City of Louisville

A Community Decarbonization Plan for Louisville

February 2024

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PARTNERS IN ENERGY

An Xcel Energy Community Collaboration

ACKNOWLEDGEMENTS

Thank you to the following individuals who contributed many hours of service to developing this Community Decarbonization Plan. The individuals who contributed to this planning process are collectively referred to as the Community Decarbonization Stakeholder Team (stakeholder team).

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 Louisville. 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: Xcel Energy's Partners in Energy Planning Process**.

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This Community Decarbonization 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 Louisville has made modifications to the plan.

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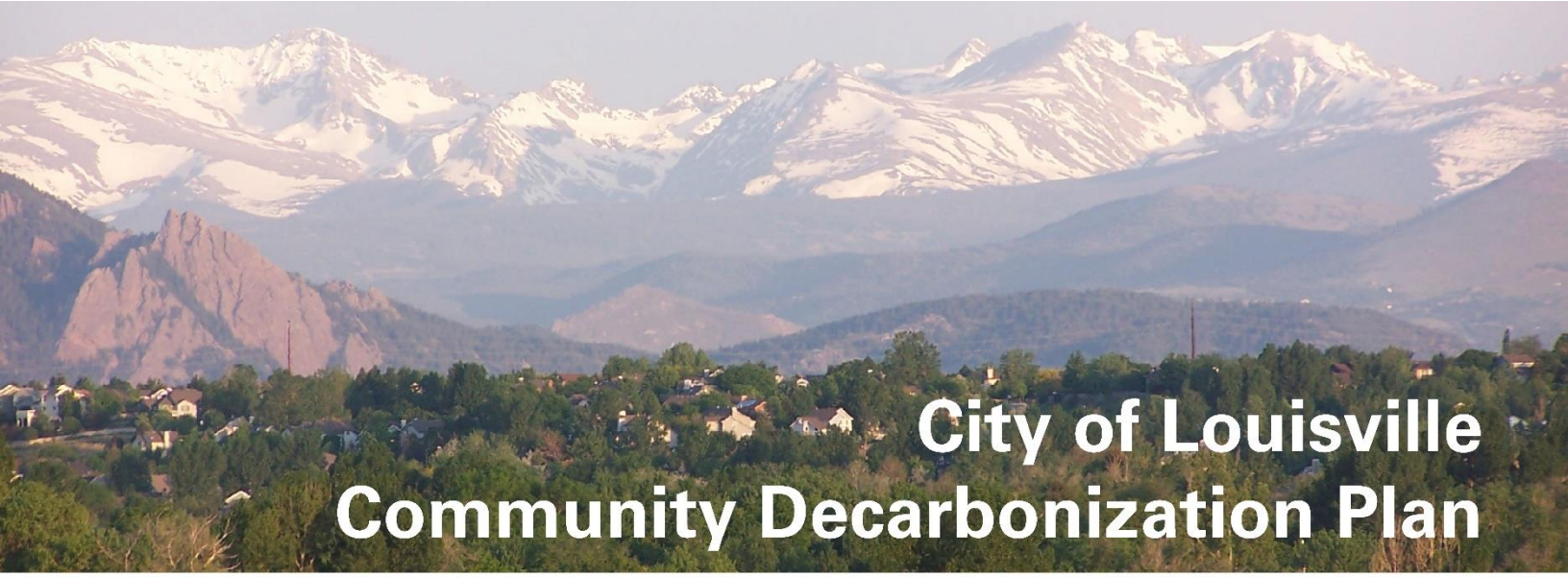

City of Louisville Community Decarbonization Plan

About this Plan

This Community Decarbonization Plan was developed in collaboration with Xcel Energy Partners in Energy. This plan focuses on decarbonizing Louisville's energy supply, improving the efficiency of and electrifying existing buildings, and increasing the adoption of electric vehicles (EV).

The City of Louisville recruited nine stakeholders with diverse community perspectives to inform the contents of this plan. Stakeholders met over the course of seven months and provided input through four in-person workshops and one stakeholder survey. Additionally, City staff sought plan feedback through a community survey.

Louisville's Vision & Goal for Community Decarbonization

A plan's vision defines a community's desired future state. It can also serve as a "north star," helping to guide action and prioritize resources. The stakeholder team collectively defined the following vision.

Vision

Louisville will take a measured, equitable approach to reducing carbon emissions from the building, energy supply, and transportation sectors.

Goal

The City of Louisville will reduce energy-related emissions 60% below 2016 levels by 2030 and will be carbon-neutral by 2050.

How Are We Going to Get There

The stakeholder team identified the following strategies to implement over the next 18-months. These strategies focus on addressing low-hanging fruit and laying the groundwork for future, high-impact action. Louisville will need to take additional actions beyond this 18-month implementation period to achieve their 2030 and 2050 goals.

Decarbonizing Our Residential Sector

- R-1 Single-Family Homeowner Engagement
- R-2 Rental and Multifamily Engagement
- R-3 Mobile Home Engagement

Decarbonizing Our Commercial and Industrial Sector

- B-1 Business Research
- B-2 Business Advisement

City of Louisville

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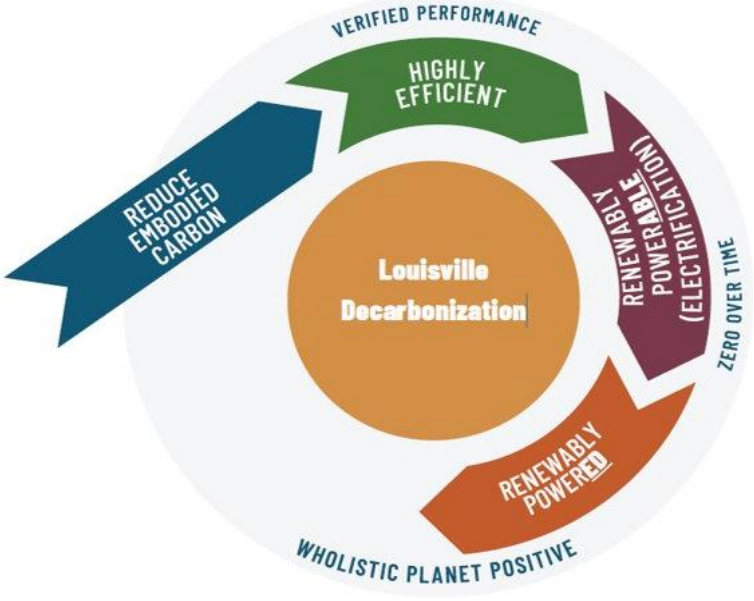
INTRODUCTION

Defining Decarbonization

A lot of our daily activities have carbon dioxide emissions associated with them—from the natural gas we use to heat our homes to the gasoline or diesel used to power our vehicles. Carbon dioxide, referred to as carbon in this plan, is a greenhouse gas that traps heat in the earth's atmosphere and is a main driver of climate change. The Sixth Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC) in 2023 found that human activities have "unequivocally" caused global warming of 1.1°C above pre-industrial levels (IPCC, 2023). The report also points to gaps between emissions projected in the context of current policy commitments and the levels needed to keep warming below 1.5°C (IPCC, 2023).



Source: City of Louisville Internal Decarbonization Plan (McKinstry, 2023)

Figure 1. Shows how City of Louisville's Internal Decarbonization Plan defines decarbonization.

Decarbonization is the act of reducing carbon from human activities. So, what does this process look like? As part of Louisville's Internal Decarbonization Plan, engineering firm McKinstry used Figure 1 to define the key components of decarbonization. While the steps shown don't always occur in sequence, considering them sequentially can help draw an efficient roadmap for decarbonization.

It starts with reducing "embodied carbon", which refers to carbon emissions associated with production of raw materials needed to create our buildings and vehicles. Next

comes improving the efficiency of our buildings, building equipment, and modes of transportation. Next, we make sure anything that's powered – like HVAC equipment, stoves, water heaters, or vehicles – can be powered renewably, by converting fossil fuel systems to electric. Finally, we power all equipment with renewable energy, like solar or wind energy.

Though there are also decarbonization opportunities in the waste, water, and agricultural sectors, this plan is focused on building efficiency and electrification, transportation electrification, and renewable energy supply. The following section further describes the specific scope of this plan.

Scope of This Community Decarbonization Plan

This Community Decarbonization Plan was developed in collaboration with Xcel Energy Partners in Energy. Xcel Energy is the natural gas and electric utility that serves the City of Louisville. Partners in Energy is a two-year collaboration to develop and implement a community's renewable energy, energy efficiency, building electrification, and transportation electrification goals. The City of Louisville recruited nine stakeholders with diverse community perspectives to inform the contents of this plan. This Community Decarbonization Stakeholder Team (see Acknowledgements) met over the course of seven months and provided input through four in-person workshops and one stakeholder survey.

As such, this plan focuses on decarbonizing Louisville's energy supply, improving the efficiency of and electrifying existing buildings, and increasing the adoption of electric vehicles. Decarbonization of additional sectors is addressed through other City plans, policies, and programs, such as the Sustainability Plan, the Comprehensive Plan, support for those rebuilding after the Marshall Fire, and the City's energy code. Decarbonization of City fleet and facilities is addressed through the City of Louisville's Internal Decarbonization Plan, adopted by City Council in October 2023.

Marshall Fire

In December of 2021, over 500 Louisville homes and businesses were burned in the Marshall Fire. With support from federal, state, utility, and local partners, Louisville began the slow process of recovering and rebuilding.

The reconstruction of these homes presents an important opportunity for decarbonization in Louisville. This Community Decarbonization Plan focuses solely on existing homes and businesses, however, there are substantial resources available to help Marshall Fire victims rebuild in alignment with Louisville's decarbonization goals. The Resilient Rebuild collaboration was formed in the wake of the Marshall Fire to connect residents with essential reconstruction information and resources. A critical function of this effort is to support the construction of energy efficient homes.

Electrification and Grid Readiness

Xcel Energy's Clean Heat Plan and 2023 Demand-Side Management and Beneficial Electrification Plan (filed, but not yet approved as of January 2024) in Colorado will help lay the groundwork for customers seeking to electrify their homes through new utility programs and initiatives launching in 2024. These programs include robust insulation and air sealing rebates, which help improve the building envelope before electrification. These plans also include programs and rebates for electric equipment, including additional rebates for projects that pair insulation, air sealing, and heat pumps. The goal in both plans is to reduce carbon emissions

and increase energy efficiency across multiple sectors, from residential to business to industrial, while maintaining reliability and affordability.

In addition to offering equipment rebates for electrification, Xcel Energy is preparing for electrification and increased electricity demand in a variety of ways, including advanced grid investments and demand side management programs. Xcel Energy's Advanced Grid Initiative is bringing digital technology to electric service with a smarter, more resilient electric distribution grid (see the Partners in Energy Advanced Grid Community Playbook for more details). Compared to traditional distribution systems, the advanced grid enhances visibility and control of the grid via modern system technology. Demand side management strategies, like time-of-use rates (also known as time-of-day rates) in Colorado, will allow Xcel Energy customers to use electricity in off-peak hours and give customers more control over bills.

What Makes Louisville Unique for Decarbonization?

During the first Community Decarbonization planning workshop, Partners in Energy developed a community decarbonization baseline (see Appendix B for details) and asked stakeholders to reflect on the question "What makes Louisville unique for decarbonization?". The following section summarizes some of the unique aspects of Louisville that present barriers and opportunities for decarbonization.

Louisville Community Members Are Community-Focused and Sustainability Minded

The residents and businesses in Louisville value the environment and have a strong sense of community. Many community members are educated and engaged on topics of sustainability and there are lots of communication channels available to share resources and information.

Figure 2. A workshop poster in which participants categorized barriers and opportunities related to decarbonization.

Not All Community Members Have Equal Decarbonization Opportunities

An individual's or family's housing situation, educational background, and socio-economic status can present barriers or opportunities for decarbonization. Stakeholders identified the importance of helping address these inequities, by identifying projects that produce real benefits for community members, while offsetting potential costs with existing or new resources.

Balancing Decarbonization with Economic Vitality is Paramount

Purchasing an electric car, upgrading insulation, or installing a heat pump water heater can be expensive. In older homes, electric panels may require upgrades to accommodate new demands of electric equipment. On a community scale, large infrastructure investments may be required to accommodate broad electrification efforts. Given these cost factors, the stakeholder team underscored the importance of leveraging incentives over regulations to advance community decarbonization while upholding economic vitality.

Commercial Sector Makes Up the Majority of Community Natural Gas Use

Across Partners in Energy communities in Colorado, natural gas use is typically driven by the residential sector, however Louisville's natural gas use in 2022 was 53 percent from the commercial sector. Louisville's commercial sector has some large businesses including

breweries, national scale food services, and hospitals that could drive much of the increased natural gas use over a typical community.

Louisville Has Ample Public Charging Opportunities

There are 54 EV charging ports dispersed throughout the City of Louisville (Figure 3). While there is no definitive guideline, one best practice suggested installing a public charging port for every ten electric vehicles (Alternative Fuels Infrastructure Directive, 2021). In 2021, there were 468 electric vehicles registered (8.5% of total registrations) (Boulder County DMV, 2021). This is less than nine vehicles per charging port, indicating the City of Louisville has ample public charging. As EV adoption increases in the community, Louisville may consider strategic investments in public infrastructure, such as public charging to increase access for those without access to at home charging. Additional strategies could include promoting workplace charging and home charging.

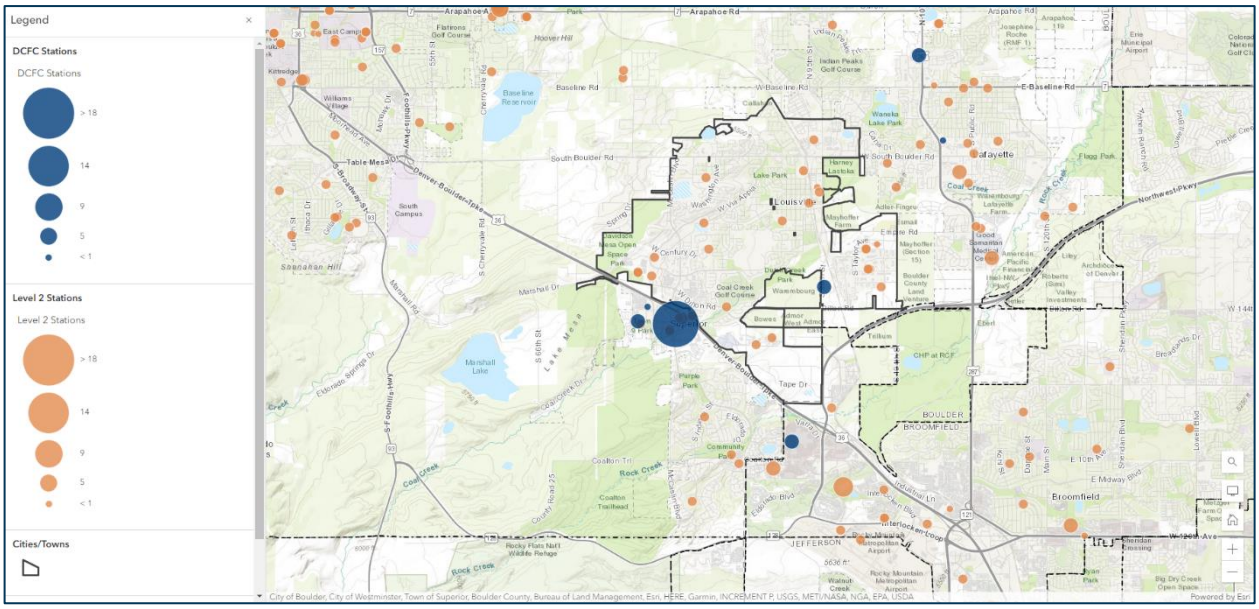


Figure 3: A map of Fast Charing (DCFC) and Level-2 charging stations in Louisville.

Renewable Energy Adoption in Louisville is Higher than Average

Across Partners in Energy communities, on average about 7% of residential customers and 2% of commercial customers have adopted renewable energy through an Xcel Energy program. In Louisville, renewable energy participation is much greater with 15% of Louisville residents and 7% of Louisville businesses adopting renewable energy. Enabled by the greening of the Xcel Energy electric grid in combination with Louisville's renewable energy efforts, emissions associated with electricity are rapidly decreasing. With lower electric grid carbon intensity, electrifying natural gas-powered equipment in buildings and gasoline/diesel-using vehicles will result in significant greenhouse gas emissions savings long-term for the community.

OUR VISION FOR A CARBON-NEUTRAL FUTURE

Louisville's Vision for Community Decarbonization

A plan's vision defines a community's desired future state. It can also serve as a "north star," helping to guide action and prioritize resources. The Community Decarbonization Stakeholder Team collectively defined the following vision.

Louisville will take a measured, equitable approach to reducing carbon emissions from the building, energy supply, and transportation sectors.

Louisville's Community Decarbonization Goal

In 2019, the City of Louisville adopted a resolution to "Reduce core community GHG emissions annually below the 2016 baseline through 2030". From an energy emissions perspective, the City has met this goal every year since 2016, and is projected to meet this goal into the future (Figure 4), even when accounting for population growth and without any change in behavior or investment. Xcel Energy's commitment to provide carbon-free electricity by 2050, which will draw down electricity emissions to zero, is playing a significant role in enabling Louisville to meet its current GHG emissions goal. Without a reduction in emissions from electricity, Louisville's overall energy emissions would increase as shown on the dotted trajectory of Louisville's baseline emissions. Long term, emissions from natural gas use represent a growing percentage of overall energy emissions and highlights the need to reduce natural gas use to achieve greater emissions reductions.

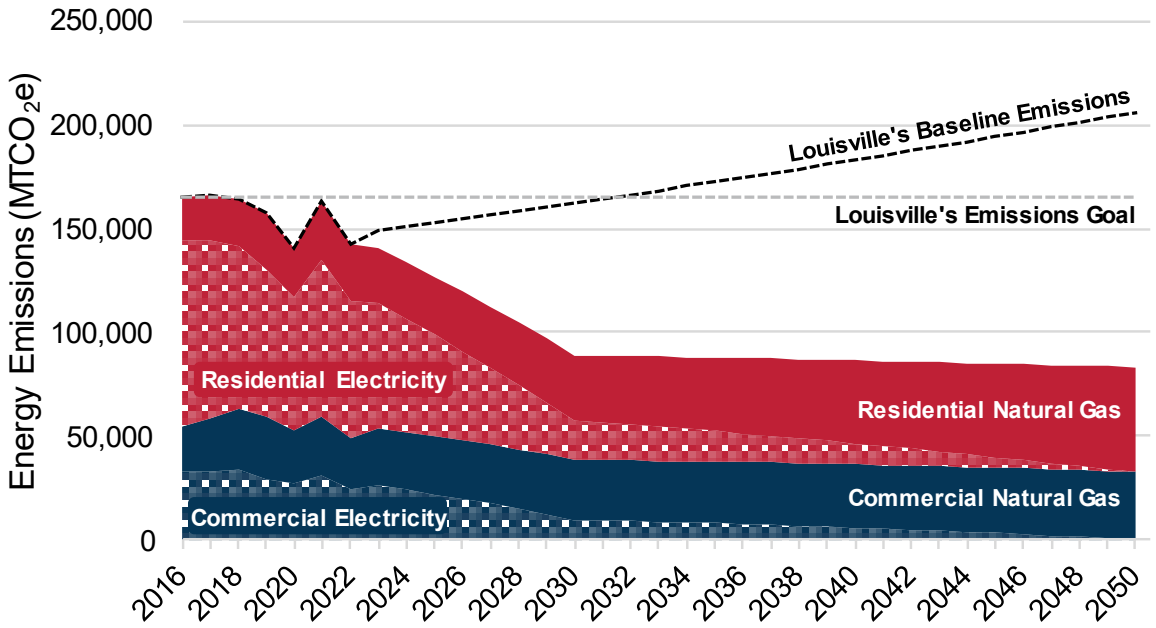


Figure 4. City of Louisville Energy Emissions Forecast

Today, the City of Louisville is looking ahead to further reduce emissions beyond its current goal. As part of the development of this Community Decarbonization Plan, stakeholders were tasked with updating the City's energy decarbonization goal to better reflect community values. Partners in Energy identified three peer goals to serve as benchmarks for conservative, ambitious, and aspirational decarbonization pathways. The table below summarizes these benchmarks.

Table 1. Benchmark Energy Decarbonization Goals Used to Inform Goal Setting

	Conservative	Ambitious	Aspirational
Definition	Achievable with current budget and workforce	Will require additional investment, but doable	Would need significant adjustment in current priorities to achieve
Benchmark	Benchmark: State (CO)	Benchmark: Superior	Benchmark: Boulder
Goal	50% below 2005 GHG emissions by 2030	60% below 2016 GHG emissions by 2030 and net-zero GHG emissions by 2050	Net zero emissions by 2035

The three benchmark goals are visualized in comparison to the City of Louisville's goal in Figure 5.

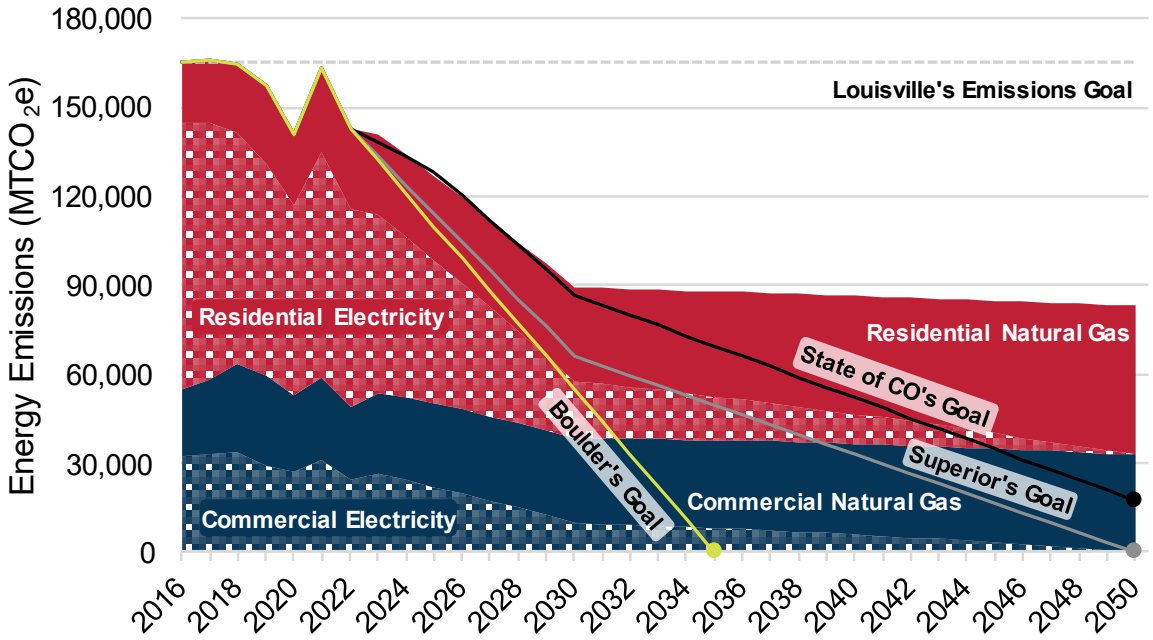


Figure 5. City of Louisville Emissions Goals Compared to Benchmark Conservative, Ambitious, and Aspirational Goals

The stakeholder team agreed to align with the “ambitious” benchmark, which establishes the following goal for this Community Decarbonization Plan:

The City of Louisville will reduce energy-related emissions 60% below 2016 by 2030 and will be carbon neutral by 2050.

HOW WE ARE GOING TO GET THERE

What Will It Take To Meet Our Goals

Figure 6 shows three energy emissions scenarios. All emission scenarios assume that Louisville continues to grow according to historical averages.

The first scenario, shown with a blue line, represents baseline emissions. The baseline emissions scenario assumes that no action is taken by Xcel Energy to decarbonize the electricity grid or by Louisville community members to reduce energy emissions.

The second scenario, shown with a grey line, represents “business-as-usual” emissions. This scenario assumes that Xcel Energy will continue to decarbonize their electricity grid, and that Louisville community members will continue to participate in renewable energy and DSM programs according to historical averages.

Under the business-as-usual scenario, Louisville is projected to achieve approximately a 50% reduction in energy emissions by 2030, about 10% short of this plan’s 2030 goal. Therefore, additional action must be taken to meet Louisville’s emissions goals.

The third scenario, shown with a black line, represents the additional action required to reduce energy emissions 60% below 2016 levels by 2030 and to draw energy emissions down to zero by 2050. This scenario assumes Xcel Energy will continue to decarbonize their electricity grid, that a transition to electric vehicles will increase electricity emissions in the mid-term, and that Louisville community members will participate in renewable energy and DSM programs at higher rates than they have in the past.

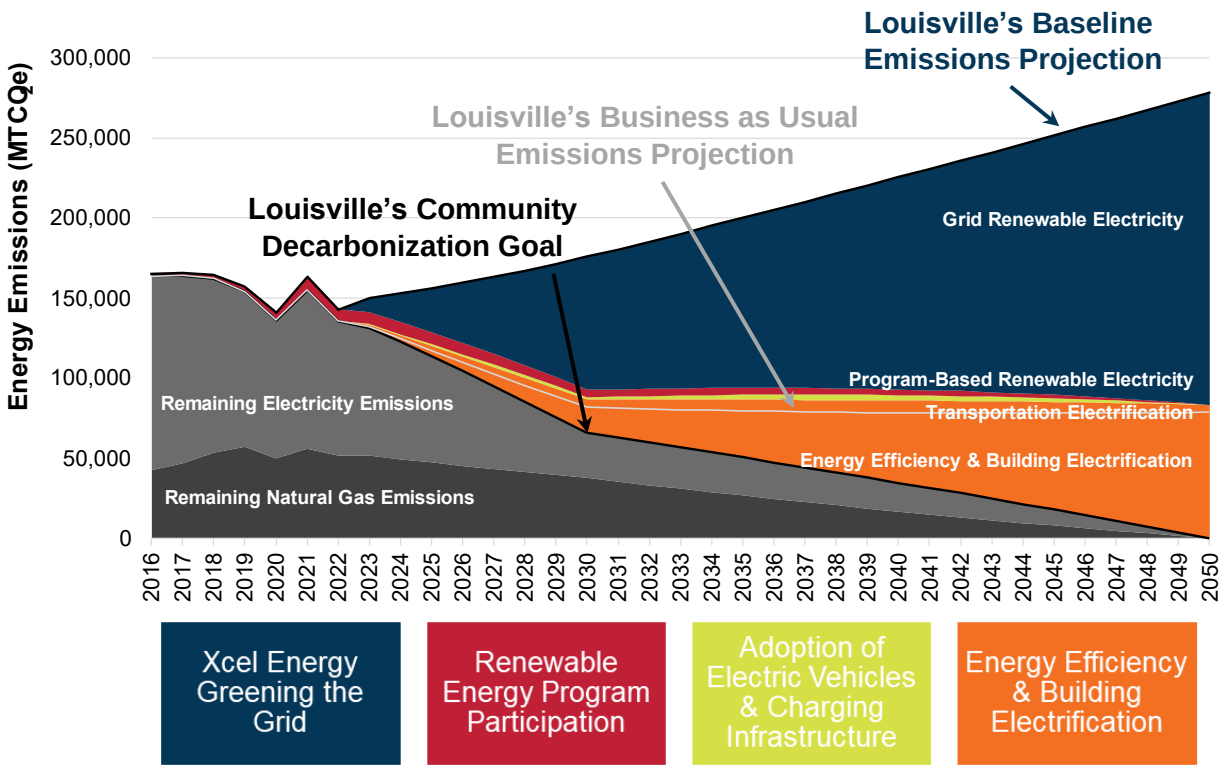


Figure 6. A carbon neutral pathway to meet Louisville's emissions goal

To better understand what it would take to achieve the Community Decarbonization Plan goals on an annual basis, Partners in Energy modeled the energy efficiency, building electrification and renewable energy action required to achieve the identified goal. Additionally, Partners in Energy modeled annual targets for EV adoption that reflect increased adoption rates. Table 2 summarizes the annual decarbonization targets necessary to achieve a 60% reduction in energy related GHG emissions by 2030 and carbon neutrality by 2050.

Table 2. Annual Sector Targets to Support Community Decarbonization Plan Goals

	Metric	Residential	Commercial	Total
Energy Efficiency	*Targeted DSM participation*	543	91	634
Building Electrification	*Premises electrified*	381 (2023-2030) 340 (2031-2050)	72 (2023-2030) 103 (2031-2050)	453 (2023-2030) 443 (2031-2050)
Transportation Electrification	*New EV's on the road*	~500 (2023-2032) and ~1,100 (2033-2050)		
Renewable Energy	*Participation in RE programs*	148 (new)	19 (new)	167 (new)

Compared to historical trends (actual program participation data between 2016-2022), these targets represent a:

- 7% increase in energy efficiency program participation
- Significant increase in building electrification. Data was unavailable to indicate current levels of building electrification. To electrify one premise, it is assumed that water heating and space heating would each be electrified.

- 100%-200% increase in transportation electrification
- 70% increase in renewable energy program participation, in line with current increasing participation trends in Louisville.

Establishing Targets for the Next 18-months of Implementation

It will take time to ramp up to the levels of program adoption reflected in Table Table 2 – especially for energy efficiency, building electrification, and transportation electrification. The stakeholder team identified several foundational strategies that must be completed before the City pursues more aggressive expansion of decarbonization technologies. These include activities like preliminary research, engagement, and advisement.

These initial activities will set Louisville up for bigger-impact campaigns in future years but are not likely to produce program participation in line with established annual targets in Table 2. Therefore, Partners in Energy developed more modest targets to reflect the foundational nature of the strategies outlined in this plan.

The more modest implementation targets are summarized below in Table 3. Energy efficiency and building electrification implementation targets are combined, as progress will be tracked using participation data in the suite of Xcel Energy demand side management (DSM) programs with a particular focus on programs that support building electrification. EV's on the road will be tracked utilizing a state-wide dashboard named EvaluateCO with intent to exceed the current increasing adoption trend by 10% by the end of implementation, as shown in Figure 7**.** Renewable energy participation will also be tracked using participation data in Xcel Energy renewable energy programs, with a particular focus on programs that reduce emissions above and beyond the renewable energy supplied to all Xcel Energy electric customers on the grid. Strategies to achieve the targets outlined in the below table will be described in the next section, **Short Term Strategies to Get Us Going**.

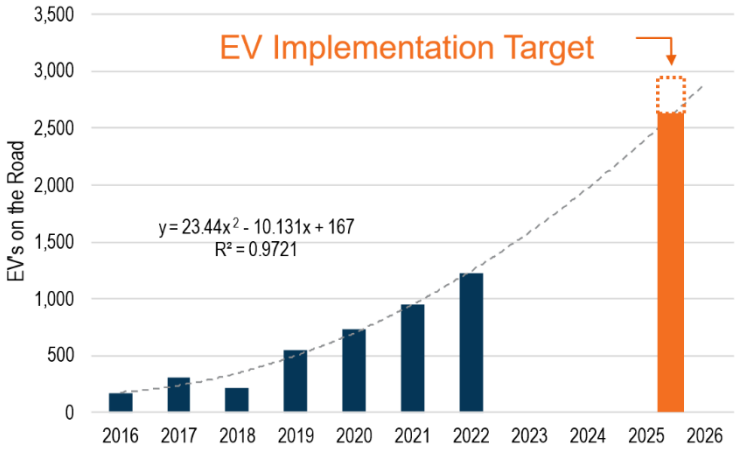


Figure 7. EV's on the road in Louisville, CO

Table 3. Annual Implementation Tracking Targets through 2025

Implementation Targets (Annual)	Residential	Commercial	Total
Energy Efficiency & Building Electrification: Combined participation in Xcel Energy DSM programs	643	135	778
Transportation Electrification: New EV's on the road	n/a	n/a	480*
Renewable Energy: New participation in Xcel Energy renewable energy programs	110	14	124

*Individual sector targets for transportation electrification were not established.

Short Term Strategies to Get Us Going

To help achieve Louisville's decarbonization goal, the stakeholder team identified five strategies, classified into two sectors: residential and commercial/industrial. The strategies outlined below are short-term strategies for implementation over the next 18 months. As such, these strategies focus on addressing low-hanging fruit and laying the groundwork for future, high-impact action. Louisville will need to take additional action beyond this 18 month implementation period to achieve their 2030 and 2050 goals.

Decarbonizing Our Residential Sector

- R-1 Single-Family Homeowner Engagement
- R-2 Rental and Multifamily Engagement
- R-3 Mobile Home Engagement

Decarbonizing Our Business Sector

- B-1 Business Research
- B-2 Business Advisement

Decarbonizing Our Residential Sector

The City of Louisville is relatively small with just under 21,000 residents (U.S. Census Bureau, 2023). Louisville residents generally have a high capacity for decarbonization, with fewer perceived barriers than other communities. As highlighted in the introduction to this plan, Louisville residents tend to be sustainability-minded and well educated on sustainability topics.

The community-wide household median income is $135,840 (U.S. Census Bureau, 2022). Most homes are single family and owner occupied, which correlates with a higher ability to invest in electric equipment. Additionally, most households have access to two or more vehicles, which correlates to a higher willingness to electrify at least one vehicle.

However, not all residents own multiple vehicles, own their home, and have moderate to high incomes. Advancing decarbonization equitably in the residential sector will mean connecting all residents, including renters, lower-income, and mobile home residents, with the right information and resources to support them along their unique decarbonization journeys.

The strategies in this sector seek to build upon existing momentum, while breaking down barriers to uncover new opportunities for Louisville's residents.

Residential Implementation Targets

Implementation Targets (Annual)	Residential
Energy Efficiency & Building Electrification: Combined participation in Xcel Energy DSM programs	643
Transportation Electrification: New EV's on the road	n/a
Renewable Energy: New participation in Xcel Energy renewable energy programs	110

Strategy R-1: Single-Family Homeowner Engagement

Strategy Description & Context
Residents who own a single-family home have more authority and autonomy to make investments like installing home charging, making electric panel upgrades, or purchasing

rooftop solar. In the City of Louisville, 76 percent of residents live in single-family detached homes and 68 percent of homes are owner occupied (U.S. Census Bureau, 2023; U.S. Census Bureau, 2022). This strategy focuses on engaging with single-family homeowners to better understand the barriers and opportunities for beneficial electrification, and to connect those residents with available resources to address identified barriers. This strategy will occur in four phases. The first phase, establishing a foundation, will focus on information gathering and building two-way communication channels with homeowners. The second and third phases will focus on engaging with these audiences through identified channels. The final phase will focus on reflecting on our engagement, to understand where information and existing resources are not enough to overcome identified barriers, and to inform future City of Louisville action.

The target audience for this strategy includes:

- Single-family homeowners interested in electrifying their homes or driving EVs

Scope & Timeline	
Phase 1: Establishing a foundation	**Q1 2024**
Establish a Website	Establish a community decarbonization landing page to host key information about decarbonization, events, and resources. This website should serve as a one-stop-shop for residents interested in decarbonization. The website should outline a “decarbonization roadmap” showing a proposed “pathway” for decarbonization.
Strengthen Communication Channels	Identify list of potential outreach channels and establish relationships with channel managers (e.g., HOA newsletters, City social media, mailers). Record any key channel details (e.g., audience, frequency, media format) and potential engagement metrics to track.
Phase 2: Homeowner Outreach	**Q2 2024**
Develop an Outreach Plan	Based on communication channels, develop an outreach plan including key messages and a calendar for outreach.
Develop Outreach Toolkit	Develop an outreach toolkit to share with outreach channel managers. The purpose of the engagement toolkit is to provide the City, Louisville Sustainability Advisory Board (LSAB), and partnering organizations with resources to perform one-way outreach and two-way engagement with identified audience segments through identified channels. Toolkit will include executive summary, talking points, newsletter content, and social media.
Conduct Outreach	Share outreach toolkit with channel managers to promote components of the decarbonization roadmap.
Phase 3: Homeowner Engagement	**Q3 2024-Q3 2025**
Establish Calendar of Listening Sessions	Develop a series of topics, speakers, and timelines to introduce residents to the concepts of, and resources to support, residential decarbonization. Listening sessions will be held in coordination with Superior and Lafayette. Sessions will break down the “decarbonization roadmap” (e.g.,

	reducing energy use, preparing for decarbonization, and purchasing electric equipment). Sessions will also include an informational and networking segment. Informational segments will include presentations from experts to address: • Topic area basics, • The benefits of decarbonization, • Frequently asked questions, and • Financial information (e.g., ROI, available incentives, financing options). Presentations should help "make the case" for decarbonization activities. Networking segments will include presentations from residents who have completed decarbonization activities and opportunities to connect with experts, contractors, and other residents interested in decarbonization.
Host Listening Sessions	Develop and deliver listening sessions. Venues should be held at relatively "neutral" locations (e.g., libraries or schools). Consider recording or hosting virtual options. If possible, provide food, childcare, and interpretation services.
Phase 4: Identifying Opportunities to Address Resource Gaps	**Q3 2025**
Host City Leadership Meeting	Host one or more meetings with City staff to review the results of engagement and identify the need for additional City investment to support residential decarbonization activities.

Roles and Responsibilities

City of Louisville

- Inform decarbonization roadmap (e.g., key steps and resources) to help single-family residents navigate energy efficiency, electrification, and renewable energy actions.
- Publish community decarbonization webpage using content developed by Partners in Energy
- Lead the identification of residential communication channels and build necessary relationships to support the sharing of decarbonization information and resources.
- Review residential outreach plan and outreach toolkit.
- Lead implementation of outreach plan by connecting communication channel managers with content from the outreach toolkit.
- Lead the planning and delivery of four regional decarbonization engagement sessions, in collaboration with Superior and Lafayette. Support for the planning and delivery of these sessions may include, the identification of experts, contractors, and community examples, identification of a venue, provision of recording services, and coordination of childcare and interpretation services.
- Participate in conversations to review results of engagement and identify opportunities for additional City-led action to support residential decarbonization.

Xcel Energy's Partners in Energy

- Draft a decarbonization roadmap (e.g., key steps and resources) to help single-family residents navigate energy efficiency, electrification, and renewable energy actions.
- Develop draft website content, outreach plan, and outreach toolkit based on decarbonization roadmap.
- Train City staff, LSAB, and partnering organizations on how to use the outreach toolkit.
- Support the planning and execution of four regional decarbonization engagement sessions, in collaboration with Superior and Lafayette. Support for the planning and delivery of these sessions may include the identification of Xcel Energy speakers and topic experts, development of promotional materials, development of informational materials, and provision of catering.
- Host one or more meetings with City staff to review results of engagement and identify next steps to support decarbonization goals.

Strategy R-2: Rental and Multifamily Engagement

Strategy Description & Context
Unlike homeowners, renters must coordinate with property owners to make improvements, and may have to split the benefit with the property owner. In the City of Louisville, nearly 32 percent of occupied homes are renter occupied, including single family and multifamily units. This strategy focuses on engaging with renters and rental property owners/managers to better understand the barriers and opportunities for beneficial electrification, and to connect those residents and property owners/managers with available resources to address identified barriers. This strategy will occur in four phases with the first phase establishing a foundation that will focus on information gathering and building two-way communication channels with homeowners. The second and third phases will focus on engaging with these audiences through identified channels. The final phase will focus on reflecting on engagement, to understand where information and existing resources are not enough to overcome identified barriers, and to inform future City of Louisville action. The target audience for this strategy includes: ▪ Renters living in single family and duplex properties. ▪ Renters living in apartments. ▪ Single-family and duplex rental property owners and managers. ▪ Multifamily property owners and managers.

Scope & Timeline	
Phase 1: Establishing a foundation	**Q2 – Q4 2024**
Conduct Preliminary Research	Identify programs and unique eligibility requirements specific for renters and/or multifamily properties.
Identify Communication Channels by Target Audience	Identify opportunities to connect with renters and rental property owners/managers, including single family and multifamily properties. Potential rental channels: • Ecotoberfest • Rental bills • Property management companies or offices • Identify a champion to help engage with renters Potential property owner channels: • Property management companies or offices • Rental management coalition • Direct mail
Identify One or More Pilot Projects	Identify one or more champions to serve as an example and support them through one or more decarbonization activities. Champions may include renters, single family property owners, and/or multifamily property owners. Decarbonization activities may include energy efficiency projects, installing EV charging stations, electrifying building equipment, or pursuing a renewable energy project.

Phase 2: Share Out Success of Pilot(s)	Q1 – Q2 2025
Develop One or More Success Stories	Summarize the pilot project(s) and synthesize any key lessons learned to help other renters/property owners along their decarbonization journeys. Include a summary of relevant information from preliminary research (e.g., key programs and eligibility requirements). The success stories should be developed into multiple formats for easy sharing, including social media posts, video segments, and/or write ups.
Share Successes with Community	Connect renters and property owners with the success story through the channels identified in phase 1.
Phase 3: Identify Opportunities to Address Resource Gaps	**Q3 2025**
Host City Leadership Meeting	Host one or more meetings with City staff to review the results of engagement and identify the need for additional city investment to support residential decarbonization activities.

Roles and Responsibilities

City of Louisville

- Lead the identification of rental and multifamily communication channels and build necessary relationships to support information sharing.
- Identify one or more renters and/or property owners to pilot decarbonization project(s).
- Support renters and/or property owners in implementing decarbonization project(s).
- Support the development of success story content by reviewing write ups and social media content and by leading any video development.
- Connect identified communication channel managers with success stories.
- Participate in conversations to identify opportunities for additional City-led action to support rental and multifamily property decarbonization.

Xcel Energy's Partners in Energy

- Lead preliminary research to summarize relevant decarbonization resources and eligibility requirements for renters and/or multifamily properties.
- Lead the development of up to four "rental property decarbonization" success stories including a write up and social media content.
- Host one or more meetings with City staff to review results of engagement and identify next steps to support decarbonization goals.

Strategy R-3: Mobile Home Engagement

Strategy Description & Context
In the City of Louisville, 1.3 percent of housing units are mobile homes. Mobile home residents may face several barriers to decarbonization, including lower household incomes, higher rates of residents with limited English proficiency, and reduced access to utility programs due to eligibility requirements. At the same time, mobile home residents may benefit greatly from decarbonization activities: energy efficiency projects can reduce utility costs and electrification projects can improve indoor air quality. This strategy focuses on engaging with residents living in Parco Dello Zingaro to better understand the barriers and opportunities for beneficial electrification, and to connect those residents with available resources to address identified barriers. This strategy will occur in four phases. The first phase, establishing a foundation, will focus on information gathering and building two-way communication channels with homeowners. The second and third phases will focus on engaging with these audiences through identified channels. The final phase will focus on reflecting on engagement, to understand where information and existing resources are not enough to overcome identified barriers, and to inform future City of Louisville action to support decarbonization for mobile home residents. The target audience for this strategy includes: ▪ Residents living in Parco Dello Zingaro

Scope & Timeline	
Phase 1: Laying the Groundwork	**Q2 2024**
Get the Lay of the Land	Work with staff and LSAB to understand: • Previous efforts: how has Louisville engaged previously with mobile home residents? What went well and what were the lessons learned? • Community characteristics: Are there barriers and opportunities related to socio-economic factors (e.g., language barriers, cost barriers) the physical environment (e.g., environmental racism, access to public charging, electrical capacity constraints).
Identify Barriers and Opportunities	Conduct initial research to better understand barriers and opportunities for mobile home residents. Research topics include: • Energy use: what is the current energy use per square foot? Is there an energy burden? Are residents avoiding energy burdens through extreme behavior measures that may impact safety or well-being? • Understanding existing infrastructure at Parco Dello Zingaro to understand if electric upgrades are needed before electrification. • Available resources and programs: historic program participation, eligibility requirements, application process, documentation requirement. Work with Xcel Energy to identify potential structural barriers and opportunities. • What information do we have or need to understand general interest in energy efficiency, electrification, and renewable energy?

Phase 2: Relationship Building	Q3 2024
Identify Community Partners	Identify trusted community organizations/liaisons and City staff liaisons to inform and lead community engagement. Be mindful of time commitments requested of community liaisons. Offer a stipend for one or more community liaisons.
Host Community Partner Meetings	Host 2-3 community partner meetings to discuss opportunities for engagement with mobile home residents and evaluate partnership opportunities. Objectives of meetings include: • Building community trust • Cultivating community leadership capacity • Co-creating a vision for community action
Phase 3: Mobile Home Resident Engagement	**Q4 2024-Q2 2025**
Attend Existing Event	Attend Louisville's existing mobile home waste event to begin building relationships with residents, introducing decarbonization concepts, and begin to identify lived-experience barriers and opportunities. Ensure materials are provided primarily in Spanish.
Distribute Door Hangers	Use door hangers to reiterate existing opportunities and promote a listen and learn session. Ensure door hangers are provided primarily in Spanish.
Host Listening Session	Plan, promote, and execute 1-2 listening sessions to share currently available resources with residents and to better understand resource gaps and needs. Listening sessions should be hosted at the mobile home park with food and childcare provided. Consider hosting one event in the morning and one event in the evening. Spanish interpretation services should be provided. The objective of listening sessions include: 1) Sharing information about relevant resources and incentives 2) Gathering resident experiences (barriers, success stories) 3) Identifying key resident needs
Phase 4: Identify Opportunities to Address Resource Gaps	**Q3 2025**
Host City Leadership Meeting	Host one or more meetings with City staff, community liaisons, and Xcel Energy to review the results of engagement and identify potential opportunities for new or revised programming to better meet the needs of mobile home residents.

Roles and Responsibilities

City of Louisville

- Identify key City staff and attend initial meeting(s) to provide background information about Parco Dello Zingaro including previous engagement efforts and community characteristics.
- Identify key community partners (e.g., residents of Parco or other trusted community liaisons) to lead engagement. Clarify roles and responsibilities for those partners and provide a stipend to support their efforts.

- Lead the organization and delivery of one mobile decarbonization listening session for Parco Dello Zingaro residents, including identification of a venue, childcare, and interpretation services.

Xcel Energy's Partners in Energy

- Host up to two meetings with City staff and Louisville Sustainability Advisory Board (LSAB) to gather background information about Parco Dello Zingaro including previous engagement efforts and community characteristics.
- Conduct initial research to identify decarbonization barriers and opportunities unique to mobile home residents.
- Host up to two meetings with Xcel Energy staff to better understand program structures and to identify potential opportunities to improve program access for mobile home residents.
- Co-host up to three community partner meetings to bring together City staff and community partners (as identified by the City).
- Attend up to one City-led waste event to share existing resources to support decarbonization and promote upcoming listening session.
- Design, translate, and print door hangers to share existing resources to support mobile home decarbonization and promote decarbonization listening session.
- Support the organization and delivery of one listening session by developing and producing a summary of resources (e.g., printed flyer available in English and Spanish) and provide catering.
- Host one or more meetings with City staff to review results of engagement and identify next steps to support decarbonization goals.
- Provide stipend to support community liaison(s).

Decarbonizing Our Business Sector

Louisville has a diverse business community and a robust network of organizations (e.g., Boulder County Partners for a Clean Environment, Chamber of Commerce, Economic Vitality division) to support businesses along decarbonization journeys. There are six primary business districts with a wide variety of industries and sizes. Unlike the residential sector, commercial decarbonization can vary widely from business to business.

Business Implementation Targets

Implementation Targets (Annual)	Commercial
Energy Efficiency & Building Electrification: Combined participation in Xcel Energy DSM programs	135
Transportation Electrification: New EV's on the road	n/a
Renewable Energy: New participation in Xcel Energy renewable energy programs	14

Strategy B-1: Business Research

Strategy Description & Context	
This strategy focuses on conducting an analysis to understand the remaining useful life of carbon production equipment in commercial buildings and utilizes the results to help inform program or policy design for the City of Louisville. This strategy is split into three phases: Phase 1 includes conducting primary commercial research to collect community input on the life of HVAC equipment in businesses; Phase 2 includes conducting secondary research to collect available data on levels of electrification and equipment characteristics in the community; and Phase 3 includes coalescing results of the first two phases to inform a new program or policy to further electrify the business sector.	
Scope & Timeline	
Phase 1: Summarize Secondary Source Commercial Data	**Q1-Q2 2024**
Review Readily Available Data	Review available data (i.e., City building permits, CoStar, Colorado's Building Performance Program, Xcel Energy, Chamber of Commerce surveys, City survey to businesses) to determine degree of commercial electrification and equipment characteristics. • Determine the defining characteristics of equipment that are ripe for upgrades. • Develop an estimate/summary of types of equipment and age of equipment in Louisville using census or permit data.
Identify Key Programs for Business Decarbonization	Evaluate the available programs/resources to support businesses. Use results of business energy assessments to inform some of the commonly recommended resources.
Phase 2: Conduct Primary Source Commercial Research to Fill Gaps	**Q3-Q4 2024**
Leverage Preliminary Commercial Assessments	Use results of commercial research to inform commercial advising strategy and identify areas for targeted outreach.

Administer a Business Survey	Develop and administer a community business survey. The purpose of the survey is to assess the current needs and interests in the business community for reducing the carbon footprint of buildings.
Compile Survey Results	Compile results from Phase 1 and 2. Identify any trends or patterns that might inform Phase 3.
Phase 3: Program Design	**Q1-Q2 2025**
Identify Resource Gap	Use information gathered in Phase 1 & 2 to determine whether there is a resource gap that must be filled to help the City achieve identified goals on a broad scale. • Determine the gaps with which an additional policy/program led by the City of Louisville could help to fill.
Identify Opportunity for Supplemental Support	Outline a potential City of Louisville intervention (e.g., policy, incentive) to assist the business community in reducing their property's carbon footprint. • Support from Federal and State programs is preferred over a new City tax. • Any new City policy should be supported by the community. • Give business owners time to become informed and familiar with new policies and provide resources to help educate them on the new policies. This could include direct City staff support to businesses to answer questions and walk through policy implications. • Modify the business licensing process within the City of Louisville to collect building data such as HVAC equipment type and age and other data points as determined by the City.

Roles and Responsibilities

City of Louisville

- Coordinate with graduate students to lead commercial sector research. Research activities will include development of a more detailed baseline of Louisville's commercial sector (e.g., age and type of building equipment), map of results to inform areas to target for commercial electrification studies and incentives, summary of public health and co-benefits of decarbonization, and potential policy levers for the City to consider.
- Lead development and administration of a business community survey.
- Lead integration of research results to inform program/policy direction.

Xcel Energy's Partners in Energy

- Provide utility data and suggestions for supplemental data sources to inform graduate student-led research to develop a more detailed baseline of Louisville's commercial sector (e.g., age and type of building equipment).
- Review and provide feedback on student-led commercial sector research.
- Support the development of a business community survey.
- Support Louisville in evaluating program/policy options to support additional commercial decarbonization.

Strategy B-2: Business Advisement

Strategy Description & Context
This strategy focuses on coordinating electrification assessments between Xcel Energy and Boulder County PACE. This strategy will occur in four phases; Phase 1, establishing a foundation, will focus on building the relationship between Boulder County and Xcel Energy assessors, and identifying key business champions to support engagement. The Phase 2 and 3 will focus on engaging with these audiences through identified channels. The Phase 4 will focus on reflecting on engagement, to understand where information and existing resources are not enough to overcome identified barriers, and to inform future City of Louisville action. The target audience for this strategy includes, but is not limited to: • Businesses with high energy use. • Small businesses.

Scope & Timeline	
Phase 1: Establishing a Foundation	**Q2 2024**
Establish a Coordinated Process	Establish a process for coordinating PACE and Xcel Energy business energy assessments, and for coordinating with financial consulting such as CO Clean Energy Fund. ○ Utilize businesses already identified through Boulder County PACE to pilot this process.
Establish a Data Collection Process	Establish data collection process with PACE and CLEAResult for Xcel Energy business energy assessments. Data collected during business assessments are subject to privacy restrictions and data may need to be synthesized, collated, or otherwise adjusted for sharing. Data may not be shared publicly.
Identify a Champion	Identify one or several business champions (e.g., well-respected business individual(s), business individual(s) that own a large percentage of the business land or buildings) to support business engagement. ○ Business champions will serve to help connect businesses with assessments and may attend assessments. Examples of champions could include City staff from Economic vitality or representatives from the Chamber of Commerce, Latino Chamber of Commerce of Boulder County and/or Downtown Business Association.
Test the Process	Test the advisement and data collection process with one or more businesses.
Identify Target Businesses	Identify a list of target businesses including property managers, businesses in Colorado Technology center (e.g., Fresca Foods, Vaisala), high energy users, participants and members of the Chamber of Commerce and Latino Chamber of Commerce of Boulder County, and recipients of the Economic Vitality newsletter. ○ Identify key communication channels and key contacts for outreach. Consider targeting owner-occupied businesses first, and developing a

	process for coordinating between property owners and tenants when businesses are not owner-occupied.
Phase 2: First Wave Outreach	**Q2-Q3 2024**
Collate Pilot Learnings	Debrief with Boulder County PACE on the piloted process to incorporate learnings into broader first wave outreach for businesses. Piloting process with pre-identified businesses.
Develop Outreach Materials	Develop outreach collateral to share with target businesses to explain decarbonization process, assessment expectations and benefits, and available rebates, incentives, and resources (e.g., Xcel Energy programs, Federal and State incentives, Commuting Solutions).
Share Outreach Materials	Conduct outreach through direct mailers, newsletters, and business meetings, to "best fit" target businesses, through identified outreach channels to garner sign ups.
Conduct Coordinated Assessments	Coordinate up to four business energy assessment “walks” for key businesses/corridors. Coordinated walks typically require prescheduling multiple assessments for a geographic area to be completed in a single day or a portion of a day.
Phase 3: Second Wave Outreach	**Q4 2024-Q3 2025**
Develop Success Stories	Develop success stories of first wave outreach to share with prospective businesses (e.g. PACE, Green Network Newsletter).
Share Success Stories	Update outreach materials with success stories and conduct a second wave of outreach to businesses identified during Phase 1. Use success stories to conduct outreach to peers of first wave businesses.
Conduct Second Round of Assessments	Coordinate up to four business energy assessment “walks” for key businesses/corridors. Coordinated walks typically require prescheduling multiple assessments for a geographic area to be completed in a single day or a portion of a day.
Phase 4: Explore Opportunities for Additional City Support	**Q2 2025**
Identify Trends and Patterns	Consolidate business energy assessment results to identify any patterns by business type and/or age of building • Use summarized results to inform where/who to engage next. For instance, if certain business types or building ages yielded high-impact recommendations, the City could look to engage similar business types or building ages. If a certain building type yielded the same recommendations across multiple businesses, the City could connect other similar businesses with those same recommendations and resources to support next steps.

Identify Opportunity for Supplemental City Support	Host one or more meetings with City staff to review the summarized assessments and identify the need for additional City investment to support commercial decarbonization activities. This conversation might try to answer questions like: • What were some of the most common or most impactful actions businesses need to take to help the City achieve our decarbonization goals? • What can the City of Louisville do to help businesses take those actions (e.g., additional funding/financing)? • Are there policy levers the City should consider that encourage or require commercial decarbonization?

Roles and Responsibilities

City of Louisville

- Identify one or more engagement leads from the City.
- Provide Spanish translation and interpretation services.
- Identify key community liaisons or champions by sector.
- Lead outreach efforts to businesses to garner sign ups.
- Attend assessment walks.
- Participate in conversations to identify opportunities for additional investment.

Xcel Energy's Partners in Energy

- Connect Boulder County PACE and Xcel Energy and facilitate the development of a coordination process for providing decarbonization assessment services (e.g., Boulder County PACE electrification advisory services, Xcel Energy Business Assessment services, Xcel Energy Fleet Electrification Advisory Program) to businesses.
- Support general and targeted engagement efforts to connect businesses with decarbonization assessment services.
- Lead the development of a data collection process to summarize decarbonization assessment results in a manner that protects data privacy of participating businesses.
- Summarize available decarbonization assessment data to inform the Business Research strategy.
- Facilitate conversations with City staff to identify opportunities to support additional commercial decarbonization based on the results of the Business Research and Business Advisement strategies.

Community Decarbonization Plan Impact

In summary, the strategies outlined in this plan are intended to achieve the following Xcel Energy program participation for the first two years of implementation, and aided through 18-months of Partners in Energy implementation support:

Table 4. Annual Implementation Tracking Targets through 2025

Implementation Targets (Annual)	Residential	Commercial	Total
Energy Efficiency & Building Electrification: Combined participation in Xcel Energy DSM programs	643	135	778
Transportation Electrification: New EV's on the road	n/a	n/a	480*
Renewable Energy: New participation in Xcel Energy renewable energy programs	110	14	124

The above targets will utilize the suite of Xcel Energy programs for DSM as well as renewable energy. In both the residential and commercial sectors, new DSM participation will build upon existing participation trends with a particular focus on programs that support building electrification and associated energy efficiency upgrades with deeper carbon reduction implications.

- Residential programs of focus include Residential HVAC, Insulation & Air Sealing, Saver's Switch, Home Energy Squad, Home Energy Audit, and others.
- Commercial sector programs of focus include HVAC+R, Small Business Solutions, Lighting Efficiency, and Strategic Energy Management.
- Renewable energy programs of focus across both sectors include Windsource®, Solar*Rewards® and Solar*Rewards Community®. In addition, the residential sector will also have a focus on the Net Metering program.
- Electric vehicles on the road follows current adoption trends in Louisville (zip code 80027) utilizing data from the EValuateCO dashboard published by Atlas Public Policy and will seek to increase EV's on the road by utilizing all existing Xcel Energy EV offerings.

Rebates, Resources, and Financing Tools to Support Plan Impact

Partners in Energy can readily track participation in Xcel Energy's DSM and renewable energy programs, which is why program participation was selected as the primary metric for implementation targets. However, there are other incentives, resources, and financing tools available to support residents and businesses along their decarbonization journeys. To maximize the impact of this plan, the Energy Action Team will connect residents and businesses with relevant resources from the City of Louisville, Boulder County, the State, and the Federal government. The City of Louisville developed the following non-exhaustive summary of resources available to support residents and businesses on their electrification journeys.

Residential Resources

Advising

- Boulder County EnergySmart: Advisors provide no-cost advising to residents interested in home energy projects.

Rebates and Incentives

- Xcel Energy Rebates: Utility rebates for heat pumps, HP hot water heaters, insulation/air sealing, smart thermostats, and EV chargers/wiring.
- Boulder County EnergySmart Rebates: County rebates for heat pumps, HP hot water heaters, insulation/air sealing, fuel switching (gas stove removal), solar PV, and electric panel upgrades (new in 2024).
- City of Louisville Rebates: City rebates for heat pumps, HP hot water heaters, insulation/air sealing, fuel switching (gas stove, furnace, hot water heater removal), and electric panel upgrades (new in 2024).
- Inflation Reduction Act (IRA) Incentives: IRA tax credits are available for residential decarbonization projects including energy audits, electrification weatherization, heat pumps, renewable energy, and EVs.

Financing

- Colorado Residential Energy Upgrade (RENU) Loan: Statewide residential loan program through the Colorado Clean Energy Fund in partnership with Colorado-based credit unions.
    - Loans up to $75,000, up to 20 years.
    - Can finance solar PV, battery storage, space heating/cooling, water heating, EV charging, insulation/air sealing, and windows/doors.

Commercial Resources

Advising

- Boulder County Partners for a Clean Environment: Provides no-cost advising to business owners interested in building energy projects.
- Colorado Clean Energy Fund: Provides no-cost advising to business owners interested in financing options for energy projects.

Rebates and Incentives

- Xcel Energy Rebates & Programs
    - Utility rebates for LED lighting upgrades and HVAC equipment, facility assessments, energy management systems, etc.
    - Businesses less than 50,000 square feet may qualify for Xcel's Direct Install program and could receive free LED lightbulbs and additional items.
- Boulder County Partners for a Clean Environment (PACE) Rebates
    - County rebates for building electrification studies, space heating/cooling, water heaters, heat/energy recovery ventilators, insulation/air sealing, lighting, solar PV, and fuel switching.
    - PACE also offers custom rebates for efficiency measures not covered by prescriptive rebate programs.
- City of Louisville Programs
    - Qualifying businesses eligible for $1,000 towards sustainability projects, including energy efficiency and electrification upgrades.

- Inflation Reduction Act (IRA) Incentives: IRA tax credits are available for commercial decarbonization projects including building efficiency and electrification, renewable energy, and EVs.

Financing

- Colorado Commercial Property Assessed Clean Energy (C-PACE): commercial loan program through Colorado Clean Energy Fund in partnership with Sustainable Real Estate Solutions (SRS).
    - Loans up to $750,000, up to 20 years.
    - Repayment through property taxes and if property changes ownership, loan stays with property.
    - Can finance renewable energy, battery storage, space heating/cooling, water heating, EV charging, and insulation/air sealing.
- Clean Conversion Loan: Commercial loan program through Colorado Clean Energy Fund designed as an alternative to C-PACE
    - Loans up to $1M, up to 15 years.
    - Repayment through monthly payments.
    - Can finance renewable energy, battery storage, space heating/cooling, water heating, EV charging, and insulation/air sealing.
- Energy Project Accelerator Loan (Energy PAL): Commercial loan for small businesses through Colorado Clean Energy Fund
    - Loans up to $500,000, up to 10 years.
    - Repayment through monthly payments.
    - Can finance renewable energy, battery storage, space heating/cooling, water heating, EV charging, and insulation/air sealing.
- National Energy Improvement Fund: Company partnered with Xcel Energy to provide businesses with financing options through Xcel approved lenders.
    - Loans for projects $2,000+, up to 7 years.
    - Repayment through monthly payments.
    - Can finance renewable energy, battery storage, space heating/cooling, water heating, and EV charging.

HOW WE STAY ON COURSE

This Community Decarbonization Plan is a living document. Goals and strategies will be assessed and refined as needed based on data and community staff capacity.

Data and Reporting

Partners in Energy will provide biannual progress reports with metrics of success and overall progress towards goals for Xcel Energy rebates and programs. These reports will be available publicly and shared with both the community and Energy Action Team.

If available, ad-hoc participation reports for specific Xcel Energy programs (e.g. Home Energy Squad) can be provided to measure success of campaigns and to determine if we need to change course.

Project Management and Tracking

Partners in Energy will host regular project management check-in calls with staff to ensure we stay on course to achieve our strategies.

If necessary, an implementation check-in meeting with the Energy Action Team can be convened to assess progress towards goals and discuss strategy refinement.

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 futures. The energy landscape is dynamically changing with communities leading the way in setting energy and sustainability goals.

To continue to innovatively support their communities, Xcel Energy launched Partners in Energy in the summer of 2014 as a collaborative resource with tailored services to complement each community's vision. The program initially focused on supporting communities in developing and achieving energy efficiency goals, and has evolved to include renewable energy, building electrification, and transportation electrification.

The program offerings include support to develop strategic energy, EV, and beneficial electrification plans, tools to help implement the plan and deliver results, and resources designed to help each community stay informed and achieve their outlined goals.

Partners in Energy supports communities for two years through two distinct phases, planning and implementation and typically provides six to eight months of planning support, to walk stakeholders through the process outlined in Figure 8. Once the plan is complete, Partners in Energy provides 18 months of plan implementation support. Implementation services offered through the Partners in Energy team are shown in Figure 9.

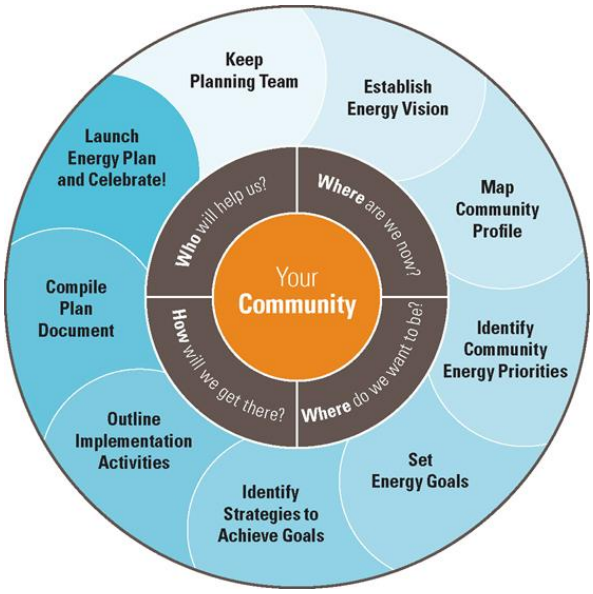


Figure 8. Partners in Energy Process for Success

Figure 9. Resources from Xcel Energy for Implementation

Plan Development Process

Louisville's Community Decarbonization planning process kicked off in May 2023 and concluded in March 2024. A project management (PM) team was formed, including City Staff, Partners in Energy community facilitators, and Xcel Energy representatives. As shown in Figure 8, the first step was to identify a group of representative stakeholders to guide the development of the plan. The project management team recruited a diverse set of stakeholders through an application process. The project management team identified nine community stakeholders with perspectives representing renters, homeowners, business owners, developers, Louisville's Sustainability Advisory board, Louisville's Chamber of Commerce, equity, and beyond. In addition to these community stakeholders, several City staff members provided input into the process, including representatives from Finance, Equity Diversity and Inclusion, Sustainability, and Economic Vitality.

The stakeholder team convened for four in-person workshop to inform the development of the plan's vision, goals, focus areas, strategies, and targets. City staff gathered additional input to inform plan development through a community survey, presentation to City council, and stakeholder survey. The following timeline summarizes key milestones of plan development:

- June 2023
  - Stakeholder formation: City staff selected a community stakeholder team through an application process.
- July 2023
  - Workshop 1: Stakeholders brainstormed the factors that make Louisville unique for decarbonization to inform potential focus areas, values to guide the development of a decarbonization vision, and level of ambition to inform a decarbonization goal.
- August 2023
  - Community Survey: Between Workshops 1 and 2, City staff launched a community survey to gauge barriers and opportunities as well as funding support for the Plan. There were 19 survey responses. All respondents were Louisville

homeowners, and 17 of the respondents were somewhat or very familiar with decarbonization. Of the 19 respondents, only one respondent did not support Louisville taking any intentional decarbonization action. The most common barrier for making building efficiency, electrification, and renewable energy upgrades was upfront cost. The most common barrier for adopting and electric vehicle was range anxiety, followed by upfront cost.

- September 2023
    - Workshop 2: Stakeholders reviewed and provide feedback on draft vision and goals. Stakeholders also reviewed Louisville's "decarbonization baseline" including energy use, utility program participation, and EV adoption. Finally, stakeholders began to brainstorm potential strategies.
    - Stakeholder Survey: Between workshop 2 and 3, stakeholders participated in a survey to inform the strategies best suited to achieve the selected goal and to vote on a preferred visions statement.
    - Preliminary Council Presentation: Between Workshop 2 and 3, City staff presented a 50 percent plan update to City Council, to receive feedback on the planning process, goal, and focus areas.
- October 2023
    - Workshop 3: Stakeholders reviewed survey results and voted on a final community decarbonization vision. Stakeholders conducted preliminary strategy action planning based on strategy survey results.
- December 2023
    - Partners in Energy developed a full draft of the Community Decarbonization Plan.
    - Workshop 4: Stakeholders provided additional feedback on draft strategies.
- January 2024
    - City staff and stakeholders reviewed the draft plan and provided comment.
- February 2024
    - Partners in Energy provided a final plan to Louisville Sustainability Advisory Board.
- March 2024
    - City staff presented the final plan to Louisville City Council with a resolution to update the Climate Action Goals in alignment with the targets outlined in the plan.

APPENDIX B: BASELINE INFORMATION

An integral part of the Partners in Energy planning process is reviewing historic energy data that informs our community's energy baseline. Analysis examined pathways for Louisville to reach its carbon neutrality and electrification goals. The team explored baseline conditions to identify areas of opportunity. In general, Louisville residents and businesses appear well suited for electrification.

Relevant Planning Efforts

Xcel Energy's Colorado Energy Plan

For more than a decade, Xcel Energy has demonstrated leadership on clean energy, proactively reducing carbon emissions at levels that currently surpass state and federal goals.

- In 2005, Xcel Energy was one of the first power suppliers to register with the Climate Registry to track and verify emissions.
- In 2018, Xcel Energy was the first major U.S. electricity provider to set a vision to serve customers with 100% carbon-free electricity by 2050, and to reduce carbon emissions 80% by 2030 from 2005 levels.
- In 2020, Xcel Energy saw its largest one-year decline in carbon emissions, reducing carbon emissions 51% since 2005, more than halfway to reaching the 2030 goal.

The pathway to achieving this bold vision involves adding thousands of megawatts of wind and solar power, incorporating natural gas and storage resources, retiring coal units, supporting electrification, and investing in critical infrastructure. Key to the grid infrastructure investments are efforts to allow Xcel Energy to increase electricity generation capacity, paving the way for electrification efforts. In addition to efficiency rebates and programs, Xcel Energy has developed several renewable energy options that support on-site and off-site generation for both wind and solar, creating additional opportunities for its customers to power their home and buildings with renewable electricity.

Louisville's Energy Action Plan

In 2016, the City of Louisville sought to decrease electricity and natural gas use. It launched a planning effort with Xcel Energy's Partners in Energy that culminated in an Energy Action Plan and an implementation effort that ran through 2018.

Targeting the commercial/industrial, residential, and municipal use, Louisville's energy goal was to reduce total energy use 1% annually over its 2015 baseline. In total over 2017, Louisville achieved a 3.2% decrease in electricity usage and a 1% decrease in natural gas usage, successfully shrinking its overall carbon footprint by 11% MTCO2 across the community. The decrease equates to CO2 savings of 2.4 million gallons of gasoline, or 118 railcars worth of coal burned.

Building off that success, Louisville worked with Xcel Energy in 2018 to create an Energy Future Collaboration (EFC) work plan which identified additional energy efficiency projects along with renewable energy and transportation efforts. It identified beneficial electrification as a longer-term project.

Resolution 25 Series 2019 – Establishing Carbon Reduction Goals for Louisville

In 2019, Louisville City Council adopted Resolution 25 series 2019, "a resolution for setting clean energy and carbon reduction goals". Importantly, the Resolution seeks to accomplish the following:

- Meet all of Louisville' s municipal electric needs with 100% carbon -free sources by 2025.
- Reduce core municipal GHG emissions annually below the 2016 baseline through 2025.
- Generate 75% of Louisville' s residential and commercial/ industrial electric needs from carbon-free sources by 2030
- Reduce core community GHG emissions annually below the 2016 baseline through 2030.

On an annual basis, the City Council will review progress towards these goals and other relevant information.

City of Louisville Sustainability Action Plan

In 2020, Louisville's Sustainability Action Plan created a clear and concise roadmap for sustainable action, both for internal and external operations. The vision of the Plan seeks to cover environmental stewardship, social equity, and economic vitality. The relevant focus areas cover climate, energy, and transportation.

In terms of energy, the goal is to reduce energy consumption, promote energy efficiency in new and existing buildings, increase the use of carbon-free energy, and transition away from fossil fuels. Louisville will work to promote available efficiency and sustainability programs for residents and businesses. It's doing this via a campaign to encourage commercial/industrial benchmarking of energy consumption through the use of data tracking software, develop a targeted outreach strategy to engage facility managers and property owners on energy conservation efforts and resources, and update Louisville guiding docs to further address energy conservation.

In addition to energy efficiency, Louisville is working externally to increase renewable energy adoption at residential and commercial properties. The Plan promotes a specific focus on identifying barriers to renewable energy participation and facilitating implementation of solutions.

Louisville is also promoting low-interest financing for residents and businesses to integrate renewable energy into buildings.

In the transportation sector, Louisville is working to support the public adoption of EVs and assist in the installation of public charging stations. Key external efforts include the support and promotion/installation of EV charging stations at commercial/industrial development and sites. Additionally, Louisville is providing educational opportunities and programs on PHEV a EV adoption to residents and commercial entities. Embedded efforts within this include evaluation of an EV-ready building code adoption, pursuing opportunities for pooled purchasing programs for EVs and e-bikes with regional partners, and working with Xcel Energy to promote the public health benefits of EVs and alternative funding and initiatives.

City of Louisville Internal Decarbonization Plan

In response to the Marshall Fire, in the summer and fall of 2022, the City contracted for the creation of a study, analysis, and strategic roadmap for electrification and decarbonization of City buildings, fleet, equipment and operations by 2030 (as part of this study, and alternative completion target was determined). The Internal Decarbonization Plan is the outcome of that effort. The roadmap establishes a pathway to complete decarbonization, including: energy efficiency, building electrification, EV charging, onsite renewable energy and fleet and equipment electrification. On October 10, 2023 City Council adopted the Internal Decarbonization Plan. Louisville will be one of the first jurisdictions in the United States to aggressively embark on decarbonized municipal operations.

https://www.louisvilleco.gov/living-in-louisville/residents/sustainability/city-sustainability

Additional Plans

Additionally, the following ongoing efforts helped shape this Plan:

- Xcel Energy's Transportation Electrification Plan, which outlines efforts and programs to incentivize residents and businesses to invest in transportation electrification.
- Boulder County Regional Transportation Electrification Plan. Since it was finalized in 2022, subgroups have focused on implementation including a recent effort to complete a mapping project that will support the County in pursuing grant funding that will benefit multiple communities.
- The Front Range Beneficial Electrification Network. This coalition of Front Range communities is focused on advancing regional workforce development needed for widespread electrification adoption, unify customer communications, understand funding opportunities, and identify opportunities to scale beneficial electrification.

Community Demographics

Residential Sector

The City of Louisville is a small- to mid-sized city with approximately 20,900 residents and 8,600 households (City of Louisville, 2023). Louisville residents have a median income of $135,840. This is significantly higher than the state's median income of $89,300 (U.S. Census Bureau, 2022). Income is a critical factor in determining a households ability to invest in decarbonization (e.g., building envelope efficiency, electric vehicles, air source heat pumps), as many decarbonization technologies carry a higher upfront or operational cost. Almost a quarter of Louisville's households fall below $75,000 of household income (Table 5) (U.S. Census Bureau, 2022).

Table 5. Distribution of Household Income in the City of Louisville.

Household Income	Est. Percent	Margin of Error
Less than $10,000	3.9%	1.3%
$10,000 to $14,999	0.9%	0.6%
$15,000 to $24,999	1.7%	1.2%
$25,000 to $34,999	4.8%	2%
$35,000 to $49,999	6.4%	1.8%
$50,000 to $74,999	8.2%	1.9%
$75,000 to $99,999	12.3%	2.6%
$100,000 to $149,999	15.9%	3.1%
$150,000 to $199,999	13.7%	2.4%
$200,000 or more	32.3%	3.7%

The majority of Louisville's housing units are single family detached. Approximately 19 percent of housing units are in apartments with 5+ units. Nearly two percent of housing units are mobile homes (Table 6) (U.S. Census Bureau, 2022). Generally, there are fewer barriers to decarbonization for single-family homes. The number of units in a structure can also inform eligibility for utility programs.

Table 6. Distribution of Housing Units per Structure in the City of Louisville

Units in Structure	Estimated Percent	Margin of Error
1, detached	68%	3.4%
1, attached	7.9%	1.9%
2 apartments	2.1%	1.2%
3 or 4 apartments	0.7%	0.6%
5 to 9 apartments	1.9%	0.8%
10 or more apartments	17.4%	2.9%
Mobile home or other type of housing	1.9%	0.8%

Tenure – whether a person rents or owns a home – is another important factor for decarbonization. Homeowners have greater authority to make improvements to their property. In Louisville, approximately 70 percent of housing units are owner-occupied, and approximately 30 percent are renter occupied (U.S. Census Bureau, 2022).

Access to one or more vehicles is an important indicator for a household's capacity to invest in electric vehicles. Many households are more willing to purchase an electric vehicle if there is one internal combustion engine vehicle available to the household. In Louisville, almost 68 percent of households have access to two or more vehicles (Table 7) (U.S. Census Bureau, 2022).

Table 7. Number of Vehicles Available per Household in the City of Louisville

Vehicles available	Estimated Percent	Margin of Error
No vehicle available	5%	2.2%
1 vehicle available	27.4%	4%
2 vehicles available	45.2%	4%
3 or more vehicles available	22.3%	2.7%

Finally, how workers complete their commutes can indicate the potential impact of electric vehicle adoption. In Louisville, nearly 61 percent of workers commute in a car, truck, or van (this includes carpooling). (Table 8) (U.S. Census Bureau, 2022)

Table 8. Distribution of Means of Transportation to Work for the City of Louisville

Means of Transportation to Work	Estimated Percent	Margin of Error
Car, truck, or van	60.9%	4.3%
Public transportation (excluding taxicab)	3.2%	1.1%
Walked	2.9%	1.4%
Bicycle	2.1%	1%
Taxicab, motorcycle, or other means	0.7%	0.6%
Worked from home	30.3%	3.7%

Commercial and Industrial Sector

The City of Louisville has approximately 750 brick and mortar businesses. Businesses are distributed across four primary districts: Historic Downtown Louisville, Downtown East Louisville, McCaslin Corridor, and South Boulder Road (City of Louisville, 2023).

Louisville's businesses are supported through several networks and organizations, including the Louisville Chamber of Commerce, Downtown Business Association, Boulder Small Business Development Center, Commuting Solutions, Boulder County Workforce, Partners for a Clean Environment, and Louisville Economic Vitality division (City of Louisville, 2023).

There are approximately 11,100 workers in the City of Louisville. Louisville has a diverse industry mix (Table 9) (U.S. Census Bureau, 2022)

Table 9. Industry Mix for the City of Louisville

Industry	Estimated Percent	Margin of Error
Educational services, and health care and social assistance	24.2%	3.2%
Professional, scientific, and management, and administrative and waste management services	22.7%	3.1%
Retail trade	9.8%	2.3%
Manufacturing	9.4%	1.7%
Construction	6.5%	2.2%
Arts, entertainment, and recreation, and accommodation and food services	5.9%	1.5%
Finance and insurance, and real estate and rental and leasing	5.8%	1.4%
Information	4.3%	1.3%
Other services, except public administration	3.6%	1.3%
Public administration	3.2%	1.1%
Transportation and warehousing, and utilities	2.5%	1.2%
Wholesale trade	1.5%	0.8%
Agriculture, forestry, fishing and hunting, and mining	0.8%	0.6%

Energy Trends

Louisville has grown slowly, with more growth in the commercial sector

Between 2016-2022, the number of energy premises in Louisville grew by five percent. While the majority of premises in Louisville are residential (86 percent), the commercial sector saw significant growth during that time. Commercial premises grew by 15 percent, while residential premises grew by 4 percent (Figure 10).

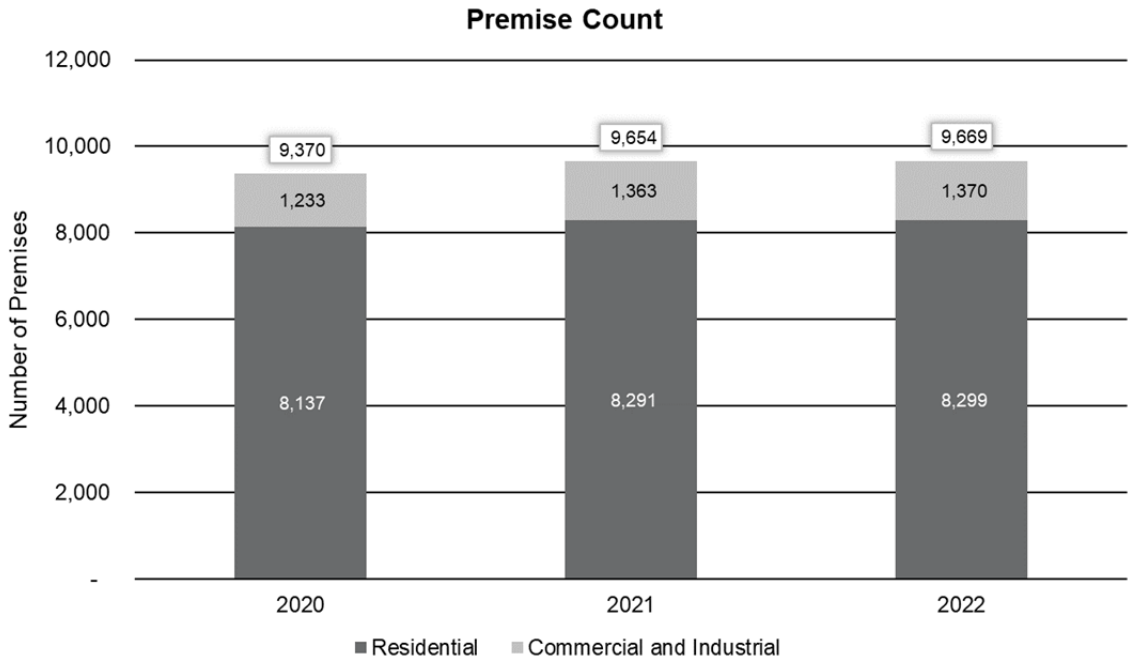


Figure 10. Change in Premises Over Time (2020-2022) for Louisville, CO

The commercial sector is driving energy trends

While there are substantially more residential premises than commercial, commercial premises are driving energy trends in the community. In 2022, commercial and industrial premises accounted for 53 percent of natural gas use and 73 percent of electricity use for the community (Figure 11). In both the residential and commercial sectors, natural gas use was primarily attributed to space heating and water heating. Residential electricity use was driven by AC, lighting, and electric water heating and space heating. Commercial electricity use was driven by HVAC, lighting, and refrigeration.

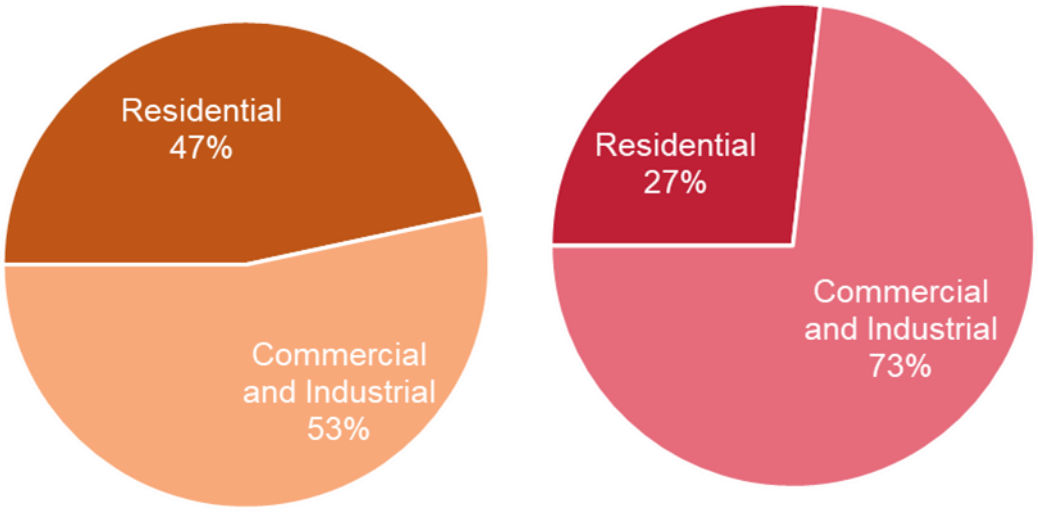


Figure 11. Natural Gas (left) and Electricity (right) Use Percentages by Sector

As shown in Figure 12, on average, residents pay $1,400 per year to heat and cool their homes while businesses pay just over $14,000. Compared to Superior and Lafayette, Louisville residents pay less for residential annual energy costs and more for commercial annual energy costs. These reasons for these differences are not known, but could include the makeup of residential and commercial buildings in Louisville.

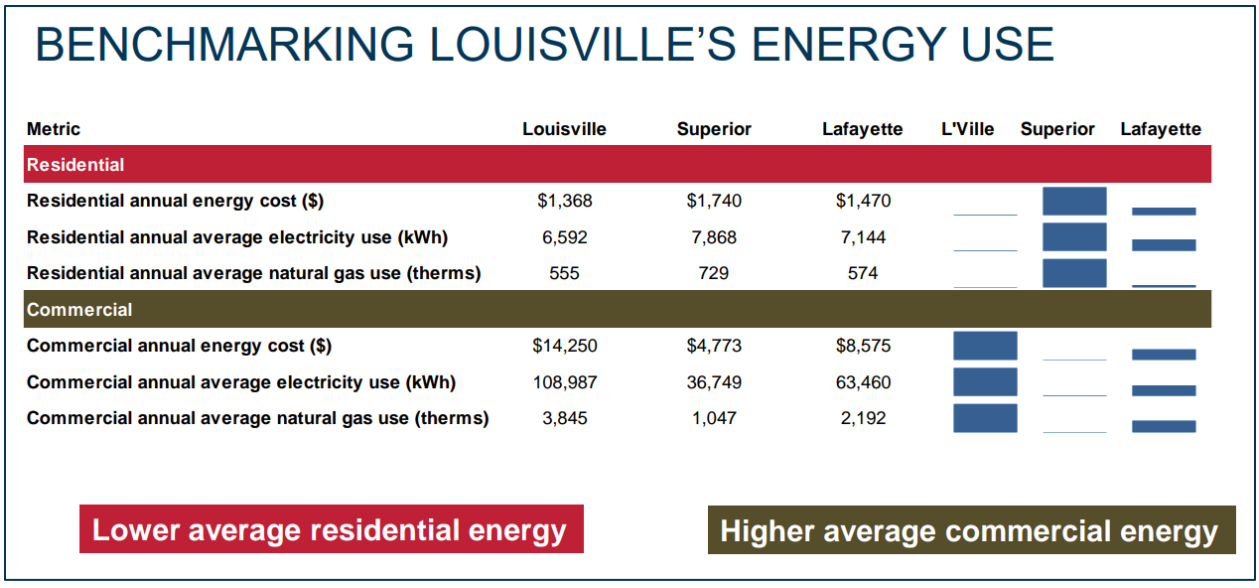


Figure 12 Louisville residents pay less for residential energy compared to neighboring cities and more for commercial energy.

Greenhouse Gas Emissions

In 2016, Louisville's total greenhouse gas emissions were 260,765 MTCO2, or 29,342,298 gallons of gasoline (Louisville, Louisville Sustainability Action Plan, 2020). Energy emissions amounted for about 67% of this number. The following chart represents Louisville's goal to stay at or below 150,000 MTCO2e (Figure 13).

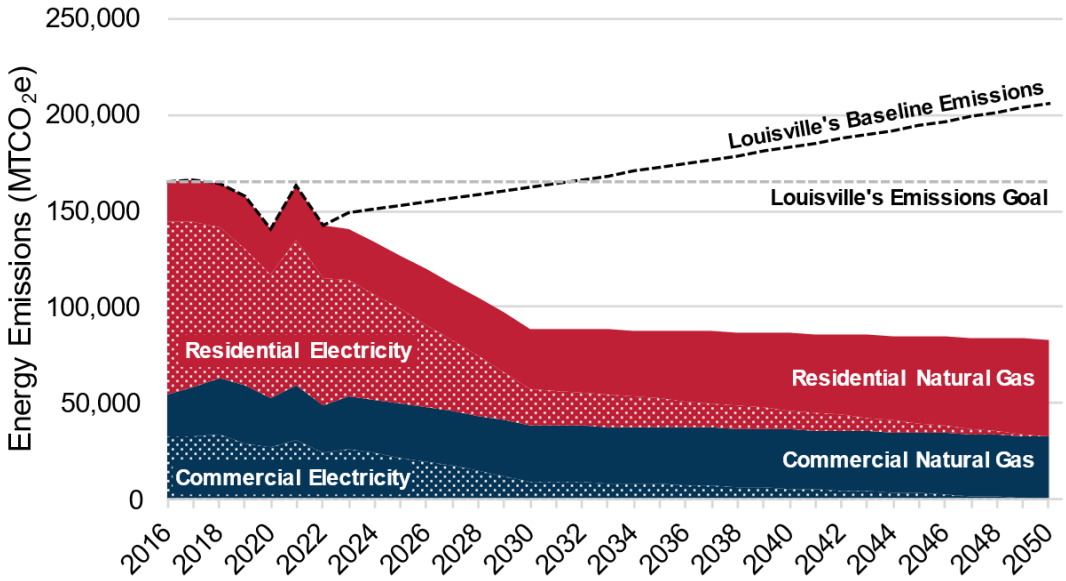


Figure 13. City of Louisville Energy Emissions Forecast

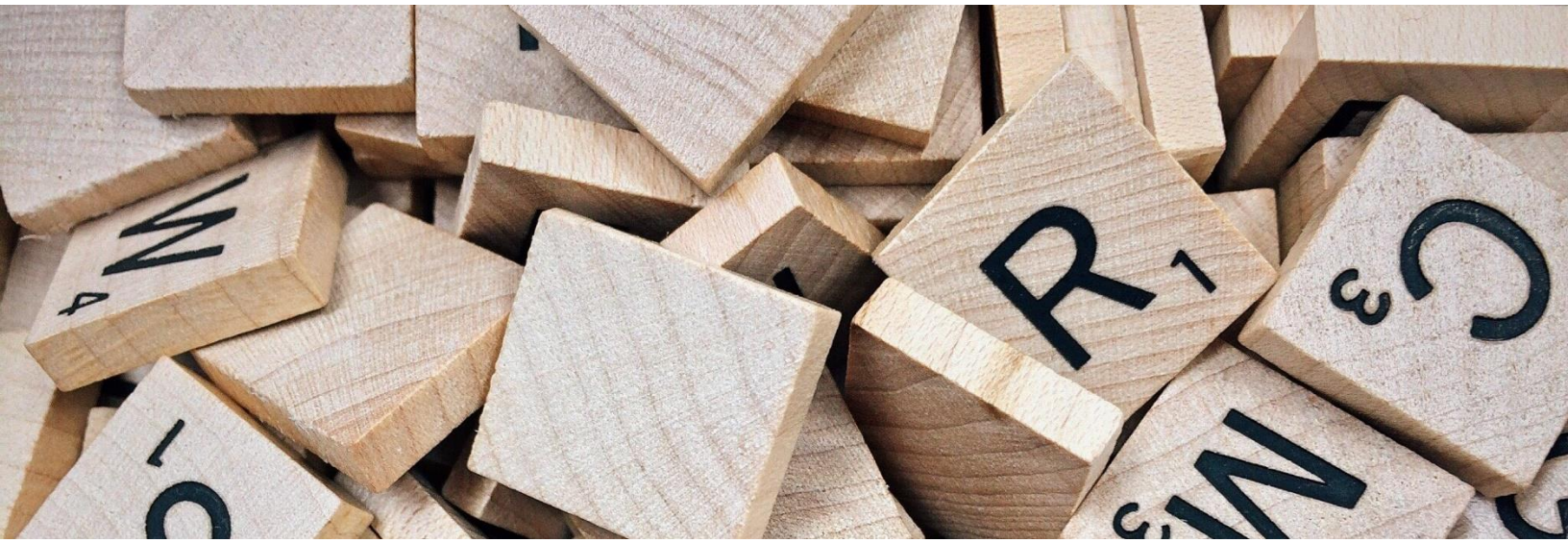
Renewable Energy

As mentioned earlier, Louisville is seeking to generate 75% of Louisville residential and business electricity needs from carbon-free sources by 2030 through Resolution 25 Series 2019. Currently 167 residential and commercial premises participate in Xcel Energy's renewable energy programs. As mentioned previously there were nearly 9,670 Xcel Energy premises in Louisville as of 2022. Renewable energy adoption rates in the community in both the residential and commercial sector exceeded the average in other Colorado Partners in Energy communities, as well as local peer communities in most cases as shown in Figure 14.

Metric	Louisville	Superior	Lafayette	L'Ville	Superior	Lafayette
Residential						
Residential DSM Participation Rate (%)	9%	10%	6%			
Residential Renewable Energy Participation Rate (%)	15%	12%	17%			
Commercial						
Commercial DSM Participation Rate (%)	7%	3%	3%			
Commercial Renewable Energy Participation Rate (%	7%	1%	2%			

Figure 14. City of Louisville DSM and Renewable Energy Adoption Rates Compared to Peer Communities

APPENDIX C: GLOSSARY OF TERMS



The following section defines a list of terms related to utilities, energy use, building electrification, and transportation electrification. While this list is not comprehensive, it does include some terms not present in this plan, but potentially useful for reference throughout implementation.

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(s) is responsible for more than 15% of the total for that data set, it is/they are removed from the summary.

Battery Electric Vehicle (BEV): An all-electric vehicle, fueled by plugging into an external charger, that has no tailpipe emissions. Requires low maintenance costs.

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

Beneficial Electrification: The replacement of direct fossil fuel use that results in either lower costs, reduced emissions, or more effective use of the power grid.

Building Electrification: Transitioning fossil-fueled appliances to ones powered by electricity, such as HVAC or water heating systems.

Carbon-free: 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: 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 is released over a set period of time. 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 electric 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.

Community Data Mapping: A baseline analysis of energy data in a geospatial (map) format across the community.

Demand Side Management (DSM): Modification of consumer demand for energy through various methods, including education and financial incentives. 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.

Direct Current (DC): The form of electricity where the current only flows in one direction. This is the type of electricity that batteries both supply and require to charge. EV chargers must convert the supplied AC electricity to DC power.

Electric Vehicle (EV): A vehicle that uses an electric engine for all or part of its propulsion.

Energy Conservation: The result of behavior changes that cause less energy to be used. For example, setting the thermostat to a lower temperature *reduces* the energy used in your home 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 energy to keep your home 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.

EV-Ready Codes: Local government codes that require installation of a 40 amp, 208/240 volt, dedicated branch circuit (similar to that of an electric dryer or oven), along with a circuit terminating in a receptacle, junction box, or EV charging station at certain parking facilities (Southwest Energy Efficiency Project, 2023).

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 (H_2O), carbon dioxide ($CO_{2)}$, methane (CH_4), nitrous oxide (N_2O), and ozone (O_3).

Grid Decarbonization: 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.

HVAC: Heating, Ventilation, and Air Conditioning

Hybrid Electric Vehicle (HEV): Contains both an electric motor and a gasoline engine. The gasoline engine powers a generator that charges the electric motor. No external battery charger is used. Runs at a constant speed, which increases fuel efficiency.

Internal Combustion Engine (ICE): Traditional vehicle engine that uses the direct combustion of gasoline, diesel, or other fuels.

Kilowatt-hour (kWh): A unit of electricity consumption. For EVs, it is the amount of electricity being sent to the EV battery from the charger in one hour. This is calculated by volts times amps divided by 1,000.

Level 1 Charging Station: Uses a standard 120-volt AC outlet and can take 8 to 12 hours to fully charge a depleted battery; intended for residential use only.

Level 2 Charging Station: Uses a 220-volt or 240-volt AC outlet and can fully charge a depleted battery in 4 to 6 hours; can be used in both residential and commercial settings.

Level 3/DC Fast Charging Station: Uses an industrial 480-volt DC outlet and can charge a battery to 80 percent in 20 to 30 minutes; used in commercial settings where the anticipated charge time is limited (e.g., supermarket, gas station); will be used on Alternative Fuel Corridors – a national network of major thoroughfares supporting EVs and other alternative fuels.

Light-Duty Vehicles: Passenger cars with a maximum Gross Vehicle Weight Rating (GVRW) of 8,500 lbs.

Micromobility: Transportation using lightweight vehicles such as bicycles or scooters, including electric bicycles and scooters, often used to travel short distances.

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

Metric Tons of Carbon Dioxide Equivalent (MTCO2e): 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 (CO_2), based on the global warming potential (GWP) of the gas.

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

Plug-in Hybrid Electric Vehicle (PHEV/PEV): Contains both an electric motor and a gasoline engine. An external plug is used to fuel the electric motor. The electric motor is used until the battery is depleted; at this point the gasoline engine takes over. Offers lower tailpipe emissions than traditional ICE vehicles and longer ranges than most BEVs.

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.

Range Anxiety: Fear of running out of power in an EV before reaching a charging station or desired destination.

Range Per Hour (RPH): A measurement of the miles an EV can travel on one hour of charge. This is generally applied to EV charging stations and expressed in terms of typical EV efficiency.

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.

Subscription: Agreement to purchase a certain amount of something at regular intervals.

Therm (thm): Unit of natural gas consumption.

Transportation Electrification: Transitioning fossil-fueled vehicles to ones powered by electricity, such as passenger vehicles or transit.

Volts: Measurement of the force pushing the flow of energy through a charger. Determined by electricity supply. Standard household outlets provide 120 volts; outlets for dryers or other high-powered household equipment supply 240 volts.

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