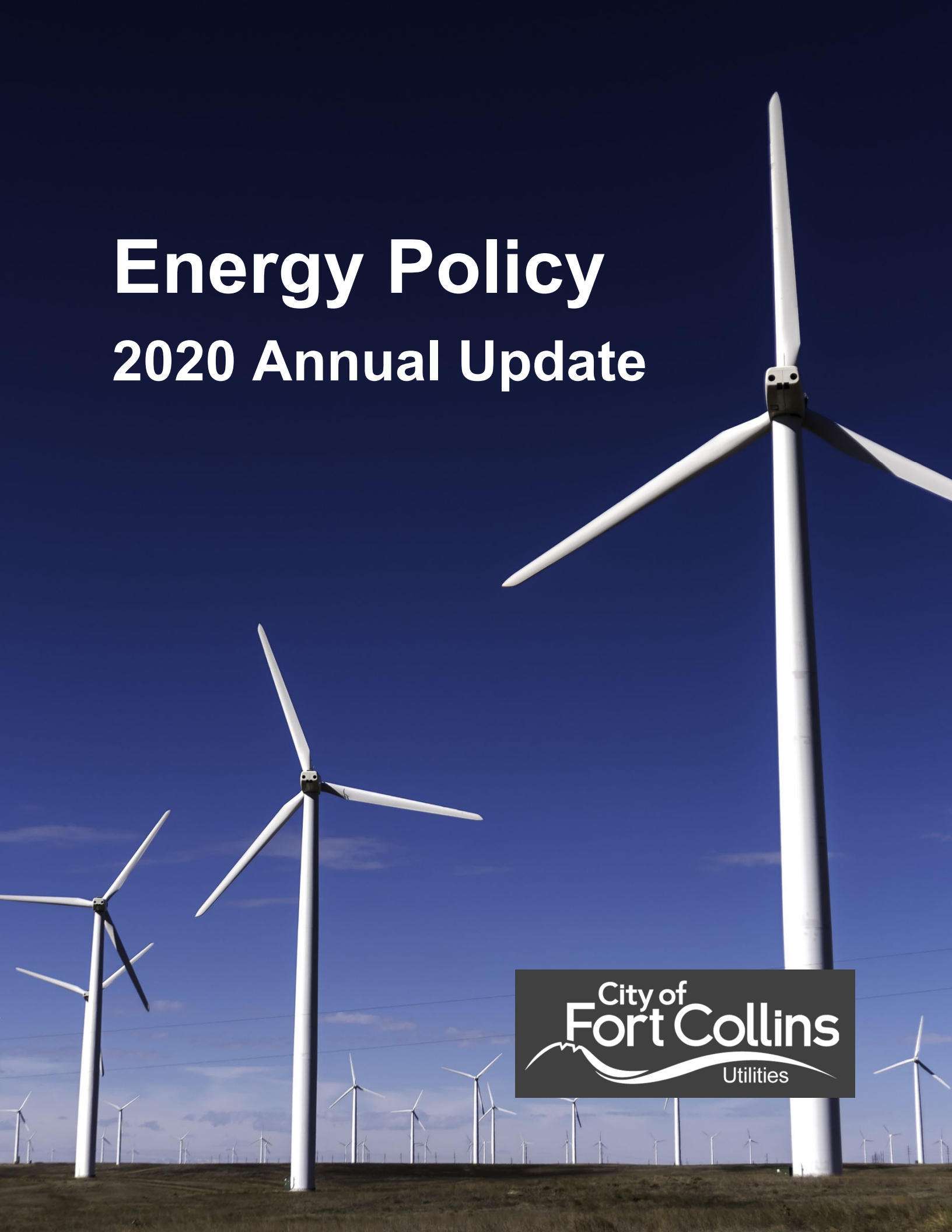
Energy Policy

2020 Annual Update



City of Fort Collins Utilities

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Introduction

This report provides an update of 2020 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.

This will be the last annual update under the Energy Policy format. Moving forward, Fort Collins has integrated Energy Policy objectives into the Our Climate Future Plan. Our Climate Future is about the future of everyone in Fort Collins in these times of climate change, and it is our community guide to creating the carbon neutral, zero waste, and 100% renewable electricity future we desire. More on this Plan in the Looking Forward section of this report.

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, while improving outcomes for historically underserved groups and supporting other sustainability objectives.

The year 2020 was a year unlike any other. The COVID-19 global pandemic forced Utilities to rethink how it provides services to the Fort Collins community, all while Colorado's largest ever wildfire burned within our watershed for over 100 days. These events challenged our community in unprecedented ways. The resulting changes included different patterns of energy use for residential and business customers and suspension then reimagining of the delivery of programs and services. Notes are added throughout this report which highlight specific impacts of these events.

2020 Outcomes

- Residential and commercial electricity use per person has decreased by 19% since 2005 and community natural gas use per person decreased by 15%. Community petroleum use per person has also decreased by 26%. Total energy use (electricity, natural gas and petroleum) has gone up by only 4% since 2005, despite a population increase of 29%.
- Efficiency programs and strategies saved approximately 43,000,000 kilowatt-hours (kWh), or 2.85% of the community's annual usage, which is equivalent to the annual electric use of 5,600 Fort Collins homes.
- Fort Collins buildings used only 11% more total energy than in 2005, while building square footage increased by 21% during that same period.
- Community carbon emissions from electricity are down 38% from 2005.

- Electricity from non-carbon resources accounted for 46% of total resources, with 19% from hydro, 23% from wind and 4% from solar energy. Fossil fuel energy comprised of only 54% of electricity sources.
- Efficiency and renewable programs generated over $44 million in local economic benefits through reduced utility bills, direct rebates and leveraged investment, supporting an estimated 240 jobs in the region.
- Electric reliability remained high at 99.9981%, with an average system outage of only 10 minutes.

2020 Major Activities and Highlights

- Utilities Energy Services co-led a project with Environmental Services to update the Energy Policy, Climate Action Plan and Zero Waste Plan. The combined planning effort was called Our Climate Future. See the 'Looking Ahead' section for more information on this comprehensive new plan.
- The Epic Homes program branding was established and launched as a comprehensive program for improving single family home efficiency, with elements for assessments, contractors, rebates, on-bill financing, real estate documentation and indoor environmental quality research.
- Utilities partnered with Operations Services and Environmental Services and was awarded a $200,000 grant through DOLA's Renewable/Clean Energy Challenge grant program. The project will enable the Northside Aztlan center to function as a resilience hub during community emergencies with additional solar, batteries and efficiency measures.
- Brad Smith of Energy Services was recognized and awarded the 2020 ICC National Leadership in Sustainability and Energy Efficiency Award. The award recognizes outstanding contributions to the growth and enhancement of codes or public policy espousing the principles of the Code Council Sustainability Membership Council.
- The Building Energy and Water Scoring program was officially launched and requires building owners who are covered under the City's Ordinance to report their ENERGY STAR® Portfolio Manager score to the City. Owners of commercial buildings over 20,000 square feet were identified of the need to report and were provided with the tools and utility resources to access their data.
- Energy Services, along with the Water Conservation department, launched new online portals, MyEnergy, MyData and MyWater, which allow customers to easily manage and track their energy and water use.
- As a result of the pandemic, Energy Services was required to find new ways to engage and motivate customers to save energy. Utilities launched the Smart Meter Savings Program, which leverages AMI data and data analytic software to make customized recommendations to commercial customers to introduce energy saving strategies in their building systems.

2020 Annual Update Infographic

Each year, Utilities provides an update on the progress and activities related to the Energy Policy. In 2020, the annual update included an infographic *(see Figure 1 on next page).*

Figure 1. 2020 Energy Policy Annual Update Infographic

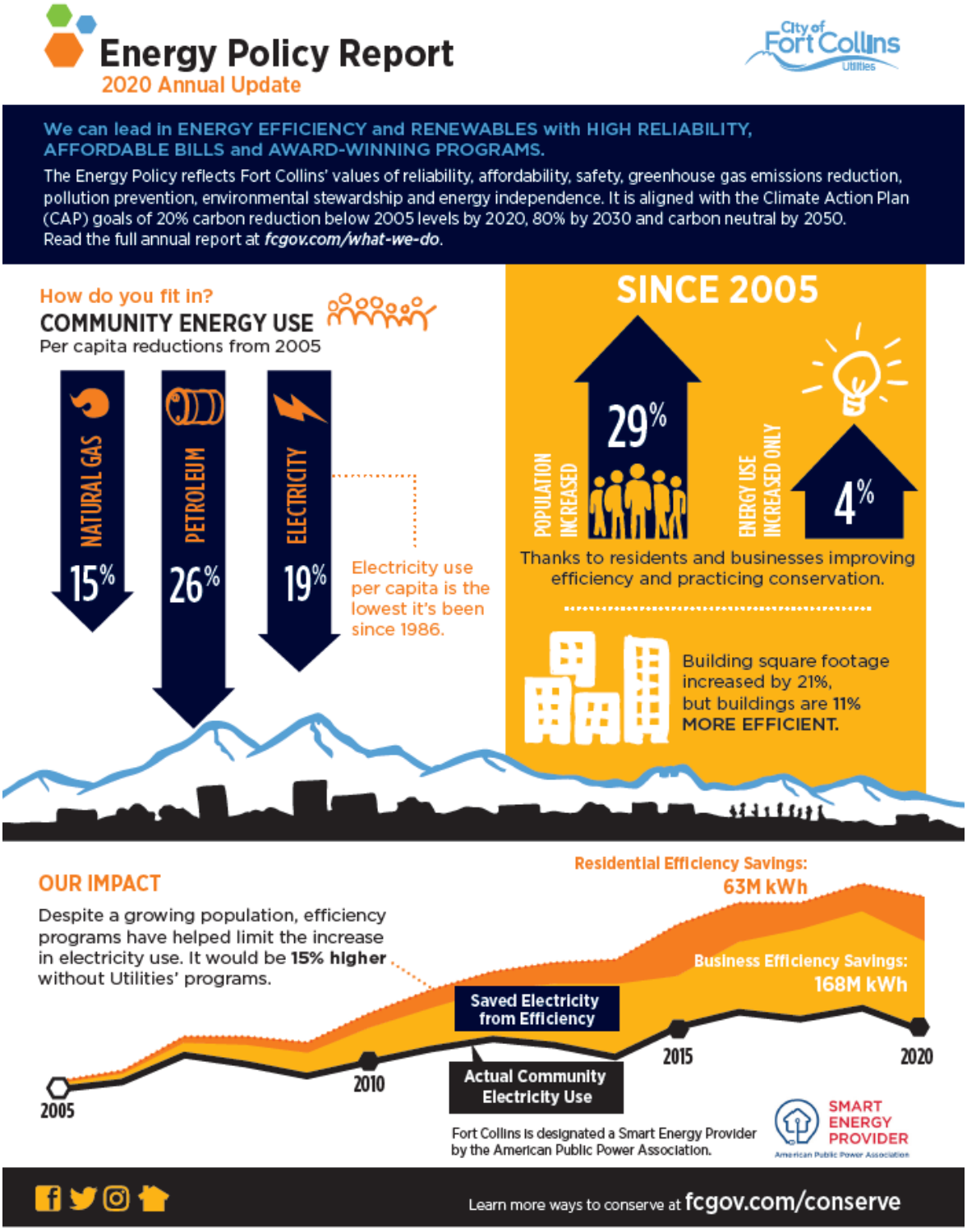
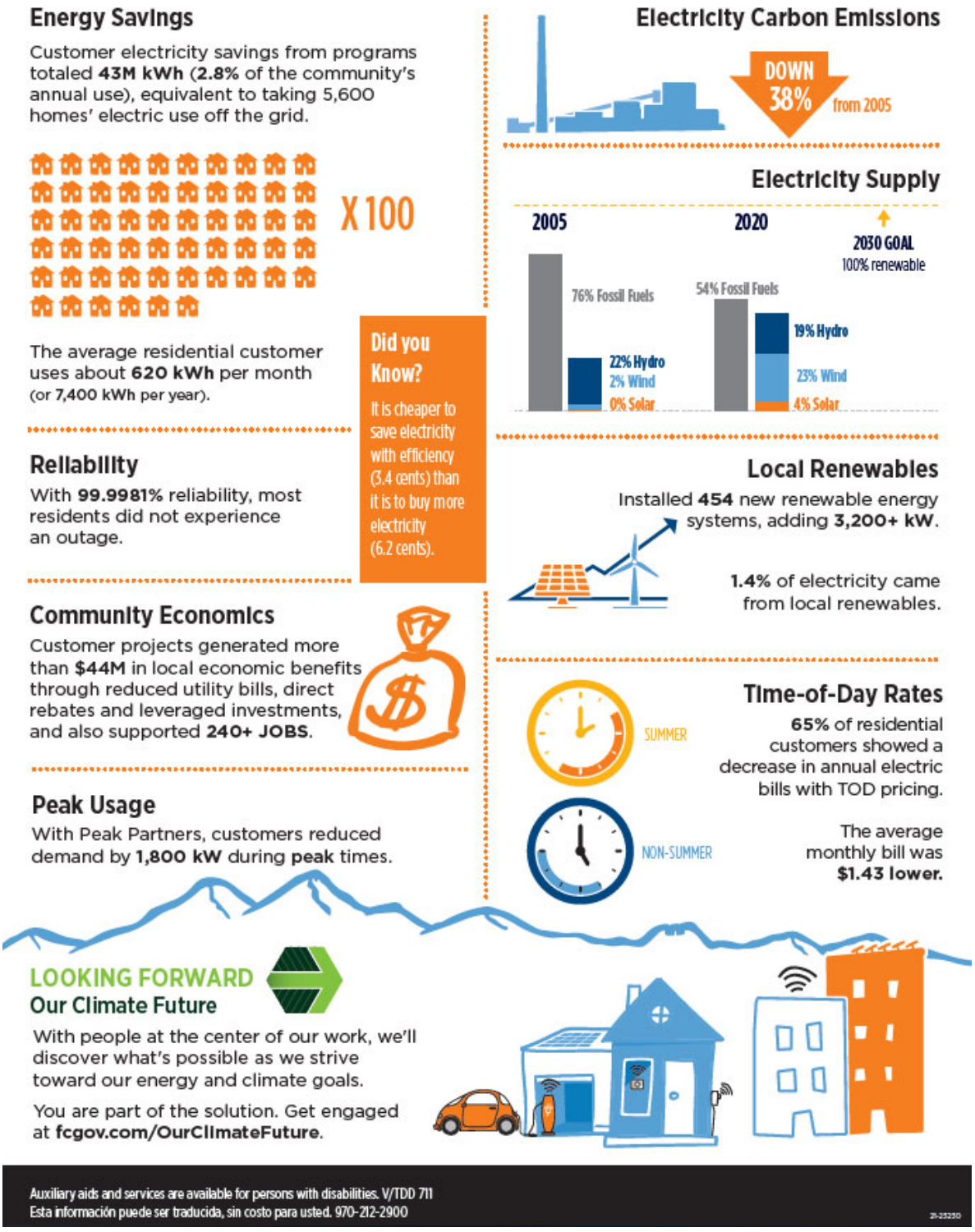


Figure 1. 2020 Energy Policy Annual Update Infographic (continued from previous page)



Community Energy Use

Community energy use (electric, natural gas and petroleum) has increased by 4% since 2005, while the population has increased by 29% from 132,000 to 171,000 residents. Per capita community energy use decreased by 19% from 2005 levels for electricity, 15% for natural gas and 26% for petroleum *(see Table 1).* Total energy use per capita decreased by 20%. In 2020, absolute electricity usage also declined and was 10% lower than in 2019. Community electricity use per capita went from 11,011 kWh in 2005 to 8,886 kWh in 2020 *(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 19% since 2005.

Table 1. Community Energy (Total and Per Capita) Consumption in 2005, 2019 and 2020

Metric/Indicator	2020 Value	% change from 2019	% change from 2005
Total Energy (kBtu)	19,176,832,454	-10%	+4%
Electricity	5,191,525,908	-2%	+4%
Coal	1,819,191,709	-38%	-50%
Non-Carbon	2,400,709,856	+38%	+100%
Natural Gas	7,988,205,285	-11%	+10%
Petroleum	5,997,101,260	-16%	-5%
Diesel	501,237,369	-17%	+244%
Gasoline	5,495,863,891	-15%	-10%
Per Capita (kBtu)	111,999	-11%	-20%
Electric	30,320	-3%	-19%
Natural Gas	46,654	-12%	-15%
Petroleum	35,025	-17%	-26%

Energy use per capita has shown a mostly downward trend since 2005, with more variation for natural gas use per capita *(see Figure 3).*

Figure 2. Fort Collins Community Per Capita Electricity Use

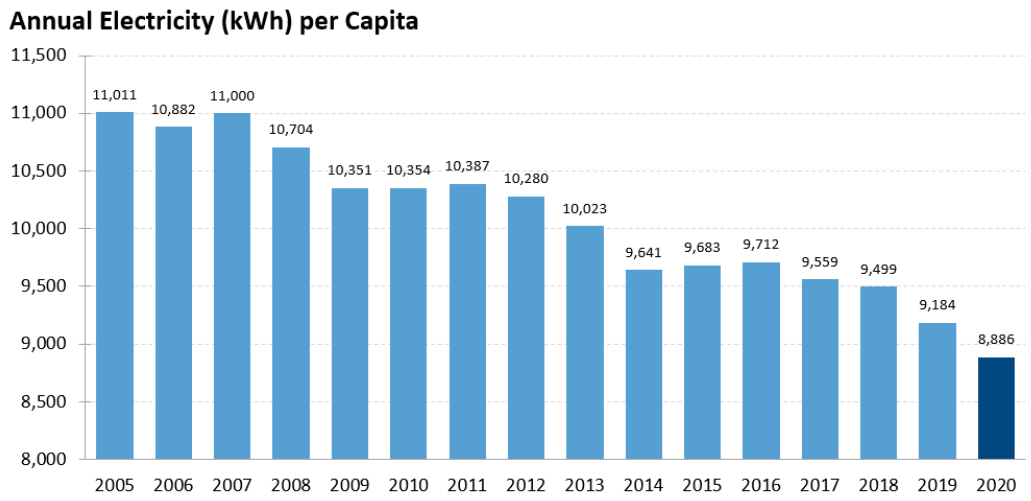
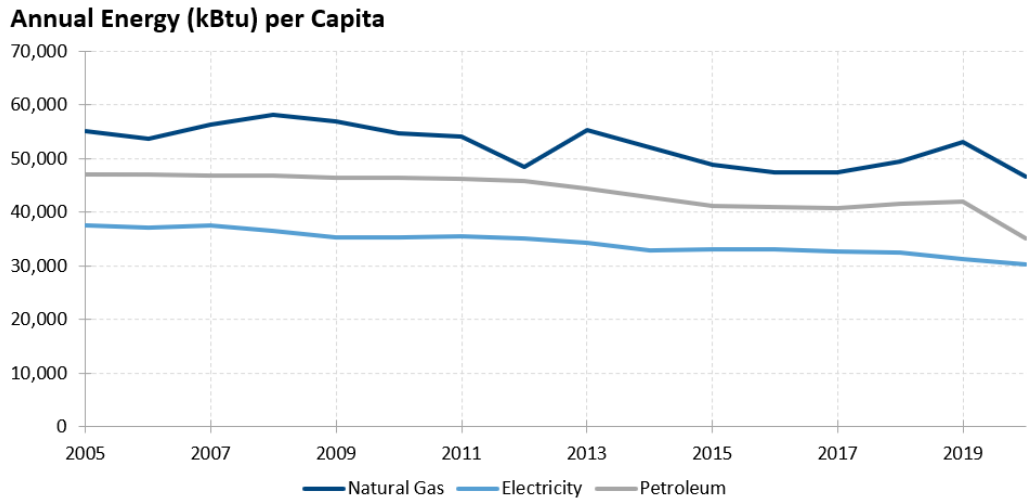


Figure 3. Fort Collins Community Per Capita Energy Use



Community Carbon Emissions

In 2020, carbon emissions from electricity were 38% below 2005 levels, surpassing the goal of 20% below 2005 by 2020. Carbon emissions reductions come from influenced areas (such as Platte River Power Authority renewable energy) and direct areas (such as energy efficiency and rooftop solar), which counteract emissions from growth and weather *(see Figure 5).*

Figure 4. Carbon Emissions from Electricity

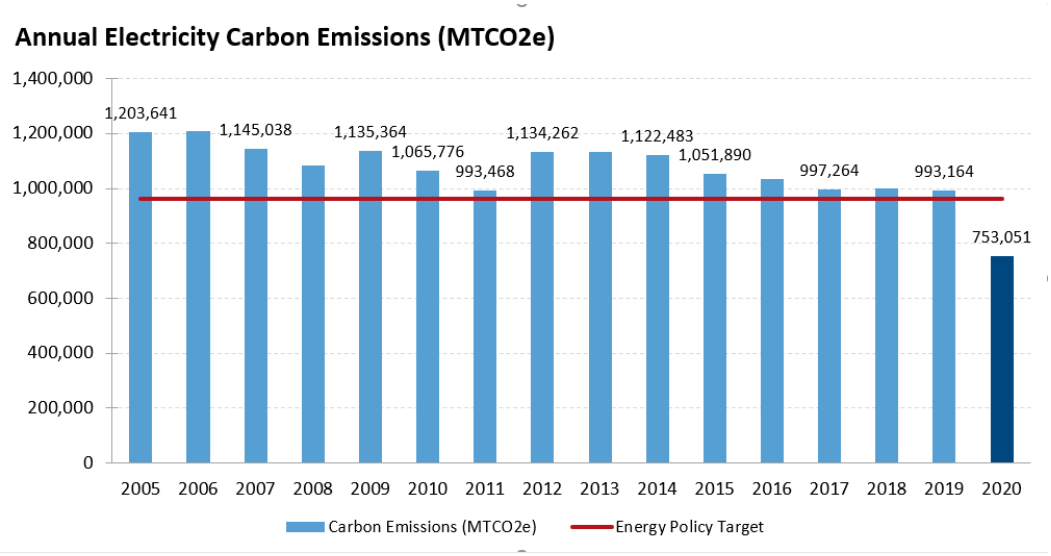
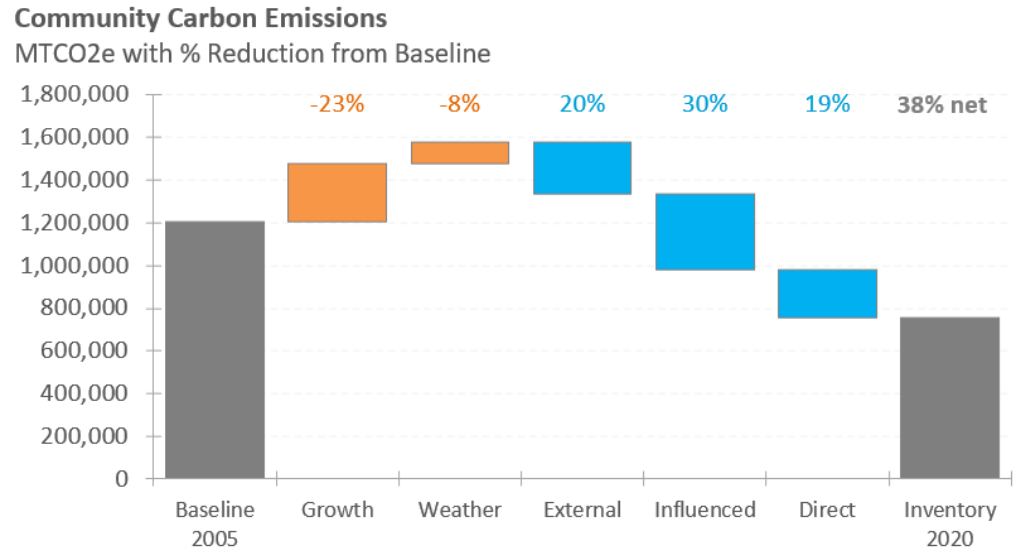


Figure 5. Drivers of Change for Carbon Emissions from Electricity



To learn more about community carbon emissions, visit the City of Fort Collins Climate Dashboard at https://ftcollinscap.clearpointstrategy.com/.

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 2020, ownership share emissions were 1,520,655 metric tons, a reduction of 12.8% below the 2005 baseline year.

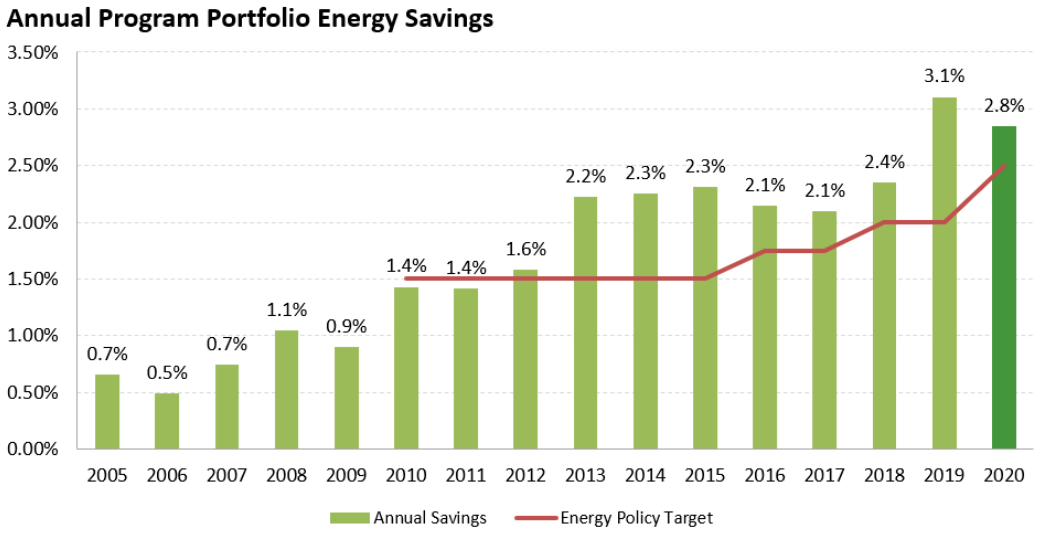
Energy Savings

In 2020, customer electric savings from efficiency programs and strategies totaled 42,834,000 kWh *(see Table 2),* which is equivalent to 2.85% of the community's annual retail electricity consumption. The 2020 goal to achieve savings of 2.5% of the community's annual electricity use was exceeded *(see Figure 6).* It is cheaper to save electricity, with energy efficiency and distributed renewables, at $0.029 per kWh, compared to the wholesale blended cost of electricity at $0.061 per kWh.

Table 2. Energy Program Portfolio Savings

Program	Participation (audits & projects)	Customer Electric Savings First Year (gross MWh)	Cost of saved energy ($ per kWh levelized)
Behavioral Efficiency	54,000	9,739	$0.039
Building Code	600	906	$0.010
Design Assistance	4	264	$0.006
EfficiencyWorks Business	448	12,751	$0.033
EfficiencyWorks Marketplace	12,739	2,262	$0.020
Epic Homes	653	434	$0.181
Income Qualified Efficiency	159	115	$0.143
Special Projects	69,291	11,966	$0.006
Distributed Renewables	454	4,396	$0.018
Total	138,348	42,834	$0.029

Figure 6. Annual Program Portfolio Energy Savings

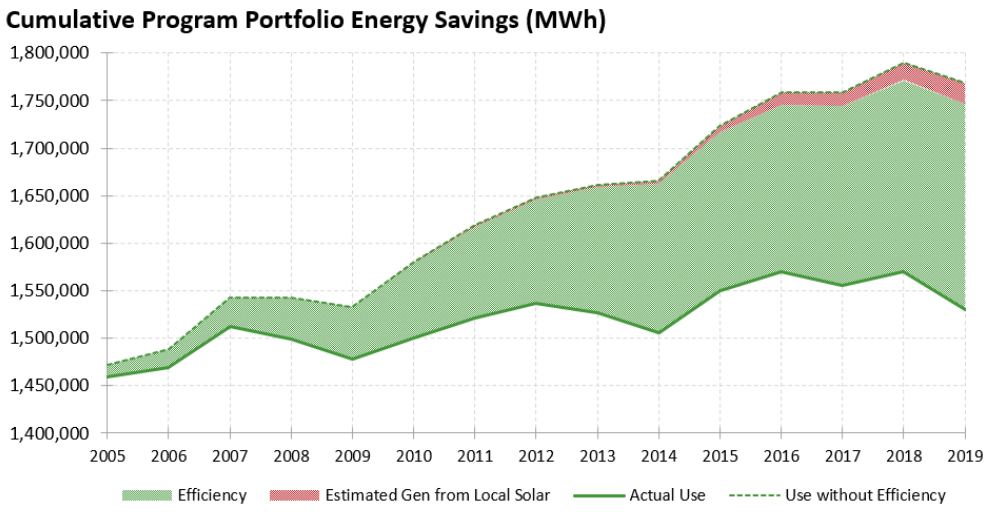


The pandemic impacted several programs, including:

- The Efficiency Works Home program suspended the implementation of onsite assessments due to the pandemic beginning in March. To continue providing services, the program team pivoted to developing remote and virtual energy advising services for homeowners.
- The Efficiency Works Business program also suspended in-person services due to the pandemic, but continued providing incentives, delivered in collaboration with Platte River Power Authority. The business program established the Smart Meter Savings Program, which leverages AMI meter data to identify building commissioning opportunities and engaged energy managers to modify building operations.
- The Larimer County Conservation Corps Water and Energy Program completed energy assessments and installation of efficiency equipment at over 150 households but were forced to end program services early due to the pandemic. The Corps members continued to provide valuable community services, primarily by volunteering their time at the Larimer County Food Bank and providing volunteer assistance across the community.
- Utilities Community Engagement team was unable to host and attend in-person events but pivoted to virtual engagement opportunities with community members focused on energy education and energy management.

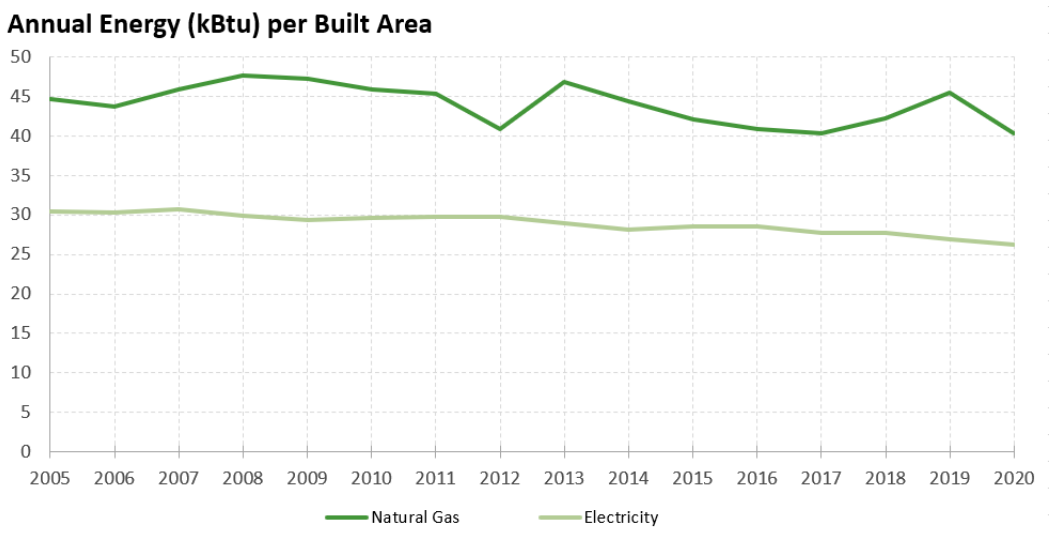
Cumulative savings from energy efficiency programs since 2002 totaled 230,500,000 kWh of avoided operational electricity use in 2020 *(see Figure 7)*. Without efficiency programs, community electricity use would be 15% higher. Comparatively, wind and solar energy sources generated 416,000,000 kWh (or 27% of Utilities operational electricity use in 2020). A combination of continued energy efficiency and renewables integration will be critical to achieving the aspiration goals set in the Energy Policy and Our Climate Future. This has helped keep our electricity consumption increase to only 4% since 2005, even with a growing population and increased building stock.

Figure 7. Cumulative Program Portfolio Energy Savings



Energy use in buildings went from 12,250,000,000 kBtu in 2005 to 13,150,000,000 kBtu in 2020, an increase of 7%. However, building square footage has gone from 163,250,000 ft^2 in 2005 to 198,150,000 ft^2 in 2020, a 21% increase. This means that buildings in 2020 were 7% more efficient than in 2005, using 66 kBtu per ft^2 instead of 75 kBtu per ft^2 *(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 2020, Utilities moved toward these goals with 54% from fossil fuels (includes coal, natural gas and regional purchases), 19% from hydro, and 27% from wind and solar (with 1.8% of that from local renewables) (s*ee Figure 9 and Table 3).* Additionally, 46% of electricity supply came from non-carbon resources. Wind and solar energy source has steadily increased from only 2% in 2005 *(see Figure 10).*

Figure 9. 2020 Operational Electricity Resource Mix

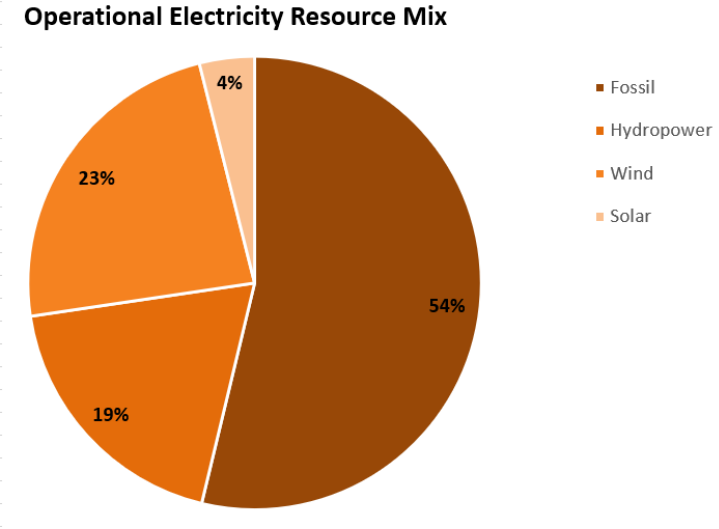
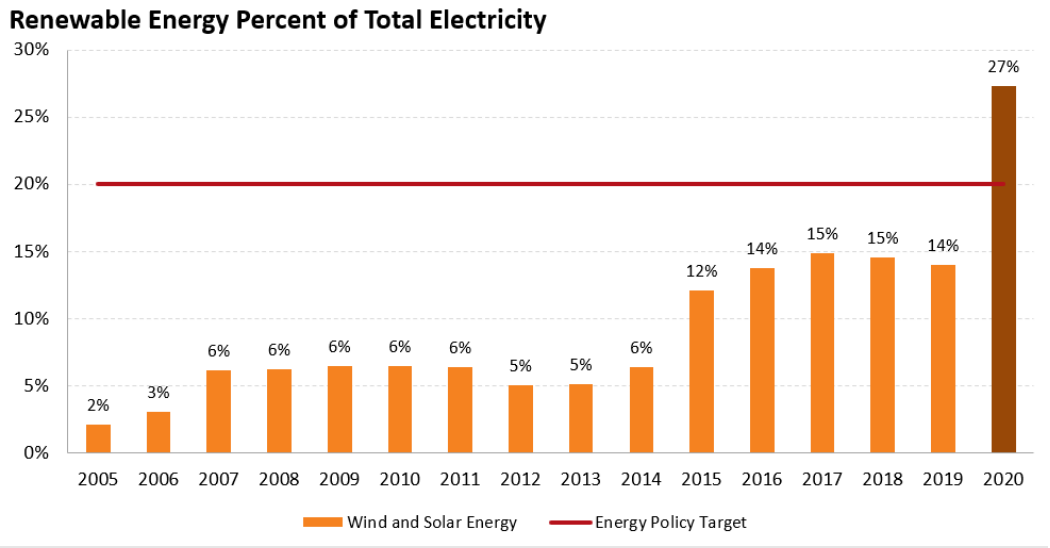


Table 3. Operational Electricity Resource Mix 2005, 2019 and 2020

	2005		2019		2020	
	MWh	%	MWh	%	MWh	%
Fossil Fuels	1,107,732	76	1,043,544	67	817,941	54
Hydro	319,594	22	290,411	19	287,526	19
Wind	31,499	2	167,186	11	356,291	23
Solar	0	0	50,477	3	59,791	4
Total*	1,458,857		1,551,618		1,521,549	

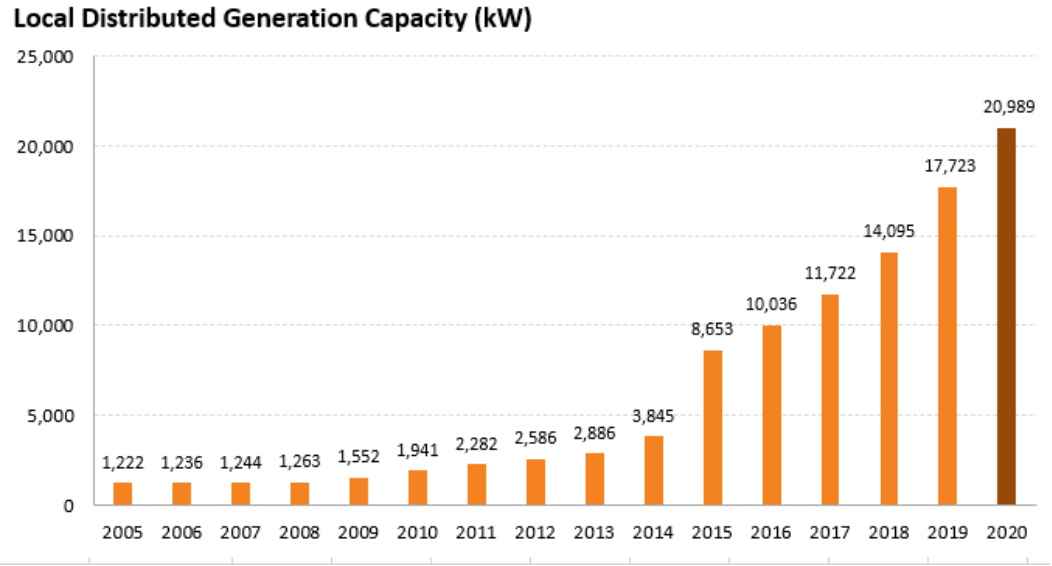
Figure 10. Wind and Solar Energy Percentage of Total Electricity



Distributed Generation

Distributed generation capacity has increased from 1,222 kW in 2005 to 20,989 kW in 2020 *(see Figure 11).* This is the result from residential and commercial solar rebate programs, solar purchase power agreements and community solar. There were 454 new renewable energy installations in 2020, adding over 3,250 in kW capacity. Utilities has an additional 24,000 kW of utility-scale solar operated by Platte River Power Authority (PRPA).

Figure 11. Fort Collins Distributed Generation Capacity



Reliability and Demand Response

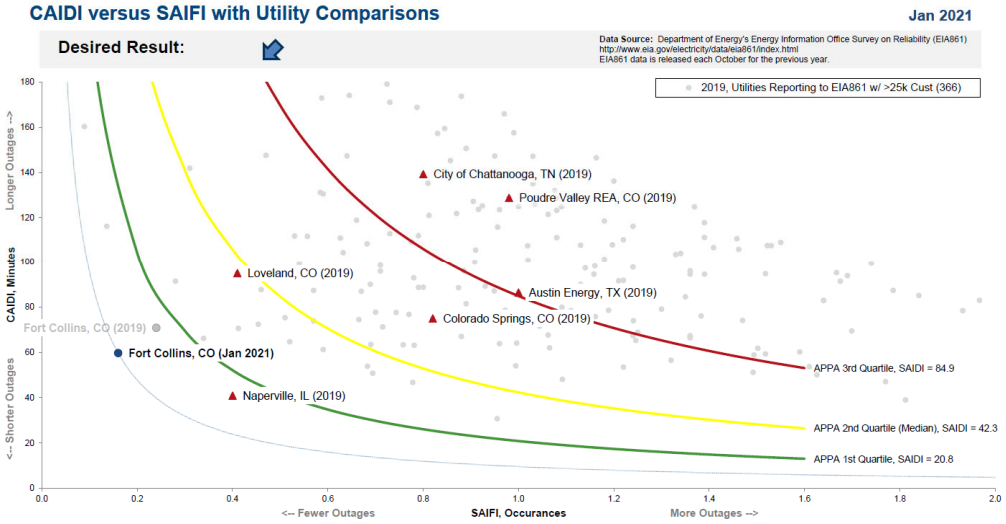
Reliability remained high in 2020 with an uptime of 99.9981% and an average system outage time of 10 minutes *(see Table 4).* Fort Collins also remained among the topmost reliable utilities for duration and frequency of outages based on standards set by the American Public Power Association (APPA) *(see Figure 12).*

Table 4. 2020 Reliability Metrics

DATE	ASAI	CAIDI	SAIDI	SAIFI	MAIFI
12/31/2020	99.9981%	59.5	10.2	.17	0

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

Figure 12. Fort Collins Reliability Comparison to Other Utilities



Peak Partners, a demand response portfolio of programs, allowed us to reduce peak loads in 2020 by up to 1,800 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 430 MWh per year of shifted load, with customers saving an average of $50 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 $44 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 247 more jobs in our community than investing in other job sectors *(see Table 5*).* According to the Clean Jobs Colorado 2020 Report, there are an estimated 3,566 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: 'How Does Energy Efficiency Create Jobs?'*

Table 5. Local Economic Benefits from Energy Efficiency and Solar Projects

Energy Efficiency	Dollar Amount ($M)	Notes
Leveraged Investment (2019)	$4.2	Incentives are typically 1/2 of project cost
Prior Year Utility Cost Savings (2002-2018)	$16.5	Direct customer bill savings
Direct Incentives (2019)	$4.2	Annual incentives in 2019
Annual Utility Cost Savings (2019)	$3.7	Annual savings for 2019
Indirect and Induced Benefits (2019)	$4.2	50% multiplier on incentives and investment
Energy Services Expenditures (2019)	-$6.8	Annual utilities expenditures
Total Energy Efficiency ($M)	$25.8	
Renewables		
Leveraged Investment (2019)	$8.2	Actual costs minus incentives
Prior Year Utility Cost Savings (2005-2018)	$5.7	Direct customer bill savings
Direct Incentives (2019)	$0.8	Annual incentives in 2019
Annual Utility Cost Savings (2019)	$0.4	Annual savings for 2019
Indirect and Induced Benefits (2019)	$4.5	50% multiplier on incentives and investment
Energy Services Expenditures (2019)	-$1.1	Annual utilities expenditures
Total Renewables ($M)	$18.5	
Total	**$44.4**	

EE Jobs Analysis	EE Path	Business as Usual Path
Jobs per $M	20	17
2019 Investment ($M)	$8.3	$8.3
Gross Jobs	170	145
Net Jobs	**25**	
Cumulative annual shift in utility bill spending ($M)	*$20.2*	*$20.2*
Jobs per $M	*17*	*10*
Gross Jobs	*349*	*200*
Net Jobs	***149***	
Net EE Jobs	**174**	
Solar Jobs Analysis	**Solar Path**	**Business as Usual Path**
Jobs per $M	20	17
2019 Investment ($M)	$9.0	$9.0
Gross Jobs	183	156
Net Jobs	**27**	
Cumulative annual shift in utility bill spending ($M)	*$6.1*	*$6.1*
Jobs per $M	17	10
Gross Jobs	106	61
Net Jobs	**45**	
Net Solar Jobs	**72**	
Combined Net Jobs	**247**	

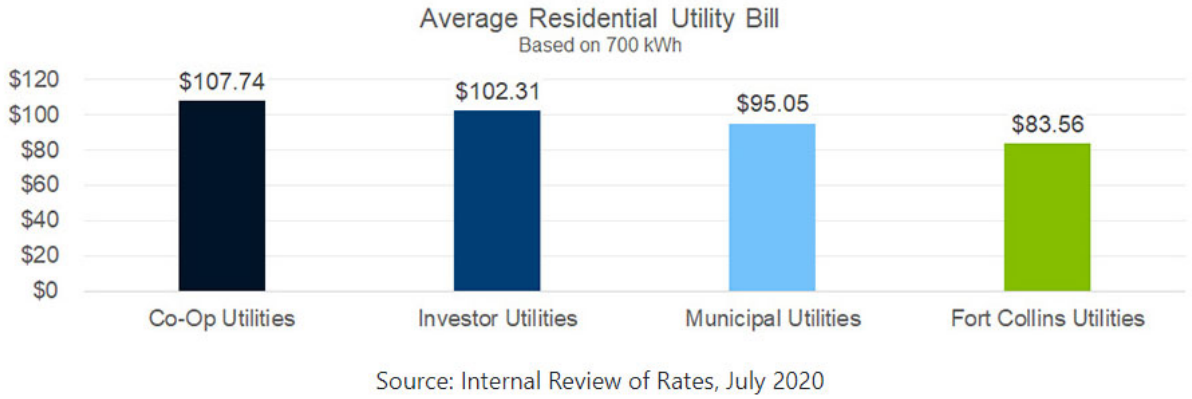
Utilities collaborates with many partner organizations to achieve these community impacts and Energy Policy goals. Partners in 2020 included, but were not limited to:

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

Rates

In July 2020, the Colorado Association of Municipal Utilities (CAMU) surveyed 44 utilities to determine the average cost of electricity in Colorado. Based on that data, Fort Collins Utilities' price for 700 kilowatt-hours (kWh) of use was $11.50 less than the average across other municipal utilities and $24 and $19 lower than the average of cooperative and investor-owned utilities, respectively. Residential rates also ranked among the lowest residential rates for Colorado municipal utilities, while providing high-quality programs in business energy efficiency, residential energy efficiency and renewable energy.

Figure 13. Rate Comparison to Other Utilities (fcgov.com/utilities/residential/rates/electric/how-we-compare)



2020 Electricity Use – Pandemic Impact

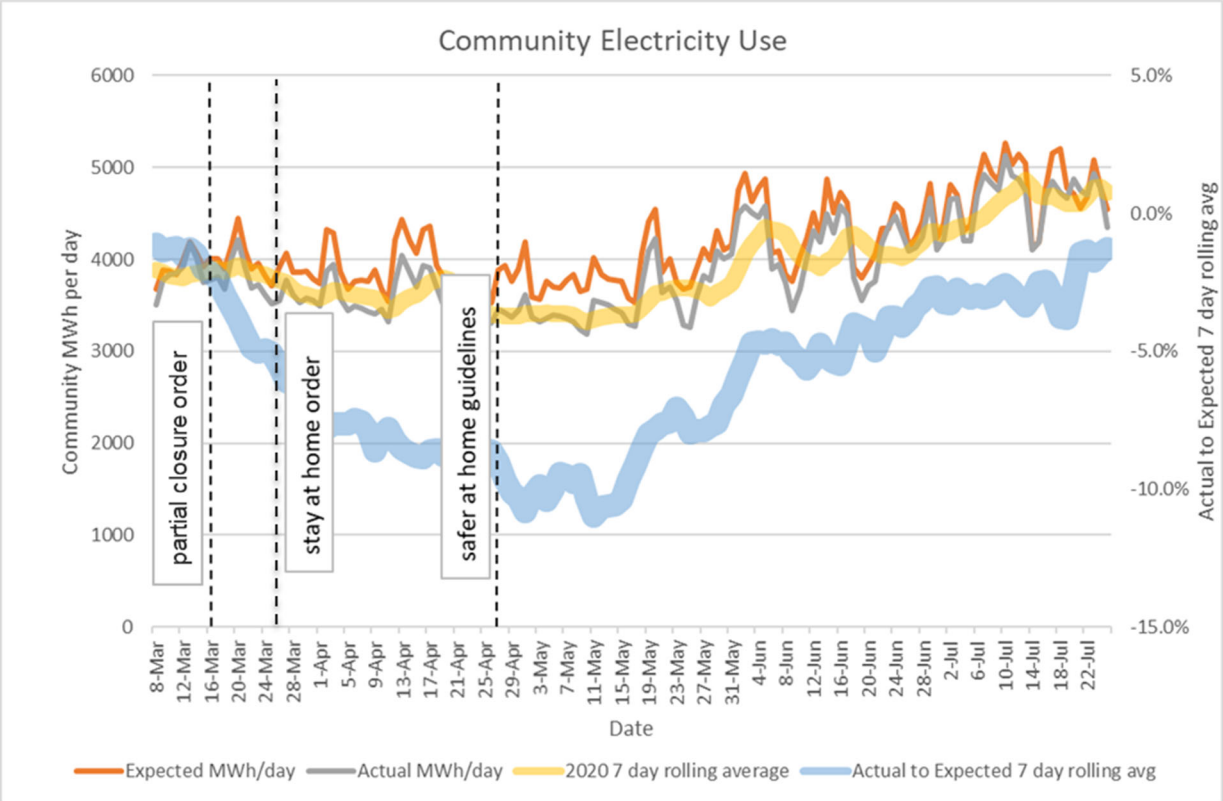
As noted in the introduction, 2020 was a year unlike any other. The COVID-19 pandemic forced rapid and unprecedented changes for residents and businesses operations. These changes were immediately visible in changing patterns of electricity use.

Utilities quickly established a data "dashboard" to represent the impact of the pandemic on the community and the Utilities organization. The dashboard was updated weekly to support awareness and decision-making for Utilities management, the City Manager and City Council.

The selected data were community-wide and sector-specific electricity and water use, along with the number of customer accounts which were behind on payments. Together, these provided insight into the community response to dramatic changes we all experienced.

Figure 15 illustrates the dramatic changes in community electricity use as the community went from partial closure, to stay at home orders and then to safer at home guidelines. In early May, community use was down over 10%, with residential use slightly higher and commercial use lower by over 20%. By the end of the year, community use was approximately 3% lower, with residential use higher by 3% and commercial use lower by 11%.

Figure 14. Pandemic Impact on Community Electricity Use



Looking Ahead

This will be the last annual update under the Energy Policy format. Moving forward, Fort Collins has integrated Energy Policy objectives into the Our Climate Future Plan. Our Climate Future is about the future of everyone in Fort Collins in these times of climate change, and it is our community guide to creating the carbon neutral, zero waste and 100% renewable electricity future we desire. This Plan presents implementation strategies to simultaneously address climate, waste and energy goals. It also improves community equity and resilience outcomes, and expresses and articulates an unwavering commitment to mitigating climate change with a systems-approach, centering in people and community priorities with an evergreen review cycle.

Putting People First

Our Climate Future recognizes that if our aim is for everyone to benefit from these efforts, we must intentionally put people at the center of the work. Our Climate Future is the first major City planning effort with a defined intent to center its work in equity and lead with race. Leading with race means that we recognize the most disparate outcomes in our country follow racial lines and that Fort Collins is no exception. While Our Climate Future is an important step forward, we know that equity is an ongoing journey. The City is committed to staying on the path to put people at the center of our work.

Fort Collins' previous plans for climate action focused primarily on technical solutions – more renewable energy, more efficient homes and businesses, low-emissions vehicles and more. Technical solutions are important pieces of the climate change puzzle, yet without considering people at the center of climate, energy and waste actions, the work won't get done, and people's needs won't be met.

When we redesign our efforts to put people, their respective communities and community-defined priorities at the center of our approach, with technical solutions serving and uplifting those priorities, climate action becomes a catalyst for addressing many of our challenges, from affordable housing to a healthy economy to convenient ways to get around. As we make this about each of us and what we care most about, we create space for more partners, leaders and perspectives at the table and increase the effectiveness, innovation and scale of what is possible in the next 10, 20 and 30 years.

New Approaches for Energy Services

For over 100 years, Utilities has 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 electricity supply, demand and storage working together to achieve a reliable, affordable and clean energy system.

Looking ahead to 2030 and beyond, the Energy Services Division will be shifting the design and implementation of customer programs with three co-optimized technical 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 while improving outcomes for historically underserved groups and supporting other sustainability objectives.

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 will be advancing 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.

These strategies drive 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 behind-the-meter DERs can vary by building type, location, hour, season and year.

A key part of these strategies 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 is the integration and continuous optimization of DERs in alignment with community sustainability outcomes.

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
  - Consumer Product Rebates
  - Refrigerator and Freezer Recycling
  - Home Energy Reports
  - Larimer County Conservation Corps
- Renewable Energy
  - Commercial and Residential Solar Rebates
  - Community Solar
- Demand Response
  - Peak Partners
- Building Code and Compliance

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

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 energyservices@fcgov.com.