CITY OF ARVADA

An Energy Action Plan for

City of Arvada

May 2022

Xcel Energy®

PARTNERS IN ENERGY

An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

Thank you to the following individuals who contributed many hours of service to developing this Energy Action Plan.

The content of this plan is derived from a series of planning workshops hosted by Xcel Energy's Partners in Energy. Xcel Energy is the main electric and gas utility serving the City of Arvada. Partners in Energy is a two-year collaboration to develop and implement a community's energy goals. For more information about the planning workshops, see Appendix A.

Energy Action Team

City of Arvada Stakeholders

Dar-Lon Chang	Member; Geos Sustainability Committee
Keegan Conley	Committee Chair; Arvada Sustainability Advisory Committee
Mark Deven	City Manager; City of Arvada
Keith Emery	Member; Arvada Sustainability Advisory Committee
John Firouzi	Manager of Mobility & Planning Innovation; City of Arvada
Nancy Ford	City Council Member; City of Arvada
Lorie Gillis	Deputy City Manager; City of Arvada
Cathy Griffith	Member; Arvada Sustainability Advisory Committee
Cory Hines	HVAC Specialist; City of Arvada
Matt Hirschinger	Assistant to the City Manager; City of Arvada; Staff Liaison for Citizen Sustainability Committee
Rosa Kougl	Administrative Coordinator; City of Arvada; Arvada Sustainability Advisory Committee
Rachael Kuroiwa	Chief Communications Manager; City of Arvada
Ike Miller	Fleet Services Manager; City of Arvada
Izabela Petrykowska	Economic Development Specialist; Arvada Economic Development Association
Melissa Ryder	Community Resilience Coordinator; City of Arvada
Kim Vagher	Manager of City Facilities; City of Arvada
David Wagman	City of Arvada Resident

Energy Action Team

Partners in Energy Team

Becca Stock	Community Facilitator
Terry Hatfield	Community Facilitator
Craig Eicher	Area Manager *(former)*
Channing Evans	Communications Lead (*former*)
Kynnie Martin	Account Manager

This Energy Action Plan was funded by and developed in collaboration with Xcel Energy's Partners in Energy. Partners in Energy shall not be responsible for any content, analysis, or results if the City of Arvada has made modifications to the plan.

TABLE OF CONTENTS

City of Arvada Energy Action Plan

About this Plan

Representatives from the City of Arvada, Arvada Sustainability Advisory Committee, and Geos Neighborhood have worked together to create an Energy Action Plan with the help of Xcel Energy's Partners in Energy. Partners in Energy supports communities like Arvada in developing and achieving their energy goals.

Our Vision & Goals

The City of Arvada aspires to achieve the following energy action goals:

- ✓ Increase participation in energy efficiency and renewable energy programs by **1/4 (24 percent) from 2020 levels** (2,318 additional program participants).
- ✓ Save an additional **1/3 in carbon reductions (32 percent)** through energy efficiency and renewable energy programs from 2020 levels (5,426 MTCO2e in additional carbon equivalent savings).
- ✓ Identify and implement energy efficiency, renewable energy, and beneficial electrification strategies on a bi-annual basis to support the state's carbon reduction goals of **26% by 2025, 50% by 2030, and 90% by 2050 below 2005 baseline**.

Community Vision

The City of Arvada and Xcel Energy collaborate to create economically viable energy solutions for all residents and businesses by 2040 that align with climate science and governing policy.

Our Focus Areas

To achieve this vision, the Arvada Energy Action Plan is divided into three focus areas:

1. **Energy Efficiency:** Reduce the amount of enegy used.
2. **Renewable & Reliable Energy:** Shift energy use to renewable sources.
3. **Beneficial Electrification:** Replacing equipment using fossil fuels with all electric options.

CITY OF ARVADA

Xcel Energy®

PARTNERS IN ENERGY
An Xcel Energy Community Collaboration

Our Strategies

Energy Efficiency

» Strategy E-1: Develop an Energy Efficiency Education & Awareness Campaign
» Strategy E-2: Build a Home Energy Squad Campaign
» Strategy E-3: Create a City Resource Library and Develop City Energy Efficiency Success Story

Renewable & Reliable Energy

» Strategy R-1: Develop City Renewable Energy Success Story
» Strategy R-2: Conduct Renewable Energy Education & Awareness Campaign
» Strategy R-3: Streamline the City's Solar Permitting Process
» Strategy R-4: Install Canopy Solar in Targeted Locations, Paired with EV Charging Stations

Beneficial Electrification

» Strategy B-1: Develop Electrification Standards at City Facilities
» Strategy B-2: Promote Electric Vehicles in City Fleet
» Strategy B-3: Building Electrification Education and Awareness
» Strategy B-4: Promote Transportation Electrification Understanding and Awareness

2020 Baseline

54,735 premises
92% residential

$85.3 million in energy costs

649.7 million kWh
of electricity used

47.7 million therms
of natural gas used

GHG emissions of **561 thousand metric tons CO_2**

Impact and Results of Plan Implementation

Over the next 18 months, the combined targets and strategies outlined in this plan will result in the following impacts:

Electricity savings of **15,380,914 kWh**

Natural gas savings of **344,982 therms**

Greenhouse gas emissions reduction of **22,241 MTCO2e**

Approximately **$1,579,000** in energy savings

Increase total participation in energy programs to **11,839**

CITY OF ARVADA

Xcel Energy®

PARTNERS IN ENERGY
An Xcel Energy Community Collaboration

INTRODUCTION

Why We Want an Energy Action Plan

An Energy Action Plan will allow Arvada residents, businesses, and the City to have specific, measurable goals that will allow us to significantly reduce our greenhouse gas (GHG) emissions while improving our quality of life. The plan will provide tangible goals to meet by 2040 that align with climate science and governing policy. The Energy Action Plan will provide a path to improve energy efficiency in residential and commercial buildings as well as increase local and grid-supplied renewable energy. Shifting to electric systems powered by renewable energy will reduce pollution from the transportation and other energy consuming sectors.

Impact Areas

This Energy Action Plan looks at how the City of Arvada uses electricity and natural gas throughout the City. This includes energy use in buildings as well as transportation as it relates to electric vehicles (EVs). As shown in Figure 1, building energy use accounts for more than half of the City's GHG emissions. This includes both natural gas use in buildings and the emissions associated with electricity generation delivered through the grid. Both natural gas and electricity use are addressed in this plan.

Transportation emissions account for another 13.5% of the overall emissions. While this plan does not take a comprehensive look at reducing transportation emissions, EV adoption strategies are explored. By switching to EVs, vehicle GHG emissions are reduced, and savings will continue to increase as Xcel Energy works toward fulfilling its vision of providing carbon free electricity by 2050.

Between the building energy use and transportation sectors, this plan identifies strategies to start reducing over two-thirds of the City of Arvada's total GHG emissions.

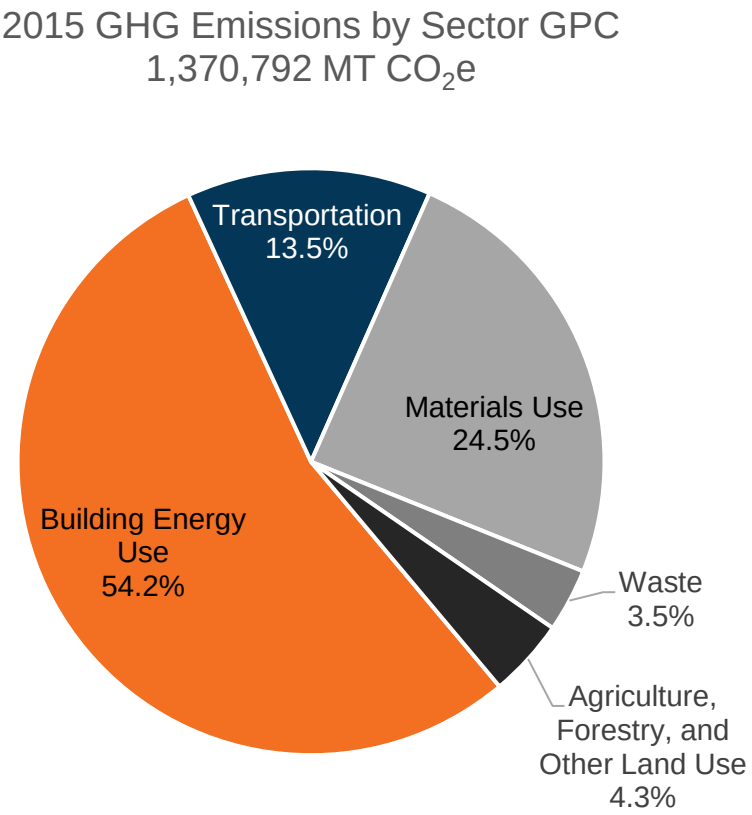


Figure 1: GHG Emissions breakout for the City of Arvada based on 2015 Inventory

Our Engagement Process

The creation of this Energy Action Plan was a 9-month active process to help support our community in characterizing its energy use, identify our energy-related goals, and develop engaging strategies to guide change toward our energy future. Starting in March 2021, the Energy Action Plan was driven by a series of planning workshops held in the community with a planning team committed to representing local energy priorities in collaboration with the City of Arvada and Xcel Energy Partners in Energy. Following the last workshop, two work sessions were held with City staff which kicked off a period of further review by City Council and staff. By the numbers, our engagement process included:

9 months	4 Community Workshops & 2 City Staff Worksessions	20 Community stakeholders

See Appendix A for more information about the planning process and Xcel Energy Partners in Energy.

WHERE WE ARE NOW

An integral part of the Partners in Energy planning process is reviewing historic energy data that informs our community's energy baseline. Xcel Energy provided data on energy use, participation counts, and utility energy conservation program savings for the City of Arvada, as detailed in the following sections. See Appendix B for a comprehensive picture of the City of Arvada's baseline energy data. From this data analysis and community demographic information taken from the 2019 Arvada Demographic Supplement, the following key characteristics about Arvada emerged to help inform strategy development.

Commuter Community

Sustainable Energy Use Opportunity

Electric vehicles (EVs) cost about 50% less, on average, to own and operate than conventional vehicles and have zero tailpipe emissions. As Xcel Energy continues to work toward its carbon neutral goal, indirect emissions from EVs will also be eliminated.

Based on American Community Survey (ACS) 2019 5-year estimates, about 3 times as many residents live in Arvada and work elsewhere as compared to residents who both live and work in the City (48,945 vs. 15,153). This reality is driving up transportation costs for residents. The Housing and Transportation (H+T) Index shows the average resident spends 21% of household income on transportation costs, with the average being slightly higher in the northwest area as compared to the downtown area (Figure 2) (Center for Neighborhood Technology , 2021). In addition to being a cost burden on residents, additional commuting miles is contributing to air pollution both from greenhouse gas emissions - where transportation makes up 13% of the community's overall emissions based on the 2015 community inventory - and regional ozone pollution. In January 2020, the EPA designated the Denver Metro Area as a serious nonattainment area based on the 2008 ozone standard.

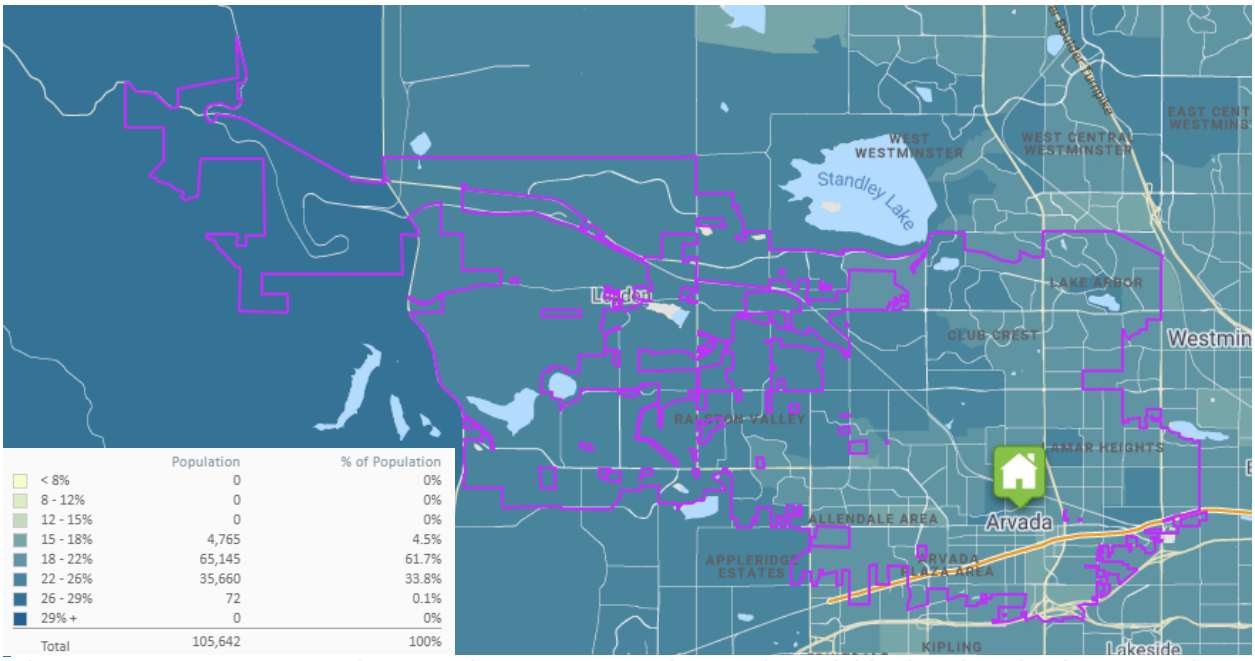


Figure 2: Average transportation costs by census tract. (Center for Neighborhood Technology , 2021)

This pattern of more residents than businesses is also reflected in the community energy use data. As shown in Figure 3, residential energy use makes up about 67% of the total energy use in the community. This highlights the importance of having sustainable energy programs available for residents.

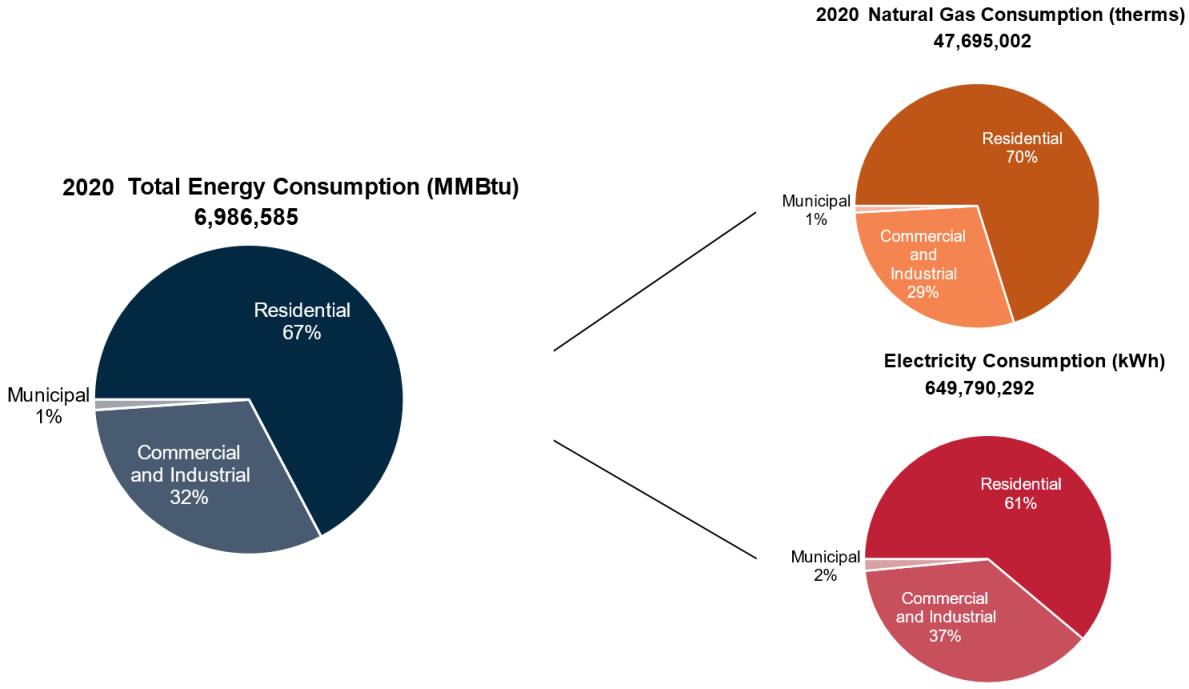


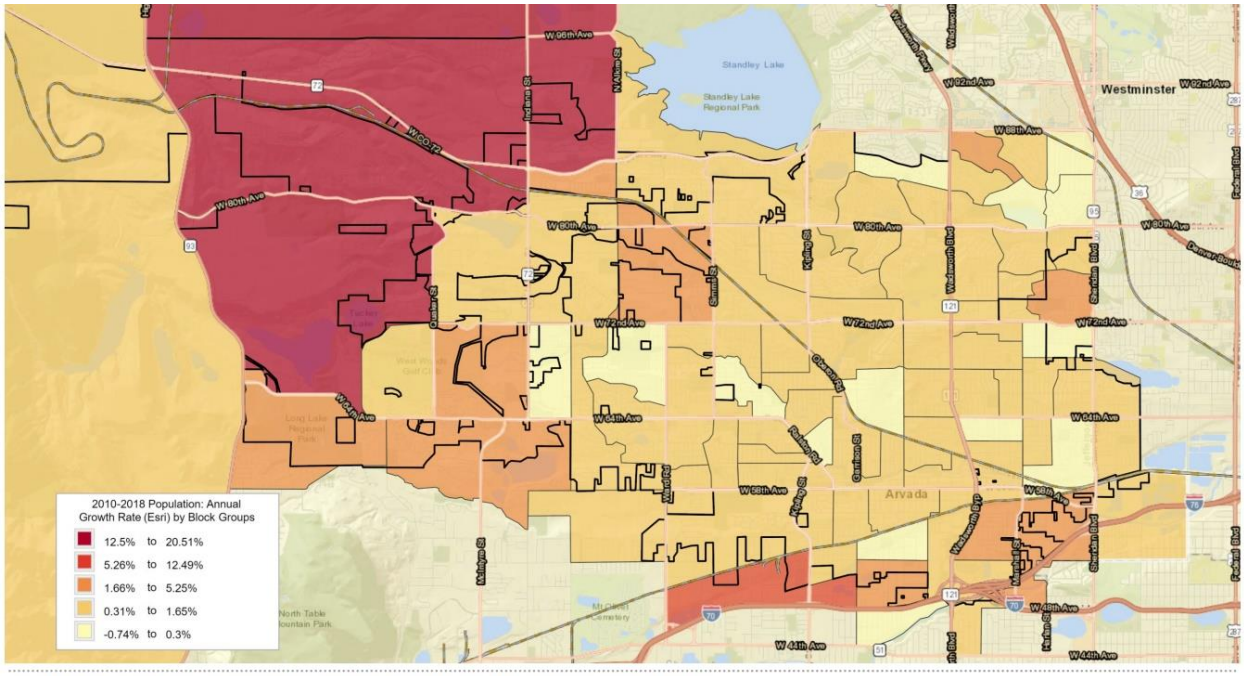
Figure 3: 2020 Community energy use breakout

Growing Community

Arvada is a rapidly growing community. The current population is about 123,000, with a projected population growth of 17% by 2035 over the 2019 population. As shown in Figure 4, much of this growth has occurred in the northwest portion of the City (City of Arvada, 2020). Over the next couple of years, much of the land available for new homes will be developed and Arvada will turn to replacement and infill to meet housing needs. As with many communities along the Front Range, affordable housing is a concern as home prices continue to rise. Homeowners in Arvada have a relatively low rate of housing cost burden with only 25% of homeowners spending more than 30% of their income on housing costs. The rate is much higher for renters - over 50%. As Arvada continues to grow, lowering utility bills through sustainable new construction choices in energy efficiency, renewable energy, or beneficial electrification may be some ways to help keep housing costs more affordable.

Sustainable Energy Use Opportunity

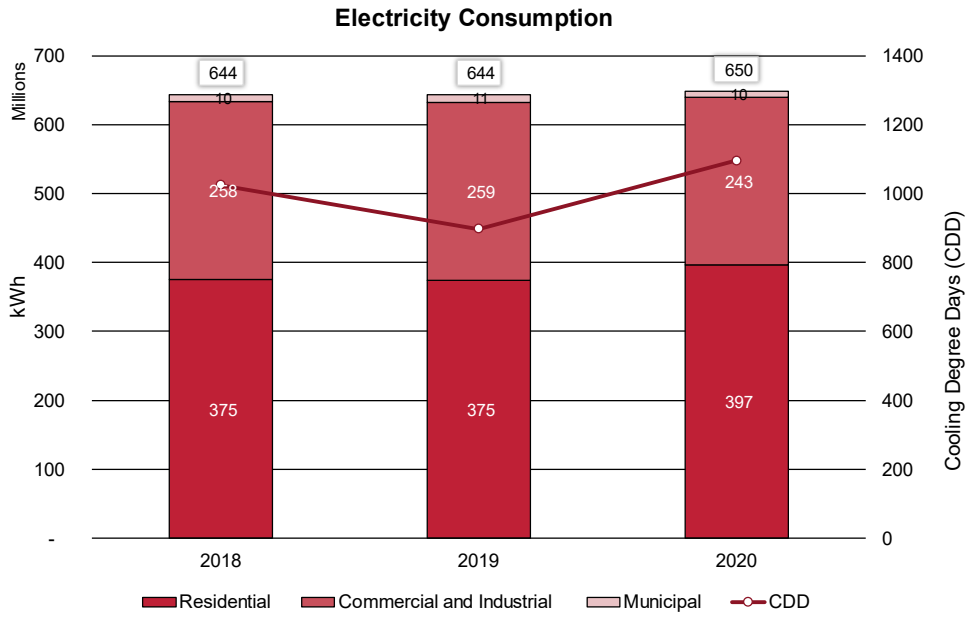
New construction projects present a good opportunity to build in energy efficiency or beneficial electrification from the start. This is lower cost than retrofitting existing buildings and often lowers the total cost of ownership of the building.



ARVADA 2010-2018 POPULATION ANNUAL GROWTH RATE BY CENSUS BLOCK GROUPS (ESRI)

Figure 4: Annual growth rate by block group 2010-2018 (City of Arvada, 2020)

To better understand the impact of this population growth on total community energy use, the three-year trend in electricity and natural gas use was examined. As shown in the community electricity use data (Figure 5), there was a 1% increase in electricity use in 2020 after it had been consistent between 2018 and 2019.



Note: Subtotals may not add up to the total shown due to rounding

Figure 5: Annual community electricity use by sector 2018-2020.

Several factors may have contributed to this increased electricity use:

- **Population growth**: The number of premises in the City grew by 2.7% from 2018-2020.
- **COVID-19 mitigation measures**: Many homes and businesses increased the amount of outside air brought into the buildings to reduce the risk of COVID-19 transmission, which would cause a higher load on air conditioning systems.
- **Weather:** Figure 5 shows that 2020 was a warmer year than 2019 (the number of cooling degree days (CDD) increased. CDD is a measure of how much air conditioning is required based on weather patterns).

Natural gas use by the community decreased over this same time and is shown in Figure 6.

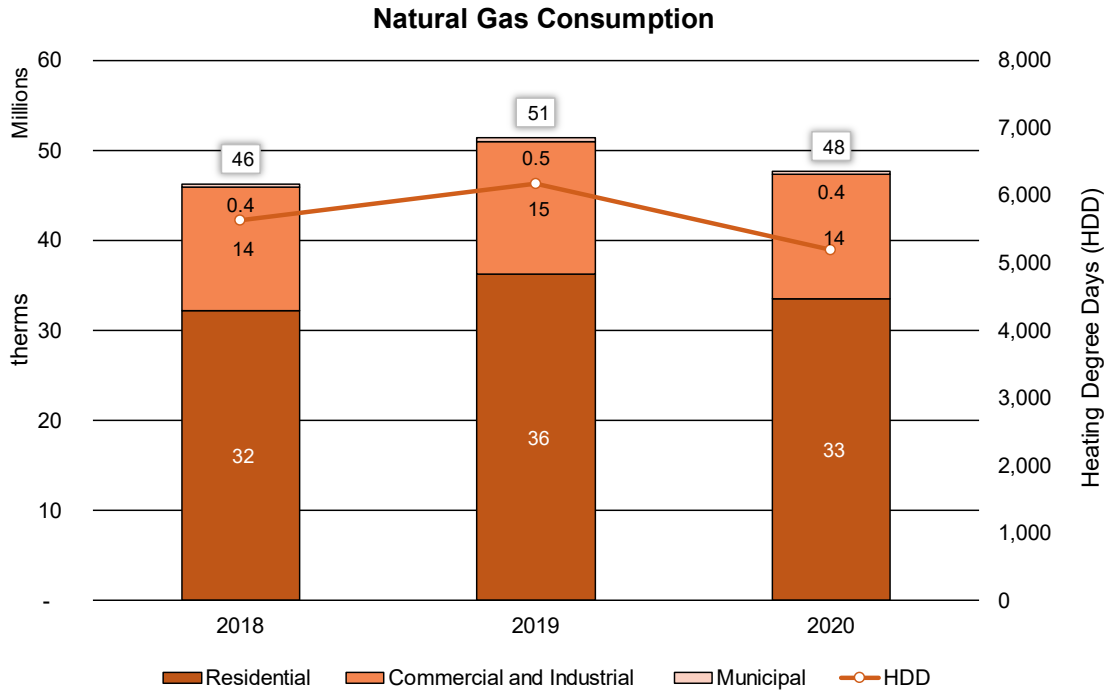


Figure 6: Community natural gas use trends from 2018-2020

Community natural gas use varies more than electricity use, but still follows the heating degree day (HDD) pattern. This suggests that the main driver behind this variation is the amount of heating required in each year. That is expected because the natural gas use is dominated by residential use. The major natural gas user in most homes is the furnace, with water heating and cooking making up a smaller portion (Figure 7).

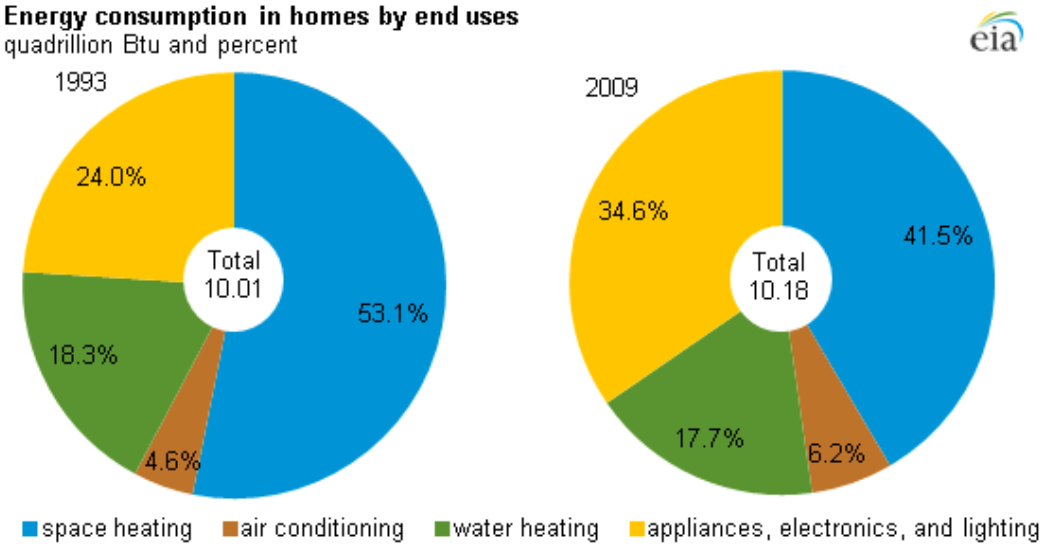


Figure 7: Typical home energy use breakout from U.S. Energy Information Administration, Residential Energy Consumption Survey.

At the community-wide scale overall, it appears that the energy efficiency improvements and renewable energy installation at homes and businesses, combined with impacts of weather and the COVID-19 pandemic on energy consumption in Arvada, have held the total grid-delivered energy use relatively constant over the last 3 years despite the 2.7% increase in the number of premises served in the City. See Appendix B for additional data and analysis.

Aging Population

When it comes to family composition, Arvada has a larger senior population, with almost 30% of households having at least one member 65 years of age or older. This is the largest proportion of senior residents in the region. This proportion of senior residents has been increasing and is expected to continue increasing as the population of the baby boomer generation ages.

In addition to having a higher proportion of senior residents as compared to other cities in the Denver Metro area, the City's average household size is also lower. Households with only one or two members make up 62% of the households in Arvada. As shown in Figure 8, most of the smaller households are concentrated along I-70, with many of the larger households in the northwest area of the City. This is also the area with the fastest population growth. Findings from the Arvada Demographics Supplement found that many senior households are single-person homes; of these, 73% were female householders living alone. For seniors living on a fixed income, decreasing utility bills through energy efficiency or renewable energy opportunities can be particularly important for financial well-being, but these residents may need additional assistance completing home improvement projects.

Equity Consideration

Seniors living alone may be less able to complete do-it-yourself (DIY) home energy improvement projects.

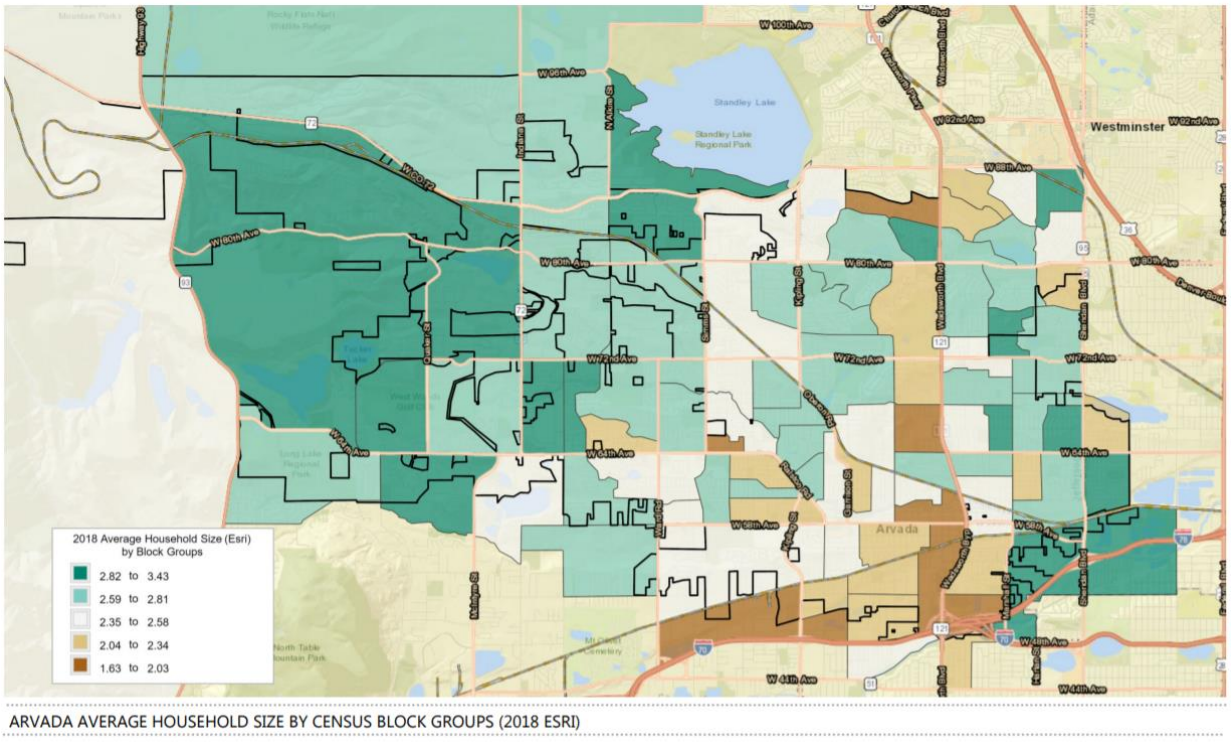


Figure 8: Average household size by census block.

Although Arvada households tend to be smaller in size than neighboring cities, energy use data shows a higher average energy use (natural gas and electricity combined) per premise than other cities, as shown in Figure 9.

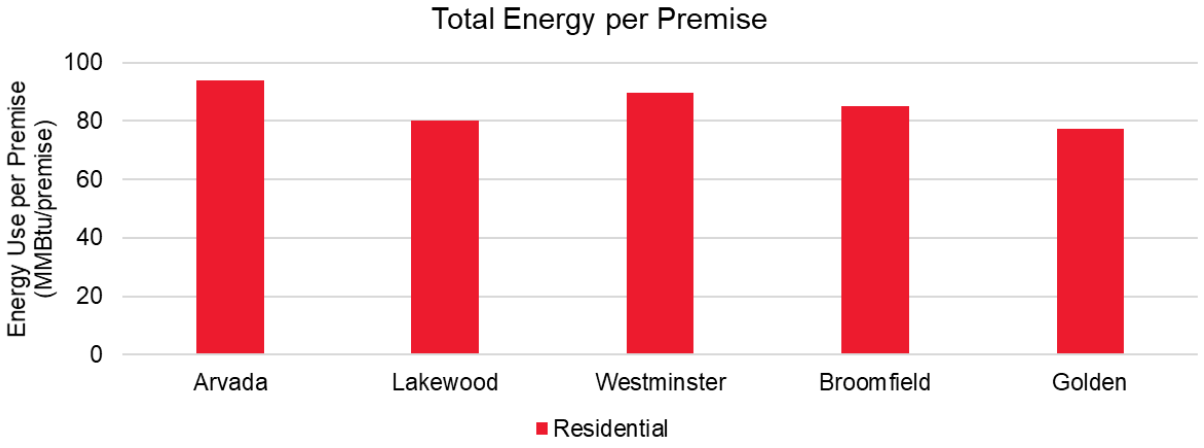


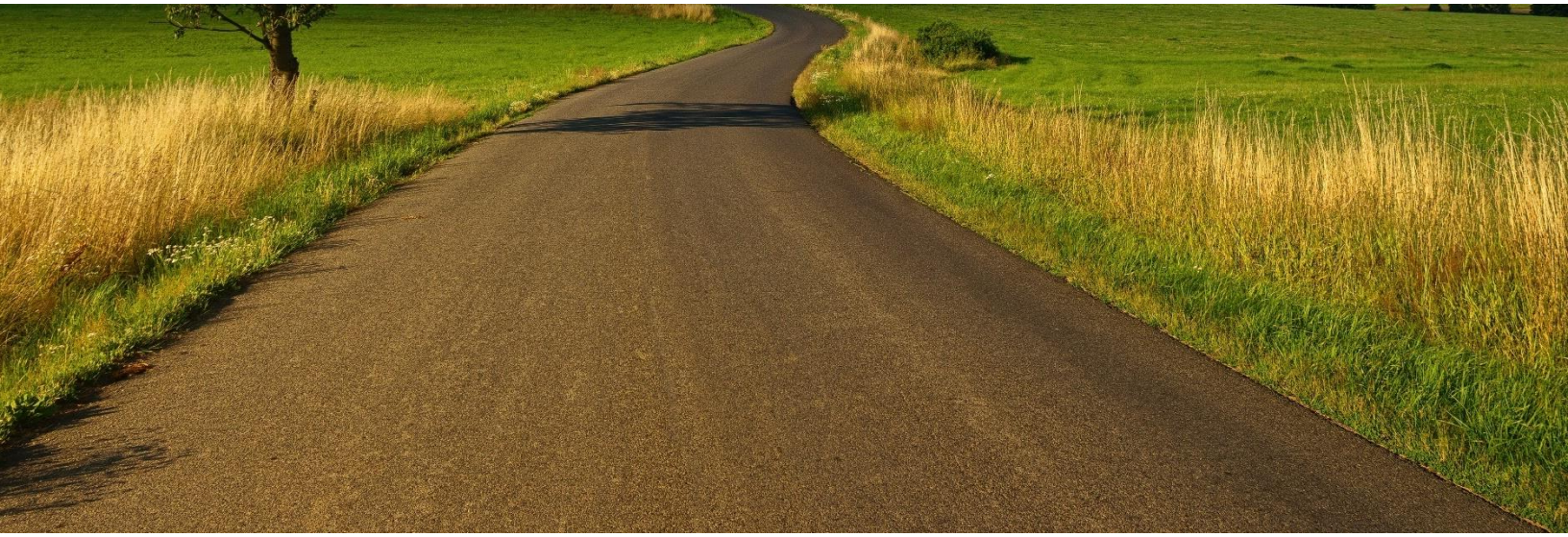
Figure 9: Average residential energy use per premise in Arvada and peer communities, 2020.

To better understand the driving factor behind this trend, we examined the housing characteristics in the City. Of the 43,000 housing units, 63% were built before 1980. This may indicate an opportunity for energy efficiency upgrades in older building systems. The good news is that the housing stock is dominated by owner-occupied homes (74%) and single-family dwellings (71%). This tends to make home improvement upgrades easier as there is no need to get permission for improvements from landlords or building owners. It also makes EV adoption more feasible as many single-family homes have garages or other dedicated spaces to install charging equipment. Additionally, residents of Arvada have a higher median income than the state, suggesting that home improvement may be more affordable for its residents. All these factors make residential energy improvements a good opportunity in the City.

Sustainable Energy Use Opportunity

Prevalence of older, owner-occupied, single-family homes provides a good opportunity to lower residential energy use. Older homes are more likely to need equipment upgrades and homeowners can make improvements to their property without needing to get permissions.

WHERE WE ARE GOING



Energy Vision Statement

During the planning process, the Energy Action Team created a vision statement for this Energy Action Plan. This statement helped guide the planning process and reflects the intention of the community.

The City of Arvada and Xcel Energy collaborate to create economically viable energy solutions for all residents and businesses by 2040 that align with climate science and governing policy.

Focus Areas

To achieve a community-wide commitment to energy stewardship, the Energy Action Team identified the following focus areas to prioritize strategies and resources.

- **Energy Efficiency**: Reduce energy use of buildings through efficient equipment and building good energy habits.
- **Renewable & Reliable Energy**: Leverage local and grid-supplied renewable energy to reduce emissions from electricity use.
- **Beneficial Electrification**: Shift building systems, on-road vehicles, and equipment from fossil fuel systems to electric systems powered by renewable energy.

These focus areas were chosen to provide an integrated approach to energy stewardship.

Goals

Working together, the team set near-term and long-term goals to track overall progress of this energy action plan. The team developed these goals from the bottom up, based on the strategies outlined in this plan. By completing the strategies in this Energy Action Plan, the City of Arvada will achieve the following goals:

Near Term

- By the end of December 2023, the City of Arvada will increase participation in energy efficiency and renewable energy programs by 24 percent from 2020 levels (2,318 additional program participants).
- By the end of December 2023, the City of Arvada will save an additional 32 percent in carbon reductions through energy efficiency and renewable energy programs from 2020 levels (5,426 $MTCO_2e$ in additional carbon equivalent savings).

Long Term

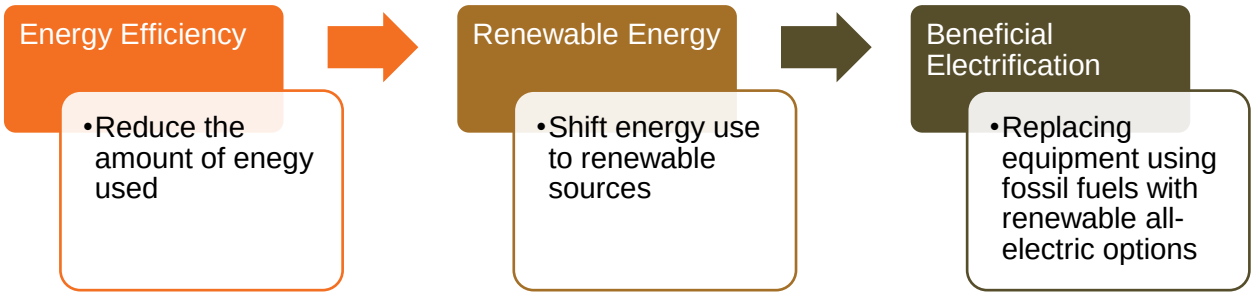
- The City of Arvada will continue to identify and implement energy efficiency, renewable energy, and beneficial electrification strategies on a bi-annual basis to support the state's carbon reduction goals of 26% by 2025, 50% by 2030, and 90% by 2050 below 2005 baseline.

In each of the focus areas outlined below, targets have been identified to achieve these contributions toward the overarching near-term goals. These goals and the strategies outlined in this plan are designed to meet the workshop participants' priorities as outlined in the word cloud below.

Figure 10: Workshop Participants' Responses to the Prompt "My time will be well spent if..."

HOW WE ARE GOING TO GET THERE

The focus areas in this plan were designed to help the City of Arvada work toward the carbon-free energy future the IPCC report shows the world needs to reach by 2050 to avoid the worst impacts of climate change (Intergovernmental Panel on Climate Change, 2021) through economically viable solutions. To do this we have outlined a 3-step process for residents and businesses to reduce or eliminate their energy carbon emissions. These steps are designed to encourage residents and business to start reducing their impact through energy efficiency, which is often the most accessible and cost-effective option. Next, they can shift the energy that is used to a renewable energy source that will further reduce impact. Finally, for those remaining energy sources that do not have renewable energy options, the equipment can be replaced with equipment that uses renewable electricity though beneficial electrification strategies. All of these strategies work together to reduce the total carbon emissions from energy use in Arvada while keeping costs affordable.



This plan has developed strategies to provide support and guidance for residents at all steps along the journey.

Energy Efficiency: Reduce the amount of energy required at your home or business through equipment replacement, controls, and behavior change strategies.

Renewable Energy: Supply the electricity needed through renewable energy sources (either onsite or through grid-supplied solutions).

Beneficial Electrification: Transition remaining fossil fuel-dependent systems, such as cooking equipment, heating systems, and vehicles, to all-electric alternatives so they can be run from renewable energy.

For more information about the benefits and barriers for each step, as well as the strategies designed to overcome these barriers, see the sections below. Key terminology used in the sections below is defined in the Glossary of Terms, contained in Appendix D.

Focus Area 1: Energy Efficiency

Strategies in this section were created to help residents and businesses in Arvada reduce the amount of the energy they use - to reduce utility costs as well as environmental impact. Energy efficiency opportunities are often a good first option because they tend to have a short financial payback. Support for identifying resources to lower upfront costs and provide information on strategies with the biggest impact are outlined below - to help overcome some of the common barriers to implementation.

On average over the last three years, the Arvada community has had 2,167 residential participants (a 4.4% rate of participation among all residents) annually and 188 commercial participants (a 4.1% rate of participation among all commercial premises) in energy efficiency programs offered by Xcel Energy (Figure 11). Following the same split of overall premises in the community, 92% of participation in energy efficiency programs in Arvada has come from the residential sector, while 8% of participation has come from the commercial sector. Through collaborative strategies, the City of Arvada seeks to engage with residents and businesses to increase participation in energy efficiency programs to above historic levels.

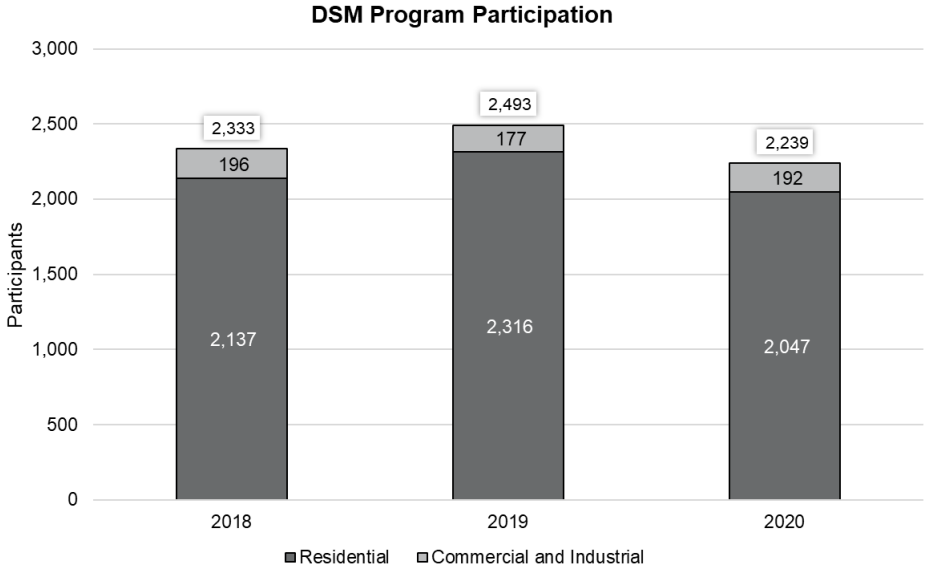


Figure 11: Annual Energy Efficiency Program Participation in Arvada, 2018-2020

Demand-side management (DSM), or energy efficiency program participation has resulted in an average of nearly 8 million kWh of electricity and 173,000 therms of natural gas savings annually over the last three years across Arvada (Figure 12 & Figure 13). These energy savings are equivalent to approximately 1.2% of Arvada's overall electricity use and 0.3% of overall natural gas use annually.

Residents have saved an average of 753 kWh and 65 therms per project, equivalent to about $100 in utility bill savings annually. Residents in Arvada have historically taken advantage of heating, ventilation, and air conditioning (HVAC) and refrigeration upgrades by participating in Xcel Energy's Refrigerator & Freezer Recycling, Residential Heating, and High Efficiency Air Conditioning programs - the top three residential energy efficiency program offerings by participation.

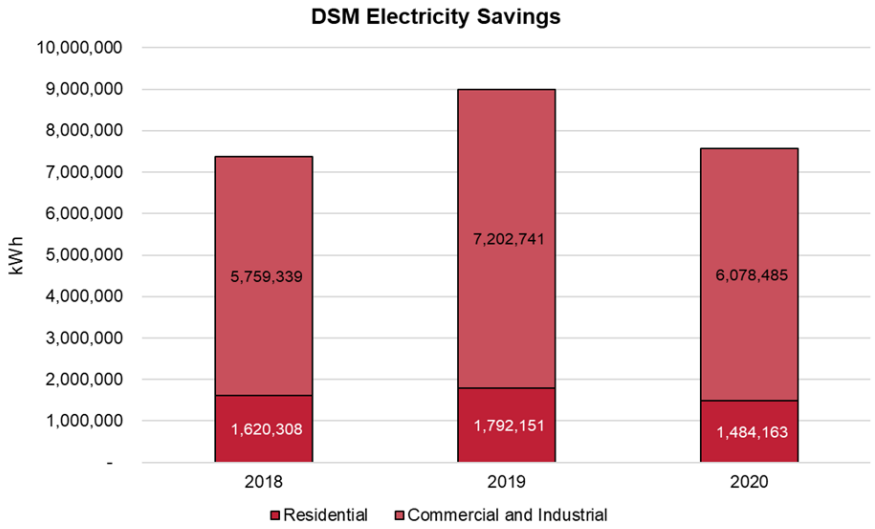


Figure 12: Electricity Savings from Energy Efficiency Program Participation in Arvada, 2018-2020

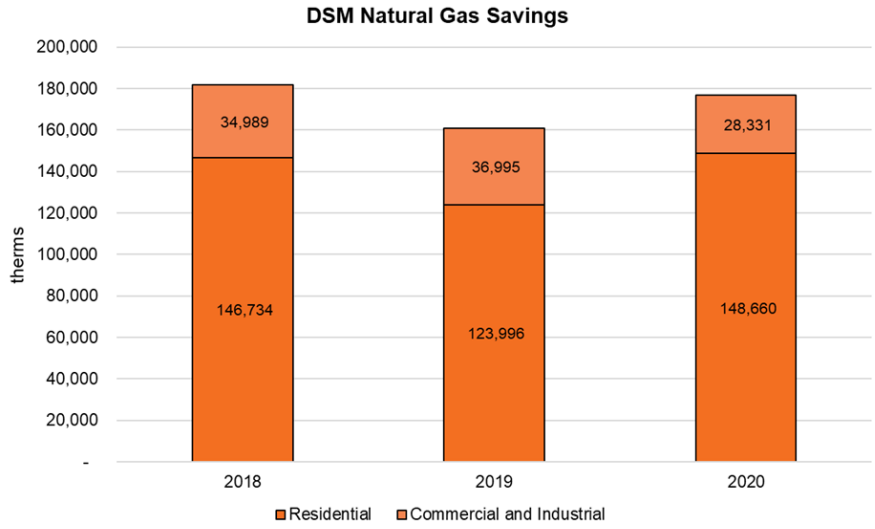


Figure 13: Natural Gas Savings from Energy Efficiency Program Participation in Arvada, 2018-2020

Businesses have saved an average of 33,700 kWh and 178 therms per project, equivalent to about $3,100 in utility bill cost savings annually. Businesses in Arvada have historically taken advantage of lighting and HVAC related upgrades through participation in the Small Business Energy Solutions, Lighting Efficiency, and Cooling programs - the top three commercial program offerings by participation.

Several energy efficiency strategies were developed to meet increased participation and energy savings targets which are outlined below.

Target:
Double the number of participants in Home Energy Squad and Business Energy Assessments from the 2020 baseline by December 2023.

Summary of Energy Efficiency Strategies

Below are the priority strategies identified to promote energy efficiency throughout Arvada over the next two years. Three energy efficiency ("E") strategies are detailed in this section:

- Strategy E-1: Develop an Energy Efficiency Education & Awareness Campaign
- Strategy E-2: Build a Home Energy Squad Campaign
- Strategy E-3: Create a City Resource Library and Develop City Energy Efficiency Success Story

Lead by Example: Energy Efficiency Improvements at City Facilities

In 2021, the City completed upgrades to 15 facilities through a $4.5 million energy savings performance contract including:

- Building envelope upgrades
- LED lighting
- 5 new PV solar systems

These upgrades are expected to reduce municipal energy use by 6% and utility costs by 21%. This is part of a larger effort to improve sustainability of municipal operations as outlined in the 2010 Arvada Sustainability Action Plan: Municipal Operations.

E-1: Develop an Energy Efficiency Education & Awareness Campaign

Description

Develop an education and awareness campaign for energy efficiency, to overcome barriers identified to implementing energy efficiency upgrades. Collateral and messaging may also address other education and awareness campaigns outlined in individual strategies throughout this plan. It is intended that each campaign will be coordinated across all focus areas with consistent messaging and design.

Events support will be one channel to utilize the energy efficiency collateral and messaging. This strategy seeks to coincide with existing City events to share developed collateral and proactively reach different audiences in the residential and business community by aligning that support through a mix of cross-community events.

Target Audience

- Residents
    - Craft different messaging for older homes vs. newer homes, by Arvada City Council District
    - Engage with older residents through the Essential Home Repairs Program to promote energy efficiency. The program focuses on older homes owned by elderly people
    - Messaging should focus on homeowners (the largest demographic) and should potentially include property owner outreach
- Businesses
    - Focus on small business messaging
        - According to City of Arvada data, there are approximately 1,500 home-based businesses (including short-term rentals)
    - Businesses within the Business Improvement District
    - Target small businesses by business type to keep information relevant

Desired Outcomes

- 499 additional energy efficiency program participants, over and above 2020 baseline levels by December 2023

Scope and Timeline

Timing	*Action*

Q3 2022	• Promote Business Energy Assessments by performing outreach through Arvada Chamber of Commerce
	  ○ Develop, print, and share program collateral - with Arvada Chamber of Commerce and targeted business collaborations - for distribution
	  ○ Work with program vendors to design the campaign and outreach plan
	  ○ Collateral can include information about the City of Arvada's Energy Action Plan, contact information for Xcel Energy's Business Solutions Center, information about Business Energy Assessments, and relevant program vendors
	  ○ Explore opportunities to utilize City staff and/or community resources such as Community Connectors to support canvassing efforts
	• Gather testimonials from Arvada businesses that have participated in the past or have recently participated because of the education and awareness campaign
	• Create a stepwise decision tree for residents to improve residential sustainability
	  ○ Connect residents with income-qualified options to improve home energy efficiency
	  ○ Collaborate with the Arvada Housing Authority to supplement the resources they provide with energy efficiency resources. Arvada Housing Authority programs to consider include the Essential Home Repairs Program
	  ○ Explore opportunities to promote Community Development Block Grants and other housing funds to complete projects
	  ○ Target specific property owners for multifamily, senior centers
	  ○ Connect with the Arvada Economic Development Association (AEDA) to identify renter families the City has not connected with in the past
	• Train representatives from the Arvada Chamber of Commerce and targeted business collaborations on distribution approach
	• Test outreach plan on a targeted business or identified business partner

Q4 2022	• Highlight "Gold Star" businesses as local advocates for energy efficiency and conduits toward working with regional/county level advocates/partnerships ○ Create one success story for a business • Share the City's relevant energy efficiency success stories with the businesses that participated in a Business Energy Assessment, to encourage potential action on resulting opportunities

Timing	*Action*

2023	• Utilize City website (Strategy E-3) as a resource library, along with a resource person or social media/web-based outreach
	  ○ Identify City resource person and outreach channels
	  ○ Resources to include relevant rebates, grants, and other financial incentives available to Arvada businesses. Also include testimonials from businesses, success stories developed for business or City facilities
	• Support up to four key events for Arvada residents and businesses, in coordination with the renewable & reliable energy and beneficial electrification focus area events
	  ○ Consider residential LED giveaways to swap out old bulbs for LEDs
	• Collaborate with Neighbors Connected program to utilize for promotion of residential resources
	• Engage with the Arvada Fire Protection District to facilitate LED bulb installation/replacement in conjunction with smoke alarm replacement

Roles and Responsibilities

City Staff	• Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach, and review materials for events • Gather testimonials from businesses who have completed business energy assessments • City staff to lead planning of events and attend events across all focus areas
Community Partners	• Arvada Sustainability Advisory Committee to advise and support residential outreach activities • Arvada Economic Development Association (AEDA), Arvada Resiliency Task Force, Arvada Chamber of Commerce, and Olde Town Business Improvement District (BID), to advise and support business outreach activities and support gathering testimonials from businesses who have completed business energy assessments
Xcel Energy Partners in Energy	• Partners in Energy to support outreach plan development and stepwise residential sustainability guide, and share best practices from other communities • Partners in Energy to draft outreach collateral and up to two success stories • Partners in Energy to help plan and staff up to four events during implementation across all focus areas

- Xcel Energy vendor for Business Energy Assessment delivery to provide follow-up support to interested properties
- Xcel Energy account managers to help identify businesses that would share their experiences

Resources and Communication Channels

- **Resources available**
  - Arvada Chamber of Commerce – Annual Dinner and business breakfast host
  - Arvada Resiliency Task Force – to engage with non-Chamber of Commerce businesses members
  - Arvada Economic Development Association (AEDA)
  - Olde Town Business Improvement District (BID)
  - Arvada Sustainability Advisory Committee
  - City of Arvada Communications Team
  - Economic Development Team
  - Xcel Energy Rebates
- **Communications Channels**
  - Key City of Arvada events
  - City of Arvada social media channels
  - City of Arvada website
  - Arvada Report

E-2: Build a Home Energy Squad Campaign

Description

Explore, and if determined to be feasible, launch a buy-down campaign for reduced/free Home Energy Squad visits.

Target Audience

- Residents
  - Target older homes
  - Target low-income populations
  - Engage with older residents through Essential Home Repairs Program to promote energy efficiency. The program focuses on older homes owned by elderly people
  - Messaging should focus on homeowners (the largest demographic) and should potentially include property owner outreach

Desired Outcomes

- Double the number of participants (to a total of 202 participants) in Home Energy Squad from the 2020 baseline (101 participants) by December 2023

Scope and Timeline

Timing	***Action***

Q3 2022	• Determine budget amount and process for buy-down campaign
	  ○ Determine number of visits desired
	  ○ Facilitate contract for approval
	  ○ Determine if budget request is needed or existing City funding source can be used
	  ▪ Community Development Block Grants: housing funds target aging population in Arvada
	• Determine target audience
	  ○ Utilize City community engagement coordinator, coming online soon
	  ○ Utilize list of HOAs for outreach to homes/residents
	  ○ Target older homes in Arvada

Q4 2022	• Develop collateral
	  ○ Include a call for testimonials from neighbors who have completed a Home Energy Squad visit in the past, to share their experience
	  ○ Develop tips for renters vs. owners, as well as how to navigate (depending on the relationship)
	  ○ Pair with education/awareness outreach on energy efficiency tips, resources, rebates, etc.
	  ○ This may include materials or information developed in Strategy E-1.

2023	• Launch and track campaign progress

Roles and Responsibilities

City Staff	• City Manager's office to lead exploration and any necessary budget requests and contracting • Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach
Community Partners	• HOAs, Arvada Sustainability Advisory Committee, to advise and support residential outreach activities
Xcel Energy Partners in Energy	• Partners in Energy to provide examples from other communities, support any necessary contracting, develop any necessary co-branded collateral, and facilitate tracking of results • Xcel Energy vendor for delivery of Home Energy Squad to lead any necessary contracting with the city and tracking of results outside of normal Partners in Energy implementation data support

Resources and Communication Channels

- **Resources available**
  - Arvada Sustainability Advisory Committee
  - City of Arvada Communications Team
  - Xcel Energy Home Energy Squad Rebates
- **Communication Channels**
  - Key City of Arvada events
  - City of Arvada social media channels
  - City of Arvada website

E-3: Create a City Resource Library and Develop a City Energy Efficiency Success Story

Description

Build upon and promote the City of Arvada's past efforts in energy efficiency and create a City website that can be used as a resource library, along with a resource person or social media/web-based outreach.

Target Audience

- Residents
- Small businesses

Desired Outcomes

- Develop one City success story
- Create a City resource library, hosted on the City website

Scope and Timeline

Timing	***Action***
Q3 2022	• Identify past project successes completed by the City of Arvada through conversations with the Facilities Management Division ○ Include testimonials, project successes from other strategies like Strategy E-1 • Create a success story for one past project

Q4 2022	• Identify opportunities to perform outreach to disseminate information
	  ○ Social media for sharing information about the website
	  ○ Share information about events that are used for education/outreach
	  ▪ Harvest Festival
	  ▪ Kite Festival
	  ▪ Sustainability committee list of key Arvada events
	  ▪ Recycling events
	• Combine other resources and materials together for use in the future resource library

2023	• Engage a consultant, as needed, and based on existing City relationships, to create resource library, implemented by City staff ○ Identify need for hiring new staff to support

Roles and Responsibilities

City Staff	• Facilities Management Division to lead identification and information sharing of a past project success • Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach • City Manager's office to lead ongoing coordination and search for a consultant to create the resource library

Community Partners	• Outside consultant to lead creation of resource library
Xcel Energy Partners in Energy	• Partners in Energy to provide examples from other communities, develop co-branded success story, and support outreach opportunity identification • Partners in Energy to combine resources across other strategies for the resource library

Resources and Communication Channels

- **Resources available**
  - Budget approved for website overhaul, so this can be incorporated
    - Expected to start and finish in 2022
  - Completed interview for large energy project at City facility
- **Communication Channels**
  - Key events in the City of Arvada
  - City of Arvada social media channels
  - City of Arvada website

Focus Area 2: Renewable & Reliable Energy

Strategies in this focus area help residents choose to leverage renewable energy to power their home or business. These options include on-site installations as well as grid-delivered solutions. These strategies focus on providing information about the options available to residents, including opportunities for residents who do not own a home suitable for rooftop solar to overcome common barriers.

In 2020, Arvada had 6,162 total participants in renewable energy programs offered by Xcel Energy (Figure 14), covering 46.3 million kWh of electricity. Residential participants made up 97% of overall participants in the community, and the estimated renewable electricity subscribed and generated made up 4.3% of Arvada's total electricity use. Commercial participants made up 3% of overall renewable energy participation in the community, and the estimated renewable electricity subscribed and generated made up 2.9% of Arvada's total electricity use.

Residents primarily participated in Windsource®, Solar*Rewards®, and Net Metering while businesses participated in Solar*Rewards and Solar*Rewards® Community. During 2020, the Renewable*Connect® program was fully subscribed, however some residents and businesses subscribed prior to the program reaching capacity.

Program	Commercial		Residential	
	Participation	Total Energy	Participation	Total Energy
2020 Xcel Energy Windsource®	15	776,914 kWh	2,200	6,611,482 kWh
2020 Xcel Energy Renewable*Connect®	4	16,430 kWh	116	603,101 kWh
2020 Xcel Energy Solar*Rewards (on-site)	59	11,333,438 kWh	2,106	7,193,451 kWh
2020 Xcel Energy Solar*Rewards Community (solar gardens)	61	6,297,754 kWh	56	345,505 kWh
2020 Xcel Energy On-site (net metered, estimated from PVWatts)	11	89,501 kWh	1,534	13,061,178 kWh
Total	**150**	**18,514,037 kWh**	**6,012**	**27,814,717 kWh**

Figure 14: Renewable Energy Program Participation and Energy Generation in Arvada, 2020

Lead by Example: Renewable Energy at City Facilities

As of 2020, City of Arvada facilities enrolled an estimated 83% of their total electricity use in renewable energy programs offered by Xcel Energy. The City of Arvada has installed a total of 9 on-site solar systems across their facilities, generating an estimated 1.9 million kWh of electricity. With the addition of subscriptions to local solar gardens and to on-site solar, a total of 8.2 million kWh of electricity came from renewable energy programs in 2020. This is equivalent to 83% of electricity used by City of Arvada facilities in 2020.

Xcel Energy is committed to increasing the number and capacity of renewable energy resources on the electric grid that reduce carbon emissions as well as provide opportunities for customers to reduce their own carbon emissions, primarily in the form of solar- or wind-powered electricity. Across its electricity grid, Xcel Energy has a vision that by 2050, all electricity production will be carbon free because of new renewable energy capacity and energy storage capacity (Figure 15). Carbon emissions targets shown are based on a 2005 baseline.

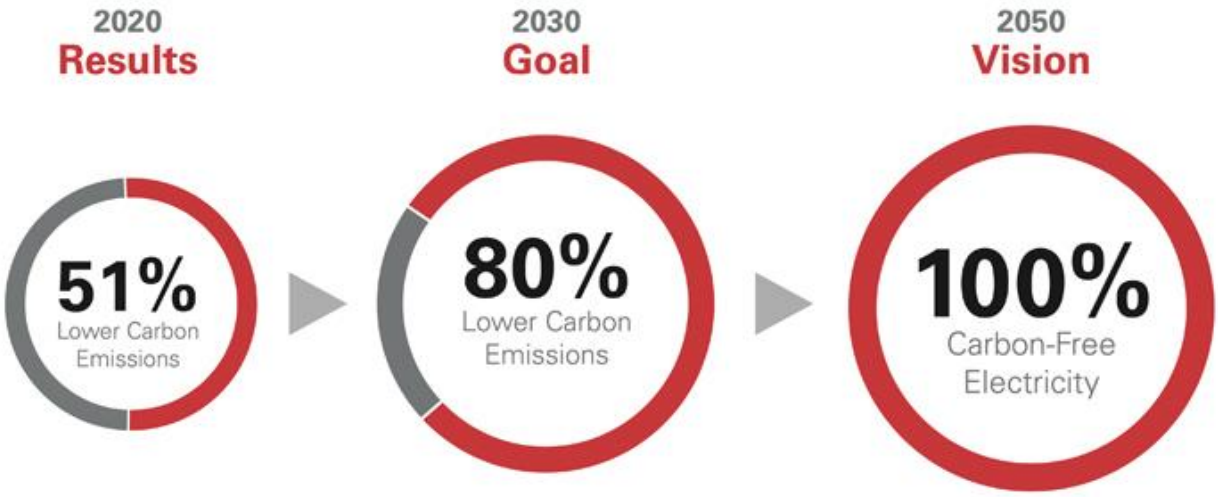


Figure 15: Xcel Energy's 2050 Carbon-Free Electricity Vision

Increasing the amount of renewable energy powering the community is important to the City of Arvada and its residents and businesses, and strategies were developed to support the renewable energy targets set in this Energy Action Plan. The renewable energy strategies and targets are outlined in detail below.

Target:
Increase participation in renewable energy program by 28% from 2020 baseline by December 2023.

Summary of Renewable Energy Strategies

Below are the priority strategies identified to promote renewable energy throughout Arvada over the next two years. Four renewable energy ("R") strategies are detailed in this section:

- Strategy R-1: Develop City Renewable Energy Success Story
- Strategy R-2: Conduct Renewable Energy Education & Awareness Campaign
- Strategy R-3: Streamline the City's Solar Permitting Process
- Strategy R-4: Install Canopy Solar in Targeted Locations, Paired with EV Charging Stations

R-1: Develop a City Renewable Energy Success Story

Description

The City has a story it can promote to the larger community given its past investments in renewable energy. Create a success story of past investments and impact on environment; utilize outreach channels to promote. The timing of outreach in this strategy should align with the website project the City is completing.

Target Audience

- City of Arvada
- Businesses

Outcomes

- Develop one City success story

Scope and Timeline

Timing	***Action***

Q3 2022	• Develop a success story for a City renewable energy project
	  ◦ Collect key metrics, steps taken to implement, and other context on renewable energy projects completed by the City of Arvada
	  ◦ Compile a success story document and/or other collateral
	• Determine outreach channels to promote a success story to the community
	  ◦ Collaborate with the Arvada Chamber of Commerce for distribution, utilizing the content of the success story in potential presentations to highlight local business successes.
	  ◦ Consider inclusion of public relations publishing opportunities through the City of Arvada Communications Division. Within the outreach messaging, include a call for additional Arvada businesses to share their positive experiences with renewable energy

2023	• Post resulting success story document and/or information on City resource library developed in Strategy E-3. • Explore opportunities to collaborate with Xcel Energy on the siting and construction of a new community solar garden, to build upon the City's own success in supporting renewable energy through community solar garden subscriptions ◦ Blunn Reservoir Master Plan completed in 2015 includes the idea of a potential 20-acre solar array located on land previously occupied by Pioneer Sand & Gravel (north of the reservoir)

Roles and Responsibilities

City Staff	• Facilities Management Division to lead identification and information sharing of a past project success • Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach
Community Partners	• Arvada Chamber of Commerce to support distribution and outreach
Xcel Energy Partners in Energy	• Partners in Energy to provide examples from other communities, develop co-branded success story, and provide support outreach • Partners in Energy to support coordination of posting the success story on the resource library

Resources and Communication Channels

- **Resources available**
  - Communication/Engagement Team for web content
  - Arvada Chamber of Commerce for distribution
- **Communications channels**
  - City website
  - City social media
  - Press releases and/or presentations
  - Arvada Report

R-2: Conduct a Renewable Energy Education & Awareness Campaign

Description

Develop an education and awareness campaign for residents and businesses to understand resources available for renewable energy adoption by the community.

Target Audience

- Residents
  - Target homeowners
- Businesses
  - Target small businesses

Desired Outcomes

- 1,718 additional renewable energy program participants above baseline 2020 participation levels by December 2023

Scope and Timeline

Timing	***Action***

Q3 2022	• Develop presentation for a residential renewable energy webinar
	• Create educational materials and event collateral
	  ○ Renewable energy approach: Outline options for residents by on-site vs. subscription opportunities. Express the importance of completing impactful energy efficiency upgrades before installing on-site renewable energy. Outline Renewable Energy Credit (REC) considerations, depending on the pathway chosen, to offset energy use with a renewable energy source
	  ○ Customize materials to include information specific to Arvada
	  ○ Promote financing models for renewable energy adoption, including Colorado Commercial Property Assessed Clean Energy (C-PACE), federal and state tax credits, grants, utility rebates and financing, and/or solar group buys as applicable

Q4 2022	• Set up Eventbrite, or equivalent RSVP system, and promote the renewable energy webinar.
	• Host a renewable energy webinar where residents can find the best option for them
	  ○ Include success stories developed in Strategy R-1 and a call for other testimonials
	  ○ Promote events in the community that will be renewable energy related
	• Promote options to adopt renewable energy for residents and businesses, coordinated through the outreach plan developed in Strategy E-1

2023	• Share developed City of Arvada success stories of solar investments • Promote developed collateral at the City Permitting office counter

Timing	*Action*
	• Broadcast and share the streamlined solar permitting process for projects, once developed from Strategy R-3

Roles and Responsibilities

City Staff	• Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach, and review materials for events • City Manager's office to support ongoing coordination for activities • City staff to lead planning of events and attend events across all focus areas
Community Partners	• Arvada Sustainability Advisory Committee to advise and support residential outreach activities • Arvada Economic Development Association (AEDA), Arvada Resiliency Task Force, Arvada Chamber of Commerce, and Olde Town Business Improvement District (BID) to advise and support business outreach activities
Xcel Energy Partners in Energy	• Partners in Energy to support outreach and share best practices from other communities • Partners in Energy to develop collateral • Partners in Energy to help plan and staff renewable energy webinar

Resources and Communication Channels

- **Resources available**
  - Communication/Engagement Team for web content
  - Arvada Chamber of Commerce for distribution
  - Arvada Resiliency Task Force – to engage with non-Chamber of Commerce businesses members
  - Arvada Economic Development Association (AEDA)
  - Olde Town Business Improvement District (BID)
  - Arvada Sustainability Advisory Committee
  - City of Arvada Communications Team
  - Economic Development Team
  - Xcel Energy Rebates
- **Communications channels**
  - City website & social media
  - Press releases and/or presentations
  - Arvada Report

R-3: Streamline City's Solar Permitting Process

Description

Explore the U.S. Department of Energy's (DOE) solar application process for consideration and adoption by the City of Arvada.

Target Audience

- New developments
- Residents
- Businesses

Desired Outcomes

- Simplify and streamline the customer experience for solar permitting in Arvada

Scope and Timeline

Timing	***Action***

Q3 2022	• Hold up to three discussions with key stakeholder groups familiar with existing process to understand potential gaps and opportunities to streamline
	  ○ Key stakeholders may include solar installers, City staff, or other knowledgeable community members
	  ○ Discussions should center around the time intensity for installing solar. Discuss the entire process and identify barriers
	  ○ Determine estimated overall labor required on the City's end to address

Q4 2022	• Review Arvada's existing permitting process to determine if there are opportunities to streamline
2023	• Summarize recommended adjustments to refine solar permitting process, with customer experience in mind • Perform code compliance comparisons with nearby municipalities to identify standardization opportunities across neighboring communities • Determine methods to market and promote the revised solar permitting process

Roles and Responsibilities

City Staff	• City Manager's office to coordinate interview efforts and lead comparative analysis between systems & tools
Community Partners	• Arvada Sustainability Advisory Committee to advise and support analysis • Arvada Chamber of Commerce to utilize channels for distribution of messaging and collateral • Arvada Resiliency Task Force to engage with non-Chamber of Commerce businesses members
Xcel Energy Partners in Energy	• Partners in Energy to support facilitation and analysis

Resources and Communication Channels

- **Resources available**
  - Communication/Engagement Team for web content
  - Arvada Chamber of Commerce for distribution
  - Arvada Resiliency Task Force – to engage with non-Chamber of Commerce businesses members
  - Arvada Economic Development Association (AEDA)
  - Olde Town Business Improvement District (BID)
  - Arvada Sustainability Advisory Committee
  - City of Arvada Communications Team
  - Economic Development Team
- **Communications channels**
  - City website
  - City social media

R-4: Install Canopy Solar in Targeted Locations, Paired with EV Charging Stations

Description

Determine targeted parking locations for on-site solar canopy installation and EV charging infrastructure

Target Audience

- Targeted City facilities
  - City Hall
  - Arvada Center
  - Indiana Shops
- Local businesses
  - RTD bus stops, train stops
  - Walmart
  - Olde Town Arvada businesses, building on an existing relationship with a property management firm
- City or business-owned parking lots

Desired Outcomes

- Install one solar array with EV charging infrastructure

Scope and Timeline

Timing	***Action***

Q3 2022	• Determine locations in Arvada to explore canopy solar and EV charging infrastructure installations
	• Pare down list of locations to a key short list of opportunities, taking into consideration potential partnerships with Arvada businesses, City facilities, visibility to the community at large, and location of and distance from existing charging infrastructure
	• Share appropriate funding and rebate resources, including applicable grant funding, to aid installation and operation
	  ○ Align with grant funding cycles
	  ○ Include information on battery-related program resources to store electricity for evening or overnight use
	• Determine public use parameters including charging cost, connection to centralized charging software (e.g., ChargePoint), hours of operation, and eligibility

Q4 2022	• Determine methods to market and promote location
2023	• Install canopy solar and EV charging infrastructure at one targeted location • Broadcast and share location to the public, utilizing City Resource Library developed in Strategy E-3

Roles and Responsibilities

City Staff	• Facilities Management Division to lead siting analysis and installation • City Fleet Manager to collaborate on installation and siting of EV charging infrastructure • Economic Development to facilitate business connections and partnerships
Community Partners	• Arvada Sustainability Advisory Committee to advise and support analysis
Xcel Energy Partners in Energy	• Partners in Energy to support analysis as needed and facilitate connections to resources • Xcel Energy EV advisors are available as needed

Resources and Communication Channels

- **Resources available**
  - Facilities Management staff
  - Fleet Maintenance staff
  - Arvada Economic Development Association (AEDA)
  - Olde Town Business Improvement District (BID)
  - Arvada Sustainability Advisory Committee
  - Economic Development Team
  - Available grants
  - Xcel Energy rebates & pilot programs
- **Communications channels**
  - City website
  - City social media
  - Press releases and/or presentations
  - Arvada Report

Focus Area 3: Beneficial Electrification

This focus area helps homes and businesses reduce their reliance on fossil fuels by switching equipment, vehicles, and building systems to run off electricity, which can be powered by renewable energy. Through Xcel Energy's 2050 vision of 100% carbon free electricity, renewable energy generation resources added over time, replacing current fossil fuel generation, has lowered greenhouse gas emissions associated with electricity generation and has enabled beneficial electrification as a strategy to reduce emissions. As this is an emerging market, much of the focus of these strategies is designed to get people comfortable with the technology available and prepare systems to adopt all-electric options as they become more available - to overcome common barriers.

Two elements to electrification are considered in this plan:

- **Building Electrification**: Transitioning building heating and cooking systems to run on cleaner electricity instead of natural gas or other fossil fuels.
- **Vehicle Electrification**: Shifting from internal combustion engine (ICE) vehicles that run on fossil fuels to EVs powered by cleaner electricity.

In both strategies, the technology is in the early market stage (see Figure 16). The adoption curve describes the rate of technology adoption by a group of people. In the early market phase, the technologies are used by those who like to be among the first to purchase innovative technology or those who are seen as opinion/communication leaders - adopting technology early but judiciously (slightly after first adopters but much earlier than the majority). After this phase, a gap needs to be overcome for technology to transition from the technology savvy innovators and the early adopters willing to accept some risk, to the general population that is more risk averse.

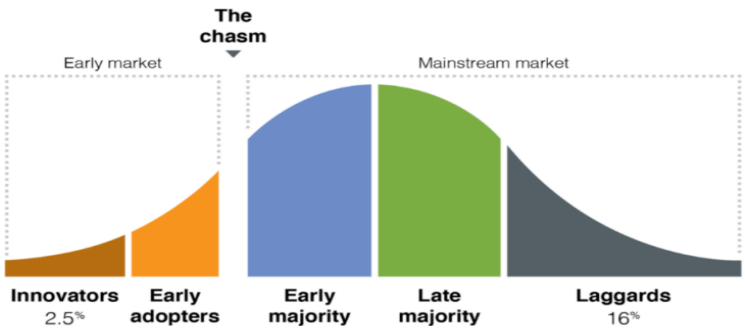


Figure 16: The Adoption Curve (E Source Companies LLC, 2020)

Education and outreach initiatives are key to helping technologies make the jump to the mainstream consumer. For both building and vehicle electrification, Arvada is in the early market phase. This plan focuses on helping share the benefits of vehicle and building electrification, to help encourage mainstream adoption of these technologies. Below are highlights of successful implementation of both building and vehicle electrification.

Building Electrification: Geos Neighborhood

One local example of successful all-electric building construction is the Geos Neighborhood at the corner of Indiana St. and West 72nd Ave. The Geos Neighborhood is a planned net zero energy community currently under development. Homes in this development leverage passive home building techniques to help ensure the buildings are very energy efficient, to allow for all the energy needs of the homes to be produced through onsite solar generation. One of these features is a tight, well-insulated, building envelope to keep conditioned air in the building as shown in Figure 17. This tight envelope helps reduce heating needs of these homes by 80% and nearly eliminates cooling requirements. The heating and cooling in these homes is provided by all-electric heat pumps, which are very efficient with backup electric resistance heat. Water heating and cooking is also provided by all-electric equipment. This means that all the power used in these homes can be provided by on-site electrical generation (rooftop solar panels) creating a net zero energy neighborhood. Based on information provided by Geos Neighborhood, these homes have a zero annual energy bill and an overall lifetime cost savings as compared to typical new construction homes. It is anticipated that annual savings will increase over time since utility costs are expected to increase.

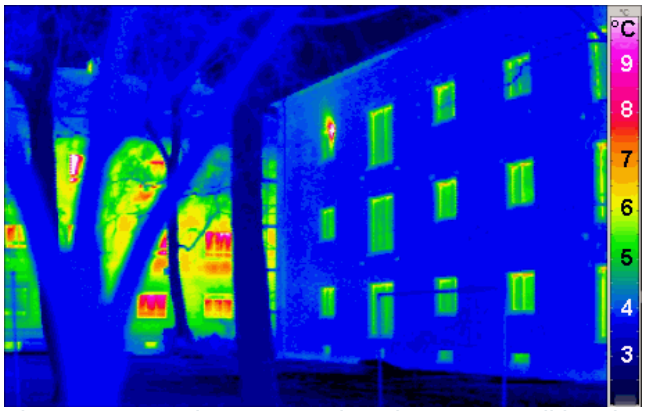


Figure 17: Heat loss comparison between traditional construction (left) and passive home techniques (right)
Photo By: Passivhaus Institut

Cost Comparison between a Net Zero Home and a Typical Home

Increased Mortgage: $1,092

Annual Energy Cost Savings: $1,320

First Year Total Savings: $228

Xcel Energy Vision: Net-Zero Energy Provider

Xcel Energy has made commitments to transition to a net-zero energy provider by 2050 as shown to the right, which supports the City of Arvada's goals and strategies throughout this plan. For more information on these commitments, visit Xcel Energy's website. Beneficial electrification strategies are supported by the following commitments:

Net-Zero Gas Service by 2050

Commitment: Achieve net-zero methane emissions on our system and reduce greenhouse gas emissions 25% by 2030 (from 2020 levels), on the way to providing net-zero gas service by 2050.

The strategies Xcel Energy plans to use to meet this commitment is outlined in Figure 18 and include building electrification.

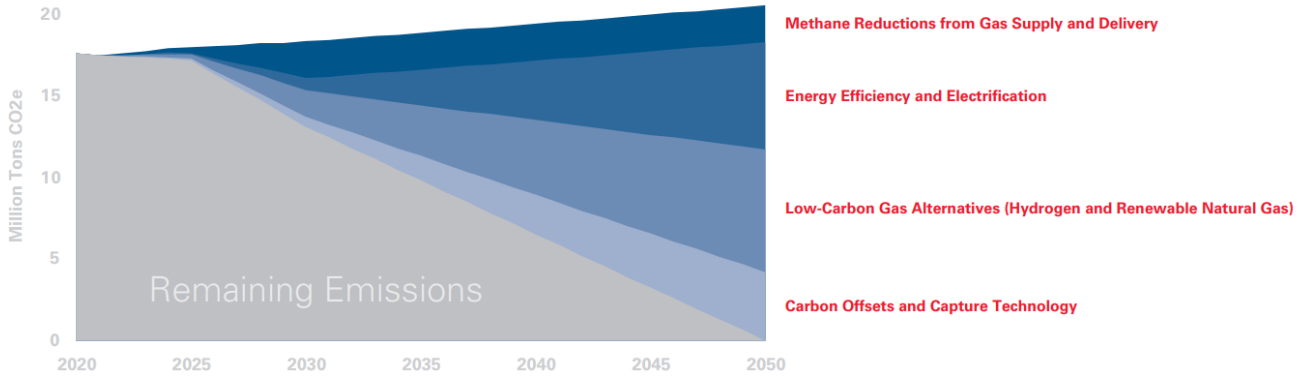


Figure 18: Strategies for Delivering Net-Zero Gas Service by 2050

Powering EVs

Commitment: Power 1.5 million EVs in the states we serve by 2030.

Xcel Energy is rolling out innovative programs with the goal of raising awareness, reducing up-front costs, and making it easier for customers to charge EVs on low-cost, low-carbon energy with programs to support residential, commercial, and public EVs. Figure 19 shows current progress toward this goal.

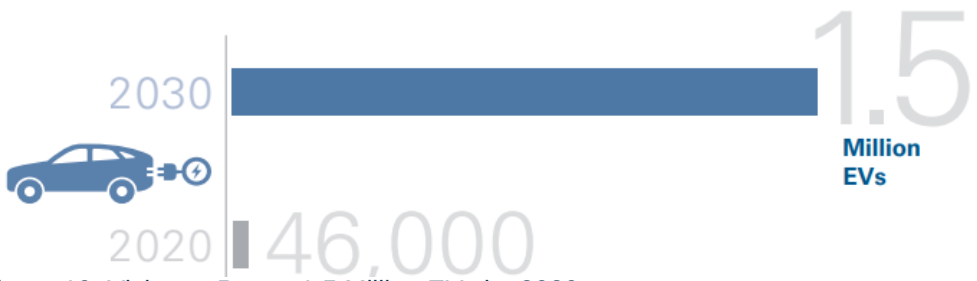


Figure 19: Vision to Power 1.5 Million EVs by 2030

Vehicle Electrification: Fast Charging Plaza

Over the past three years, the number of EVs registered in the Arvada[1] area has risen considerably, as shown in Figure 20. At the end of 2021, there had been a cumulative total of 2,448 original EV registrations, with 1,921 of these vehicles currently on the road. This is 9.36 EVs per 1,000 people, which is above the state average of 8.38 vehicles per 1,000 people (Atlas Public Policy, 2022).

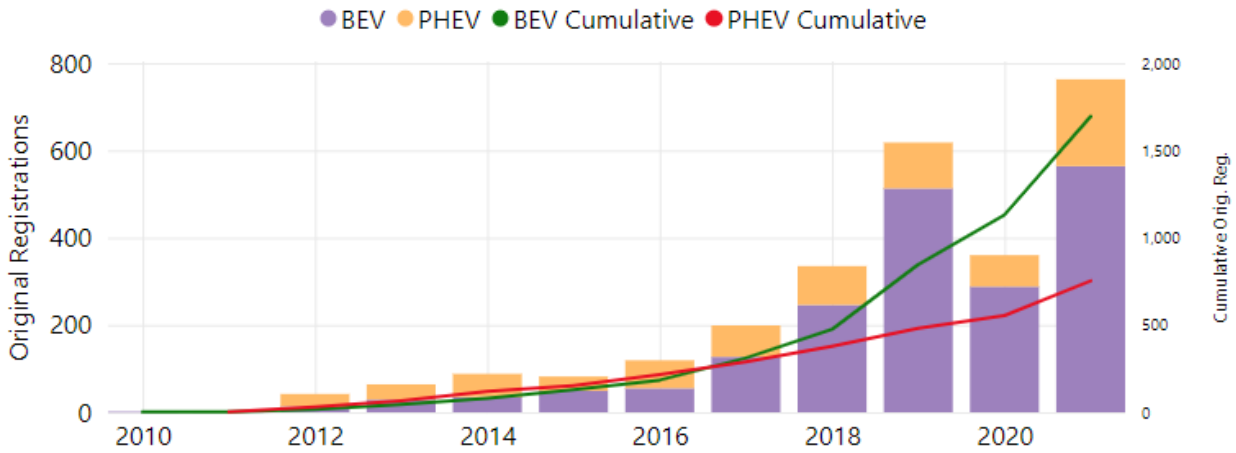


Figure 20: Trends in vehicle registration in the Arvada area[1] (Atlas Public Policy, 2022)

To support the rapidly growing EV population, public EV charging infrastructure has also been growing, as shown in Figure 21.

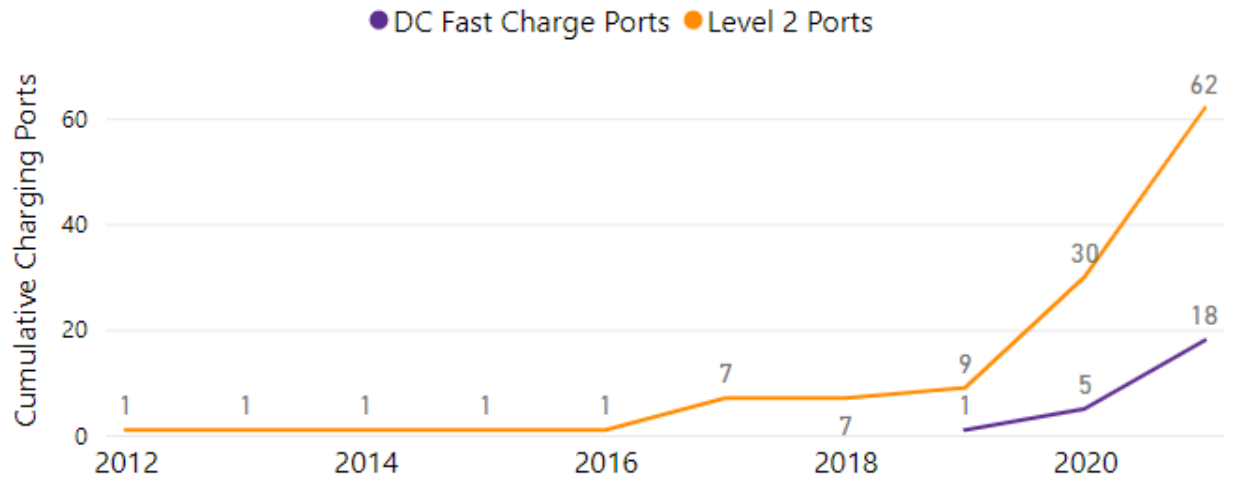


Figure 21: EV charging stations in the Arvada Area[1] (Atlas Public Policy, 2022)

[1] As measured by the number of EVs registered to zip codes 80001, 80002, 80003, 80004, 80005, 80006, 80007, 80030, 80033, and 80403.

Most notably, a new fast charging plaza, which has 6 fast chargers capable of charging between 90 and 180 miles of range in 15 minutes, was installed at the Lloyd King Center in 2021. Through the installation of this charging plaza, the City of Arvada is supporting the development of the statewide initiative to install a charging network across Colorado, to help the state meet its zero emissions vehicle goals. EVs are a key component of the City of Arvada's GHG emissions goals, as 13% of the City's GHG emissions comes from on-road transportation. For more information about EV technologies, benefits of vehicle electrification, and frequently asked questions see Appendix C: Electric Vehicles 101.

Target:

Engage 10,000 households and 400 businesses through outreach efforts by December 2023 and track impact of outreach through participation in new Xcel Energy beneficial electrification offerings[2].

***Lead by Example**:*

Minimize future fossil fuel dependency through fleet electrification and ensure that all new facilities are at least electrification ready.

Summary of Beneficial Electrification Strategies

Below are the priority strategies identified to promote electrification throughout Arvada over the next two years. All strategies were initially discussed during the planning workshop series. Four beneficial electrification ("B") strategies are detailed in this section:

- Strategy B-1: Develop Electrification Standards at City Facilities
- Strategy B-2: Promote Electric Vehicles in City Fleet
- Strategy B-3: Building Electrification Education and Awareness
- Strategy B-4: Promote Transportation Electrification Understanding and Awareness

Lead by Example: EV Charging at City Hall

The City leveraged a Charge Ahead Colorado grant to install an EV charging station at City Hall. This is a dual-head, level 2 charger that can charge two vehicles at a time. This is part of a larger effort to increase EV adoption throughout the Denver-metro Area to decrease air pollution and GHG emissions. All-electric vehicles have no tailpipe emissions and can be emissions free when charged using renewable energy sources.

[2] Examples include residential heat pump hot water heaters, central heat pump HVAC systems, and EV charging incentives.

B-1: Develop Electrification Standards at City Facilities

Develop and adopt a standard to minimize natural gas use and promote electrification at City facilities through:

- **Building the Foundation:** Align internal processes and policies to remove any existing barriers; support all-electric or electric-ready construction
- **Pilot:** Choose a new building in which to test updated policies and processes, revising as needed.
- **Full Electrification:** Take the learnings from the pilot program to execute the developed policy and processes more broadly at City facilities.

Target Audience

- City Facilities Design team
- City Maintenance and Controls staff
- City Council and other decision makers

Desired Outcomes

- Revised design standards that remove barriers to all-electric buildings, and facilitate all-electric construction when beneficial
- Identify one future project to evaluate potential for all-electric or electric-ready construction

Scope and Timeline

Timing	Action
Q3 2022	• Review existing design standards and identify requirements that may be a barrier to all-electric construction; identify opportunities to encourage all-electric construction as beneficial to the City
Q4 2022	• Hold a work session with City staff to review recommended adjustments to design standards
Q1 2023	• Finalize changes to design standards and receive approval from City leadership
Q2 2023	• Identify upcoming projects that may be good candidates for all-electric or electric-ready construction
Long-term	• Implement new standards on pilot project and revise standards as needed based on project outcomes. Consider the City of Arvada Myers Pool as a pilot location

Roles and Responsibilities

City Staff	Kim Vagher to lead and identify team to: • Attend work session to review design standard adjustments and provide feedback • Incorporate design standard adjustments into policy document • Approve new design standards • Implement design standards in new construction and renovation projects
Community Partners	• None
Xcel Energy Partners in Energy	• Provide recommendations for adjustments to design standards • Facilitate work session with City staff

Resources and Communication Channels

- **Resources available**
  - Xcel Energy rebates and pilot programs
- **Communications channels**
  - City website & social media
  - Press releases and/or presentations
  - Arvada Report

B-2: Promote Electric Vehicles in the City Fleet

Work with City staff to understand the best way to leverage EV opportunities, to reduce emissions from City-owned vehicles. The focus of this strategy will be to building the foundation for full electrification through three main efforts:

- **Policy & Process Alignment:** Remove any existing barriers and enact policies to support EV purchases.
- **Staff Education and Engagement:** Leverage pilot vehicles and networking opportunities to help City staff understand the benefits of EVs and garner wide-spread support for further fleet electrification.
- **High-Level Fleet Electrification Plan:** Outline a high-level fleet electrification plan providing an estimate for the necessary charging infrastructure, vehicle budget, and maintenance training. This plan can help City Council make decisions on budget and guidance for the City fleet as well as prepare the City to take advantage of any available grant funding. This should also include a high-level analysis of the change in fuel and maintenance costs as well as the air quality and GHG emissions benefits.

Target Audience

- City Facilities staff
- City Fleet staff
- City Council and other decision makers
- Fleet vehicle users

Desired Outcomes

- City policies and processes to facilitate fleet electrification
- Increased interest and support for EV adoption at all levels
- High-level plan outlining the City's path to fleet electrification, to inform next steps

Scope and Timeline

Timing	Action
Q3 2022 -Q3 2023	• Procure telematics and install on municipal vehicles.
Q4 2022	• Create one success story on EV use in municipal fleet and identify key networking and peer learning opportunities
Q1-Q2 2023	• Review fleet procurement procedures to identify any barriers to EV purchases along with opportunities to promote EV adoption • Recommend revisions to policy, based on findings
Potential Additional Support	• Consider leveraging additional Partners in Energy planning support to develop high-level fleet electrification plan including: ○ Vehicle costs ○ Infrastructure needs and associated costs ○ Electricity and fossil fuel use impacts ○ Air quality and GHG emissions reductions

Roles and Responsibilities

City Staff	Ike Miller to lead and identify the team to: • Procure and install telematics • Provide information on current fleet EVs for success stories • Update procurement policy to facilitate EV conversion
Community Partners	• None
Xcel Energy Partners in Energy	• Create one City EV success story • Provide recommendations on adjustments to procurement policy

Resources and Communication Channels

- **Resources available**
  - Xcel Energy Fleet EV Solutions
    - Fleet Electrification Advisory Program
    - EV Supply Infrastructure Program
    - Critical Peak Pricing Program
  - EV Toolkit: xcelenergycommunities.com/document/ev-toolkit-appendix
- **Communications channels**
  - N/A - Internal to City of Arvada

B-3: Building Electrification Education and Awareness

Develop an education and awareness outreach plan toward adoption of building electrification in residences and businesses in Arvada including:

- Define what electrification of buildings means and its impacts
- Show how electrification helps the City of Arvada reach its carbon goals
- Understand and provide resources (e.g., incentives, grants) to overcome barriers
- Develop a phased approach for electrification, for homeowners and businesses, highlighting the more cost-effective strategies that also have significant impact

Target Audience

- Commercial building owners
- Homeowners

Desired Outcomes

- Increased understanding of all-electric building systems for homes and businesses, through community outreach - at up to 4 outreach events.

Scope and Timeline

Coordinate activities with Strategy E-1.

Roles and Responsibilities

City Staff	• Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach, and review materials for events • City staff to lead planning of events and attend events across all focus areas
Community Partners	• Arvada Sustainability Action Committee to support distribution of materials at public events
Xcel Energy Partners in Energy	• Develop collateral about beneficial electrification and available resources

Resources and Communication Channels

- **Resources available**
  - Xcel Energy rebates and pilot programs
- **Communications channels**
  - Coordinate with other outreach events
  - Coordinate with other focus area outreach channels

B-4: Transportation Electrification Education and Awareness

Develop an education and awareness outreach plan toward adoption of EVs and infrastructure sited at residences and businesses in Arvada.

Target Audience

- Businesses in key areas for public charging stations
- Large businesses with commercial fleets
- Residents who own a vehicle

Desired Outcomes

- Increase the number of EVs in Arvada zip codes

Scope and Timeline

Timing	***Action***
Q3 2022	• Identify target outreach events

Q4 2022	• Define audience and key message(s) for each outreach event and develop materials. Some topics include:
	  ○ Promote group buys that reduce the cost of purchasing an EV
	  ○ Explore resources available to help cover infrastructure costs
	• Coordinate with Drive Clean Colorado to organize ride-and-drives as appropriate.

Q1 2023	• Identify large employers and/or businesses for employee charging outreach.
Q2 2023	• Meet with identified large employers and/or businesses to understand capacity and interest in installing EV charging station • Connect interested employers and/or businesses to resources to support implementation including funding opportunities.
Q3 2023	• Identify key businesses as targets for public charging. • Outreach to businesses to provide information on installing public charging including funding opportunities and benefits to the business.
2023	• Attend up to 4 outreach events to share information about EVs and associated charging infrastructure, in coordination with the renewable & reliable energy and energy efficiency focus area events

Roles and Responsibilities

City Staff	• Communications Department staff, including Chief Communications Manager (Rachael Kuroiwa), to lead coordination of communication resources and necessary outreach, and review materials for events • City staff to lead planning of events and attend events across all focus areas

Community Partners	• Arvada Sustainability Action Committee to support distribution of materials at public events • Drive Clean Colorado may support events with ride-and-drive opportunities
Xcel Energy Partners in Energy	• Develop collateral about EVs and available resources • Support events and provide event materials such as an example charging station for events

Resources and Communication Channels

- **Resources available**
  - Xcel Energy Fleet EV Solutions
    - Fleet Electrification Advisory Program
    - EV Supply Infrastructure Program
    - Critical Peak Pricing Program
  - Drive Clean Colorado
- **Communications channels**
  - City website & social media
  - Press releases and/or presentations
  - Arvada Report

Energy Action Plan Impact

Over the next 18 months, the combined targets and strategies outlined in this plan will result in the following impacts:

Table 1: 18-Month Energy Action Plan Impact

Metric	Baseline (18-month)	Incremental Impact	Total
Participation	9,521	2,318	**11,839**
Electricity Savings (kWh)	11,343,972	4,036,942	**15,380,914**
Natural Gas Savings (therms)	265,487	79,495	**344,982**
Renewable Electricity (kWh)	46,328,754	13,766,675	**60,095,429**
Greenhouse Gas Emissions Savings (MTCO2e)	16,815	5,426	**22,241**
Energy Cost Savings ($)	$1,153,701	$425,200	**$1,578,901**

HOW WE STAY ON COURSE

This Energy Action Plan is a living document. Goals and strategies will be assessed and refined as needed, based on data and community staff capacity. Implementation of this Energy Action Plan is anticipated to extend through December 2023 and will be re-evaluated thereafter, depending on further interest in pursuing strategies outlined in Appendix D.

Energy Action Team Commitment

An Energy Action Team will be formed to support implementation by attending applicable implementation check-in calls and serving as liaisons to the rest of the community. Energy Action Team members will include representatives from the planning team (see Acknowledgements for a complete list of planning team members) and will provide opportunities for additional community members to join and contribute.

Check-in calls will be used for strategy implementation coordination and discussion of the City of Arvada's progress toward its goals. Energy Action Team commitments are more clearly outlined in each strategy. The Energy Action Team will be expected to take an active role in implementation - to support development of appropriate messaging, to disseminate information to the community, and to participate in ongoing coordination.

Data and Reporting

Partners in Energy will provide biannual progress reports with metrics of success and overall progress toward goals. These reports will be available publicly and shared with both the community and Energy Action Team. By focus area, the incremental targets, over and above baseline participation and savings, by which overall progress will be measured are outlined in Table 2.

Table 2: Incremental Targets Tracking Summary

Focus Area	Energy Efficiency	Renewable & Reliable Energy	Beneficial Electrification	Total (Incremental)
Incremental Participation Target (# of Participants)	587	1,718	13	**2,318**
Incremental Electricity Savings Target (kWh)	3,272,078	-	764,864	**4,036,942**
Incremental Natural Gas Savings Target (Therms)	53,592	-	25,902	**79,494**
Incremental Renewable Electricity Target (kWh)	-	13,766,675	-	**13,766,675**
Incremental Carbon Reduction Target (MTCO2e)	1,635	3,338	453	**5,426**

APPENDIX A: XCEL ENERGY'S PARTNERS IN ENERGY PLANNING PROCESS

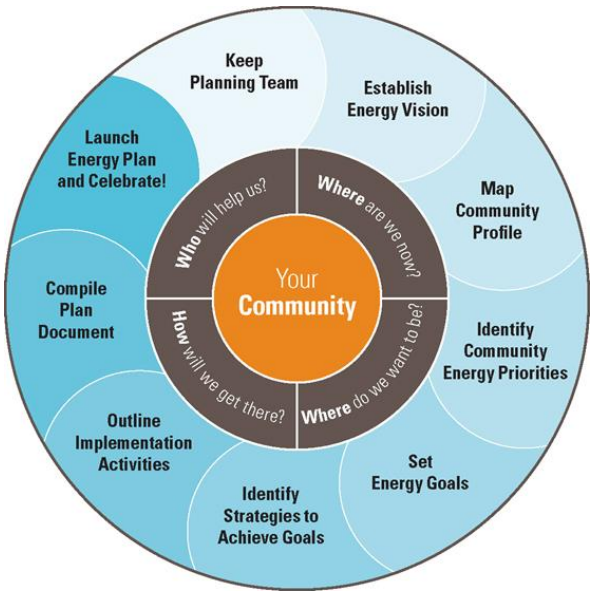
About Xcel Energy's Partners in Energy

Xcel Energy is an electric and natural gas utility that provides the energy that powers millions of homes and businesses across eight Western and Midwestern states. Each community Xcel Energy serves has its own unique priorities and vision for its energy future. The energy landscape is dynamically changing, with communities leading the way in setting energy and sustainability goals. To continue to innovatively support these communities, Xcel Energy launched Partners in Energy in the summer of 2014 as a collaborative resource with tailored services to complement each community's energy future vision. The program offerings include support to develop an energy action plan or electric vehicle plan, tools to help implement the plan and deliver results, and resources designed to help each community stay informed and achieve their outlined goals.

The City of Arvada applied to Partners in Energy in 2021, joining more than 30 other Colorado communities that are or have participated in the program. Partners in Energy is a two-year collaboration between Xcel Energy and a community to develop and implement a plan for the community to reach its energy goals. Participation typically spans two years. The first six months are spent developing an energy action plan; the following eighteen months include support to implement that plan. Once the

implementation support period is complete, “graduate” communities receive ongoing benefits which includes access to Partners in Energy events, newsletters, and resources. Graduate benefits can also include targeted or ad-hoc support to continue building on success established during implementation.

During planning and implementation, Partners in Energy provides project management and facilitation services, serves as a liaison between Xcel Energy and the community, and delivers detailed data analyses. During implementation, Partners in Energy builds on these resources to provide marketing and communication, host events, share technical information, and coordinate among implementation stakeholders. Community participation in Partners in Energy serves to accelerate the achievement of community energy goals through coordinated planning and implementation.



Partners in Energy Process for Success

Resources from Xcel Energy for Implementation

Plan Development Process

The City of Arvada’s planning phase of Partners in Energy kicked off in March 2021 with the project management team, to identify a list of potential Energy Action Team candidates based on the City of Arvada’s priorities and values identified in the City’s Partners in Energy application. Key members and representatives of the business community, residents, sustainability group members, and City staff and City Council members were identified. The project management team contacted potential team members via multiple channels to invite them to the process. The invitations to join the Partners in Energy process culminated in an Energy Action Team of 20 members of the Arvada community. Through four virtual engagement workshops with the Energy Action Team, the content of this plan was developed using input gathered from the team. Two work sessions were then held with City staff to ensure implementation support from the City is well-aligned with strategies developed by the Energy Action Team.

APPENDIX B: BASELINE ENERGY ANALYSIS

Data was provided by Xcel Energy for all City of Arvada premises for 2018–2020. Xcel Energy provides electric and natural gas service to the community. The data helped the Energy Action Team understand the City of Arvada's energy use and opportunities for energy conservation and renewable energy. Data included in this section establishes a baseline against which progress toward goals will be compared in the future.

Electricity and Natural Gas Premises & Energy Use

Most premises in Arvada are residential, making up 92 percent of the nearly 55,000 premises within the City (Figure 22). With residential premises being most premises in Arvada, residential premises also make up two-thirds of the total energy use in Arvada (Figure 23). In typical Partners in Energy communities in Colorado, Commercial and Industrial (C&I) premises typically use most of the total energy; but the Arvada commercial sector is made up of smaller-than-average businesses. Due to this nuance, both residents and small businesses were identified as target audiences for strategies developed in the Energy Action Plan.

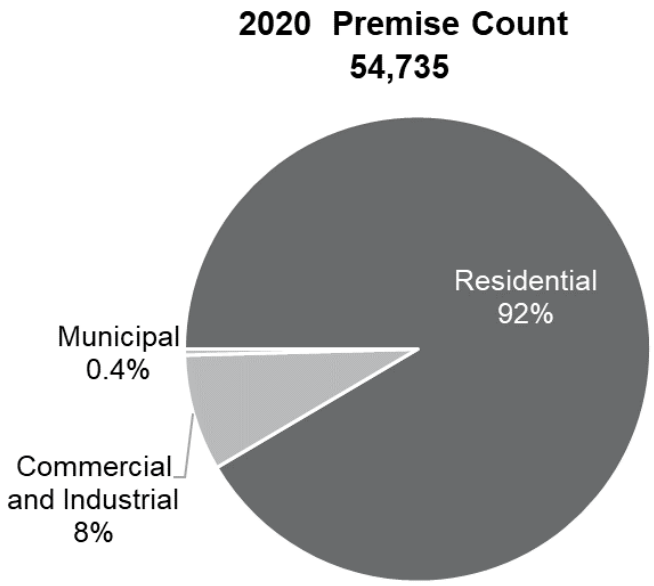


Figure 22: City of Arvada Premises by Sector, 2020

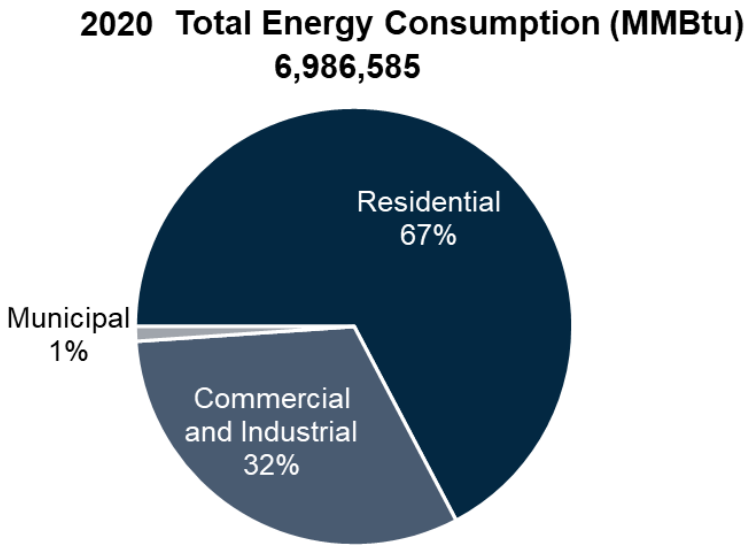


Figure 23: City of Arvada Energy Use by Sector, 2020

Over the last three years, Arvada premises have grown by 2.2%, with consistent growth across each of the three sectors - residential, commercial, and municipal (Figure 24). Population growth is projected to continue into the future, with a total of 17.5% additional growth anticipated by 2035, focused primarily in the northwest corner of the City (City of Arvada 2019 Demographic Supplement).

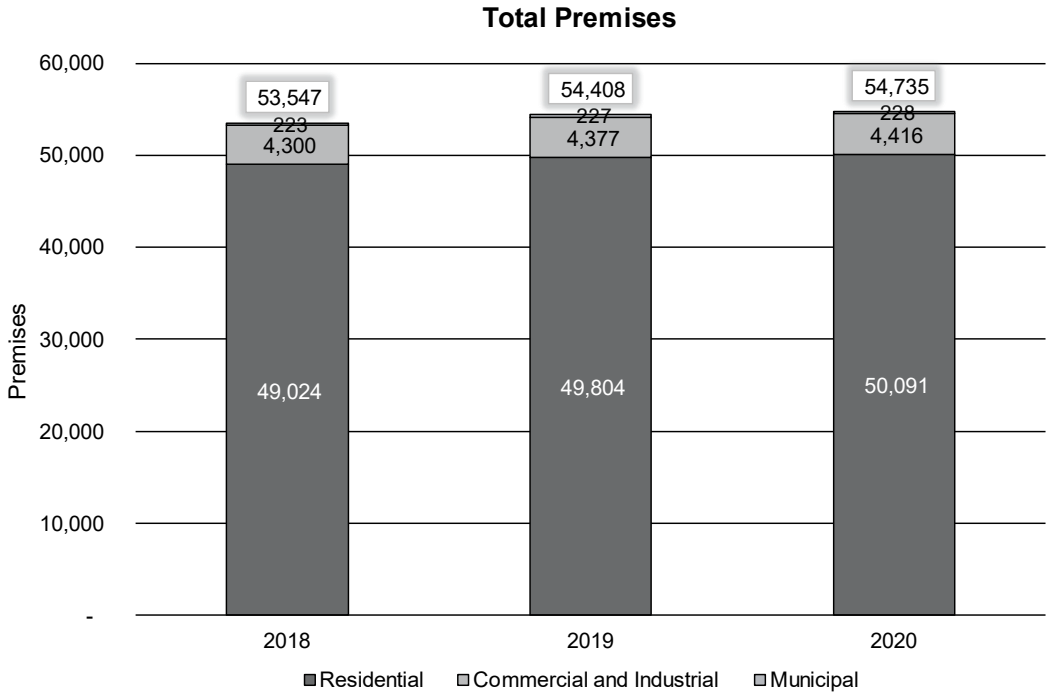


Figure 24: Annual community premises by sector 2018-2020

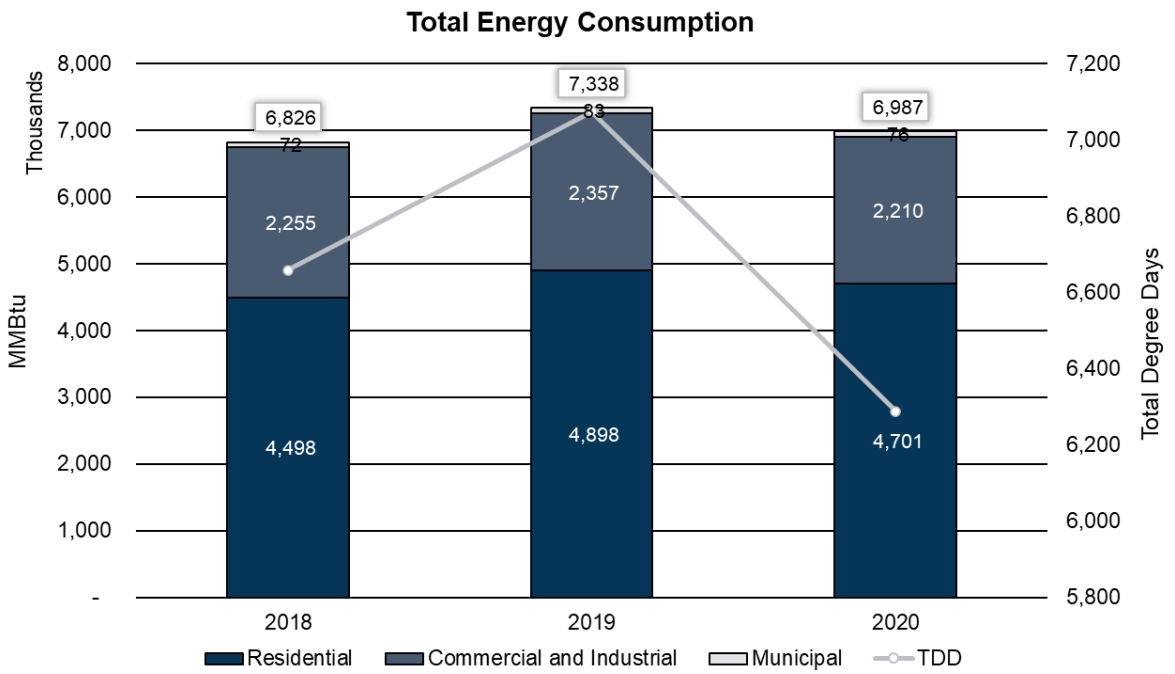


Figure 25: Annual community energy use by sector 2018-2020

Despite significant growth in premises over the same time, energy use has fluctuated overall in Arvada between 2018-2020 (Figure 25). Other factors contributed to lower energy use in 2020, including the COVID-19 pandemic (which forced the temporary closure of some businesses in Arvada) and overall warmer winter weather conditions (reducing some heating energy needs in residences and businesses compared to 2019).

Among peer communities of Lakewood, Westminster, Broomfield and Golden, CO, Arvada had the lowest average total energy use per premise in 2020 (Figure 26). This is corroborated by the smaller average business size within the community. The City of Arvada selected these peer communities to provide additional context for energy use in Arvada. In connection with the overall energy makeup in Arvada, this data was utilized to define the small business audience within Arvada - to target for outreach and education toward further reducing energy use in the community.

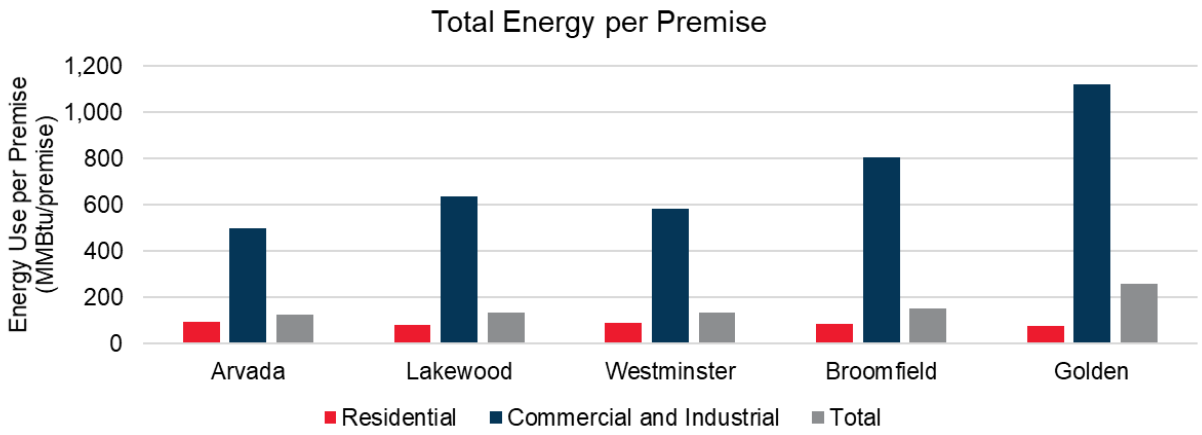


Figure 26: 2020 Total and sector-specific energy use per premise in Arvada, compared to peer communities

Greenhouse Gas Emissions and Trends

Building electricity and natural gas usage in Arvada contributes over 561 thousand metric tons of carbon dioxide equivalent ($MTCO_2e$) to total emissions. The scale of Arvada's emissions is the same as the amount that 122,000 standard passenger vehicles (EPA, 2021) would produce if they were driven for a full year. Well aligned with their overall energy consumption, residential customers contribute 65% of greenhouse gases associated with stationary building energy use (Figure 27).

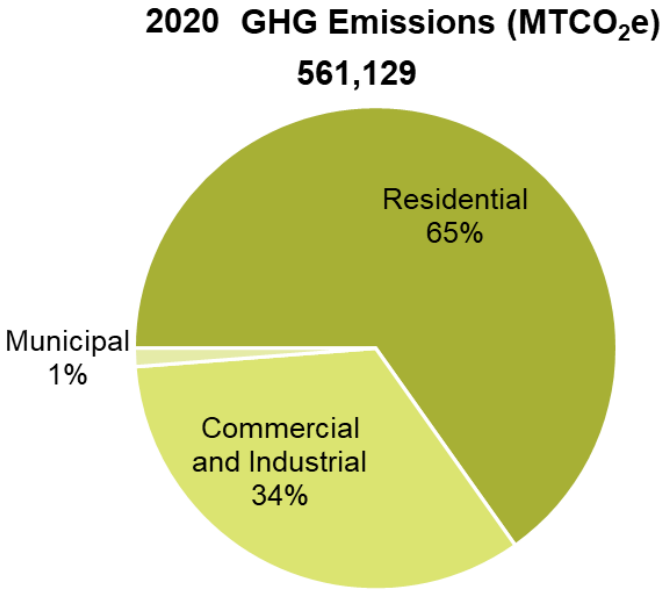


Figure 27: Greenhouse gas emissions from energy in Arvada by sector, 2020

Energy consumption-related greenhouse gas emissions declined in Arvada in 2020, after remaining nearly constant between 2018-2019 (Figure 28), despite total energy consumption fluctuating more significantly over the same three year period (Figure 25).

This finding is largely due to the “greening of the grid” or the process of adding more renewable energy supply into the source fuel mix to support electricity generation.

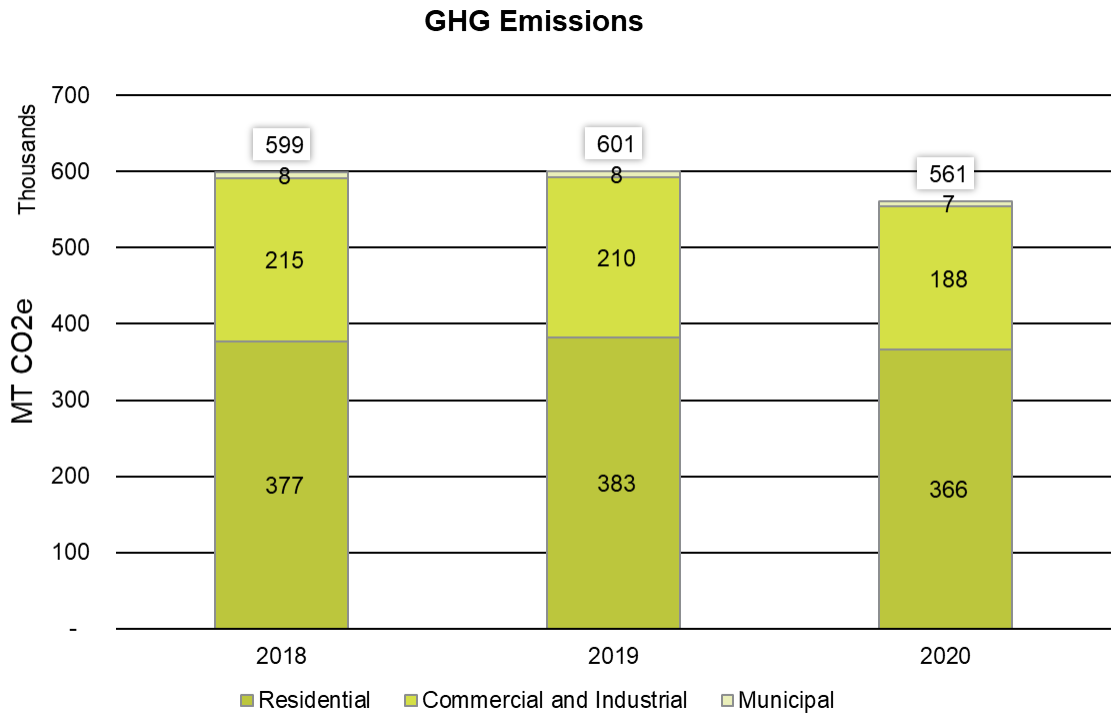


Figure 28: Annual community energy-related greenhouse gas emissions by sector 2018-2020

Energy Costs

Like energy use and greenhouse gas emissions, energy costs in Arvada are distributed comparably across all sectors, with the residential sector making up about two thirds of the overall $85.3 million spent on energy in 2020 (Figure 29). Over the last three years, energy costs have fluctuated but are consistent with overall energy use trends. In the residential sector, the trend has been increased energy costs over the last three years, with 2020 energy costs being 5.4% higher than 2018. As Arvada continues to grow in the future, energy costs will also grow. A 17.5% growth in population through 2035, as anticipated by the City of Arvada, would result in an approximate $15 million growth in community energy costs. This growth in energy costs justifies the approach of developing strategies to address efficiency and carbon reductions for new construction as well as in Arvada’s existing building stock, to limit the impact of overall energy cost increases.

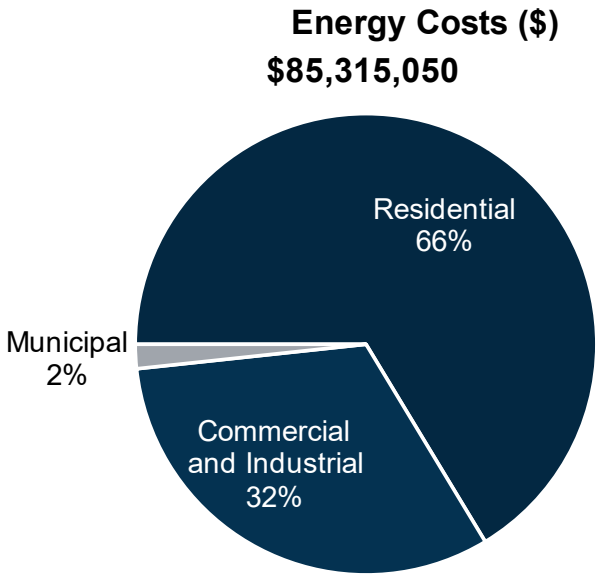


Figure 29: Energy costs in Arvada by sector, 2020

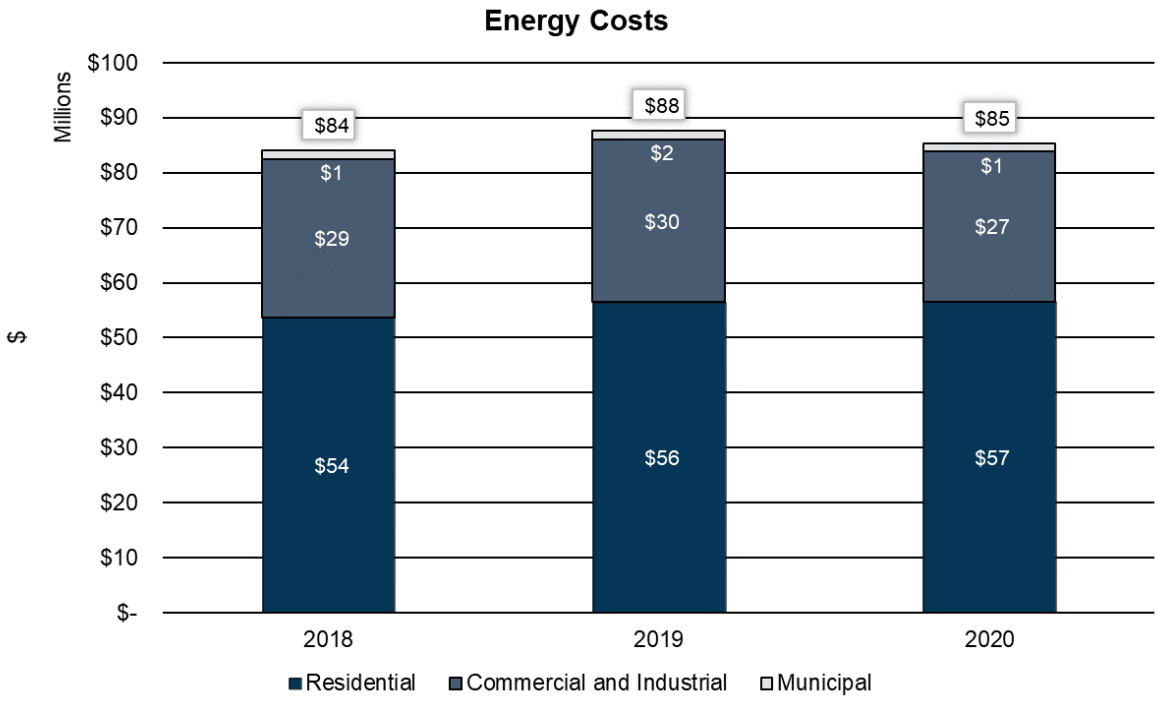


Figure 30: Annual community energy costs by sector 2018-2020

APPENDIX C: STRATEGY LIBRARY

This appendix provides a library of additional strategy ideas identified throughout the planning process but not prioritized for the first phase. These strategies are organized by focus area and are available for future consideration as capacity allows.

Energy Efficiency

- Update building codes to include an energy efficiency stretch code requirement for new buildings.
- Require LEED Silver certification for new buildings (residential & commercial) and/or LEED Neighborhood Development (ND) for new developments.
- Highlight energy efficient new builders and developers serving Arvada.

Renewable & Reliable Energy

- Perform workforce development in the renewable energy industry, promoting training and job resources such as GRID Alternatives.
- Require and/or promote solar-ready new construction for residents and businesses. This strategy could include a requirement for new buildings to produce at least 5% of the energy required to operate the building from on-site renewable energy. On-site energy storage should also be considered to ensure energy reliability.

Beneficial Electrification

- Incorporate total cost of ownership into the City of Arvada vehicle procurement process.

- Hold a networking event with other city/town fleet managers to learn what works well and to learn about and understand common issues when electrifying a municipal fleet.
- Require all new construction to be electric vehicle-ready through installing conduit and other infrastructure as part of a new construction project.
- Coordinate with large employers in Arvada to promote and provide employee and/or public charging.
- Develop a contractor finder list to help residents and businesses understand what to consider with electrification, including applicable success stories.
- Promote group buys that reduce the cost of purchasing an electric vehicle.
- Highlight all-electric new builders and developers serving Arvada.
- Develop a utility rate/cost screening tool to aid understanding of electric vehicle charging costs at various locations.
- Coordinate with Drive Clean Colorado to host ride-and-drive events to promote electric vehicle adoption in the community.

For the further development of the strategies in this appendix, the following Strategy Action Plan template may be used.

Strategy Title

Description

Provide a high-level description of the strategy here.

Target Audience

- Identify and outline the audience of the strategy here.

Target Outcomes

- Identify a target to track the progress of this strategy. Targets will support an overall goal for the community.

Scope and Timeline

- Outline Scope and Timeline for the steps identified in the Action Plan here. The following table may be used to organize action steps.

Timing	Action
Quarter, Year	• Details action steps here
Quarter, Year	• Details action steps here
Quarter, Year	• Details action steps here
Quarter, Year	• Details action steps here

Roles and Responsibilities

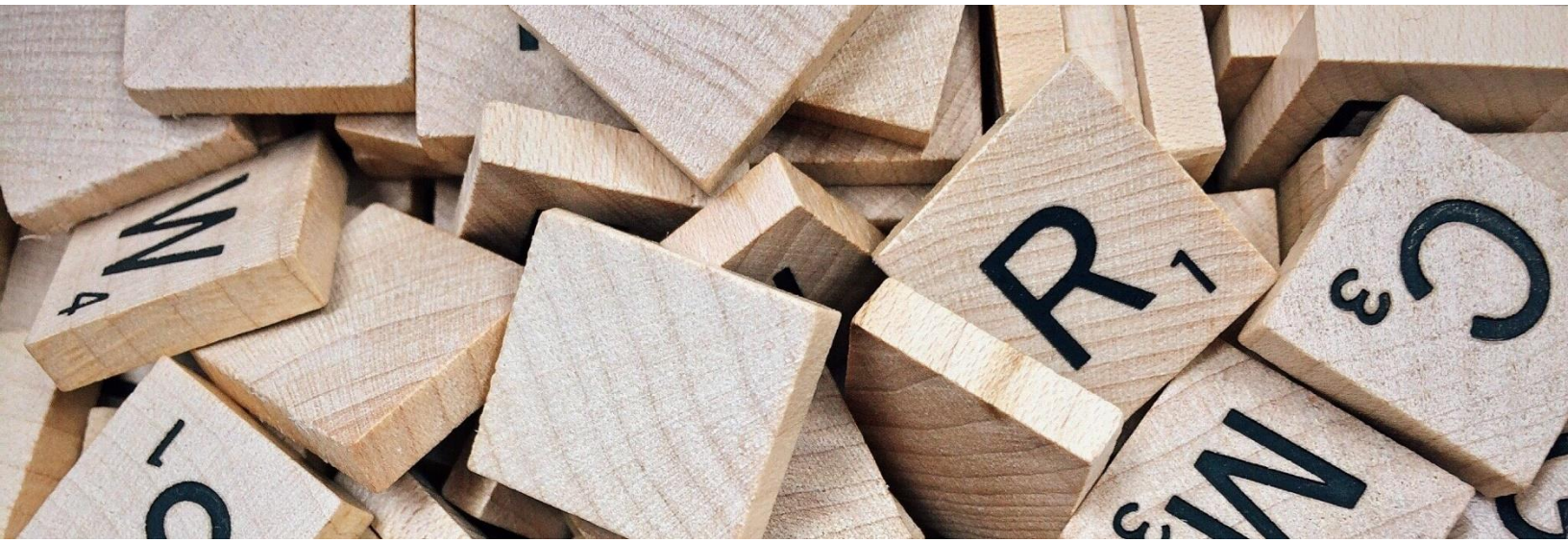
- Outline roles and responsibilities for City staff, community partners, and others involved in the implementation of the strategy

City Staff	• Detail roles and responsibilities
Community Partners	• Detail roles and responsibilities
Xcel Energy Partners in Energy	• Detail roles and responsibilities

Resources and Communication Channels

- Outline available resources to support this strategy (City staff, community partners, available data, or funding)
- What additional resources will be required (e.g., facilities, handouts, budget. etc.)? What are potential funding sources?
- How will you spread the message (e.g., website, social media, press releases)? What media do you foresee needing? Are there events that would support your strategy?

APPENDIX D: GLOSSARY OF TERMS



15 x 15: Xcel Energy's privacy rule, which requires all data summary statistics to contain at least 15 premises, with no single premise responsible for more than 15% of the total. Following these rules, if a premise is responsible for more than 15% of the total for that data set, it is removed from the summary.

British Thermal Unit (BTU): Amount of heat needed to raise one pound of water at maximum density through one degree Fahrenheit

Carbon-free: Carbon-free refers to sources of energy that will not emit additional carbon dioxide into the air. Wind, solar and nuclear energy are all carbon free sources but only wind and solar are renewable.

Carbon-neutral: Carbon-neutral, also described as "net zero." Could include carbon-free sources but is broader and refers to energy that removes or avoids as much carbon dioxide as it releases over a set period. Carbon-neutral is sometimes used to describe a site that produces an excess amount of electricity from a renewable energy source, such as solar, compared to what it consumes. That excess energy is put back into the grid in an amount that offsets the carbon dioxide produced from the electricity it draws from the grid when it is not producing renewable energy.

Demand Side Management (DSM): Modification of consumer demand for energy through various methods, including education and financial incentives. DSM aims to encourage consumers to decrease energy consumption, especially during peak hours or to shift time of energy use to off-peak periods such as nighttime and weekend.

Energy Burden: Percentage of gross household income spent on energy costs.

Energy Reduction: The result of behavior changes that cause less energy to be used. For example, setting the thermostat lower *reduces* the energy used during the winter. Since energy reductions can be easily reversed, they are not accounted for when calculating changes in energy usage.

Energy Savings: Comes from a permanent change that results in using less energy to achieve the same results. A new furnace uses X% less to keep your home/business at the same temperature (all things being equal), resulting in energy *savings* of X%. For accounting purposes, energy savings are only counted in the year the new equipment is installed.

Greenhouse Gases (GHG): Gases in the atmosphere that absorb and emit radiation and significantly contribute to climate change. The primary greenhouse gases in the earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Grid Decarbonization: The current planned reduction in the carbon intensity of electricity provided by electric utilities through the addition of low- or no-carbon energy sources to the electricity grid.

Kilowatt-hour (kWh): A unit of electricity consumption.

Million British Thermal Units (MMBtu): A unit of energy consumption that allows both electricity and natural gas consumption to be combined.

Metric Tons of Carbon Dioxide Equivalent (MTCO2e): A unit of measure for greenhouse gas emissions. The unit "CO2e" represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide (CO2), based on the global warming potential (GWP) of the gas.

Megawatt (MW): A unit of electric power equal to 1 million watts.

Premise: A unique combination of service address and meter. For residential customers, this is the equivalent of an individual house or dwelling unit in a multi-tenant building. For business customers, it is an individual business, or for a larger business, a separately metered portion of the business’s load at that address.

Renewable Energy Certificate (REC): For every megawatt-hour of clean, renewable electricity generation, a renewable energy certificate (REC) is created. A REC embodies all the environmental attributes of the generation and can be tracked and traded separately from the underlying electricity. Also known as a Renewable Energy Credit.

Resilience: The ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.

Solar Garden: Shared solar array with grid-connected subscribers who receive bill credits for their subscriptions.

Solar Photovoltaic (PV): Solar cells/panels that convert sunlight into electricity (convert light, or photons, into electricity, or voltage).

Subscription: An agreement to purchase a certain amount of something in regular intervals.

Therm (thm): A unit of natural gas consumption.