






SUSTAINABILITY ACTION AGENDA 2020



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SUSTAINABILITY ACTION AGENDA EXECUTIVE SUMMARY

BACKGROUND

In 2018, Thornton staff came together to form a Sustainability Working Group, with the vision to promote sustainability action within the organization and across the community. The group spent a year looking within the city at existing programs and services supportive of sustainability principles, reviewing the sustainability efforts of other municipal organizations, and identifying gaps and interest areas. The group ultimately procured consulting services to provide additional capacity in establishing an integrated and holistic Sustainability Action Agenda that will help drive future city actions and that provides a detailed roadmap on how the city can achieve our vision for a sustainable future. This Sustainability Action Agenda lays out the vision, framework, goals, and strategies by which Thornton will grow into a more sustainable organization and community in the coming years.

Our proposed approach to sustainability action is pragmatic and exploratory. This Sustainability Action Agenda represents the first significant step toward viewing the city's services and programs through a sustainability lens. The Sustainability Action Agenda is also deeply influenced by the organization's desire to promote sustainability actions that also mitigate climate change impacts and improve the community's resilience. It was in the middle of developing this Sustainability Action Agenda that the COVID-19 pandemic and associated economic recession hit, adversely impacting the city's operating budget and staff capacity to focus on sustainability. These conditions resulted in extreme stress for residents and businesses in the form of health and economic concerns. While acknowledging these near-term challenges, the Sustainability Working Group also recognizes the need to act with dedication and urgency to achieve a more sustainable future.

SUSTAINABILITY FRAMEWORK

Thornton defines sustainability as finding ways to reduce our environmental impacts and to give back to the environment to ensure resources remain available in perpetuity while also creating a healthy, resilient, and adaptable organization and community.

Thornton's Sustainability Action Agenda addresses eight sustainability topics that provide environmental, social, and economic benefits to the organization and community (Figure 1).

The city is already taking some action in each of these topic areas (Figure 2), but commits to elevating the level at which Thornton delivers services and programs, and to leading the way by taking sustainability action for city facilities and operations.



Figure 1. Thornton's Organizing Sustainability Framework

City plans and policies supporting the Sustainability Action Agenda





Figure 2. Existing City Plans and Policies Supportive of Sustainability Action

SUSTAINABILITY ACTION AGENDA

For each of the eight sustainability topics, the Sustainability Working Group collaborated to establish focus areas, action levels, goals, and strategies for the organization and community (Figure 3). Each focus area is categorized into one of the following levels:

- **Level 1: Ad Hoc Efforts**
The city takes some sustainability action through existing programs and services.
- **Level 2: City Leads the Way**
The city focuses sustainability action on improvements at city facilities and operations.
- **Level 3: Community Finds Regional Alignment**
The city promotes sustainability action within the organization and the community to do our fair share and be supportive of regional and state goals.
- **Level 4: Community Shines as a National Leader**
The city takes sustainability action within the organization and the community to demonstrate leadership as one of the highest performing cities in the US.

| Topic & Areas of Focus | Goal Level and Targets | Example Strategies for City Facilities and Operations |
|---|---|--|
| CLIMATE ACTION  <i>Climate Mitigation</i> <i>Climate Adaptation</i> | Level 3: Community Finds Regional Alignment <ul style="list-style-type: none"> • Reduce greenhouse gas emissions by 50% by 2030. • Make infrastructure more resilient to climate change impacts | <ul style="list-style-type: none"> ❑ Pursue citywide recognition under the State's Environmental Leadership Program. ❑ Establish guidelines for sustainable procurement and project decisions. ❑ Evaluate sustainability impacts from oil and gas leases in Weld and Larimer counties. |
| CARBON-FREE ENERGY SUPPLY  <i>Distributed Renewables</i> <i>Utility-Scale Renewables</i> | Level 2: City Leads the Way <ul style="list-style-type: none"> • Actively procure renewable energy sources for city facilities and operations. • Advocate for new renewable energy programs offered by electric utilities. | <ul style="list-style-type: none"> ❑ Complete the planned solar project at the Thornton Water Treatment Plant. ❑ Conduct a feasibility study of city facilities to identify new solar projects. ❑ Support Xcel Energy's Renewable*Connect filing with the Public Utilities Commission. ❑ Subscribe city meters to Renewable*Connect when available. ❑ Use sustainable heating and cooling technologies, like sewer heat recovery. |

**HEALTHY & EFFICIENT
BUILDINGS***Existing Buildings**New Buildings***Level 3: Community Finds
Regional Alignment**

- Promote energy efficiency and healthy indoor environments in buildings.
- Incorporate sustainable design principles into new buildings.

- Require that new projects be evaluated for environmental and social impacts during design and construction.
- Establish guidelines for purchasing, and maintaining, healthy building materials.

**SUSTAINABLE
TRANSPORTATION
& CLEAN AIR***Multimodal**Transportation**Transit-Oriented Development**Air Quality**Electric Vehicles***Level 4: Community Shines
as a National Leader**

- Increase the proportion of electric vehicles in the city's fleet and the community.
- Expand safe and convenient public transit, walking, and bicycling routes.
- Promote sustainable transportation options to reduce car usage.

- Implement the 10-year fleet management and electrification plan.
- Expand charging infrastructure.
- Promote electric vehicle selection in transportation procurement and replacement policies.

**WASTE REDUCTION
& RECYCLING***Materials**Recycling**Compostables***Level 3: Community Finds
Regional Alignment**

- Increase recycling, composting, and yard waste services.
- Foster a zero-waste culture.

- Implement the sustainable purchasing policy.
- Improve waste data collection and tracking.
- Coordinate recycling efforts for electronics and shredded paper.

**SUSTAINABLE WATER &
LAND MANAGEMENT***Water Quality**Water Quantity**Land Management***Level 4: Community Shines
as a National Leader**

- Reduce potable water demands.
- Increase tree canopies, parks and open spaces, and green infrastructure.
- Reduce pesticides used for land management.
- Expand social and environmental benefits of land uses.

- Implement the Naturally Thornton initiative to convert turf to native grasses.
- Expand the city's tree planting program.
- Fund integrated pest management practices.
- Use the northern properties in Larimer and Weld Counties for socially and environmentally beneficial land uses.



| Topic & Areas of Focus | Goal Level and Targets | Example Strategies for City Facilities and Operations |
|---|---|--|
| <p>HEALTHY COMMUNITY</p>  <p><i>Sense of Community</i> <i>Healthy Eating</i> <i>Active Living</i></p> | <p>Level 3: Community Finds Regional Alignment</p> <ul style="list-style-type: none"> • Create an age-friendly community. • Increase availability and access of local food choices. • Promote active living. | <ul style="list-style-type: none"> □ Continue offering wellness programs for employees of all ages and abilities. |
| <p>RESILIENT ECONOMY</p>  <p><i>Sustainable Development</i> <i>Business Health</i> <i>Workforce Development</i></p> | <p>Level 3: Community Finds Regional Alignment</p> <ul style="list-style-type: none"> • Provide a diverse range of employment opportunities. • Foster a resilient local economy. • Provide good quality and sustainable housing options and commercial spaces. • Support workforce development programs. | <ul style="list-style-type: none"> □ Continue offering programs that support financial stability and planning. |

Figure 3. Thornton's Sustainability Action Agenda

A CALL TO SUSTAINABILITY ACTION

The Sustainability Action Agenda was presented to the city manager and introduced to City Council in July 2020. Thornton is implementing an Energy Action Plan developed in conjunction with Xcel Energy that benefits particularly the topics of Climate Action, Carbon-Free Energy Supply, and Healthy & Efficient Buildings (Appendix A: Thornton's Energy Action Plan). For the remaining sustainability topics, Thornton will begin implementation by emphasizing strategies that can be accomplished within existing staff resources and using annual operating funds or external funding sources, where available, with an intent to expand budget requests in future years.

Thornton expects to realize myriad benefits from these efforts to improve sustainability within the organization and community. Anticipated benefits in the near-term include utility cost savings, improved facilities, less waste, operational efficiencies, employee and resident wellness, improved procurement practices, external funding support, and alignment with regional and state partners. Longer-term benefits include reduced climate change impacts, resilient infrastructure, better air quality, plentiful natural resources, and strong community values that support current and future generations of Thornton residents and businesses.

The Sustainability Working Group invites all employees to engage in implementing this Sustainability Action Agenda and helping to foster a culture of sustainability within our organization and community.



LETTER FROM THE CITY MANAGER



Dear Thornton Community,

I am pleased to introduce the City of Thornton's Sustainability Action Agenda, which sets out the vision, framework, goals, and strategies by which Thornton will grow into a more sustainable organization and community in the coming years. This Action Agenda is the culmination of ten months of work by over 30 Thornton staff members from departments across the city, Adams 12 Five Star School District, the non-profit sector, energy utilities that serve the community, and the city's consulting team, Brendle Group.

A healthy Thornton is a resilient Thornton, and a robust sustainability vision is critical to ensuring that our community thrives into the future. Thornton defines sustainability as finding equitable ways to reduce our environmental impacts to ensure resources remain available in perpetuity to serve all the members of our community while also creating a healthy, resilient, inclusive, and adaptable organization and community.

The city has already made progress with several sustainability efforts that affect both the organization and the community. The Sustainability Action Agenda captures these efforts and challenges the city to go further by creating a holistic vision across eight sustainability topics to provide environmental, social, and economic benefits to the organization and community.

Thornton's Sustainability Action Agenda is an active endeavor, not a static report. It is intended to be agile and responsive to City Council vision, the needs of the community, and the state of the environment. The Agenda seeks to find balance as we work to protect our environment, advance our economy, and connect our community.

I am excited to take this important step toward a more sustainable and resilient Thornton, and I welcome your input and participation.

Your partner in sustainability,

A handwritten signature in black ink that reads "K. S. Woods". The signature is written in a cursive, flowing style.

Kevin S. Woods
City Manager, City of Thornton

ACKNOWLEDGEMENTS

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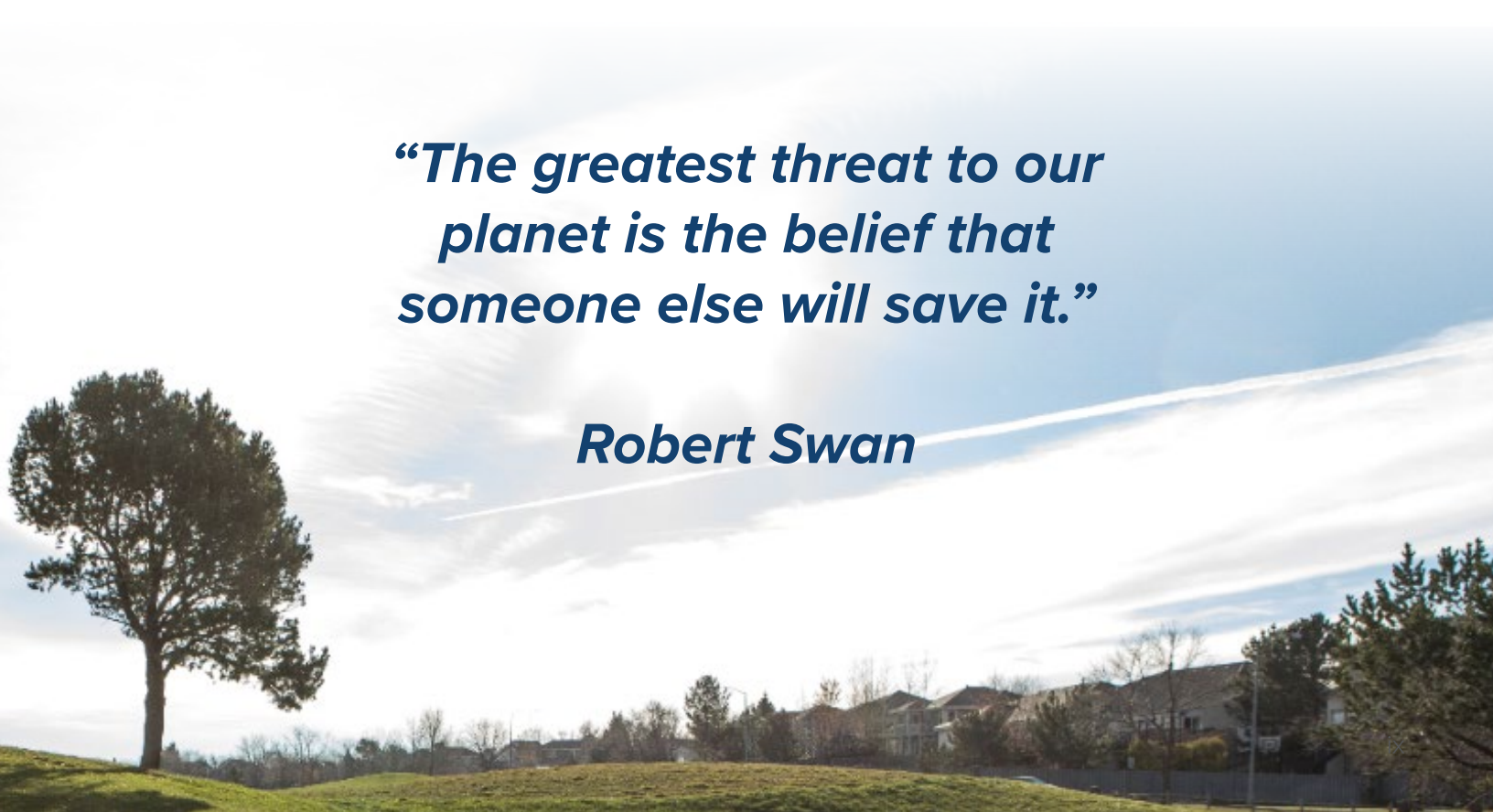
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***“The greatest threat to our
planet is the belief that
someone else will save it.”***

Robert Swan





City of Thornton

INTRODUCTION

The city of Thornton, located on the north side of the Denver metro area, has blossomed from an emerging residential development into a full-service community that is home to more than 140,000 residents and 21,000 jobs (Thornton, 2018a). As one of the fastest growing cities in the State of Colorado, Thornton is increasingly looking to smart planning initiatives and resource conservation programs. Thornton also has a longstanding commitment to build the business community along with the residential community. With this growth and development, Thornton recognizes the need to act with intention and urgency to achieve a sustainable future that benefits the environment, the economy, and the residents of the Thornton community.

PLANNING PROCESS

In 2019, the city embarked on an effort to establish a sustainability action agenda for city facilities and operations as well as the broader community. In a companion effort, the city partnered with Xcel Energy through the Partners in Energy program to develop the 2020 Thornton Energy Action Plan. This plan will improve energy efficiency and increase renewable energy supplies to help the city and community take immediate climate action (Appendix A: Thornton's Energy Action Plan). Together, these efforts engaged more than 30 representatives from departments across the city, Adams 12 Five Star School District, the non-profit sector, and energy utilities that serve the community. Representatives worked together to answer the following questions through the lenses of sustainability and energy action:



Where are
we now?

Where do we
want to go?

How will we
get there?

How will we
stay on track?

This Sustainability Action Agenda lays out the vision, framework, goals, and strategies by which Thornton will grow into a more sustainable organization and community in the coming years.

SUSTAINABILITY DEFINED

Thornton defines sustainability as **finding ways to reduce our environmental impacts and to give back to the environment to ensure resources remain available in perpetuity while also creating a healthy, resilient, and adaptable organization and community.**

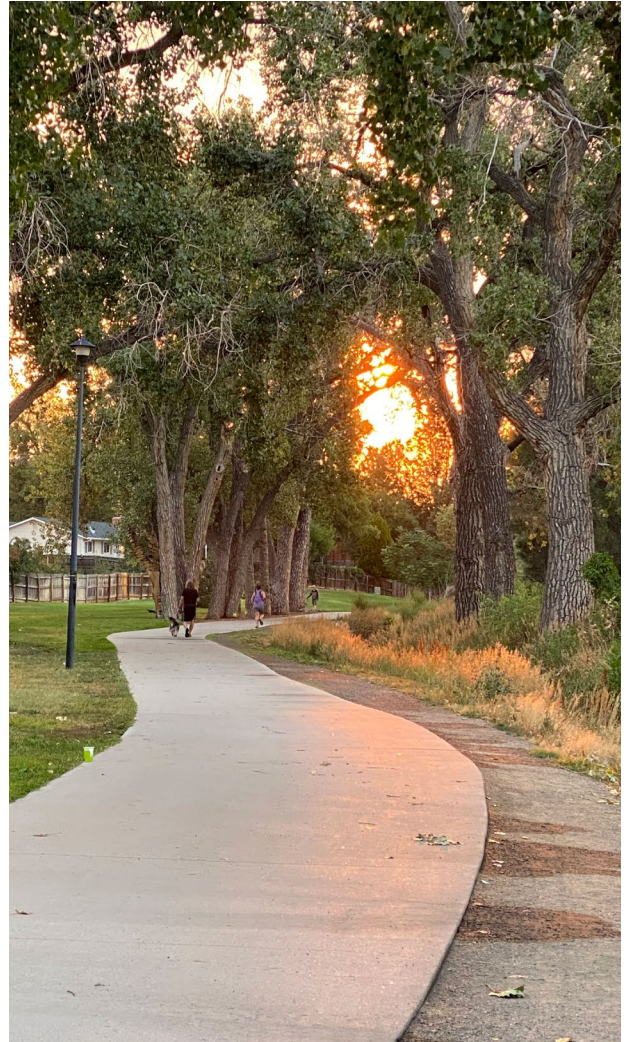


OUR SUSTAINABILITY VISION AND GUIDING PRINCIPLES

Thornton will lead the way for the broader community by incorporating sustainability principles into decision-making, reducing carbon emissions from municipal facilities and operations, and providing residents and businesses with equitable access to sustainability information and services.

To achieve our sustainability vision, Thornton commits to:

- **Taking sustainability action** by setting goals and targets to work toward.
- **Working in partnership** with residents, businesses, public agencies, and community organizations to achieve collective success.
- **Implementing fiscally responsible and impactful strategies** that reflect our responsibility to future generations.
- **Fostering a culture of sustainability** by integrating sustainability principles across city facilities and operations.
- **Promoting sustainable growth and economic vitality** in the community.
- **Supporting businesses and residents** with equitable and inclusive access to affordable programs and services.
- **Increasing education and services** to promote awareness of sustainability principles.
- **Connecting sustainability benefits to our community's resilience** and ability to withstand and recover from environmental, social, and economic shocks and stressors.
- **Adapting to short-term conditions** while working towards a longer-term vision for a sustainable future.



Thornton is committed to ensuring that the Sustainability Action Agenda is implemented in an equitable and inclusive way, both within the organization and throughout the community. Two recent city initiatives will help define and guide this vision of inclusivity. On June 23, 2020, Thornton City Council approved a resolution establishing an ad hoc committee on equity, with a focus on the topics of police oversight, communications and technology, amenities, and transportation (Thornton, 2020i). The ad hoc committee is charged with reviewing these topics and developing recommendations for consideration in the 2021 budget. In August 2020, the City Manager launched the TIDE (Thornton Inclusion, Diversity and Equity) Taskforce, which has the objective of building inclusion, diversity, and equity within the city organization. The outcomes and recommendations of both these initiatives, as well as future efforts, will be incorporated into the Sustainability Action Agenda.

BENEFITS AND OPPORTUNITIES

In taking sustainability action, Thornton has the opportunity to build on efforts and commitments made by the State of Colorado and Xcel Energy and to take advantage of the unique characteristics and values of our community. We see a number of benefits and opportunities to promote sustainability action:

As a Colorado community, Thornton is supportive of the State's commitments to **cut greenhouse gas emissions by 50% by 2030 and by 90% by 2050** (State of Colorado, 2019).

As a community that is predominantly served electricity by Xcel Energy, a utility that has committed to 100% carbon-free electricity by 2050, **Thornton has considerable opportunities to promote and use carbon-free energy supplies** (Xcel Energy, 2019).

As a municipal government, Thornton has the ability to **reduce community greenhouse gas emissions by 30-40%** through carbon-free energy, sustainable development, and sustainable transportation solutions (Coalition for Urban Transitions, 2019).

As a community with new regional electric commuter rail transit options, Thornton has the opportunity to help **improve transportation-related air quality issues** in the Denver metropolitan region.

As a community with affordable housing in the Denver metropolitan region and significant future growth potential, Thornton has considerable opportunities to **incorporate sustainable design and land management principles**.

As a community with plentiful water and land resources, Thornton can **provide residents with opportunities for healthy eating and active living**.

As a community at risk from natural hazards such as floods and droughts, Thornton has the opportunity to **take sustainability action and promote a more resilient community** able to withstand and recover from environmental, economic, and social hazards (Colorado Resiliency Office, 2019).

As one of the largest employers in Thornton, the city can **become a workplace of choice** and help employees take pride in knowing they are working for an organization that prioritizes sustainability.

By being a leader in sustainability action, Thornton can **inspire likeminded businesses that want to be associated with sustainable practices**.

By taking sustainability action, Thornton can help **demonstrate that sustainability not only comes with environmental and social benefits, but oftentimes financial benefits as well**.

CHALLENGES

Thornton began the development of this Sustainability Action Agenda in December 2019, just a few months before the COVID-19 health crisis, economic recession, and racial equity demonstrations took hold in communities. This dramatic shift in social and economic conditions underscores the timeliness and relevance of taking sustainability action to promote community connections and resilience. Even in the best of times, Thornton needs to work to overcome the following social and structural barriers to enacting sustainability actions:

City policies, ordinances, and codes may present barriers to sustainability action and may limit the city's ability to implement certain strategies. As one example, Thornton's current development code strongly favors suburban, automobile-dependent development patterns. Low density housing and development require Thornton to construct more streets, underground utilities, and other infrastructure.

Thornton has a **low jobs-to-housing ratio**. The majority of employment opportunities located in Thornton are relatively low-paying service and retail jobs, with a disproportionately small number of higher-paying and primary jobs. The net result is that many Thornton residents commute to work in other communities, driving alone on their commute, and increasing air pollution and greenhouse gas emissions.

Thornton at times suffers from **poor air quality** (in particular ozone pollution) that afflicts the Denver metropolitan region. Since January 2020, the Denver Metro/Front Range ozone nonattainment zone has been downgraded from "moderate" to "serious" status (Colorado Department of Public Health & Environment, 2019a; US Environmental Protection Agency, 2020b). Thornton also suffers from episodic pollution (in particular particulate matter) associated with wildfire smoke, which leads to respiratory and other adverse health effects in the community. Particulate matter pollution has been particularly bad during the unprecedented wildfire season occurring in 2020.

Thornton's **multimodal infrastructure has a way to go to maximize walking, biking, and mass transit options** to help the community transition away from single driver commuting patterns. While Thornton aims to promote transportation electrification, the community currently lacks the charging infrastructure needed to support increasing electric vehicle usage.

Thornton recognizes that **social inequities exist** and need to be overcome in our community for under-resourced populations. These groups include, but are not limited to senior citizens, low-income residents, the seasonally employed, non-English speaking, and immigrant populations.

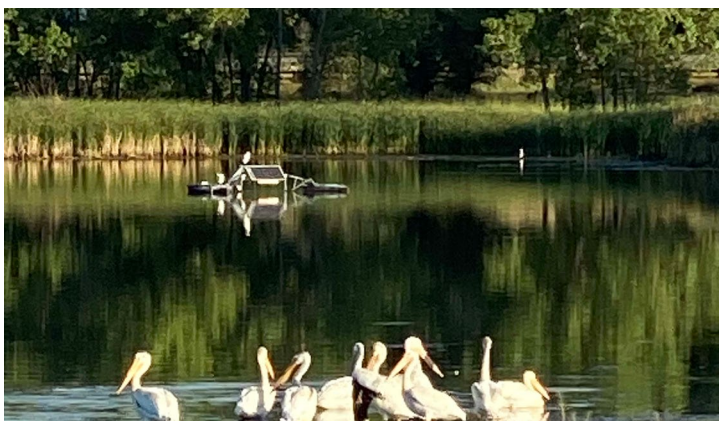
As a community that leases land to operators of oil and gas wells in Weld and Larimer counties, **Thornton benefits financially from extractive industries that negatively impact our carbon footprint.**

Thornton does not currently have a dedicated sustainability manager or budget, which means that sustainability actions must fit within existing staff and budget levels. New services, programs, and staff cost money, which city budgets may not be able to support until economic conditions improve.

As a result of cascading and compounding risks – illustrated by the current combination of the coronavirus pandemic, economic recession, racial equity demonstrations, and wildfires – **Thornton will need to navigate promoting sustainability in the face of tradeoffs.** Examples of tradeoffs include: (1) high-efficiency particulate air (HEPA) filters improve indoor air quality but use more energy than traditional filters, and (2) alternative transportation modes help support the reduction of greenhouse gases in the long-term but may expose travelers to higher levels of pollution in the short-term if air quality is poor.

A CALL TO SUSTAINABILITY ACTION

Thornton's Sustainability Action Agenda in the near-term will emphasize strategies that can be accomplished with existing staff using annual operating funds or external funding sources, where available. Thornton will allocate time from existing staff and operating budgets, as feasible, to implement these strategies. While the city acknowledges the realities of the public health crisis and recession, we will not lose sight of the need to act with intention and urgency to achieve a sustainable future.













THE SUSTAINABILITY ACTION AGENDA

The following sections summarize Thornton's Sustainability Action Agenda, which encompasses an organizing sustainability framework, a commitment by the city to lead the way in sustainability action, a look at where the city wants to go in each sustainability topic, and an actionable set of goals and strategies to help Thornton achieve a sustainable future.

SUSTAINABILITY FRAMEWORK AND TERMINOLOGY

Thornton's Sustainability Action Agenda is organized into eight sustainability topics that represent our intention to take action across the three pillars of sustainability to be inclusive of environmental, social, and economic benefits (Table 1).

Table 1. Thornton's Sustainability Topics

| Sustainability Topic | Environmental Sustainability | Social Sustainability | Economic Sustainability |
|--|------------------------------|-----------------------|-------------------------|
| CLIMATE ACTION  | P | S | S |
| CARBON-FREE ENERGY SUPPLY  | P | S | P |
| HEALTHY & EFFICIENT BUILDINGS  | P | P | S |
| SUSTAINABLE TRANSPORTATION & CLEAN AIR  | P | P | S |
| WASTE REDUCTION & RECYCLING  | P | P | S |
| SUSTAINABLE WATER & LAND MANAGEMENT  | P | P | S |
| HEALTHY COMMUNITY  | S | P | P |
| RESILIENT ECONOMY  | S | P | P |

*P = Primary

*S = Supporting

Within those eight sustainability topics, 22 areas of focus were identified for greater sustainability action (Figure 4).



Figure 4. Thornton's Organizing Sustainability Framework

CITY LEADS THE WAY

Thornton is committed to leading the way in sustainability action for the broader community using an integrated and holistic approach for city facilities and operations that builds upon existing plans and initiatives (Figure 5).





Figure 5. City Plans and Policies Supporting the Sustainability Action Agenda

CHARTING OUR PATH FORWARD

Thornton defined four levels of sustainability action to exemplify increasing commitment and outcomes:

- **Level 1: Ad Hoc Efforts** – the city takes some sustainability action through existing programs and services.
- **Level 2: City Leads the Way** – the city focuses sustainability action on improvements at city facilities and operations.
- **Level 3: Community Finds Regional Alignment** – the city promotes sustainability action within the organization and the community to do our fair share and be supportive of regional and state goals.
- **Level 4: Community Shines as a National Leader** – the city takes sustainability action within the organization and the community to demonstrate leadership as one of the highest performing cities in the US.

These levels are useful for assessing and communicating where Thornton is starting from and where Thornton wants to go through implementation of the Sustainability Action Agenda. Thornton looked at starting conditions, city values and priorities, and the feasibility of making improvements to assign action targets for each of the eight sustainability topics (Figure 6).

CHARTING A PATH: How Far Will Thornton Go?

Level 1 - Ad Hoc Efforts

Moving forward, the city aims to go beyond ad hoc efforts to take sustainability action using an integrated and holistic approach.

Level 2 - City Facilities and Operations Lead the Way

Thornton will focus on its city facilities and operations to advance the following sustainability topic:



CARBON-FREE ENERGY SUPPLY

Level 3 - Community Finds Regional Alignment

In addition to leading the way through city facilities and operations, Thornton will work to find regional alignment on the following sustainability topics:



CLIMATE ACTION



HEALTHY COMMUNITY



HEALTHY & EFFICIENT BUILDINGS



RESILIENT ECONOMY



WASTE REDUCTION & RECYCLING

Level 4 - Community Shines as National Leader

In addition to leading the way through city facilities and operations and finding regional alignment, Thornton will work to shine as a national leader on the following sustainability topics:



SUSTAINABLE TRANSPORTATION & CLEAN AIR



SUSTAINABLE WATER & LAND MANAGEMENT

Figure 6. Charting a Path: How far will Thornton go?

The following sections share a synopsis for each sustainability topic that includes:

- An introductory problem statement or sustainability opportunity.
- The sustainability objectives for each area of focus.
- Performance metrics that describe where Thornton is starting from.
All values represent the baseline year of 2018 unless noted otherwise.
- Success stories showing sustainability action that Thornton is already taking.
- Goals and strategies to achieve the targeted action level, including plans and policies that need to be modified or other implementation actions that are needed.
- Actions that city staff, residents, and businesses can take to be supportive of this Sustainability Action Agenda.







CLIMATE ACTION

Climate Action means mitigating greenhouse gas emissions to the extent feasible and making our community more resilient to the impacts of climate change. Thornton conducted a greenhouse gas inventory for city facilities and operations as well as the community to determine the largest emissions contributors, which then informed which strategies in this Sustainability Action Agenda would be the most impactful for climate action. The city found that in 2018, the largest sector contributing greenhouse gas emissions in the community was stationary energy use¹ (61%), followed by transportation (32%), and finally waste (7%) (Brendle Group, 2020).



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, AND BASELINE

CLIMATE MITIGATION

SUSTAINABILITY OBJECTIVE

Reducing or preventing greenhouse gas emissions.

BASELINE

- The Thornton community emitted 1,044,000 metric tons of carbon dioxide equivalent in 2018, equivalent to emissions from more than 225,000 conventional passenger vehicles driven for one year (US Environmental Protection Agency, 2020a). This level of emissions represents a 10% reduction from the 2008 greenhouse gas inventory for comparable sectors (Brendle Group, 2020; Thornton, 2010b)
- This level of emissions translates to 7.5 metric tons of emissions per resident, slightly lower than the average per capita emissions from other North American cities (C40 Cities Climate Leadership Group, 2020), attributed to the fact that Thornton is predominantly a residential community without large industrial contributors.
- Emissions from city operations and facilities represented 5% of total community emissions, or 51,700 metric tons of carbon dioxide equivalent.

SUCCESS STORIES

- ☑ In 2020, the city updated its greenhouse gas inventory to comply with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories, the global standard for reporting (Brendle Group, 2020).
- ☑ Thornton Water is a recognized Silver Partner under the State's Environmental Leadership Program (Colorado Department of Public Health and Environment, 2019c).

¹Stationary energy use is associated with buildings (residential, commercial, or industrial) or other stationary (non-moving) entities.

CLIMATE ADAPTATION

SUSTAINABILITY OBJECTIVE

Reducing vulnerability to the harmful effects of climate change (such as increased flooding and drought risks) and making the most of the beneficial opportunities of climate change (such as longer growing seasons).

BASELINE

- Structures valued at \$97 million are at high risk of flooding, including 29 critical facilities located in special flood hazard areas (Thornton, Federal Heights, and Northglenn, 2017).
- The city has five designated shelters in case of emergency (Thornton, Federal Heights, and Northglenn, 2017).

SUCCESS STORIES

- ☑ The city's Drought Management Plan, Emergency Operations Plan, and Natural Hazard Mitigation Plan have all been updated within the last three years (Thornton, 2019a; Thornton, Federal Heights, and Northglenn, 2017). These plans together serve to identify risks and vulnerabilities, identify projects to reduce the risks and vulnerabilities, and put plans into place to respond to emergencies when they occur.
- ☑ City staff participate in regional climate action discussions with the Denver Regional Council of Governments (DRCOG), Regional Sustainability Directors group, the Joint Front Range Climate Alliance, and the Governor's Water Availability Task Force.



GOALS TO ACHIEVE LEVEL 3: COMMUNITY FINDS REGIONAL ALIGNMENT

- ❑ Commit to, and demonstrate progress towards, a reduction in communitywide greenhouse gas emissions of 50% from 2018 levels by 2030.
- ❑ Reinforce the sustainability co-benefits from making infrastructure more resilient to climate change impacts.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ❑ Pursue citywide recognition under the State's Environmental Leadership Program.
 - ❑ Issue guidance for incorporating sustainability into each Department's Strategic Plan.
 - ❑ Assess sustainability impacts from oil and gas leases on northern properties in Weld and Larimer counties, for example to mitigate emissions or determine whether a portion of lease proceeds can be used to fund sustainability programs.
- Communitywide
 - ❑ Update the greenhouse gas emissions inventory at least every two years to track progress and inform future sustainability strategies.
 - ❑ Assess and improve building standards to promote resiliency, particularly for at-risk housing and aging infrastructure.
 - ❑ Leverage development review processes to track voluntary building and site improvements that enhance community resiliency and sustainability.
 - ❑ Implement projects that reduce flooding and other hazard risks for structures.



**YOU CAN
TAKE ACTION!**

- ❑ Familiarize yourself with Thornton's Sustainability Action Agenda and Energy Action Plan to understand what the city is working towards (Thornton and Xcel Energy, 2020).
- ❑ Take some of the steps outlined in this plan to use less energy, use renewable energy, drive less, and throw less waste into the garbage.
- ❑ Contact your state and local representatives to express the importance of addressing climate change impacts in your community.





CARBON-FREE ENERGY SUPPLY

Carbon-Free Energy Supplies are defined as energy sources with a net-zero carbon footprint. They include renewable energy sources under the State of Colorado's Renewable Energy Standard (State of Colorado, 2020), as well as other carbon-neutral technologies such as sewer heat recovery. For the purposes of this Sustainability Action Agenda, Thornton is focusing on energy use from buildings and streetlights, which accounted for 61% of Thornton's community greenhouse gas emissions, and 86% of the emissions from city facilities and operations (Brendle Group, 2020).

Promoting carbon-free energy supplies will be some of the most impactful sustainability actions Thornton can take that are also supportive of climate action goals.

And because Xcel Energy supplies about 90% of the electricity used in the community, Thornton has the opportunity to support – and benefit from – Xcel Energy's commitment to 100% carbon-free electricity by 2050 (Xcel Energy, 2019). United Power supplies the remaining 10% of electricity used in Thornton. That percentage is expected to grow as development continues in the northern and eastern portions of the city. Thornton's Energy Action Plan lays out strategies for Thornton to increase renewable energy supplies for city facilities and operations, as well as helping to educate residents and businesses about their renewable energy options (Appendix A: Thornton's Energy Action Plan).



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, AND BASELINE

DISTRIBUTED RENEWABLES

SUSTAINABILITY OBJECTIVE

Promoting new renewable energy projects by homes, businesses, and institutions, including rooftop solar systems and community solar gardens.

BASELINE

- More than a quarter (28%) of electricity used in Thornton came from carbon-free energy sources in 2018 (Xcel Energy, 2020). That percentage will continue to increase dramatically as Xcel Energy works towards 100% carbon-free electricity by 2050.
- Thornton issued 645 permits for solar projects in 2019.
- Thornton has a combined 150 kilowatts of solar generation capacity installed at Thornton City Hall and the Carpenter Recreation Center.

SUCCESS STORIES

- ☑ Since 2016, Thornton has partnered with Grid Alternatives, a non-profit organization, to promote a program that subsidizes solar installations on income-qualified homes.
- ☑ Amazon's fulfillment center in Thornton has the largest single rooftop solar array in Colorado with a generation capacity of 6.05 megawatts (Denver Post, 2019).

UTILITY-SCALE RENEWABLES

SUSTAINABILITY OBJECTIVE

Promoting renewable energy programs and generation through electric utilities.

BASELINE

Just over one-quarter (28%) of grid-supplied electricity in Thornton came from renewable energy sources in 2018.

SUCCESS STORIES

More than 5% of Thornton households participate in renewable energy programs offered by Xcel Energy and United Power (Thornton and Xcel Energy, 2020).

GOALS TO ACHIEVE LEVEL 2: CITY LEADS THE WAY

- Actively procure renewable energy sources for city facilities and operations where sources are cost-neutral, cost-beneficial, and/or useful to hedging against future rate increases.
- Advocate for new utility-scale programs. For example, write a letter of support for Xcel Energy's Renewable*Connect filing currently before the Public Utilities Commission (PUC).



**YOU CAN
TAKE ACTION!**

- Residents can contact GRID Alternatives to find out if you qualify for a free rooftop solar system.
- Residents and businesses can subscribe to a renewable energy program offered by your electricity provider.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - Complete the planned 294-kilowatt solar project at the Thornton Water Treatment Plant.
 - Conduct a feasibility study of city facilities to identify opportunities for new solar projects. For example, evaluate a potential solar project at the Consolidated Services Center in partnership with Adams 12 Five Star School District.
 - Subscribe city meters to Xcel Energy's Renewable*Connect program if approved. The program is estimated to become available in 2022 if approved by the PUC.
 - Look for opportunities to use sustainable heating and cooling technologies, such as sewer heat recovery.
- Communitywide
 - Share information on renewable energy programs with residents and businesses.







HEALTHY & EFFICIENT BUILDINGS

Healthy & Efficient Buildings not only make efficient use of resources like energy and water, but also incorporate elements that benefit the health, well-being, and productivity of occupants (Figure 7).



Figure 7. Elements of a Healthy Building (McManus, 2018)

FOCUS AREAS, SUSTAINABILITY OBJECTIVES, AND BASELINE EXISTING BUILDINGS

SUSTAINABILITY OBJECTIVE

Improving the energy efficiency and health of existing buildings.

BASELINE

- The city manages 63 buildings representing 846,000 square feet of building space (Thornton and Xcel Energy, 2020).
- The average household in Thornton uses 80 MMBtu² of energy per year. This value is slightly more efficient than the average value of 84 MMBtu per household in the Mountain North region of the US (US Energy Information Administration, 2018).
- 50% of homes in Colorado have radon levels that exceed the federal action level and need to be mitigated to be protective of human health (Colorado Department of Public Health & Environment, 2019b).

² Million British Thermal Units, a common unit of energy, that encompasses both electricity and natural gas usage. For reference, a refrigerator made in the last five years uses about 1.9 MMBtu of energy per year (ENERGY STAR, 2020).

SUCCESS STORIES

- ☑ Implementation of Thornton's Energy Action Plan began in 2020 to help city facilities, residences, and businesses save energy (Appendix A: Thornton's Energy Action Plan).
- ☑ Thornton's Help for Homes and Home Repair Loan programs help residents make improvements in their homes, including energy efficiency measures (Thornton, 2020d).
- ☑ In 2020, the city will complete a three-year project to upgrade city facilities to energy-efficient light-emitting diode (LED) technology. This upgrade is expected to save 30% of the city's lighting electricity usage (Colorado Department of Public Health and Environment, 2019c).
- ☑ Streetlights served by United Power are being upgraded to LED technology.



NEW BUILDINGS

SUSTAINABILITY OBJECTIVE

Constructing buildings with sustainable design features, made of durable and healthy materials, and using practices that minimize construction waste.

BASELINE

- Nine (9) buildings in Thornton are LEED (Leadership in Energy and Environmental Design) certified. LEED is one of several green building rating systems. Two of the LEED-certified buildings – Trail Winds Recreation Center and Carpenter Recreation Center – are owned by the city.

SUCCESS STORIES

- Thornton updates building codes every three years to incorporate energy, water, and other building improvements. In 2019, Thornton upgraded to the 2018 codes (Thornton, 2020f).
- Thornton's Energy Action Plan addresses energy efficiency measures in new developments (Appendix A: Thornton's Energy Action Plan).
- New developments in Xcel Energy-served territory are required to install city-owned streetlights that use LED technology.



GOALS TO ACHIEVE LEVEL 3: COMMUNITY FINDS REGIONAL ALIGNMENT

- Promote energy efficiency and healthy indoor environments in new and existing buildings.
- Incentivize and incorporate sustainable design principles into new buildings and city operations.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - Require that new city projects consider environmental and social impacts and benefits, in addition to economic considerations, during design and construction.
 - Establish guidelines for purchasing, and maintaining, healthy building materials in city facilities.
- Communitywide
 - Continue updating building codes every three years.
 - Establish healthy and sustainable design guidelines for public and private developments and redevelopment projects throughout the community.
 - Collaborate with partners such as Tri-County Health Department to expand existing programs and educational materials.



**YOU CAN
TAKE ACTION!**

- Residents and business can participate in energy efficiency programs offered by your energy provider to save energy and money.
- Residents can contact Tri-County Health for information about testing your home for radon.
- Residents, businesses, and the city can switch to natural cleaning products to improve indoor air quality in your home or office.





SUSTAINABLE TRANSPORTATION & CLEAN AIR

The Sustainable Transportation & Clean Air topic focuses on the interdependencies between regional transportation issues and poor air quality. Thornton is largely a car-dependent community, with the transportation sector accounting for 32% of communitywide greenhouse gas emissions (Brendle Group, 2020). Oil and gas extraction and processing in Thornton also contribute to poor air quality, adversely impacting vulnerable communities.



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, AND BASELINE

MULTIMODAL TRANSPORTATION

SUSTAINABILITY OBJECTIVE

Make available and promote all transportation modes, including mass transit, walking, biking, and carpooling.

BASELINE

- In Thornton, 95% of commuters drive alone, for an average of 17 vehicle miles traveled per day per person (Brendle Group, 2020). This value is below average for the Denver metropolitan region, where the average commuter drives 26 miles per day (DRCOG, 2019).
- Thornton has 61 miles of on-street bike lanes and paved shoulders as of 2019 and has made a commitment to increase them (Thornton, 2017a).



SUCCESS STORIES

- ☑ Thornton has codified and incorporated “Complete Streets” into its Standards and Specifications to promote safe street access for all users and travel by alternative methods (Thornton, 2011a).
- ☑ RTD’s N Line is slated to open in September 2020. This electric rail line connects Thornton to the rest of the Denver metropolitan area and offers a sustainable commuting option to many of Thornton’s residents.

TRANSIT-ORIENTED DEVELOPMENT (TOD)

SUSTAINABILITY OBJECTIVE

Creating mixed-use areas that take advantage of available transportation options in compact and pedestrian-oriented environments.

BASELINE

- In 2019, Thornton had an AllTransit™ performance score of 3.8 out of 10, indicating that few residents were able to take transit to work. The average score in the Denver metropolitan region is slightly higher, at 5 (Center for Neighborhood Technology, 2019). Thornton's performance score is expected to increase with the opening of the N Line in 2020.

SUCCESS STORIES

- ☑ FasTracks Master Plans have been developed and are being implemented for each N Line stop in Thornton (Thornton, 2020a).
- ☑ Thornton's future land use map promotes smart growth by including more mixed-use development in many parts of the city and transit-oriented developments in proximity to the four commuter rail stations which serve the community (Thornton, 2020c).



AIR QUALITY

SUSTAINABILITY OBJECTIVE

Reducing or preventing air pollution from vehicles, oil and gas wells, and other emissions sources.

BASELINE

- Thornton has one pollutant, ground-level ozone, that often exceeds the National Ambient Air Quality Standards established by the Clean Air Act (US Environmental Protection Agency, 2020a).
- Since January 2020, the Denver Metro/ Front Range ozone nonattainment zone has been downgraded from “moderate” to “serious” status (Colorado Department of Public Health & Environment, 2019a; US Environmental Protection Agency, 2020b).

SUCCESS STORIES

- ☑ Thornton recently installed two new air quality monitoring stations.
- ☑ Thornton participates in regional groups that collaborate to improve air quality.



ELECTRIC VEHICLES

SUSTAINABILITY OBJECTIVE

Accelerating the adoption of electric vehicles and the installation of charging infrastructure.

BASELINE

- 1% of units in Thornton’s fleet are electric vehicles, and 5% of units are hybrid gas/electric vehicles.
- There are 15 electric vehicle chargers in the community (PlugShare, 2020).

SUCCESS STORIES

- ☑ The Thorncreek golf course maintenance team has purchased hybrid lawnmowers.
- ☑ There are two electric vehicle charging stations installed at city facilities, one at the Infrastructure Maintenance Center and the other at Trail Winds Recreation Center. Additional charging stations will be installed at City Hall and at Trail Winds Recreation Center through a grant-funded project.



GOALS TO ACHIEVE LEVEL 4: COMMUNITY SHINES AS A NATIONAL LEADER

- ☐ Increase the proportion of electric vehicles in the city's fleet and in the community.
- ☐ Expand safe and convenient public transit, walking, and bicycling routes, including last-mile transportation connections.
- ☐ Reduce the number of city employees and community members driving alone by promoting sustainable transportation options.

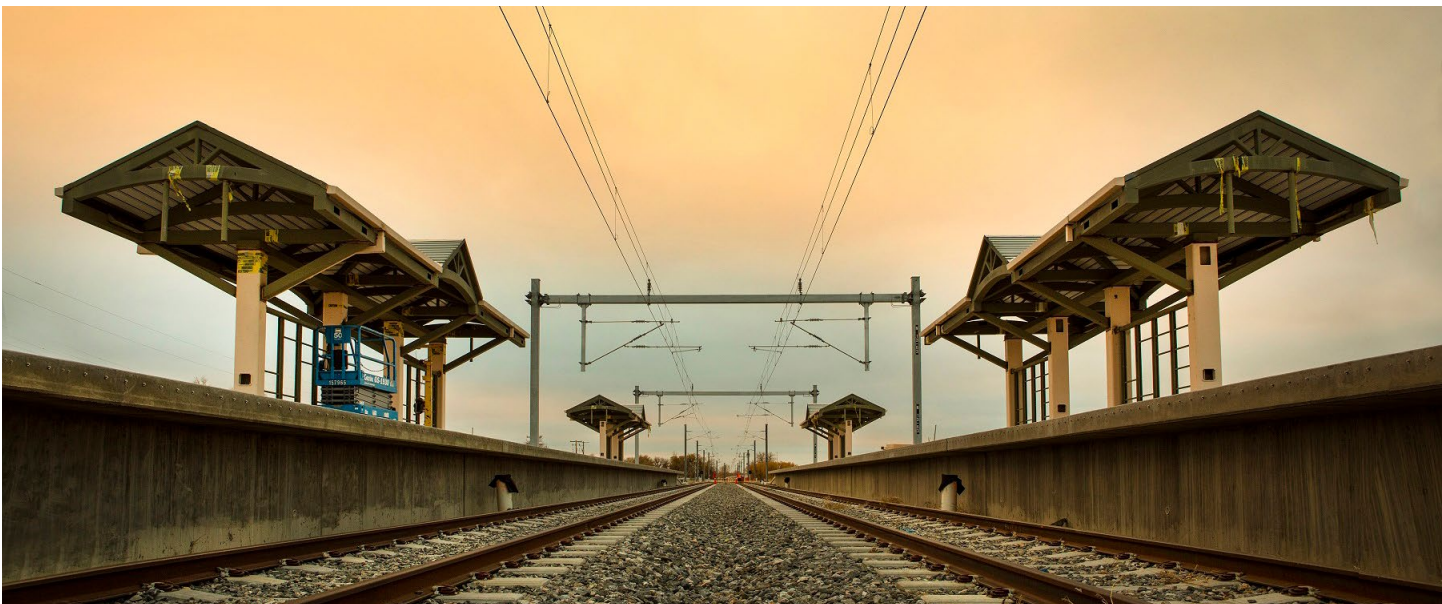
HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ☐ Implement the 10-year fleet management plan to include fleet electrification.
 - ☐ Expand charging infrastructure by utilizing grant funding and planning opportunities.
 - ☐ Incorporate life cycle cost or other evaluation approach into transportation procurement (or replacement) policies to promote electric vehicles.
- Communitywide
 - ☐ Promote existing, and explore additional, alternative transportation options, including the N Line, shuttle service, bicycling, shared micro-mobility, and ride-share options.
 - ☐ Promote flexible working arrangements, such as telecommuting.
 - ☐ Increase bicycling and sidewalk infrastructure and access.
 - ☐ Explore options to reduce costs of public transportation for under-resourced populations.
 - ☐ Develop a roadmap for transportation electrification in the community that addresses expanding charging infrastructure, using renewable energy supplies for charging infrastructure where feasible, education and awareness, equity, and electric vehicle adoption.



**YOU CAN
TAKE ACTION!**

- ☐ Walk, run, bike, scoot, or skate to nearby places.
- ☐ Consider mixing transportation modes, such as biking to an N Line stop to go to downtown Denver.
- ☐ Organize car trips around things located close to each other to minimize trips.
- ☐ Advocate for increased transportation options and electric vehicle infrastructure.
- ☐ Be aware of ozone alert days. When they occur, stay indoors, and minimize your use of lawnmowers, other small engines, and cars.







WASTE REDUCTION & RECYCLING

The Waste Reduction & Recycling topic promotes the well-known mantra of “reduce, reuse, recycle.” Emerging trends in the waste sector focus on creating a zero-waste culture, also known as a circular economy, where waste streams from one process serve as inputs to other processes, creating a closed-loop system that minimizes waste disposal volumes. While only 7% of communitywide greenhouse gas emissions that originate in Thornton come from the waste sector, almost half of greenhouse gas emissions in the US originate from the ways we produce, consume, and dispose of materials (Brendle Group, 2020; US Environmental Protection Agency, 2009). Recycling and composting efforts in Colorado have proven to be an effective climate action strategy, serving to reduce greenhouse gas emissions by more than 1,800,000 metric tons of carbon dioxide equivalent, a comparable amount to taking more than 400,000 conventional vehicles off the road (Bailey, Setzke, & Katz, 2019). Waste disposal services in Thornton are delivered by a combination of providers that offer varying services. The city offers curbside recycling services to customers, who are primarily in residential neighborhoods. Residents and businesses served by private haulers do not have access to curbside recycling services. No providers offer curbside yard waste or composting services in the community.



FOCUS AREAS, SUSTAINABILITY OBJECTIVE, & BASELINE

MATERIALS

SUSTAINABILITY OBJECTIVES

- Procuring healthy, durable, and local materials, including construction materials, chemicals, and other material inputs.
- Reducing waste generation, pollution, and other harmful environmental impacts.

BASELINE

- An estimated 143,000 tons of waste were generated by the Thornton community in 2018 (Colorado Department of Public Health and Environment, 2018).
- Success stories
- The city uses 25% recycled asphalt material in paving projects.
- The city is collaborating with other Denver metropolitan and Front Range communities to improve regional waste systems.

RECYCLING

SUSTAINABILITY OBJECTIVE

Collecting materials that would otherwise be thrown away as trash and turning them into new products.

BASELINE

- 13% of waste collected through Thornton's trash and recycling service is diverted from landfills in order to be recycled or composted (Thornton, 2018b). At this time, all composting is achieved through drop-off, rather than curbside, programs.



SUCCESS STORIES

- ☑ The city provides curbside recycling services to its residential customers.
- ☑ The city offers residents access to free drop-off locations to collect and recycle motor oil, antifreeze, cooking oil, and other hard-to-recycle materials.
- ☑ The city hosts recycling events in partnership with Adams County to collect and recycle electronic waste.

COMPOSTABLES

SUSTAINABILITY OBJECTIVES

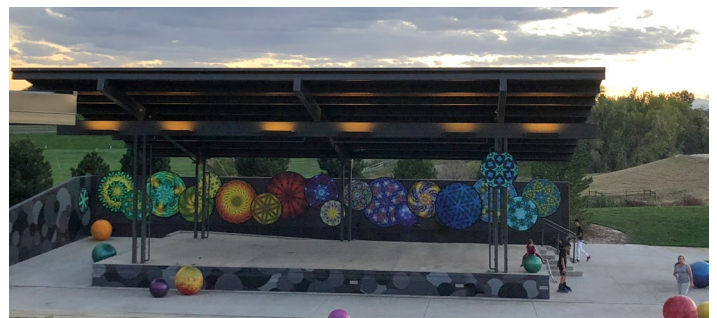
- Reducing food waste.
- Diverting food and yard waste from landfills by rescuing surplus food and composting food and yard waste.

BASELINE

- Thornton has the opportunity to take big steps in this area, as no residents or businesses have access to curbside compost or yard waste services.

SUCCESS STORIES

- ☑ The city offers residents access to free drop-off locations for compostable materials.
- ☑ The city launched a pilot program for several city facilities to collect compostable materials from bathrooms and kitchens.



GOALS TO ACHIEVE LEVEL 3: COMMUNITY FINDS REGIONAL ALIGNMENT

- ☐ Increase community waste diversion through recycling, composting, and yard waste services.
- ☐ Foster a zero-waste culture at the city through sustainable purchasing policies, zero-waste events and operations, and education.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ☐ Establish a sustainable purchasing policy that allows procurement decisions to be made based on environmental and social impacts, as well as financial considerations.
 - ☐ Improve data collection and tracking for waste generation and diversion.
 - ☐ Coordinate recycling efforts for electronics and shredded paper.
- Communitywide
 - ☐ Provide zero-waste education to the community, including recycling and composting information.
 - ☐ Expand waste services to include curbside recycling and composting for households and schools serviced by the city.
 - ☐ Work with regional partners to increase the number and awareness waste collection and recycling events.



**YOU CAN
TAKE ACTION!**

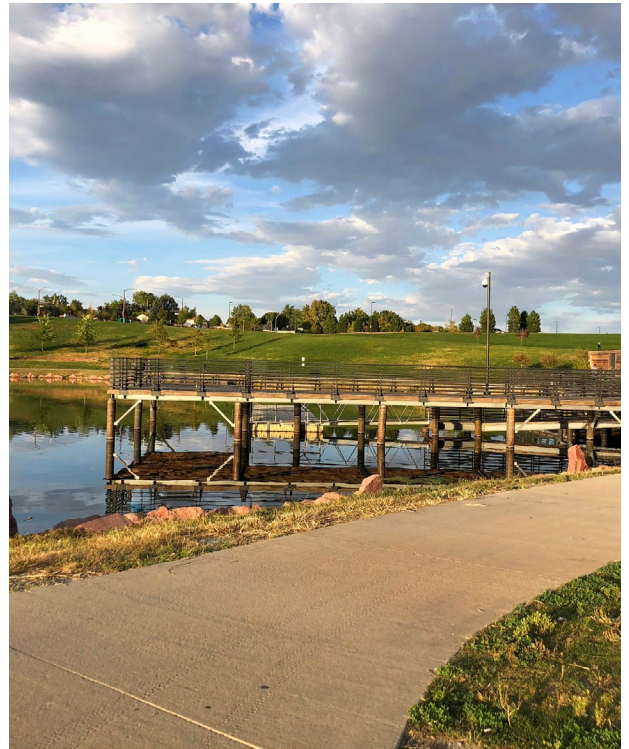
- ☐ Shop for products with minimal packaging, such as bulk foods.
- ☐ Get a list from your waste provider to figure out what can, and cannot, be recycled.
- ☐ Collect hard-to-recycle items like old electronics, bike tires, and cosmetics and find locations that will recycle them.





SUSTAINABLE WATER & LAND MANAGEMENT

Water stress is increasing in many parts of the US due to water supply shortages, population growth, and water quality degradation (Fedak, et al., 2018). Though a growing population and expanding economy are often welcome signs of community vitality, these forces can also strain natural resources. Traditional strategies to mitigate water stress have included developing new supplies, adding new storage, implementing water efficiency programs, and encouraging the use of alternative water supplies (Keystone Policy Center, 2018). Communities are increasingly seeking to better integrate water supply considerations into land use planning and development decisions. For example, the Colorado Water Plan states that 75% of Coloradans should live in communities that, by 2025, have integrated water-saving actions into land-use planning (State of Colorado, 2015). Thornton, like many communities in the Denver metropolitan region, expects to experience population growth in the foreseeable future, with commensurate demands placed on the community's land and water resources.



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, AND BASELINE

WATER QUALITY

SUSTAINABILITY OBJECTIVE

Improving watershed health, protecting source watersheds, and continuing pollution prevention programs.

BASELINE

- All 52 miles of assessed streams within Thornton's boundaries are classified as impaired waters under the Clean Water Act for recreation and water supply uses due to E Coli and selenium pollution (Colorado Department of Public Health and Environment, 2020c). Naturally occurring sources and industrial and agricultural operations upstream of Thornton are the predominant sources of these pollutants.
- Thornton operates two state-of-the-art drinking water treatment plants to treat water to drinking water standards.

SUCCESS STORIES

- ☑ Thornton's drinking water system provides clean and reliable water to residents and businesses. No state or federal drinking water standards were exceeded in 2018 or 2019, and additional testing for unregulated contaminants did not detect any issues (Thornton, 2019b). Thornton also provides stormwater and wastewater collection services.
- ☑ The city completed an integrated utility master plan in 2020 (Thornton, 2019c).



WATER QUANTITY

SUSTAINABILITY OBJECTIVE

Sustainably managing water resources that serve as water supplies or receiving waters.

BASELINE

- Thornton's residents used an average of 81 gallons of water per person per day in 2018 (79 gal/person/d in 2019), which is more efficient than the average value of 85 gallons of water per person per day across Colorado (State of Colorado, 2015).
- City facilities use almost 17 million gallons of potable water per year. That is about the same amount of water used by 200 homes in a year or to manufacture 400 cars (US Environmental Protection Agency, 2016).
- The city uses more than 465 million gallons of water each year to irrigate rights-of-way, medians, and approximately 800 acres of parks.



SUCCESS STORIES

- ☑ The city's water efficiency programs save more than 420 million gallons of water each year communitywide (Thornton, 2018c).
- ☑ Irrigation water for city facilities and properties increasingly comes from raw water supplies, easing the pressure on drinking water supplies while also saving energy and chemical use associated with the drinking water treatment process.

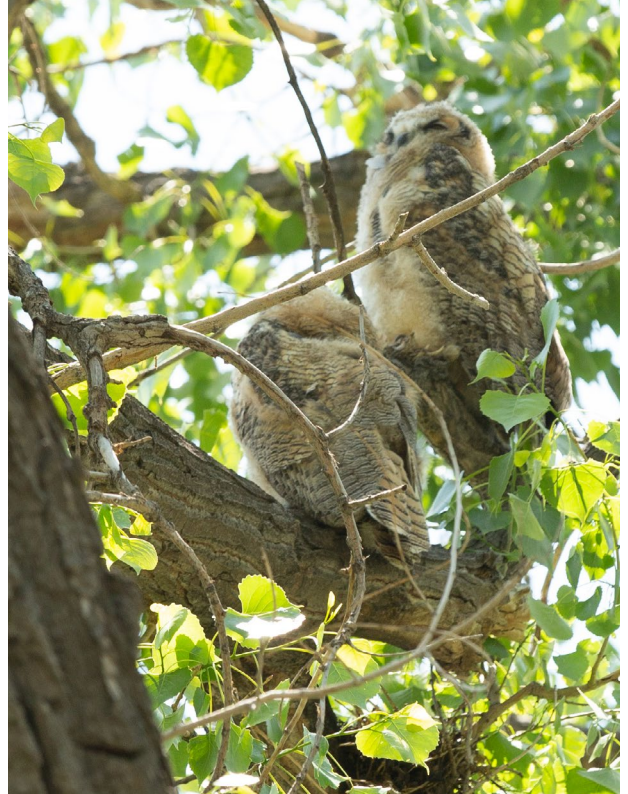
LAND MANAGEMENT

SUSTAINABILITY OBJECTIVE

Putting land resources to best and highest value use, providing residents with access to parks and open spaces, and preserving land covers such as tree canopies that provide environmental benefits.

BASELINE

- Thornton has six acres of parks per 1,000 residents.
- The city manages more than 33 square miles of land within Thornton's boundaries (in the form of city-owned parks, open spaces and lands, and parcels associated with municipal facilities) as well as in Weld and Larimer counties.
- The city manages more than 14,000 trees, which are estimated to represent 10% of all trees in Thornton.
- The city sells approximately 50 trees per year at cost to residents to promote tree planting on private property.



SUCCESS STORIES

- ☑ Thornton completed the Parks and Open Space Master Plan in 2017, which incorporates principles to sustainably manage land (Thornton, 2017a).
- ☑ The 29 square miles of land Thornton manages in Weld and Larimer Counties represent a unique opportunity to promote environmentally beneficial land uses. A stewardship plan for the properties was initiated in 2019.

GOALS TO ACHIEVE LEVEL 4:



COMMUNITY SHINES AS A NATIONAL LEADER

- ☐ Reduce potable water demands by minimizing water used for irrigation, by promoting the right quality of water be put to the right use, and by increasing population density.
- ☐ Increase tree canopies, parks and open spaces, and green infrastructure.
- ☐ Reduce pesticides used for land management.
- ☐ Expand social and environmental benefits of land uses.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ☐ Implement the Naturally Thornton initiative to convert sod to native grasses (Thornton, 2020g).
 - ☐ Expand the city's tree planting and tree sale programs.
 - ☐ Fund integrated pest management practices that primarily rely on biological and physical approaches, rather than just chemical.
 - ☐ Pursue the Northern Properties Stewardship Plan and identify ways to use the northern properties in Larimer and Weld counties to support agriculture, renewable energy, recreation, or other socially and environmentally beneficial land uses.
- Communitywide
 - ☐ Better integrate water considerations into land use planning and development decisions. Use incentives and regulatory mechanisms to promote water efficiency measures in new developments.
 - ☐ Reduce supplemental irrigation demands on large properties. Promote alternative water supplies where allowable and feasible.
 - ☐ Build on the city's existing water waste ordinance to implement permanent watering rules.



**YOU CAN
TAKE ACTION!**

- ☐ Take advantage of the city's water efficiency programs and rebates to save water and money.
- ☐ Consider landscaping with drought-resistant and low-water using plants, rather than sod.
- ☐ Properly dispose of cleaning products, motor oil, and other hazardous household chemicals.
- ☐ Use fertilizers, pesticides, and herbicides sparingly.
- ☐ Report illegal dumping into waterways.
- ☐ Participate in local river cleanup days.
- ☐ Plant a tree!





MARGARET W. CARPENTER RECREATION CENTER





HEALTHY COMMUNITY

A healthy community contributes to social sustainability by providing programs that help address the needs of its residents. Thornton builds on a strong history of community programs that provide residents with access to local food options, parks and recreation amenities, and community events. Partnerships with regional agencies and local organizations help deliver key health and human services and opportunities to build strong community connections. A healthy community with strong social connections becomes ever more important as residents face challenges such as those occurring with the COVID-19 public health crisis, resulting economic recession, and racial equity demonstrations.



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, & BASELINE

SENSE OF COMMUNITY

SUSTAINABILITY OBJECTIVE

Fostering supportive social networks, civic participation, and community diversity.

BASELINE

The American Association of Retired Persons (AARP) judges that Thornton scores a 52 based on their Livability Index, slightly higher than the national average of 50 (AARP, 2018). Thornton scores well in the inclusion opportunity, neighborhood, transportation, health, and environment categories, but relatively low in the engagement and housing categories.

SUCCESS STORIES

- ☑ The city's Community Connections division provides resources to support all members of the community.
- ☑ The city participated in the Denver Regional Council of Government's Boomer Bond initiative to evaluate and improve existing resources, programs, and infrastructure for older adults (Denver Region Council of Governments, 2019).
- ☑ The city hosts more than ten festivals and special events each year.

HEALTHY EATING

SUSTAINABILITY OBJECTIVE

Ensuring availability of, and access to, a variety of healthy food options.

BASELINE

Most Thornton residents (78%) have low access to healthy food options (US Department of Agriculture, 2015).

SUCCESS STORIES

- ☑ The city, in partnership with the Tri-County Health Department, the American Heart Association, and Anythink Libraries, holds a summer farmers' market series to provide fresh fruit and vegetables to the community at an affordable cost.
- ☑ There are ten community gardens located in Thornton. All participants are required to donate a portion of the food grown to local food banks (Thornton, 2019d).
- ☑ The city's summer recreation programs, in partnership with Adams 12 School District, provide free meals for kids from income-qualified families.
- ☑ The city has expanded its employee wellness program to offer services intended to address the physical, mental, and financial health of employees.



ACTIVE LIVING

SUSTAINABILITY OBJECTIVE

Providing facilities and areas that promote physical activity where people can live, learn, work, and play.

BASELINE

90% of Thornton residents live within a 10-minute walking distance of a park (The Trust for Public Land, 2019).

SUCCESS STORIES

- ☑ The Thornton City Council adopted a resolution affirming a commitment to encourage healthy opportunities for the community and joining LiveWell Colorado's Healthy Eating, Active Living Cities and Towns Campaign (Thornton, 2013a).
- ☑ The city opened a second recreation center (Trail Winds), which provides access to a pool, gym, climbing wall, running track, and more.
- ☑ Thornton's new Active Adult Center includes a fitness studio and offers massage, podiatry, acupuncture, and visiting nurse services.
- ☑ Thornton's Parks, Recreation, and Community Programs Department is a finalist for the 2020 National Gold Medal Awards for Excellence in Parks & Recreation Management.
- ☑ The city's expanded employee wellness program includes nutrition education classes.

GOALS TO ACHIEVE LEVEL 3: COMMUNITY FINDS REGIONAL ALIGNMENT

- ☐ Create an age-friendly community by developing policies and programs to support residents aging in place and multi-generational living.
- ☐ Increase the availability of, and access to, local food choices.
- ☐ Promote active living by providing equitable access to recreation and ensuring that Thornton parks, recreation facilities, trails, and open spaces continue to adapt to the needs of current and future residents.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ☐ Continue offering fitness classes and other wellness programs for employees of all ages and abilities.
- Communitywide
 - ☐ Measure and track Thornton's sense of community to inform future initiatives.
 - ☐ Promote aging-in-place and multi-generational living in new and existing developments.
 - ☐ Improve utilization of city properties for local food and farmer partnerships.
 - ☐ Work with other organizations to expand farmers' markets, community gardens, community-supported agriculture, and residential food production.
 - ☐ Remove barriers that prevent residents from visiting recreational facilities, for example by improving public transportation options and childcare offerings.



**YOU CAN
TAKE ACTION!**

- ☐ Get to know your neighbors and organize a block party.
- ☐ Check in with older adults in your neighborhood.
- ☐ Join a community garden or shop at a farmers' market.
- ☐ Grow vegetables and fruit in your backyard.
- ☐ Exercise at a nearby park or recreation center.
- ☐ Find safe walking and biking options in your neighborhood.





RESILIENT ECONOMY

The current economic recession is unprecedented, with recent data showing a national decline of 33% in gross domestic product occurring in the second quarter of 2020 (US Bureau of Economic Analysis, 2020). A resilient economy contributes to economic sustainability by providing programs that help businesses operate successfully in Thornton and acknowledging that additional support is needed during periods of economic downturns. Thornton has been working diligently with regional and state partners to develop new programs and services to help businesses survive and recover from the current crisis.



FOCUS AREAS, SUSTAINABILITY OBJECTIVES, & BASELINE

SUSTAINABLE DEVELOPMENT

SUSTAINABILITY OBJECTIVE

Ensuring that sustainable development options are available to businesses and that residents have access to a variety of affordable and quality housing types.

BASELINE

- The median home price in Thornton is \$354,000, about 10% less than the median home price in the Denver metropolitan region (Thornton, 2018a).
- Even with relatively affordable housing options, almost one-third of Thornton households are cost-burdened, defined as spending more than 30% of income on housing costs (Western Economic Services, 2019).



SUCCESS STORIES

- ☑ The Balanced Housing Task Force was created in 2017 to advise City Council on ways to increase housing options for low- and moderate-income residents.
- ☑ The city offers financial assistance programs to help income-qualified homeowners with home repairs, including improvements that save energy and water, providing sustainability co-benefits (Thornton, 2020d).

BUSINESS HEALTH

SUSTAINABILITY OBJECTIVE

Creating opportunities for businesses to thrive and help strengthen the local economy.

BASELINE

As of 2016, the jobs-to-housing ratio in Thornton was relatively low at 0.47, indicating there are less than half as many jobs in Thornton as there are housing units.

SUCCESS STORIES

- ✓ The city offers a variety of programs and services that support businesses, including grant funding, site selection support, and business health check-ups (Thornton, 2020e).
- ✓ The city has developed business resource guides to help businesses navigate the startup process and to access pandemic-related assistance resources (Thornton, 2020e).



WORKFORCE DEVELOPMENT

SUSTAINABILITY OBJECTIVE

Educating and training individuals to enter the local workforce and help businesses thrive.

BASELINE

Thornton had an unemployment rate of less than 3% in 2018 (US Census Bureau, 2018), though it is anticipated that the COVID-19 global pandemic has significantly increased this number.

SUCCESS STORIES

- ✓ The Adams County Workforce and Business Center offers career development classes and other services to support jobs seekers (Adams County, 2020).
- ✓ Thornton partners with GRID Alternatives, a non-profit organization whose mission includes a commitment to workforce development in the solar industry.



GOALS TO ACHIEVE LEVEL 3: COMMUNITY FINDS REGIONAL ALIGNMENT

- ☐ Provide a diverse range of employment opportunities and foster a resilient local economy.
- ☐ Provide a range of good quality and sustainable housing options and commercial spaces.
- ☐ Support and promote workforce development programs tailored to the Thornton community.

HIGHLIGHTED STRATEGIES

- City facilities and operations
 - ☐ Continue to offer employee programs that are supportive of financial stability and planning.
- Communitywide
 - ☐ Support regional efforts and establish programs and policies to support resilient businesses.
 - ☐ Encourage affordable and quality housing options, including options such as co-housing communities.
 - ☐ Promote sustainable commercial development.
 - ☐ Work with regional partners to align post-secondary education programs, workforce development training programs, and economic development strategies.



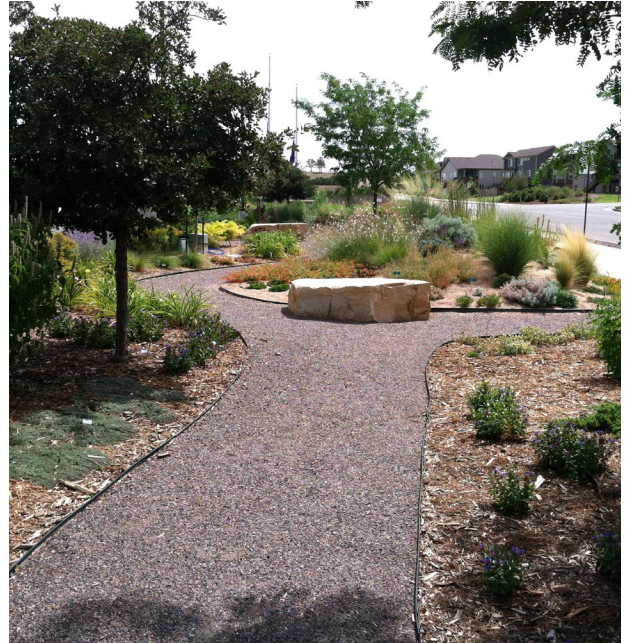
**YOU CAN
TAKE ACTION!**

- ☐ Shop local – find businesses at BusinessinThornton.com.
- ☐ Learn a new skill at a local community center or college.
- ☐ Offer internship and mentorship opportunities.
- ☐ Volunteer with youth programs.



ACTIVATING OUR SUSTAINABILITY AGENDA

This Sustainability Action Agenda was introduced to City Council at a July 2020 planning session. Council affirmed Thornton's continued participation in Xcel Energy's Partners in Energy offering, through which the city will implement the Energy Action Plan (Appendix A: Thornton's Energy Action Plan), which influences particularly the topics of Climate Action, Carbon-Free Energy Supply, and Healthy & Efficient Buildings. For the remaining sustainability topics, Thornton will begin implementation with an emphasis on strategies that can be accomplished within existing staff resources and using annual operating appropriations or external funding sources, where they can be procured. The city has developed implementation action plans for each of the sustainability topics to identify the implementation teams, performance targets, action items, and timelines necessary to implement the strategies in this Sustainability Action Agenda.



Thornton expects to realize myriad benefits from these efforts to improve sustainability within the organization and community. Anticipated benefits in the near-term include utility cost savings, improved facilities, less waste, operational efficiencies, employee and resident wellness, improved procurement practices, external funding support, and alignment with regional and state partners. Longer-term benefits include reduced climate change impacts, resilient infrastructure, better air quality, plentiful natural resources, and strong community values that support current and future generations of Thornton residents and businesses.



YOU CAN TAKE ACTION!

CITY EMPLOYEES CAN

- ☐ Help implement this Sustainability Action Agenda within the organization and talk to co-workers about the value of sustainability.
- ☐ Start a sustainability challenge within or across departments.
- ☐ Share your sustainability successes with the Sustainability Task Force.

RESIDENTS CAN

- ☐ Educate your neighbors and places of business about the energy and sustainability action Thornton is taking.
- ☐ Get educated about sustainability topics and learn about the city's efforts at ThorntonSustainability.com.



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GLOSSARY OF SUSTAINABILITY TERMS

Circular economy: An economic system aimed at eliminating waste and reusing resources.

Community-supported agriculture (CSA): A food system that connects producers with consumers.

Energy action plan: A written plan that includes an integrated approach to all aspects of energy management and efficiency (Appendix A: Thornton's Energy Action Plan).

Electric vehicle (EV): A vehicle powered by a battery and electric motor, rather than gasoline, diesel, or other fossil fuels.

Electronic waste (E-waste): Used electrical or electronic devices.

Gross domestic product (GDP): An economic measure of the market value of the goods and services produced.

Greenhouse gas (GHG): Gases in the atmosphere that absorb and emit radiant energy within the thermal infrared range. Primary GHGs include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. GHGs are associated with climate change impacts.

Light-emitting diode (LED): An energy-efficient light bulb technology.

Leadership in Energy and Environmental Design (LEED): A green building certification program.

Kilowatt (kW): A unit of electric power equivalent to 1,000 watts.

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

Megawatt (MW): A unit of electric power equivalent to 1,000,000 watts.

Metric tons of carbon dioxide equivalent (MT CO₂e): A unit of measure used to compare the emissions from different greenhouse gases based on their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by its associated GWP.

Million British Thermal Units (MMBtu): A measure of energy content or usage, often used to combine consumption across fuel types, such as electricity and natural gas.

Solar garden: A shared solar array with grid-connected subscribers who receive bill credits for their subscriptions.

Solar photovoltaic (PV): Solar cells/panels that convert sunlight into electricity.

Stationary energy use: Energy use associated with buildings (residential, commercial, or industrial) or other stationary (non-moving) entities. Does not include energy use associated with transportation or other non-stationary (moving) entities.

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

Therm: A unit of heat energy, often used to represent natural gas consumption .

Transit-Oriented Development (TOD): A type of urban development that maximizes the amount of residential, business, and recreational spaces within walking distance of public transport.

Vehicle Miles Traveled (VMT): A key transportation metric representing the number of miles traveled by vehicle.



APPENDIX A: THORNTON'S ENERGY ACTION PLAN

See following pages.





Thornton, Colorado

ENERGY ACTION PLAN

September 2020

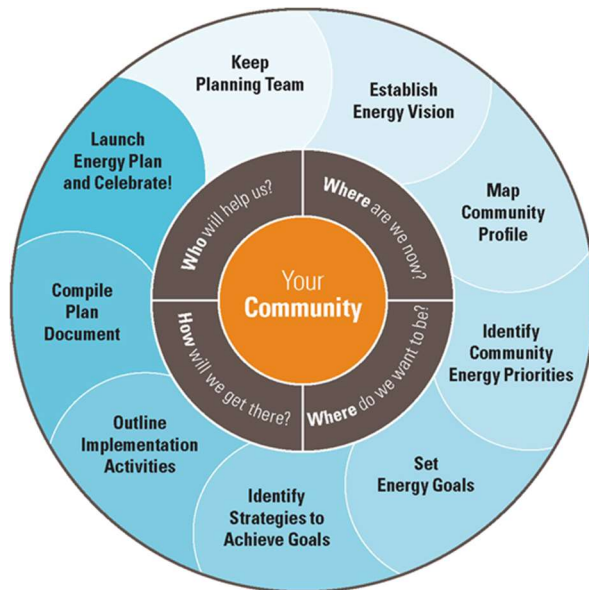


PARTNERS IN ENERGY
An Xcel Energy Community Collaboration

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 energy. Energy is a dynamic topic, and it is changing rapidly - with new ways to save, the growth of renewables, electric vehicles, and changing regulations. With these competing priorities and stretched resources, creating and maintaining an energy-conscious culture within a community can be a missed opportunity in meeting energy and sustainability goals.

In the summer of 2014, Xcel Energy launched Partners in Energy as a collaborative solution for communities to reach their goals. The content of this plan is derived from a series of planning workshops held in the community, with a planning team committed to representing local energy priorities and implementing plan strategies.



Partners in Energy Process for Success



Resources from Xcel Energy for Implementation

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Thornton's Energy Action Planning Team

Project Management Team

- **Pia Gerstle, Water Resources**
- **Emily Hunt, Water Resources**
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- **Martin Postma, City Development**

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- **Scott Tekavec, Information Technology**
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Community Partners

- **Tom Green, United Power**
- **Matt McNearney, GRID Alternatives**
- **Shannon Oliver, Adams 12 Five Star School District**

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- **Terry Hatfield, Partners in Energy Facilitator**
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Executive Summary

This plan is the first Energy Action Plan developed for Thornton. As such, it lays out an energy vision along with energy efficiency and renewable energy goals focused on city operations, as well as the broader community, for the first time.

The content of the plan was developed collaboratively with a stakeholder team through four planning workshops conducted from November 2019-March 2020. The planning team included representatives from the city, community partner organizations, and the two utilities (Xcel Energy and United Power) which provide electricity and natural gas service to the Thornton community.

Thornton joins more than 20 other Colorado communities that have developed energy action plans through Xcel Energy's Partners in Energy, an offering which provides resources for community energy planning. Partners in Energy also supports 18 months of plan implementation in the form of marketing and communications, data tracking and analysis, program expertise, and project management.

Energy Baseline

Thornton is predominantly a residential community, with 93% of locations that are served electricity, natural gas, or both fuel types classified as residential. In the baseline year of 2018, the Thornton community used almost 718 million kWh of electricity and 38 million therms of natural gas - for a total energy cost of \$89 million. This amount of energy usage puts Thornton in line with other Denver metropolitan communities such as Arvada, Broomfield, and Westminster (Xcel Energy, 2019).

Thornton municipal operations used more than 26 million kWh and 485,000 therms of natural gas, for a total energy cost of \$2.6 million. Although municipal locations account for only 0.4% of locations served, city facilities and operations account for 4% of electricity usage and 1% of natural gas usage.

Our Energy Vision

Thornton will lead the way in creating a more resilient community through energy efficiency improvements and the adoption of energy sources that reduce carbon emissions from municipal operations while also facilitating equitable access to energy programs and opportunities for residents and businesses.

Our Goals

The planning team expressed a collective desire to "move the needle" on a community scale through energy efficiency improvements and promotion of renewable energy sources in the short term (2020-2022), and through alignment with the State of Colorado's climate commitments in the long-term (2030 and beyond).

Based on these shared intentions, Thornton commits to:

- By 2022, increasing participation in energy efficiency and renewable energy programs by 30% over the 2018 baseline year.
- By 2030, aligning with state climate and energy goals, which means reducing greenhouse gas emissions by at least 50% across all sectors.

Focus Areas and Strategies

Thornton has identified four focus areas and ten strategies to achieve these goals (**Table 1**). The city aims to lead the way in energy action for the broader community by contributing more than half of the anticipated energy savings from its own facilities and operations. These savings will be achieved by focusing on lighting upgrades, water system process efficiency, and a new solar PV project. As a top employer and community leader in sustainability, Adams 12 Five Star School District was a key stakeholder in plan development and will be improving energy efficiency and renewable energy in several Thornton schools through an energy performance contract. The city will work with Xcel Energy to plan and deliver home energy efficiency and business lighting campaigns that help residents and businesses save energy and money, while also meeting the goals of this plan.

Table 1. Energy Action Plan Highlights

| Focus Area | Strategies | Notable Projects | Energy Savings Contribution |
|-------------------------------------|---|--|-----------------------------|
| Municipal Facilities and Operations | <ul style="list-style-type: none"> • Manage Energy Action Plan Implementation • Manage Energy Program • Promote Existing Facility Efficiency • Promote Efficient New Development • Promote Carbon-Free Energy Sources • Promote Energy Awareness and Training | <ul style="list-style-type: none"> • Lighting upgrades • Water system process efficiency • New solar PV project | 55% |
| Institutional | <ul style="list-style-type: none"> • Collaborate with Adams 12 Five Star School District • Engage with Other Institutional Stakeholders | <ul style="list-style-type: none"> • Energy performance contract at selected Thornton schools | 15% |
| Residential | <ul style="list-style-type: none"> • Promote Residential Energy Improvements | <ul style="list-style-type: none"> • Home energy efficiency campaign | 25% |
| Business | <ul style="list-style-type: none"> • Promote Business Energy Improvements | <ul style="list-style-type: none"> • Business lighting campaign | 5% |

Impact of Plan Implementation

If this Energy Action Plan is fully implemented, Thornton is on track to reduce greenhouse gas emissions from stationary building energy use by at least 20% by the year 2022 and by at least 56% by the year 2030. These emissions reductions are attributable to improvements in utility source fuel mixes, energy efficiency measures, and renewable energy supplies. In only two years, and in partnership with its energy utility service providers, community partners, residents, and businesses, the Thornton community can avoid emitting 126,300 MT CO₂e of greenhouse gas emissions per year, which represents 21% of the community's baseline emissions from stationary energy use, and is approximately equivalent to the annual carbon dioxide emitted from 27,000 passenger vehicles (US Environmental Protection Agency, 2017).

Introduction

This Energy Action Plan lays out an energy vision along with energy efficiency and renewable energy goals focused on city operations, as well as the broader community. The content of the plan was developed collaboratively with a stakeholder team through four planning workshops conducted from November 2019-March 2020. The planning team included representatives from Thornton, community partner organizations, and the two utilities (Xcel Energy and United Power) which provide electricity and natural gas service to the Thornton community.

Thornton joins more than 20 other Colorado communities that have developed energy action plans through Xcel Energy's Partners in Energy, an offering which provides resources for community energy planning (**Appendix G: Memorandum of Understanding for Phase 1 – Plan Development**). Partners in Energy also supports 18-months of plan implementation in the form of marketing and communications, data tracking and analysis, program expertise, and project management (**Appendix H: Memorandum of Understanding for Phase 2 – Plan Implementation**).

Thornton's Energy Action Plan includes:

- A look at the characteristics of Thornton that are significant to interpreting energy use and understanding the community's energy needs and priorities (**About Thornton**)
- An overview of Thornton's energy baseline (**Where Are We Now?**)
- An energy vision, goals for the near-term 18-month plan implementation period, and goals for a longer planning horizon of 2030 (**Where Do We Want To Go?**)
- Focus areas and strategies to achieve the defined goals, along with metrics that will be tracked to demonstrate success (**How Are We Going to Get There?**)
- Recommendations to transition from planning into implementation action (**How Are We Going to Stay on Course?**)

Plan appendices include supplemental information as follows:

- Appendix A: Glossary of Terms
- Appendix B: Municipal Facility Inventory
- Appendix C: Energy Programs for Businesses
- Appendix D: Preliminary Analysis of Renewable*Connect Eligibility
- Appendix E: Residential Energy Efficiency Programs
- Appendix F: Residential Energy Heat Maps
- Appendix G: Memorandum of Understanding for Phase 1 – Plan Development
- Appendix H: Memorandum of Understanding for Phase 2 – Plan Implementation

Why Develop a Community Energy Action Plan?

In 2019, the city began to draft a Sustainability Action Agenda for city operations and the Thornton community. Among other objectives, the Sustainability Action Agenda will address four key issues that are impacted by Thornton's energy use:

- Reduce the carbon footprint of both the city organization and the community.
- Contribute to the improvement of air quality in the Denver Metropolitan Area through local transportation strategies.
- As the seventh-largest water utility provider in the State of Colorado, reduce energy consumption associated with water production and distribution, as well as wastewater collection.
- Make affordable energy programs available to Thornton residents, especially under-resourced populations, to improve the overall resilience of the Thornton community.

Through Xcel Energy's Partners in Energy offering, the city was able to access resources and subject matter expertise in energy efficiency and renewable energy that culminated in this Energy Action Plan that defines an energy vision, goals, and strategies that make sense for Thornton's community values.

About Thornton

City Leads the Way

Thornton is the third-largest employer in the city, with 963 full-time employees (Thornton, 2020b). The city is also one of the largest energy users, as a result of building use and city operations:

- The city manages 63 buildings representing 846,000 square feet of building space (**Appendix B: Municipal Facility Inventory**).
- The city manages 33.6 square miles of land area associated with:
 - Facility parcels (0.5 square miles)
 - Parks, Thorncreek Golf Course, and facilities shared with Adams 12 Five Star School District (1.7 square miles)
 - Open spaces and lands, including trail corridors (2.2 square miles)
 - Properties in Weld and Larimer Counties, outside of the city's incorporated limits (29.3 square miles).
- The city produces and delivers 21,280 acre-feet/year (on average) of potable water.

When it comes to establishing a culture of energy awareness, improving energy efficiency, promoting renewable energy, and saving money, the city looks to set an example for the broader community through its own staff, facilities, and operations.

A Growing Community

Thornton is located in the northern part of the Denver Metropolitan Area. Thornton has blossomed from a fledgling residential development into a full-service community that is home to more than 140,000 residents and 21,000 jobs (Thornton, 2018). Thornton's population is expected to continue to grow to 190,000-205,000 residents by 2040 (Thornton, 2018). Similarly, Thornton's incorporated area has grown considerably from the time the city was first incorporated in 1956 – from 1 mile to 37 square miles (Thornton, 2018).

Whereas the growth in economic expansion activity that traditionally comes with population growth and new development has historically been correlated with increasing energy usage, that relationship is increasingly being decoupled (US Energy Information Administration, 2017). Thornton has the opportunity to encourage energy efficiency measures for new and existing developments and therefore mitigate growth in energy

usage despite a growing population and significant opportunities for new development, infill, and redevelopment within current city limits and the future growth area.

The 2020 Thornton Comprehensive Plan, Thornton Tomorrow Together, lays the foundation for this emphasis on efficient development through the following themes for future land use and development (Thornton, 2020a):

- Growing Smarter and Greener
- Fostering Economic Vitality
- Providing Resources and Building Relationships
- Creating Quality and Diverse Neighborhoods

New and Affordable Housing

Thornton is a family-oriented community, with 42% of households including children under the age of 18, compared to average values of 27% across Colorado and the United States (US Census Bureau, 2018). Families are attracted to Thornton because of its relatively new and affordable housing in the Denver Metro region (Thornton, 2018):

- 58% of housing units were built after 1990. Most of the housing consists of single-family detached homes (63%), while 19% of housing units are in multifamily buildings with five or more units.
- The 2018 median home price of \$353,800 is 10% lower than the median home price of \$391,000 across the Denver Metro region.

In addition to improving energy efficiency in older existing homes, Thornton has the opportunity to build new energy-efficient homes. More than 7,500 new housing units are expected to be added in the community from 2020-2025.

A Vibrant Economy

The largest industries in Thornton are retail trade (generating more than \$1.3 billion in sales each year), health care, and accommodation and food services (US Census Bureau, 2018; Thornton, 2018). The top five employers in the city are Adams 12 Five Star School District, Amazon, Thornton, North Suburban Medical Center, and Walmart - each employing more than 700 people (Thornton, 2020b).

Energy efficiency and renewable energy opportunities can vary greatly based on the type and individual circumstances of a business. However, businesses are some of the largest energy users in the community, and as such, have the potential to save large amounts of energy and money. **Appendix C: Energy Programs for Businesses** contains a summary of energy programs relevant to common business types in Thornton.

Where Are We Now?

Energy Utility Service Providers

Xcel Energy is an investor-owned utility that provides electricity service to 90% of Thornton, and natural gas service to all of Thornton (**Figure 1**). United Power is a member-owned cooperative utility that provides electrical service to 10% of the city's incorporated area, concentrated in the northern and eastern portions of Thornton. While United Power currently services a relatively small portion of the community, its number

of customers in Thornton is growing rapidly (by 25% from 2016-2018) and continued growth is expected as new development occurs within its service territory.

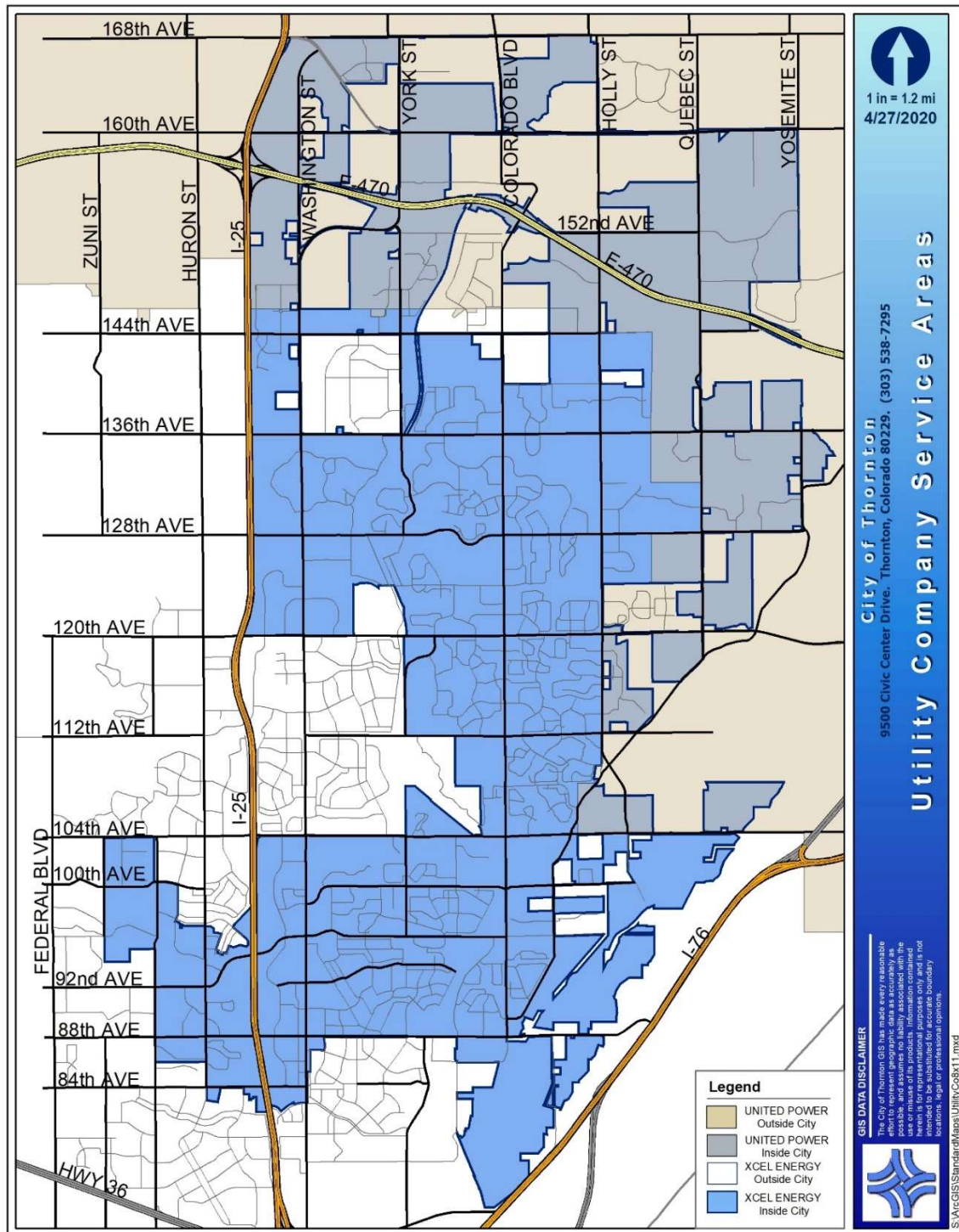


Figure 1. Xcel Energy (shown in blue and white) and United Power (shown in gray and tan) service areas in Thornton (Thornton, 2020c)

Baseline Energy Analysis

A foundational step in the energy action planning process is conducting a baseline energy analysis, which is used to:

- Understand how much energy is being consumed by the city and the broader community
- Determine whether energy use is increasing or decreasing
- Look for opportunities to reduce energy use and/or save money
- Define metrics that will be tracked in the future to show the benefits of energy initiatives and/or the impacts of new developments

Historical energy data for the period 2016-2018 were analyzed to answer these questions, with the most recent year of available data at the time of plan development (2018) serving as the baseline year.

Sector Analysis

More than 57,000 unique locations (premises) in Thornton are served electricity, natural gas, or both fuel types. Approximately 93% of these locations are residential housing units. Businesses make up 7% of served locations, while Thornton municipal facilities represent only 0.4% of served locations (**Figure 2**). Streetlights are also served electricity but are not included in the premise counts.

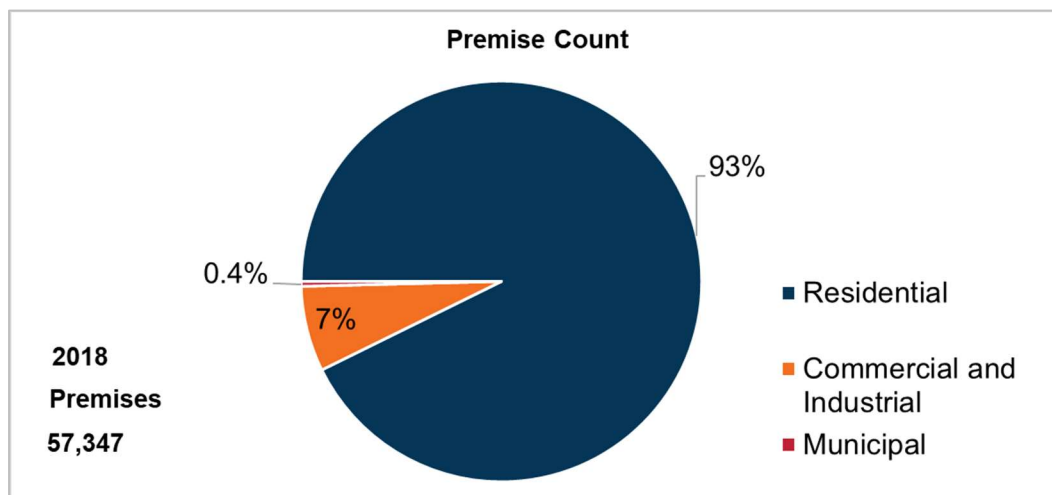


Figure 2. 2018 Premise Count by Sector

Energy Consumption

In the baseline year of 2018, the Thornton community used almost 718 million kWh of electricity and 38 million therms of natural gas, for a total energy cost of \$89 million (**Figure 3, Figure 4, Figure 5**). This amount of energy usage puts Thornton in line with other Denver metropolitan communities such as Arvada, Broomfield, and Westminster (**Table 2**).

Table 2. Energy Use and Costs for Selected Denver Metropolitan Communities (Xcel Energy, 2019)

| Community | 2018 Electricity Use (million kWh) | 2018 Natural Gas Use (million therm) | 2018 Energy Costs (million \$) |
|--------------------------|---------------------------------------|---|-----------------------------------|
| Arvada | 651 | 44.6 | \$98.3 |
| Broomfield ¹ | 635 | 27.9 | \$76.5 |
| Denver | 6,841 | 335.4 | \$819.0 |
| Englewood | 337 | 18.7 | \$43.0 |
| Littleton | 381 | 20.4 | \$51.1 |
| Thornton | 718 | 38.2 | \$89.0 |
| Westminster ¹ | 797 | 41.5 | \$108.0 |
| Wheat Ridge | 215 | 17.5 | \$32.8 |

¹ Values exclude a minority portion of electricity usage and costs served by United Power.

Observations by sector include:

- **Residential:** Although 93% of premises are residential, residences consume only 56% of electricity and 76% of natural gas.
- **Commercial and industrial:** The typical commercial and industrial facility uses more energy than a typical residence, so although businesses represent only 7% of premises served, they use 39% of the total electricity and 23% of the total natural gas.
- **Municipal:** Thornton used more than 26 million kWh and 485,000 therms of natural gas, for a total energy cost of \$2.6 million. Although municipal premises account for only 0.4% of locations served, city facilities and operations account for 4% of electricity usage and 1% of natural gas usage.
- **Streetlights:** Streetlights along public streets are owned by Xcel Energy, United Power, and the city, but the energy usage is paid for by the city. Streetlights represent 7.4 million kWh of electricity use and \$1.8 million in annual energy costs.

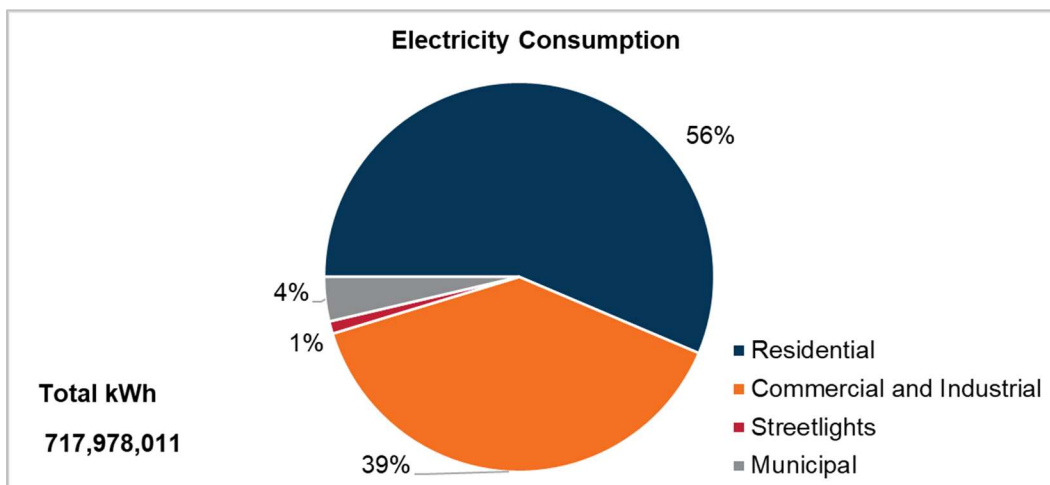


Figure 3. 2018 Electricity Consumption by Sector (kWh)

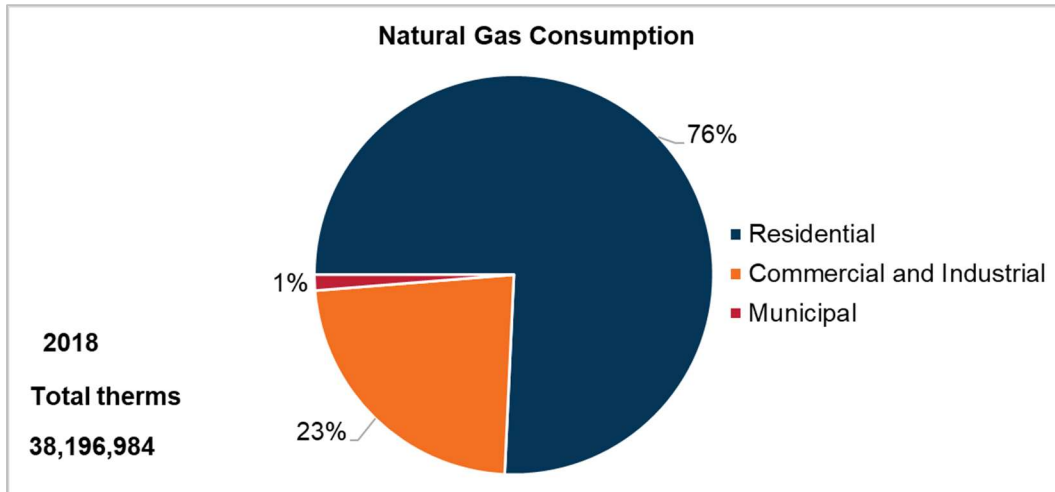


Figure 4. 2018 Natural Gas Consumption by Sector (therms)

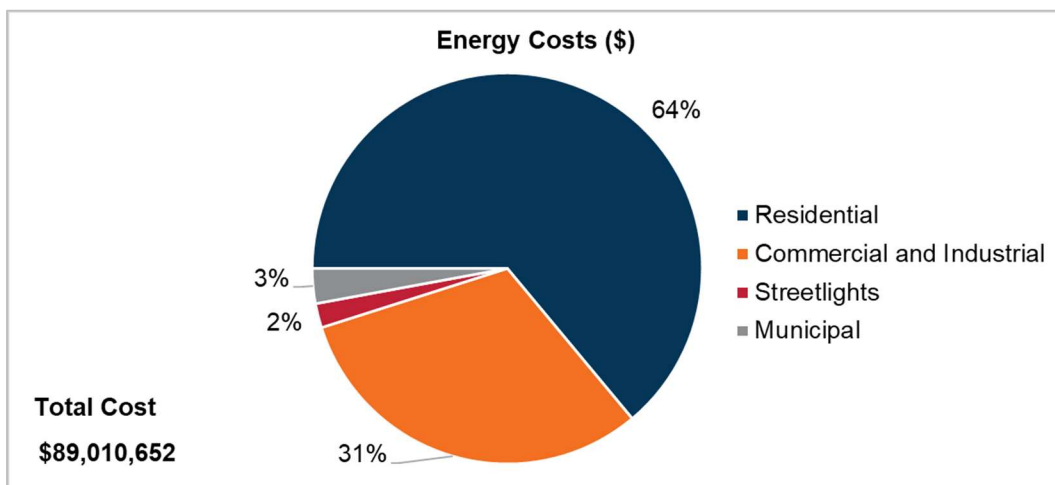


Figure 5. 2018 Energy Costs by Sector (Dollars)

Though the number of premises served increased by 6% (from 54,331 to 57,347) over the 2016-2018 period, there was no corresponding increase in energy use at the community scale. Rather, fluctuations in energy use during this period are primarily attributed to variations in weather because total energy use is correlated with the number of total degree-days (TDD) as shown in **Figure 6**. TDD represent a measure of the days that required heating (expressed as heating degree-days, or HDD) and the number of days that required cooling (cooling degree-days, or CDD). Increases in energy use over this time period at the sector level were observed in streetlights (2% increase) and in municipal natural gas usage (11% increase).

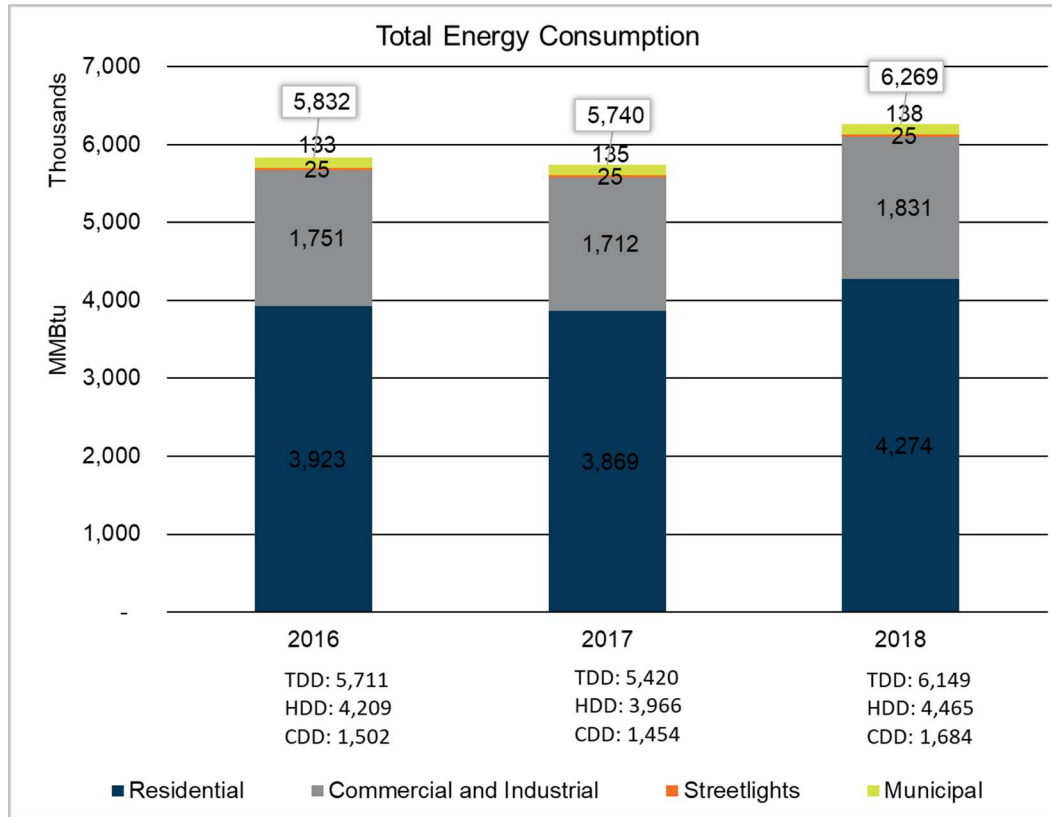


Figure 6. 2016-2018 Energy Consumption by Sector (Thousands MMBtu) (Weather Data Depot, 2020)

Energy use per household is a common metric used in the residential sector for efficiency benchmarking. Residences in Thornton consumed about 80 MMBtu per premise in 2018, inclusive of electricity and natural gas usage. This value is slightly more efficient than the average value of 84 MMBtu per household in the Mountain North region of the United States, likely a reflection of Thornton's newer housing stock (US Energy Information Administration, 2018).

Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions from stationary energy use in 2018 represented almost 604,000 metric tons of carbon dioxide equivalent, or MT CO₂e. This amount of emissions is equivalent to driving 130,400 passenger vehicles for a year, or burning 3,320 railcars' worth of coal (US Environmental Protection Agency, 2020). It would take 788,400 acres of forests, or planting 10 million new trees, to offset these emissions (US Environmental Protection Agency, 2020).

Greenhouse gas emissions at the sector level varied according to their relative energy use, with the residential sector accounting for 63% of emissions; businesses accounting for 33% of emissions; city operations accounting for 3% of emissions; and streetlights accounting for 1% of emissions (**Figure 7**).

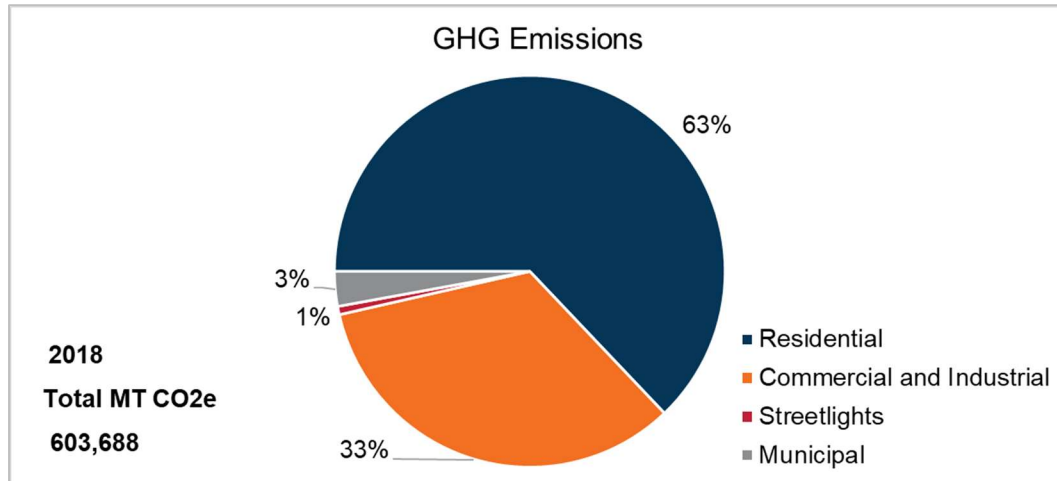


Figure 7. 2018 Greenhouse Gas Emissions by Sector (MT CO₂e)

Energy Efficiency Program Participation

Xcel Energy and United Power offer a variety of energy efficiency programs that financially benefit their customers through rebates and other financial incentives, as well as the ongoing benefits of reduced energy use and cost savings. Historical participation and energy savings data from these programs are useful for assessing which types of programs customers are using and to what degree. The data also illuminate opportunities for greater participation in the available programs and for increased education and awareness.

In 2018, more than 2,000 residents, businesses, and city facilities in Thornton participated in these energy efficiency programs, for a total savings of 5.7 million kWh of electricity and 142,000 therms of natural gas.

In the residential sector, almost 4% of residences participated in the energy efficiency programs, saving nearly 1.5 million kWh and 140,000 therms. This energy savings translates to an average annual cost savings of \$105 per participating residence, in addition to rebates and other financial incentives associated with program participation. The top programs in 2018 were Residential Heating, ENERGY STAR New Homes, and Refrigerator & Freezer Recycling (**Figure 8**).

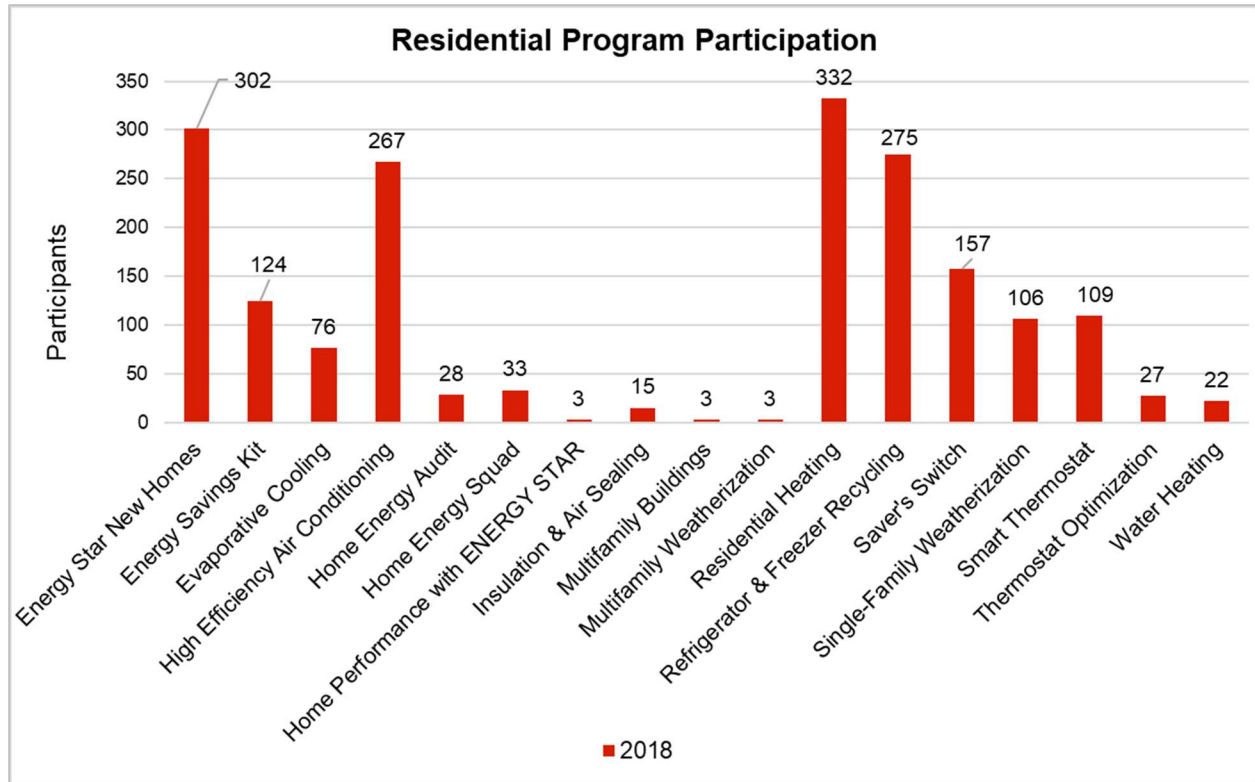


Figure 8. 2018 Residential Energy Efficiency Program Participation

In the commercial and industrial sector, about 5% of businesses and city facilities participated in the energy efficiency programs, saving 4.2 million kWh and 1,700 therms. This energy savings equates to an average annual cost savings of about \$2,000 per participating business or facility, in addition to rebates and other financial incentives associated with program participation. The top programs in 2018 were Lighting Efficiency, Small Business Lighting, and Cooling (**Figure 9**).

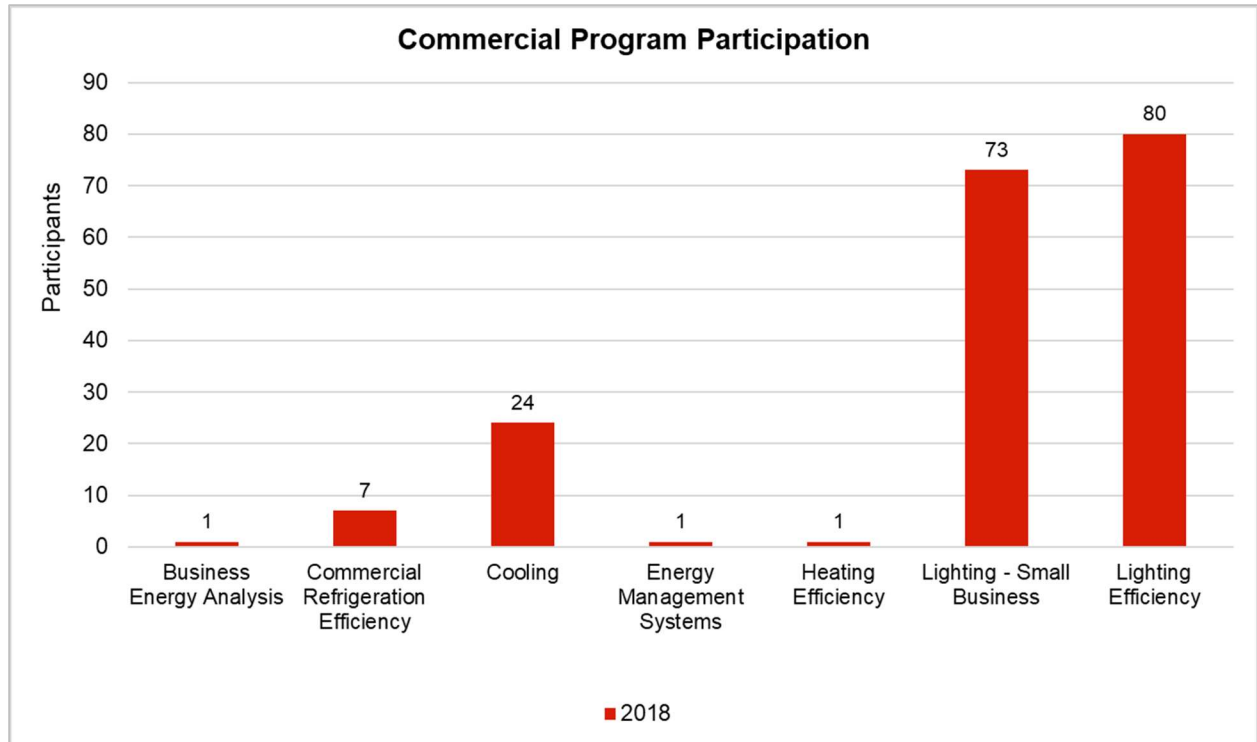


Figure 9. 2018 Commercial & Industrial Energy Efficiency Program Participation

Renewable Energy Program Participation

Xcel Energy and United Power also offer a variety of renewable energy programs that provide customers access to carbon-free energy sources. In 2018, about 5% of Thornton residences and 1% of Thornton businesses participated in one of these renewable energy offerings (**Table 3**).

Table 3. 2018 Renewable Energy Program Participation (Xcel Energy, 2019)

| Program | Business | | Residential | |
|---|---------------|-------------------|---------------|-------------------|
| | Participation | Subscribed Energy | Participation | Subscribed Energy |
| Xcel Energy Windsource® | 3 | 21,202 kWh | 1,253 | 2,720,723 kWh |
| Xcel Energy Renewable*Connect® | -- | -- | -- | -- |
| Xcel Energy Solar*Rewards (on-site) | 24 | 1,450 kW | 1,532 | 7,328 kW |
| Xcel Energy Solar*Rewards Community (solar gardens) | 7 | 351 kW | 58 | 177 kW |
| United Power Green Power Partners | 7 | -- | 1 | -- |
| On-site (net metered) | Total unknown | Total unknown | Total unknown | Total unknown |

*Note: Xcel Energy's Renewable*Connect® program is included for completeness but the program did not become available until 2019.*

Existing Energy Practices

Thornton has a strong history of energy improvements in its own facilities and operations, as well as energy initiatives undertaken by partner organizations in the community. **Table 4** contains a summary of key past projects on which this Energy Action Plan builds.

Table 4. Community Energy Initiatives

| Thornton Municipal Operations |
|---|
| <ul style="list-style-type: none"> • Lighting projects <ul style="list-style-type: none"> ○ By the end of 2020, all city-owned buildings will use light-emitting diode (LED) lighting for interior and exterior building lights, including parking lot lights. ○ As of 2012, all new streetlights in Xcel Energy service territory are city-owned and installed with LED lighting. ○ Traffic signals have been upgraded to LED lighting. • Facilities and operations <ul style="list-style-type: none"> ○ Heating, ventilation, and air conditioning (HVAC) systems are automated. ○ The city's largest electricity users (Wes Brown Water Treatment Plant and Thornton Water Treatment Plant) are participating in Xcel Energy's Strategic Energy Management program. • Carbon-free energy sources <ul style="list-style-type: none"> ○ Thornton City Hall and the Carpenter Recreation Center have rooftop solar photovoltaic (PV) systems. • Sustainable design <ul style="list-style-type: none"> ○ Trail Winds Recreation Center and Carpenter Recreation Center are Leadership in Energy and Environmental Design (LEED) certified and incorporate sustainable design concepts such as white roofs. ○ Thornton City Hall is all electric, which would allow the building to be served entirely by renewable energy sources. |
| Adams 12 Five Star Schools |
| <ul style="list-style-type: none"> • Energy efficiency <ul style="list-style-type: none"> ○ Adams 12 Five Star School District is entering into an energy performance contract to implement energy efficiency and renewable energy measures. Two schools in and one bordering Thornton to which some Thornton residents attend will be included in the contract. ○ Past participation in Xcel Energy's Commercial Refrigeration Efficiency, Computer Efficiency, Cooling, and Lighting programs. ○ In 2017, eighteen schools upgraded their computers to energy-efficient models. • Carbon-free energy sources <ul style="list-style-type: none"> ○ The Aquatic Center has a rooftop solar thermal array to preheat the pool. ○ All C-schedule meters are enrolled in Xcel Energy's Renewable*Connect renewable energy program. ○ The District has a subscription of 1.4 MW/yr to a community solar garden (Adams 12 Five Star Schools, 2020). |
| Other Community Projects |
| <ul style="list-style-type: none"> • The largest single rooftop solar installation (6.05 MW) in Colorado sits atop Amazon's robotics fulfillment center in Thornton (Thornton, 2019). |

Outreach and Communication Channels

Engaging with residents and businesses in the community, to share information about available energy programs, is critical to reaching the goals set forth in this Energy Action Plan. **Table 5** lists some of the ways residents and businesses currently receive information from the city.

Table 5. Outreach and Communication Channels

| <i>Digital and Printed Communications</i> |
|--|
| <ul style="list-style-type: none"> • ThorntonCO.gov • Thornton Sustainability Web Site (www.thorntonsustainability.com) • Thornton Facebook Page • @CityofThornton Twitter Feed • Thornton T-Alerts Email Newsletters • Targeted emails from Xcel Energy • ThorntonWater.com • Partner websites • Utility Bill Mailings • City Voice |
| <i>Community Events</i> |
| <ul style="list-style-type: none"> • Thorntonfest • Thornton Harvest Fest • Thornton WinterFest |
| <i>Community Spaces for Collateral Distribution</i> |
| <ul style="list-style-type: none"> • Margaret W. Carpenter Recreation Center • Trail Winds Recreation Center • Thornton Community Center • Youth & Teen Center • Adams 12 Five Star Schools • Anythink Libraries |

Where Do We Want To Go?

Our Energy Vision

With input gathered via the planning workshops and a survey, energy action team members crafted an energy vision statement that expresses Thornton's energy intentions and values:

Thornton will lead the way in creating a more resilient community through energy efficiency improvements and the adoption of energy sources that reduce carbon emissions from municipal operations while also facilitating equitable access to energy programs and opportunities for residents and businesses.

Our Energy Goals

In discussing what Thornton should aim to achieve through this Energy Action Plan, the planning team expressed a collective desire to “move the needle” on a community scale through energy efficiency improvements and promotion of renewable energy sources in the short term (2020-2022), and through alignment with the State of Colorado’s climate commitments in the long term (2030 and beyond).

Based on these shared intentions, Thornton commits to:

- **By 2022, increasing participation in energy efficiency and renewable energy programs by 30% over the 2018 baseline year.** This additional program participation is expected to lead to an additional:
 - 625 completed energy projects (30% increase over baseline)
 - 2 million kWh of electricity savings (40% increase over baseline)
 - 54,000 therms of natural gas savings (28% increase over baseline)
 - 0.7 million kWh of renewable energy supplies (at a minimum), with the potential to add up to 9.4 million kWh of renewable energy supplies if all planned projects move forward.
 - 21% reduction (at a minimum) in GHG emissions from stationary building energy use, attributable to improvements in utility source fuel mixes, energy efficiency measures, and renewable energy supplies. This reduction in emissions represents 126,300 MT CO₂e, which is approximately equivalent to the carbon dioxide emitted from 26,870 passenger vehicles per year.
- **By 2030, aligning with state climate and energy goals, which means reducing GHG emissions by at least 50% across all sectors** (Colorado General Assembly, 2019).
 - Upon implementation of this Energy Action Plan, Thornton is on track to reduce GHG emissions from stationary building energy use by at least 56% by the year 2030, attributable to improvements in utility source fuel mixes, energy efficiency measures, and renewable energy supplies.

How Are We Going to Get There?

To achieve Thornton’s energy goals, the planning team identified four focus areas: municipal, institutional, residential, and business. The following sections define each focus area, including its scope, objectives, and key metrics and targets to measure success. Strategies for the 2020-2022 timeframe are organized into tables that summarize the strategy, implementation activities, responsible parties, timeline, implementation resources, partners, and communication and outreach channels.

Focus Area 1: Municipal Facilities and Operations

What is included in this focus area?

- Any energy-related initiative on a property owned or leased solely by Thornton.
- Electric vehicles are not included in this focus area – electric vehicles will be addressed through the city’s Sustainability Action Agenda.

Objectives

- Help the city save energy and money
- Continue to lead by example for energy action in the broader community
- Promote adoption of energy sources that reduce carbon emissions and are cost-neutral or cost-beneficial
- Promote smart, green, and equitable growth through fiscally responsible design and construction of the built environment by facilitating infill and redevelopment, promoting and incentivizing sustainable development practices, and leveraging new technology to foster a “smart” city
- Benchmark against state energy and climate goals

Metrics

- Municipal annual energy use (electricity and natural gas)
- Municipal annual energy costs (electricity and natural gas)
- Annual project participation and savings (electricity and natural gas)
- Energy use intensity (building energy use per square foot)
- Municipal greenhouse gas emissions

Targets

- Maintain historical levels of four energy projects and 59,000 kWh electricity savings.
- Complete an additional 20 energy projects over the next two years for 1.1 million kWh of additional electricity savings and 9,000 therms of additional natural gas savings.
- Increase renewable energy supplies up to 2,445 kW over the next two years.

Strategies

Strategy 1-1: Manage Energy Action Plan Implementation

Table 6. Municipal Focus Area, Strategy 1-1: Manage Energy Action Plan Implementation

| Strategy 1-1: Manage Energy Action Plan Implementation |
|---|
| Description |
| The Manage Energy Action Plan Implementation strategy encompasses the administrative tasks necessary to implement this Energy Action Plan. This strategy will be led by the Water Resources department. |
| Implementation Activities (2020-2022) |
| <ul style="list-style-type: none"> • Manage the implementation of the Energy Action Plan for the period 2020-2022. <ul style="list-style-type: none"> ○ Designate a project management team responsible for administering the energy plan implementation project. ○ Designate an implementation advisory team to advise on the priority and resources available to support the city’s energy implementation activities within the context of the broader sustainability action agenda. ○ Designate energy teams within each strategy to execute the city’s energy projects. |

Responsible Parties (or Designated Representatives)

- PM Team
 - Pia Gerstle, Water Resources, Thornton
 - Emily Hunt, Water Resources, Thornton
 - John Orr, Water Resources, Thornton
 - Martin Postma, City Development, Thornton
- Implementation Advisory Team (aka Sustainability Task Force)
 - Paul Burkholder, Parks and Open Space, Thornton
 - Emily Hunt, Water Resources, Thornton
 - Martin Postma, City Development, Thornton
 - Erika Senna, Management and Budget Office, Thornton
 - Jaylin Stotler, Community Connections, Thornton
 - Lisa Wilson, Communications, Thornton
- Kynnie Martin, Xcel Energy Account Manager
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Kick off the 2020-2022 implementation project.
 - Finalize the project management, implementation advisory, and energy teams.
 - Submit 2021 budget requests.
 - Quarterly check-in and status review.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Quarterly check-in and status review.
- Implementation Q3 (Mar-May 2021)
 - Quarterly check-in and status review.
- Implementation Q4 (Jun-Aug 2021)
 - Quarterly check-in and status review.
 - Submit 2022 budget requests.
- Implementation Q5 (Sep-Nov 2021)
 - Quarterly check in and status review.
- Implementation Q6 (Dec 2021-Feb 2022)
 - Quarterly check in and status review.
 - Close out 2020-2022 implementation project and determine plans for 2022 and beyond.

Implementation Resources

- Thornton Staffing Resources
 - 580 hours.
- Funding Needs
 - None identified.
- Partners in Energy Implementation Requests
 - Program management (check-in calls, invoice and status reporting, portal updates)

Communication and Outreach Channels

- Quarterly check-in meetings

Strategy 1-2: Manage Energy Program

To date, Thornton has not maintained a centralized energy management program, though various departments and staff have contributed substantially to energy efficiency efforts.

Table 7. Municipal Focus Area, Strategy 1-2: Manage Energy Program

| Strategy 1-2: Manage Energy Program |
|--|
| <p>Description</p> <p>The Energy Program Management strategy encompasses the foundational technical and financial tasks necessary to implement this Energy Action Plan. This strategy will be led by the Water Resources department.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> • Conduct energy data management and analysis <ul style="list-style-type: none"> ○ Complete the municipal facility inventory that was started during the planning phase (Appendix B: Municipal Facility Inventory). ○ Leverage Xcel Energy's Benchmarking program, and the ENERGY STAR Portfolio Manager tool, to assess building efficiency through a performance metric such as energy use intensity (EUI, calculated as energy used per sq ft). Portfolio Manager is a tool that will allow the city to assess energy use at a high level across the city's portfolio and to use benchmarking results to assess which buildings may benefit from an audit or other operational evaluation. ○ Analyze implementation data every six months to ensure plan implementation is on track. This analysis is done through the Partners in Energy implementation support. The analysis results are provided to every community that participates in the program. ○ Conduct annual reporting on the past year's successes and the upcoming year's goals and priorities. • Coordinate funding need assessments and annual budget requests. <ul style="list-style-type: none"> ○ In addition to the city's general fund and enterprise funds, evaluate the potential to finance projects through bonds, public-private partnerships, energy performance contracts, the Colorado Commercial Property Assessed Clean Energy (C-PACE) program, and grant funding (e.g., Department of Energy). The United States Bureau of Reclamation (USBR) WaterSMART grant program has been used in the past to fund water infrastructure projects (including metering) and may be a good candidate to fund joint water-energy projects. Projects with a demonstrated simple payback period of 3-5 years or less will be prioritized. ○ Ensure that the city is maximizing rebates and other financial incentives from utility energy programs. |
| <p>Future Implementation Activities (2022 and beyond)</p> <ul style="list-style-type: none"> • Monitor and analyze energy use and cost information on a regular (monthly or annual) basis. Identify which software systems are currently being used for billing and building maintenance. Consider if additional data management and analysis software (such as EnergyCAP, ARC, or Energy Manager) would be beneficial to analyze energy use at a detailed level (by meter, by month, etc.). • Evaluate the need for a sustainability director and staff. |

Responsible Parties (or Designated Representatives)

- Water Resources, Thornton (John Orr, PM Team Representative)
- Engineering Services, Thornton (Jason Pierce, Engineering Services Director)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Management Services, Thornton (Jim Tully, Building Maintenance Supervisor)
- Utilities Operations, Thornton (Steve McFadden, Mechanical Maintenance Supervisor)
- Water Resources, Thornton (Josh Redman, Senior Water Resources Administrator)
- Water Treatment and Quality, Thornton (Martin Kimmes, Water Treatment and Quality Manager)
- Kynnie Martin, Xcel Energy Account Manager
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Identify energy projects with energy incentives (e.g., LED lighting upgrades, HVAC, variable frequency drive (VFDs)).
- Submit 2021 budget requests.
 - Enroll in benchmarking program and set up Portfolio Manager.
 - Conduct 2020 Q2 implementation data processing.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Complete benchmarking analysis based on energy use intensity.
- Implementation Q3 (Mar-May 2021)
 - Conduct 2020 Q4 implementation data processing.
- Implementation Q4 (Jun-Aug 2021)
 - Submit 2022 budget requests.
- Implementation Q5 (Sep-Nov 2021)
 - Conduct 2021 Q2 implementation data processing.
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staffing Resources
 - 470 hours.
- Funding Needs
 - None identified.
- Partners in Energy Implementation Requests
 - Implementation data analysis and reporting
 - Support in setting up ENERGY STAR Portfolio Manager

Partners

- Tom Green, Account Manager, United Power
- Colorado Energy Office (CEO) – facilitates the energy performance contracting process
- Energy services companies (ESCOs) – design, execute, and implement the energy performance contract
- Property Assessed Clean Energy (PACE) – offers the C-PACE financing program

Communication and Outreach Channels

- Focus area lead check-in meetings
- Share annual reporting with all city staff via intranet

Strategy 1-3: Promote Existing Facility Efficiency

The 2020 Thornton Comprehensive Plan includes a policy to seek new opportunities to incorporate energy efficiency, conservation, and renewable energy into city operations and facilities (Thornton, 2020a).

Table 8. Municipal Focus Area, Strategy 1-3: Promote Existing Facility Efficiency

Strategy 1-3: Promote Existing Facility Efficiency

Description

The Promote Existing Building Efficiency strategy encompasses existing buildings, equipment, and processes in facilities owned and operated by Thornton. This strategy will be led by the Building Maintenance, Water Treatment & Quality, and Transportation departments.

Implementation Activities (2020-2022)

- Complete LED lighting upgrades at city facilities in 2020 as planned (Management Services).
- Identify new opportunities for energy efficiency improvements in existing buildings (Management Services).
 - Use data analysis and benchmarking results to prioritize top energy-using and highest energy-use-intensity buildings and to complete at least three audits/assessments.
 - Use audit/assessment results to prioritize opportunities for implementation (e.g., automated lighting controls, on-demand hot water systems, efficient heating and cooling equipment, building envelope upgrades, variable frequency drives, data center efficiencies).
 - Look for opportunities to take advantage of Xcel Energy's Energy Management Systems and Retro-commissioning programs.
 - Look for opportunities to promote joint energy-water savings (e.g., irrigation systems, hot water heaters, boilers).
 - Maximize financial incentives available through utility programs.
- Continue participation in Xcel Energy's Strategic Energy Management Program for the water system. Planned next steps include incorporation of energy monitoring, tracking, and trend reporting into the SCADA system as well as field verification of pump curves to support energy-efficient pump selection.
- Continue conversations and cost-benefit analyses of upgrading existing streetlights served by Xcel Energy and United Power to LEDs and installing lighting controls.
 - To retrofit Xcel Energy-owned streetlights to LEDs, the city could choose one of two options – paying for the upgrades up front or paying for the upgrades over time through the monthly billing process. Because only 2% of streetlight usage served by Xcel Energy is metered, while 98% is contracted, the city would realize relatively limited cost savings from the upgrades, estimated at \$30,000-90,000 per year, though the retrofits have the potential to save a large amount of energy (1.4 million kWh/yr). The city would consider authorizing the retrofits if a clear cost benefit could be demonstrated, specifically the financial tradeoff

between reduced maintenance costs over the life of the LED fixtures and the costs of replacing the LED fixtures at the end of their life.

- United Power-owned streetlights are currently being upgraded to LEDs in a multi-phase project. The retrofits should be completed by the end of 2021.
- Lighting controls could be used to alter lighting based on need (e.g. motion sensing, dimming during certain hours, turning off during certain hours, remote controls).
- Evaluate the pros and cons of moving to a four-day work week and/or promoting work-from-home policies. Investigate best practices for using similar policies to achieve energy savings and avoid unintended consequences.

Implementation Activities (2022 and beyond)

- Complete participation in Xcel Energy's Strategic Energy Management Program for the water system Infrastructure. Activities to be considered include power monitoring equipment at outlying facilities such as booster and pump stations; development of an operational model to identify and test tactical operational efficiencies; and equipment adjustments such as pressure-reducing valve (PRV) settings.

Responsible Parties (or Designated Representatives)

- Water Resources, Thornton (John Orr, PM Team Representative)
- Engineering Services, Thornton (Jason Pierce, Engineering Services Director)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Traffic Engineering and Operations, Thornton (Darrell Alston, Traffic Engineer)
- Utilities Operations, Thornton (Steve McFadden, Mechanical Maintenance Supervisor)
- Water Resources, Thornton (Josh Redman, Senior Water Resources Administrator)
- Water Treatment and Quality, Thornton (Martin Kimmes, Water Treatment and Quality Manager)
- Preston Gibson, Xcel Energy Area Manager
- Kynnie Martin, Xcel Energy Account Manager
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Submit 2021 budget requests.
 - Initiate participation in next phase of Strategic Energy Management program.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Complete LED lighting upgrades project.
 - Install power monitoring equipment.
 - Perform field verification of pump curves.
 - Develop energy performance indicators.
 - SCADA programming.
- Implementation Q3 (Mar-May 2021)
 - Go out to bid for audit services.
- Implementation Q4 (Jun-Aug 2021)
 - Submit 2022 budget requests.

- Implementation Q5 (Sep-Nov 2021)
 - Complete audits.
 - Implement and evaluate operational changes.
- Implementation Q6 (Dec 2021-Feb 2022)
 - Implement and evaluate operational changes (ongoing - may require up to three years).
 - Complete retrofit of United Power-owned streetlights to LED lighting.

Implementation Resources

- Thornton Staffing Resources
 - 600 hours.
- Funding Needs
 - \$20,000 to complete facility lighting upgrades (allocated in the 2020 budget).
 - Up to \$150,000 to complete operational modeling for water system (alternatively, work may be done in house by Thornton staff).
 - Funding to complete audits, assessments, and/or additional identified energy projects.
- Partners in Energy Implementation Requests
 - Program management (check-in calls).
 - Technical analysis, based on benchmarking and other data analytics, to help identify potential buildings for audits.
 - Utility program information and other support.

Partners

- Tom Green, United Power Account Manager
- Shannon Oliver, Energy and Sustainability Manager, Adams 12 Five Star Schools
- Cascade Energy – Xcel Energy vendor for the Strategic Energy Management program
- CLEAResult – Xcel Energy vendor that can help with program documentation and realizing financial incentives, especially for lighting programs
- Graphet Data Analytics – Xcel Energy vendor for the Strategic Energy Management program

Communication and Outreach Channels

- Focus area implementation group check-in meetings

Strategy 1-4: Promote Efficient New Development

Table 9. Municipal Focus Area, Strategy 1-4: Promote Efficient New Development Strategy

| Strategy 1-4: Promote Efficient New Development |
|--|
| <p>Description</p> <p>The Promote Efficient New Development strategy encompasses new facilities designed and built by Thornton, and codes related to new development across the community. This strategy will be led by the City Development, Building Maintenance, Contracts & Purchasing, and Infrastructure Engineering departments.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> Establish a policy governing the design and construction of city facilities (Infrastructure, Management Services). Evaluate all new city facilities for the feasibility of: <ul style="list-style-type: none"> LEED certification. While LEED certification is not always feasible based on the cost, site constraints, and/or intended building use, all of Thornton’s design contracts require green or sustainable systems and equipment as items that are required by current code. A list of recommendations is generated at the 70% design phase. Beneficial electrification (also known as fuel-switching) to increase electricity use and minimize natural gas use, thus maximizing the amount of energy that can be supplied from carbon-free fuel sources. On-site solar PV projects (e.g., ground, building rooftops, or solar parking canopies) and/or subscriptions to renewable energy through utility programs. Evaluate all planned new buildings in the design phase (Fire Station 7 and Police Training Facility) for the feasibility of pursuing LEED certification, beneficial electrification, and renewable energy sources (Infrastructure, Management Services). New buildings under construction (e.g., Fire Station 1, Active Adult Facility) are assumed to be too far along to implement additional energy efficiency or renewable energy design features. Depending on building location and utility provided, take advantage of financial incentives from Xcel Energy’s Energy Design Assistance and Energy Efficient Buildings programs. Incorporate findings into design and construction scoping requirements. Explore options to incentivize above-code construction (City Development). Engage and educate the developer community on energy codes and energy-efficient design guidelines (City Development). |
| <p>Future Implementation Activities (2022 and beyond)</p> <ul style="list-style-type: none"> Continue to adopt the latest International Code Council (ICC) code bundles every three years and train city staff on code updates (City Development – Building Division). In summer 2022, Thornton will adopt the 2021 codes. |
| <p>Responsible Parties (or Designated Representatives)</p> <ul style="list-style-type: none"> City Development, Thornton (Martin Postma, PM Team Representative) City Development, Thornton (Jim Bilyeu, Plans Examining Supervisor) Contracts, Thornton (Sean Saddler, Contracts and Purchasing Director) Engineering Services, Thornton (Jason Pierce, Engineering Services Director) Management and Budget Office, Thornton (Erika Senna, Budget Manager) |

- Management Services, Thornton (Jim Tully, Building Maintenance Supervisor)
- Kynnie Martin, Xcel Energy Account Manager
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Assemble team.
 - Prepare budget requests for FY 2021.
 - Establish initial policy goals for municipal and community developments.
 - Draft policies and circulate for review, including legal review. Finalize draft policies.
 - Establish “concept-level” curriculum focused on the developer community.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Refine developer community curriculum.
 - Submit policies to City Manager for approval
 - Distribute for review and refine developer curriculum. Develop materials.
- Implementation Q3 (Mar-May 2021)
 - Implement as opportunities become available.
 - Present developer curriculum to City Manager for review and program approval.
- Implementation Q4 (Jun-Aug 2021)
 - Prepare budget requests for FY 2022.
- Implementation Q5 (Sep-Nov 2021)
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staff Resources
 - 630 hours
- Funding
 - None identified.
- Partners in Energy Implementation Requests
 - Provide example policies and design checklists for “green” design and construction guidelines in municipal facilities.
 - Provide information on code trainings funded by Xcel Energy and/or the Colorado Energy Office.
 - Develop collateral to share with developers (e.g., through the Building department) to highlight programs, educational opportunities, and/or other important information about the latest energy code requirements.

Partners

- Tom Green, United Power Account Manager
- Colorado Energy Office (code webinar training series)

Communication and Outreach Channels

- Focus area implementation group check-in meetings
- Thornton website (development web pages)
- Thornton registered contractor emails

Strategy 1-5: Promote Carbon-Free Energy Sources

Table 10. Municipal Focus Area, Strategy 1-5: Promote Carbon-Free Energy Sources

| Strategy 1-5: Promote Carbon-Free Energy Sources |
|--|
| <p>Description</p> <p>The Promote Carbon-Free Energy Sources strategy encompasses on-site energy generation (e.g., micro-hydropower, ground-mount solar, building rooftop-solar, solar parking canopies), solar gardens, and on-bill utility programs. This strategy would be led by the City Manager’s Office, Engineering Services Division, Water Resources Division, and Water Treatment & Quality Division.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> • Build the proposed 294 kW solar project at the Thornton Water Treatment Plant, which is estimated to generate 0.4 million kWh of energy annually (Infrastructure). • Complete the Northern Properties Stewardship plan and include solar projects and carbon sequestration projects as two potential future land uses that are evaluated (Infrastructure). • Evaluate facilities (buildings and parking structures) to determine feasibility of new solar projects. <ul style="list-style-type: none"> ○ GRID Alternatives provided a preliminary assessment of the potential for new rooftop solar projects at Thornton facilities (Appendix B: Municipal Facility Inventory). ○ The evaluation or planning phase would include an assessment of the system size and capacity against the facility’s energy usage; a structural assessment of the roof condition (ability to hold the weight of the solar system, and in good enough condition that roof replacement is not expected for at least ten years); and system design and funding strategy. Design and construction follow the planning phase and are assumed to occur in 2022 or later to allow time for project budgeting. • If requested by Xcel Energy as part of the regulatory filing process, write a letter of support to the Public Utilities Commission for Xcel Energy’s Renewable*Connect program. |
| <p>Implementation Activities (2022 and beyond)</p> <ul style="list-style-type: none"> • Secure funding, design, and construct new solar projects (based on the outcomes from the Northern Properties Stewardship Plan, Adams 12 Five Star Schools Shared Facilities Feasibility Study, and/or other opportunities such as carport roofs). • If the Renewable*Connect program is approved, subscribe qualifying meters to Xcel Energy’s Renewable*Connect program under a 10-year contract term (the longer the term, the more financially beneficial to the city). <ul style="list-style-type: none"> ○ A screening analysis was conducted in the preparation of this plan to assess the city’s potential to enroll in Round 2 of the program if and when it becomes available in 2022. Based on the terms of the first offering made in 2018-2019, a theoretical maximum of 9,781 kW of the city’s energy use could be subscribed under the program - resulting in an estimated 26.1 million kWh of renewable energy produced each year, which would cover more than 99% of the city’s energy use (Appendix D: Preliminary Analysis of Renewable*Connect Eligibility). However, the actual subscription amount that the city can access will be limited by the program capacity and the program demand from other customers. In the first round of the program offering, customers were limited to 25% of the |

requested subscription amount. For the purposes of establishing planning targets, 2,445 kW is assumed to be the maximum subscription that the city could access.

Responsible Parties (or Designated Representatives)

- Water Resources, Thornton (Pia Gerstle, PM Team Representative)
- Communications, Thornton (Todd Barnes, Communications Director)
- Engineering Services, Thornton (Jason Pierce, Engineering Services Director)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Management Services, Thornton (Jim Tully, Building Maintenance Supervisor)
- Water Resources, Thornton (Emily Hunt, Deputy Infrastructure Director)
- Water Treatment and Quality, Thornton (Martin Kimmes, Water Treatment and Quality Manager)
- Kynnie Martin, Xcel Energy Account Manager
- Dara Ward, Xcel Energy Renewable Energy Product Development
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Submit 2021 budget requests.
- Implementation Q2 (Dec 2020-Feb 2021)
- Implementation Q3 (Mar-May 2021)
- Implementation Q4 (Jun-Aug 2021)
 - Complete Northern Properties Stewardship Plan, including recommendations for future solar projects, if any.
 - Submit 2022 budget requests.
- Implementation Q5 (Sep-Nov 2021)
 - Complete installation of Thornton Water Treatment Plant solar system.
 - Complete planning phase of new solar project on shared facility with Adams 12 Five Star Schools.
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staff Requests
 - 350 hours
- Funding
 - \$978,000 to construct solar project at Thornton Water Treatment Plant as planned – of which \$323,000 has been spent for construction in 2020 and the remaining \$655,000 will be requested in the 2021 budget.
- Partners in Energy Implementation Resources
 - Help with net metering, interconnection agreement, and/or need for grounding transformer for solar project at Thornton Water Treatment Plant.
 - Act as liaison with Xcel Energy's renewable energy product development team.
 - Analyze meters to identify those eligible for Renewable*Connect subscriptions under current terms.

Partners

- Tom Green, United Power Account Manager
- Douglass Colony, Solar installer proposed for Thornton Water Treatment Plant project
- Garney Construction, Thornton Water Treatment Plant Project Manager
- THK, ICS, CDR, Northern Properties Stewardship Plan consultants

Communication and Outreach Channels

- Focus area implementation group check-in meetings

Strategy 1-6: Promote Energy Awareness and Training

Table 11. Municipal Focus Area, Strategy 1-6: Promote Energy Awareness and Training

Strategy 1-6: Promote Energy Awareness and Training

Description

The Promote Energy Awareness and Training strategy encompasses staff trainings, and project and staff recognition. This strategy will be led by Human Resources and Communications departments.

Implementation Activities (2020-2022)

- Include materials about Thornton's climate and energy goals, improving energy efficiency, and increasing carbon-free energy supplies in new employee onboarding and training materials, using intranet and Neogov platform.
- Recognize the completion of LED lighting conversion project through posters or flyers or other effective communication method(s).
- Recognize the buildings supplied by renewable energy through posters or flyers or other effective communication method(s).

Responsible Parties (or Designated Representatives)

- Water Resources, Thornton (Pia Gerstle, PM Team Representative)
- Communications, Thornton (Todd Barnes, Communications Director)
- Human Resources, Thornton (Tricia Hinton-Potter, Human Resources Director)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Management Services, Thornton (Jim Tully, Building Maintenance Supervisor)
- Recreation, Thornton (Jill Collins, Wellness Coordinator)
- Implementation Advisory Team, Thornton
- City Council, Thornton
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Submit 2021 budget requests.
 - Develop training strategy.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Complete first flyer, poster, and e-mail for distribution to recognize lighting project completion.
 - Complete onboarding and training materials for inclusion in intranet and NeoGov (due Jan 2021).

- Implementation Q3 (Mar-May 2021)
 - Make NeoGov training operational.
- Implementation Q4 (Jun-Aug 2021)
 - Submit 2022 budget requests.
- Implementation Q5 (Sep-Nov 2021)
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staff Needs
 - 85 hours
- Funding
 - None identified
- Partners in Energy Implementation Requests
 - Support development of onboarding materials about Thornton's climate and energy goals, improving energy efficiency, and increasing carbon-free energy supplies.
 - Design a poster or flyer to recognize the completion of the LED lighting conversion project.
 - Design a poster or flyer to recognize buildings supplied by renewable energy.

Partners

- Tom Green, United Power Account Manager
- Colorado State University Extension – supports energy efficiency and renewable energy trainings

Communication and Outreach Channels

- Focus area implementation group check-in meetings
- Thornton employee emails, intranet, and NeoGov
- Thornton Sustainability website
- Collateral distribution at city facilities

Focus Area 2: Institutional

What is included in this focus area?

- School district properties (Adams 12 Five Star Schools, Mapleton Public Schools, 27J Schools, Adams 14 School District)
- Anythink properties (Wright Farms, Huron Street, York Street library locations)
- Hospitals (UC Health, North Suburban Medical Center, Concentra)
- Regional Transportation District (RTD)

Objectives

- The city should serve as a nexus for community services and education around energy awareness, efficiency, and renewable options.

Metrics

- Annual project participation and savings (electricity and natural gas) – for Adams 12 Five Star School District only, as data waivers are needed to share these data at a customer level
- Number of community events held and number of event attendees

Targets

- Maintain historical levels of 24 energy projects and 405,800 kWh electricity savings.
- Complete an additional 9 energy projects over the next two years for 0.3 million kWh of additional electricity savings and 1,000 therms of additional natural gas savings. These targets can be updated from Adams 12 Five Star School District's energy performance contract when data are available in Summer 2020.
- Increase renewable energy supplies by 0-2.14 MW over the next two years.

Strategies

Strategy 2-1: Collaborate with Adams 12 Five Star School District

Table 12. Institutional Focus Area, Strategy 2-1: Collaborate with Adams-12 Five Star School District

Strategy 2-1: Collaborate with Adams 12 Five Star School District

Description

The collaboration with Adams 12 Five Star School District strategy encompasses facilities and properties owned and operated by Adams 12 Five Star School District within the Thornton community. This strategy will be led by the Adams 12 School District.

Implementation Activities (2020-2022)

- Adams 12 Five Star Schools will complete the energy performance contract for as planned, including both energy efficiency and renewable energy projects. Where new solar projects are installed, consider coupling projects with signage (for awareness), hands-on lab experience for students (for education), and installation internships (for workforce development).
- Adams 12 Five Star Schools will evaluate the potential for new solar projects at:
 - The transportation maintenance facility known as the Consolidated Service Center. This facility is shared between the city and Adams 12 under an intergovernmental agreement. GRID Alternatives has provided Adams 12 a preliminary assessment of three buildings.
 - Parking structures.
- Adams 12 Five Star Schools will identify new energy projects at schools or other District facilities not included in the energy performance contract and include them in budgeting processes.
- The city will promote energy awareness by participating in and/or tabling at one event per year (Colorado Association of School District Energy Managers (CASDEM) meetings, and/or annual Water Festival).
- Adams 12 Five Star Schools will share energy efficiency and renewable energy efficiency information through the Adams 12 Five Star Schools Facebook page and other social media platforms.
- Adams 12 Five Star Schools will evaluate the potential for Thornton and Adams 12 communications departments to collaborate to amplify messaging on relevant topics.

Responsible Parties (or Designated Representatives)

- City Development, Thornton (Martin Postma, PM Team Representative)
- Shannon Oliver, Energy and Sustainability Manager, Adams 12 Five Star Schools
- Melanie Gavin, Account Manager, Xcel Energy
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Identify an appropriate Colorado Association of School District Energy Managers (CASDEM) meeting for Thornton and Xcel Energy Partners in Energy participation and tabling. Meetings are held every two months during the school year (September, November, January, March, and May).
 - Prepare materials for and participate in annual Water Festival.
 - Create a social media calendar in collaboration with Adams 12.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Target November CASDEM meeting for Xcel Energy Partners in Energy participation.
- Implementation Q3 (Mar-May 2021)
- Implementation Q4 (Jun-Aug 2021)
 - Submit 2022 budget requests, as needed.
- Implementation Q5 (Sep-Nov 2021)
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staffing Resources
 - 177 hours.
- Funding Needs
 - None identified.
- Partners in Energy Implementation Requests
 - Support events with collateral, giveaways, and attendance where needed.
 - Scope and help identify funding for a joint technical assistance engineering study among Xcel Energy, Thornton, and Adams 12 to identify future energy projects at shared facilities (Aquatic Center and Consolidated Service Center).
 - Provide a social media calendar.

Partners

- Tom Green, United Power Account Manager
- Colorado Energy Office – facilitates the energy performance contracting process.
- McKinstry, ESCOs – responsible for the design, execution, and implementation of the Adams 12 energy performance contract.
- Colorado PACE – offers the C-PACE financing program.
- Matt McNearney, Grid Alternatives – provides solar feasibility assistance for shared facilities.

Communication and Outreach Channels

- Focus area implementation group check-in meetings – consider in-person meetings at city or School District facilities for ongoing communication and coordination.
- Adams 12 Five Star Schools websites and emails.

Strategy 2-2: Engage with Other Institutional Stakeholders

Table 13. Institutional Focus Area, Strategy 2-2: Engage with Other Institutional Stakeholders

| Strategy 2-2: Engage with Other Institutional Stakeholders |
|--|
| <p>Description</p> <p>The Engage with Other Institutional Stakeholders strategy encompasses engagement with institutional stakeholders (e.g., libraries, school districts, hospitals, public transportation) that did not participate in the planning process - to raise awareness of energy efficiency, renewable energy, and utility programs. This strategy will be led by the Thornton City Development department.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> • Develop tailored collateral for each type of institution or for Regional Transportation District (RTD) transit modes within Thornton. • Identify points of contact for each institution and schedule one-on-one meetings to share information, gauge interest in and potential for energy projects (energy efficiency and/or renewable energy), and opportunities to promote energy awareness. |
| <p>Responsible Parties (or Designated Representatives)</p> <ul style="list-style-type: none"> • City Development, Thornton (Martin Postma, PM Team Representative) • City Development, Thornton (Kent Moorman, Regional Transportation Engineer) • Communications, Thornton (Todd Barnes, Communications Director) • Community Connections, Thornton (Adam Lyons, Grant and Housing Supervisor) • Economic Development, Thornton (Adam Krueger, Deputy Economic Development Director) • Water Resources, Thornton (Emily Hunt, Deputy Infrastructure Director) • Xcel Energy Partners in Energy and program staff |
| <p>Timeline</p> <ul style="list-style-type: none"> • Implementation Q1 (Sep-Nov 2020) <ul style="list-style-type: none"> ○ Gather stock materials from Xcel Energy. ○ Brand and tailor promotional materials. ○ Identify points of contact and reach out to schedule meetings. ○ Submit 2021 budget requests, as needed. • Implementation Q2 (Dec 2020-Feb 2021) <ul style="list-style-type: none"> ○ Schedule and engage with institutional stakeholders to share information and develop buy-in. • Implementation Q3 (Mar-May 2021) <ul style="list-style-type: none"> ○ Schedule and engage with institutional stakeholders to share information and develop buy-in. ○ Compile meeting summaries and outcomes report. • Implementation Q4 (Jun-Aug 2021) <ul style="list-style-type: none"> ○ Submit 2022 budget requests, as needed. • Implementation Q5 (Sep-Nov 2021) • Implementation Q6 (Dec 2021-Feb 2022) |

Implementation Resources

- Thornton Staffing Resources
 - 90 Hours.
- Funding Needs
 - None identified.
- Partners in Energy Implementation Requests
 - Develop tailored collateral for up to three institutional business types.

Partners

- Tom Green, United Power Account Manager
- Anythink Libraries
- Mapleton School District
- North Suburban Medical Center
- Regional Transportation District

Communication and Outreach Channels

- Focus area implementation group check-in meetings
- Institutional partners' websites and emails

Focus Area 3: Residential**What is included in this focus area?**

- Any single-family or multi-family property located within Thornton limits.

Objectives

- The city should promote smart, green, and equitable development through fiscally responsible growth patterns, promoting infill and redevelopment, promoting sustainable development practices, and leveraging new technology to foster a "Smart" City.
- The city should serve as a nexus for equitable community services and education around energy awareness, efficiency and renewable options, and electrification.
- The city should provide vulnerable populations, including lower-income and seasonally employed residents, with access to affordable energy programs.

Metrics

- Residential annual energy use (electricity and natural gas)
- Residential annual energy costs (electricity and natural gas)
- Annual project participation and savings (electricity and natural gas)
- Average energy use (MMBtu/premise)
- Number of LEED (or other sustainably certified) housing units

Targets

- Maintain historical levels of 1,900 energy projects, 1.4 million kWh electricity savings, and 140,000 therms of natural gas savings.
- Complete an additional 570 energy projects over the next two years for 0.5 million kWh of additional electricity savings and 40,000 therms of additional natural gas savings.
- Increase renewable energy supplies by 0.3 million kWh over the next two years.

Strategies

Strategy 3-1: Promote Residential Energy Improvements

Table 14. Residential Focus Area, Strategy 3-1: Promote Residential Energy Improvements

| Strategy 3-1: Promote Residential Energy Improvements |
|--|
| <p>Description</p> <p>The Promote Residential Energy Improvements strategy encompasses all types of energy improvements targeted at the residential sector, including new home efficiency, existing home efficiency, multi-family programs, renewable energy supplies, and energy awareness. This strategy will be led by the Parks Recreation & Community Programs and Water Resources departments.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> • Purchase (or buy-down) Home Energy Squad® visits for 500 residents, beginning with low-income residents or targeted neighborhoods with relatively high energy use; and then open up the offering to any qualified resident. Appendix E: Residential Energy Efficiency Programs contains information about Xcel Energy's Home Energy Squad and Home Energy Squad Plus programs. Appendix F: Residential Energy Heat Maps contains maps of average electricity use per premise, and average natural gas use per premise, by census block. • Use existing city programs with customer outreach channels to cross-promote energy programs. <ul style="list-style-type: none"> ○ City programs to leverage include water conservation programs delivered by Resource Central and the Home Loan Repair program. ○ Programs to be promoted may include those with historically high participation and savings, including but not limited to: <ul style="list-style-type: none"> ▪ Xcel Energy Home Energy Squad® ▪ Xcel Energy and United Power heating programs ▪ Xcel Energy and United Power refrigerator and freezer recycling programs ▪ Xcel Energy Single-Family Weatherization program • Raise energy awareness in the community by holding one educational workshop per year – the first to be focused on residential energy efficiency and the second to be focused on renewable energy options for residents. <ul style="list-style-type: none"> ○ The energy efficiency workshop will focus on “Top 10” energy-savings tips and provide an overview of relevant energy programs. ○ The renewable energy workshop will cover (1) tools and resources (e.g., CSU Extension Solar Calculator, Google Project Sunroof); (2) information about Xcel Energy and United Power solar and wind subscription programs; and (3) funding programs to help homeowners with PV solar system installations. • Promote energy education and awareness at city events (e.g., tabling and distributing conservation kits at Thorntonfest and Harvest Fest). • Promote new home efficiency by connecting with the development community and raising awareness of Xcel Energy's Energy Star New Homes and other programs targeted at new construction. • Promote energy efficiency in multifamily buildings by working with CLEAResult and promoting the Xcel Energy Multifamily Buildings and Multifamily Weatherization Programs. |

- Consider Community Development Block Grant (CDBG) funding to help homeowners with energy efficiency improvements.

Responsible Parties (or Designated Representatives)

- Water Resources, Thornton (John Orr, PM Team Representative)
- City Development, Thornton (Jim Bilyeu, Plans Examining Supervisor)
- Communications, Thornton (Todd Barnes, Communications Director)
- Community Connections, Thornton (Adam Lyons, Grant and Housing Supervisor)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Water Resources, Thornton (Emily Hunt, Deputy Infrastructure Director)
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Submit 2021 budget requests.
 - Communicate with CLEAResult to determine timing of 2021 Home Energy Squad campaign, and mechanisms for promoting the multi-family buildings programs. Define marketing and outreach strategy.
 - Work with Resource Central to market energy programs.
 - Identify possibilities to utilize CDBG funding for energy efficiency improvements.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Work with procurement for sole source contract justification and approval.
 - Develop marketing materials and submit for brand review.
 - Conduct residential energy efficiency workshop.
 - Participate in Harvest Fest.
- Implementation Q3 (Mar-May 2021)
 - Execute contract with CLEAResult for Home Energy Squad campaign.
 - Begin marketing for Home Energy Squad campaign. Consider in-person event promotions.
- Implementation Q4 (Jun-Aug 2021)
 - Continue marketing and begin implementing Home Energy Squad campaign.
 - Work with Resource Central to market energy programs.
 - Conduct a residential renewable energy workshop.
 - Submit 2022 budget requests, as needed.
- Implementation Q5 (Sep-Nov 2021)
 - Work with Resource Central to market energy programs.
 - Participate in Thorntonfest.
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staffing Resources
 - 240 hours.
- Funding Needs
 - \$12,500-\$50,000 to subsidize (or purchase, depending on the level of funding available) Home Energy Squad visits on behalf of Thornton residents. Potential grant funding sources,

such as Community Development Block Grants, will also be evaluated for suitability to this project.

- Partners in Energy Implementation Requests
 - Coordinate and market the Home Energy Squad campaign with Thornton and CLEAResult, including sending marketing e-mails to Thornton residents.
 - Develop collateral for residents, to be distributed by Resource Central and other program visits.
 - Plan and attend two educational workshops.
 - Develop collateral for developers, promoting Energy Star New Homes and other programs
 - Leverage the New Development, Multifamily, Congregation, and Underserved toolkits for resident engagement.
 - Event tabling support (e.g., collateral development, printing, giveaways, attendance).

Partners

- Tom Green, United Power Account Manager
- Matt McNearney, GRID Alternatives – vendor that offers multiple programs to help Thornton residents install rooftop solar, including free installations and energy generation for low-income residents.
- Resource Central – City vendor that implements various water conservation programs
- CLEAResult –Xcel Energy vendor for Multifamily Buildings program and Home Energy Squad®.
- Brothers Redevelopment – City vendor that provides home repairs to Thornton homeowners.
- Colorado State University Extension – provides informational resources for home energy efficiency and solar PV systems

Communication and Outreach Channels

- Focus area lead check-in meetings
- Thornton Sustainability website
- Thornton email, newsletters
- Resource Central emails, visits, customer surveys, and website
- Xcel Energy emails
- United Power emails
- Collateral distribution at city facilities

Focus Area 4: Business

What is included in this focus area?

- Any business property located within Thornton limits, excluding municipal and institutional properties.

Objectives

- The city should serve as a nexus for community services and education around energy awareness, efficiency, and renewable options.
- The city should promote growing smarter and greener through fiscally responsible growth patterns, promoting infill and redevelopment, promoting sustainable development practices, and leveraging new technology to foster a “Smart” City.
- The city should promote energy efficiency standards in public and private developments.

Metrics

- Commercial and industrial annual energy use (electricity and natural gas)
- Commercial and industrial annual energy costs (electricity and natural gas)
- Annual project participation and savings (electricity and natural gas)

Targets

- Maintain historical levels of 190 energy projects, 4.2 million kWh electricity savings, and 1,700 therms of natural gas savings.
- Complete an additional 28 energy projects over the next two years for 0.1 million kWh of additional electricity savings and 4,000 therms of additional natural gas savings.

Strategies

Strategy 4-1: Promote Business Energy Improvements

Table 15. Business Focus Area, Strategy 4-1: Promote Business Energy Improvements

| Strategy 4-1: Promote Business Energy Improvements |
|---|
| <p>Description</p> <p>The Promote Business Energy Improvements strategy encompasses all types of energy improvements targeted at the private sector, including new business efficiency, existing business efficiency, renewable energy supplies, and energy awareness. This strategy will be led by the Economic Development Department.</p> |
| <p>Implementation Activities (2020-2022)</p> <ul style="list-style-type: none"> Conduct a lighting campaign for a selected business corridor in Thornton. Potential locations include shopping centers such as Thornton Town Center, Eastlake, Thorncreek Shopping Center, etc. Develop an engagement strategy, for large businesses, that includes tailored energy packets by business type (collateral and case studies) and one-on-one engagement led by the Economic Development Department. The city’s business database includes contact information, ownership versus rental information, and other attributes that will allow engagement with targeted businesses. Contact will be initiated by email, with follow-up conversations with interested businesses. Leverage connections with the Businesses In Thornton Advisory Council (BTAC) to share general collateral and program information suitable for small businesses. Identify business types that are interested in more detailed or tailored information. Networking events, hosted twice per year (May/June and Sept/Oct), allow tabling and networking opportunities with small businesses. |

- Leverage connections with the Alianza organization, to connect with Spanish-speaking businesses.
- Incorporate information from the Partners in Energy Small/Medium Business Toolkit.
- Evaluate whether Annual Green Business Award (given out in April) can be used to recognize businesses that have achieved energy excellence, whether through efficiency or renewable energy initiatives.

Responsible Parties (or Designated Representatives)

- City Development, Thornton (Martin Postma, PM Team Representative)
- Communications, Thornton (Todd Barnes, Communications Director)
- Economic Development, Thornton (Adam Krueger, Deputy Director of Economic Development)
- Management and Budget Office, Thornton (Erika Senna, Budget Manager)
- Water Resources, Thornton (Emily Hunt, Deputy Infrastructure Director)
- Xcel Energy Partners in Energy and program staff

Timeline

- Implementation Q1 (Sep-Nov 2020)
 - Develop a plan for business lighting campaign, large business outreach, BTAC and Alianza outreach, and material development for small businesses.
 - Communicate with CLEAResult to determine timing of small business lighting campaign and define marketing and outreach strategy.
 - Submit budget requests.
 - Develop marketing materials and submit for brand review. Translate into Spanish where needed and feasible.
- Implementation Q2 (Dec 2020-Feb 2021)
 - Identify points of contact and reach out to schedule meetings with large businesses.
- Implementation Q3 (Mar-May 2021)
 - Begin marketing for and implementing lighting campaign. Consider in-person event promotions.
 - Attend BTAC meeting and coordinate with Alianza.
 - Meet with large businesses.
- Implementation Q4 (Jun-Aug 2021)
 - Meet with large businesses.
 - Submit budget requests.
- Implementation Q5 (Sep-Nov 2021)
 - Meet with large businesses.
- Implementation Q6 (Dec 2021-Feb 2022)

Implementation Resources

- Thornton Staffing Resources
 - 275 Hours.
- Funding Needs
 - None identified.
- Partners in Energy Implementation Requests
 - Attend up to three business networking events.

- Leverage the Small Business and Medium Business toolkits for business engagement.
- Event tabling support (e.g., collateral development, printing, giveaways, attendance).
- Support one-on-one business engagement as needed.

Partners

- Tom Green, United Power Account Manager and BTAC chairman
- CLEAResult –Xcel Energy vendor for the Small Business Lighting program.
- BTAC – represents and communicates with Thornton businesses
- Colorado State University Extension – supports energy efficiency and renewable energy trainings

Communication and Outreach Channels

- Focus area lead check-in meetings
- Thornton Economic Development web site
- Thornton Sustainability web site
- Thornton business email newsletters
- Xcel Energy emails
- United Power emails
- Business partner websites and emails (e.g., TBAC)
- Tabling at business events

How Are We Going to Stay on Course?

Thornton intends to create an Implementation Project Management Team consisting of the following staff members to act as overall stewards of the plan.

Implementation Team

- Emily Hunt, Deputy Infrastructure Director
- John Orr, Water Resources Administrator
- Martin Postma, Senior Policy Analyst
- Pia Gerstle, Water Resources Analyst II

Project Management and Tracking

Partners in Energy will host biweekly project management check-in calls with the Implementation Team to ensure we stay on course to achieve our strategies. From there, the Implementation Team will coordinate with relevant Energy Team members, identified in the strategy tables above, to take identified actions, share progress, and make course corrections to meet the realities of implementation.

Data and Reporting

This Energy Action Plan is intended to be a living document (**Figure 10**). Goals and strategies will be assessed every six months and refined if needed. Partners in Energy will provide biannual progress reports with metrics of success and overall progress toward goals. These progress reports will be available publicly

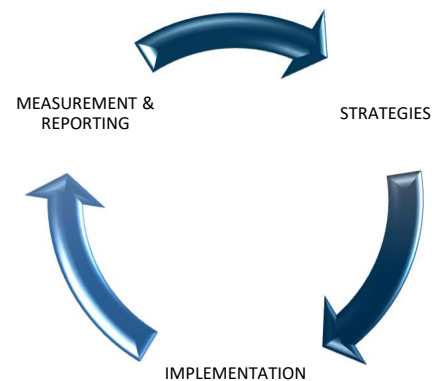


Figure 10. Actions and Tracking

and shared with the Energy Team. If needed, ad hoc participation reports for specific Xcel Energy programs (e.g., Home Energy Squad) are available to measure the success of campaigns.

Beyond the Plan Horizon

As Thornton sets out to achieve its 2030 goal of aligning with the State of Colorado's GHG emission reduction targets, Xcel Energy is moving in the same direction and working hard to support customers in achieving their climate goals. To this end, Xcel Energy has committed to achieving 100% carbon-free electricity by 2050 (**Figure 11**).



Figure 11. Xcel Energy Carbon-Free Energy Commitments

In partnership, Thornton along with its energy utility service providers, community partners, residents, and businesses can realize the energy vision and goals set forth in this Energy Action Plan to make Thornton a more sustainable and resilient community.

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Appendix A: Glossary of Terms

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. DSM aims to encourage consumers to decrease energy consumption, especially during peak hours or to shift time of energy use to off-peak periods such as nighttime and weekend.

Direct Installation: Free energy-saving equipment installed by Xcel Energy or other organization for program participants that produces immediate energy savings.

Energy Action Plan: A written plan that includes an integrated approach to all aspects of energy management and efficiency. This includes both short- and long-term goals, strategies, and metrics to track performance.

Energy Use Intensity: A metric that expresses a building's energy use as a function of its size (e.g. kWh/sq. ft.) or other characteristics.

Greenhouse Gas (GHG): Gas in the atmosphere that absorbs and emits radiant energy within the thermal infrared range (primary GHGs include water vapor, carbon dioxide, methane, nitrous oxide, and ozone); GHGs are associated with affecting climate change.

Goals: The results toward which efforts and actions are directed. There can be a number of objectives and goals outlined in order to successfully implement a plan.

HOA: Homeowners' association.

HVAC: Heating, ventilation, and air conditioning.

LED: light-emitting diode.

kW: kilowatt (1,000 watts); a unit of electric power.

kWh (kilowatt-hour): A unit of electric consumption

MMBtu: One million British Thermal Units; a measure of energy content in fuels.

MTCO₂e: Metric tons of carbon dioxide equivalent (MTCO₂ Eq.); measure used to compare the emissions from different greenhouse gases based on their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by its associated GWP.

MW: Megawatt (1 million watts); a unit of electric power.

Premise: A unique identifier for the location of electricity or natural gas service. In most cases, it is a facility location. There can be multiple premises per building and multiple premises per individual debtor.

Recommissioning: An energy efficiency service focused on identifying ways that existing building systems can be tuned-up to run as efficiently as possible.

RFP: Request for proposals (solicitation of services).

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

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

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

Therm: A unit of heat energy (natural gas).

Weatherization: Insulation, air sealing, weather stripping, etc., that improve the building envelope.

Appendix B: Municipal Facility Inventory

| Complex | Building | Address | Square Feet |
|---|-------------------------------------|-----------------------|-------------|
| City Hall | Civic Center Main Building | 9500 Civic Center Dr | 106,561 |
| | Justice Center | 9551 Civic Center Dr | 102,426 |
| | <i>Complex Total</i> | - | 208,987 |
| Infrastructure Maintenance Center | Administration | 12450 Washington St | 23,204 |
| | Operations | 12450 Washington St | 18,252 |
| | Storage | 12450 Washington St | 7,298 |
| | Fleet Shops | 12450 Washington St | 14,030 |
| | Heated Storage | 12450 Washington St | 9,511 |
| | Shop Addition | 12450 Washington St | 8,000 |
| | Ice slicer dome | 12450 Washington St | 5,000 |
| | New Fleet Buildings | 1330 E 126th Ave | 28,000 |
| | <i>Complex Total</i> | - | 113,295 |
| Maintenance Service Center | Building A | 8651 Colorado Blvd | 16,222 |
| | Building B | 8651 Colorado Blvd | 40,350 |
| | Building D | 8651 Colorado Blvd | 4,850 |
| | Building E | 8651 Colorado Blvd | 4,800 |
| | Building F | 8651 Colorado Blvd | 1,200 |
| | <i>Complex Total</i> | - | 67,422 |
| Fire Station #1 | Fire Station #1 | 9451 Dorothy Blvd | 6,113 |
| Fire Station #2 | Fire Station #2 | 9667 Huron St | 3,500 |
| Fire Station #3 | Fire Station #3 | 11257 Birch Dr | 2,000 |
| Fire Station #4 | Fire Station #4 | 1400 E 128th Ave | 7,500 |
| Fire Station #5 | Fire Station #5 | 14051 Colorado Blvd | 11,800 |
| Community Center | Fossil Ridge Public Safety Building | 13150 Quebec St | - |
| | Community Center | 2211 Eppinger Blvd | 24,881 |
| | Community Building | 2141 E 95th Ave | 2,901 |
| | Community Pool Storage | 2141 E 95th Ave | 1,525 |
| | Boiler/Pump Building | 2141 E 95th Ave | 1,700 |
| | Pool Building | 13401 Albion Way Pool | |
| | | 13401 Albion Way | |
| | <i>Complex Total</i> | - | 31,007 |
| Margaret W. Carpenter Recreation Center | Building | 11151 Colorado Blvd | 78,780 |
| | Park Restrooms | 11151 Colorado Blvd | 1,600 |
| | Open Space Buildings | 11151 Colorado Blvd | 3,000 |
| | <i>Complex Total</i> | - | 83,380 |
| Trail Winds Recreation Center | Building | 13495 Holly St | 88,000 |
| | Restrooms | 13495 Holly St | 800 |
| | Restrooms | 13385 Holly St | 1,236 |
| | <i>Complex Total</i> | - | 90,036 |
| Woodglen Park | Restrooms | 11551 Madison St | 800 |
| Thornton Arts & Cultural Center | Thornton Arts & Cultural Center | 9209 Dorothy Blvd | 7,500 |
| | <i>Complex Total</i> | - | 7,500 |
| Thorncreek Golf Course | Club House | 13555 Washington St | 6,000 |
| | Maintenance Shop | 13555 Washington St | 8,000 |

| Complex | Building | Address | Square Feet |
|--|-------------------------------|------------------------------|-------------|
| | Maintenance Shop | | |
| | <i>Complex Total</i> | - | 14,000 |
| Riverwalk Ballfields | Riverwalk Ballfields | 8651 Riverdale Rd | 5,000 |
| | ESP Dewatering PS | | |
| | <i>Complex Total</i> | - | 5,000 |
| Northern Lights Ballfield | Restrooms | | 800 |
| Thornton Sports Complex | Restrooms | | 800 |
| Active Adult Center | Active Adult Center | 9471 Dorothy Blvd | 8,039 |
| Park Village Pool | Building | 4051 Summit Grove Pkwy | 2,665 |
| Lambertson Farm | Main Farm House | 751 E 100th Ave | 4,000 |
| | Small Farm House | 751 E 100th Ave | 1,500 |
| | Outbuildings | | |
| | <i>Complex Total</i> | - | 5,500 |
| Thornton WTP | Thornton WTP | 9520 Ellen Ct | 34,042 |
| | UV Building | 9520 Ellen Ct | 820 |
| | Thornton Treatment Plant | 9520 Ellen Ct | 2,277 |
| | <i>Complex Total</i> | - | 37,139 |
| Wes Brown (Columbine) WTP | Wes Brown (Columbine) WTP | 3651 E 86th Ave | 119,459 |
| | Midgordon Garage | 3651 E 86th Ave | 1,920 |
| | West Raw Water | 3651 E 86th Ave | 1,800 |
| | West Pre-Treat | 3651 E 86th Ave | 600 |
| | Tani Lakes Pump | 3651 E 86th Ave | 1,300 |
| | East Raw Water | 3651 E 86th Ave | 2,100 |
| | South I-76 Pre-Treatment | 3651 E 86th Ave | 600 |
| | <i>Complex Total</i> | - | 127,779 |
| Pumps | McKay Pump Station | 9800 McKay Road | 370 |
| | Rogers Pump Station | 13600.5 E 168th Ave | |
| | Hammer Pump Station | 14790 Riverdale Road | |
| | Hilltop Repeater Station | 4500 140th Ave | 500 |
| | Holly Pump Station | 12663 Holly Street | 500 |
| | Grange Hall Pump Station | 4225 108th Ave | 214 |
| | Woodglenn Pump Station | 11698 Milwaukee Circle | 600 |
| | Cherry Park Pump Station | 11590.5 Birch Dr | |
| | Zone 2-3 Pumphouse | 1000 Thornton Parkway | 1,800 |
| | Zone 3A Pump Station | 14055 S Colorado Blvd | 400 |
| | Margaret W. Carpenter Center | | |
| | Pump Station | 3444 E 112th Ave | 368 |
| | Zone 3/4 Pump Station | 9520 Ellen Ct | 2,972 |
| | Community Park Pump Station | 2141 E 95th Ave | 500 |
| | East Gravel Lake Pump Station | 4300 E 88th Ave | |
| | West Gravel Lake Pump | | |
| | Station | 8590 Riverdale Rd | |
| | Riverdale Lift Station | 8651 Riverdale Rd Building D | |
| Eastlake Elevator Building / Beauty Shop | | 1245 York St | 5,877 |
| | Western Hills | | 3,257 |

Appendix C: Energy Programs for Businesses

| Business Type and Common Energy Opportunities | Program Recommendations | First Steps | Avg. Electricity Savings - (kWh/yr) ¹ | Avg. Natural Gas Savings (therm/yr) ¹ | Avg. Cost Savings ¹ |
|--|--|--|---|--|--------------------------------------|
| Restaurant Lighting Refrigeration Water heating Cooking Heating, ventilation, and cooling | Small Business Lighting (<i>quick win</i>) | Sign up for a lighting audit and get free equipment installations and recommendations for more savings | 6,540 kWh/yr | 199 therm/yr | \$688 cost savings; \$682 in rebates |
| | Commercial Refrigeration Efficiency (<i>quick win</i>) | Sign up for a refrigeration audit and get free equipment installations and recommendations for more savings | 5,029 kWh/yr | 300 therm/yr | \$602 cost savings; \$377 in rebates |
| | Energy Audit (<i>informed investment</i>) | Schedule your site visit and review your report for best projects to implement, including process improvements and equipment recommendations | Businesses under 50,000 sq. ft. qualify for a free audit. Savings vary by the projects you choose to implement. Your report will include recommended energy-efficient improvements along with their estimated costs, rebates, and paybacks. | | |
| Retail Lighting Heating and cooling | Small Business Lighting (<i>quick win</i>) | Sign up for a lighting audit and get free equipment installations and recommendations for more savings | 6,540 kWh/yr | 199 therm/yr | \$688 cost savings; \$682 in rebates |
| | Building Tune-up (<i>quick win</i>) | Sign up for a tune-up for equipment optimization | Savings will vary by the measures you choose. Your report will include all applicable low- and no-cost measures with their estimated costs, rebates, and paybacks. | | |
| | Energy Audit (<i>informed investment</i>) | Schedule your site visit and review your report for best projects to implement, including process improvements and equipment recommendations | Businesses under 50,000 sq. ft. qualify for a free audit. Savings vary by the projects you choose to implement. Your report will include recommended energy-efficient improvements along with their estimated costs, rebates, and paybacks. | | |

| Business Type and Common Energy Opportunities | Program Recommendations | First Steps | Avg. Electricity Savings - (kWh/yr) ¹ | Avg. Natural Gas Savings (therm/yr) ¹ | Avg. Cost Savings ¹ |
|--|--|--|---|--|--------------------------------------|
| Grocery Convenience Liquor Refrigeration Lighting Heating and cooling | Small Business Lighting (<i>quick win</i>) | Sign up for a lighting audit and get free equipment installations and recommendations for more savings | 6,540 kWh/yr | 199 therm/yr | \$688 cost savings; \$682 in rebates |
| | Commercial Refrigeration Efficiency (<i>quick win</i>) | Sign up for a refrigeration audit and get free equipment installations and recommendations for more savings | 5,029 kWh/yr | 300 therm/yr | \$602 cost savings; \$377 in rebates |
| | Building Tune-up (<i>quick win</i>) | Sign up for a tune-up for equipment optimization | Savings will vary by the measures you choose. Your report will include all applicable low- and no-cost measures with their estimated costs, rebates, and paybacks. | | |
| | Energy Audit (<i>informed investment</i>) | Schedule your site visit and review your report for best projects to implement, including process improvements and equipment recommendations | Businesses under 50,000 sq. ft. qualify for a free audit. Savings vary by the projects you choose to implement. Your report will include recommended energy-efficient improvements along with their estimated costs, rebates, and paybacks. | | |
| Healthcare Lighting Heating and cooling Water heating | Small Business Lighting (<i>quick win</i>) | Sign up for a lighting audit and get free equipment installations and recommendations for more savings | 6,540 kWh/yr | 199 therm/yr | \$688 cost savings; \$682 in rebates |
| | Low-flow water fixtures (<i>quick win</i>) | Check out the Xcel Energy Store for low-flow water fixtures | Savings will vary by the fixtures you choose. The Xcel Energy Store provides estimated savings by water fixture. | | |
| | Plug load control (<i>quick win</i>) | Check out the Xcel Energy Store for programmable thermostats and power supplies | Savings will vary based on the items you choose. | | |
| | Building Tune-up (<i>quick win</i>) | Sign up for a tune-up for equipment optimization | Savings will vary based on the measures you choose. Your report will include all applicable low- and no-cost measures with their estimated costs, rebates, and paybacks. | | |

| Business Type and Common Energy Opportunities | Program Recommendations | First Steps | Avg. Electricity Savings - (kWh/yr) ¹ | Avg. Natural Gas Savings (therm/yr) ¹ | Avg. Cost Savings ¹ |
|--|---|--|---|--|--|
| Small Office Lighting Heating and cooling Water heating Plug load | Energy Audit (<i>informed investment</i>) | Schedule your site visit and review your report for best projects to implement, including process improvements and equipment recommendations | Savings vary by the projects you choose to implement. Your report will include recommended energy-efficient improvements along with their estimated costs, rebates, and paybacks. | | |
| | Building Recommissioning (<i>informed investment</i>) | Contact the Building Services Commissioning Firm for more information on building recommissioning | 85,804 kWh/yr | 814 therm/yr | \$8,129 cost savings; \$5,728 in rebates |
| | Small Business Lighting (<i>quick win</i>) | Sign up for a lighting audit and get free equipment installations and recommendations for more savings | 6,540 kWh/yr | 199 therm/yr | \$688 cost savings; \$682 in rebates |
| | Building Tune-up (<i>quick win</i>) | Sign up for a tune-up for equipment optimization | Savings will vary based on the measures you choose. Your report will include all applicable low- and no-cost measures with their estimated costs, rebates, and paybacks. | | |
| | Low-flow water fixtures (<i>quick win</i>) | Check out the Xcel Energy Store for low-flow water fixtures | Savings will vary based on the fixtures you choose. The Xcel Energy Store provides estimated savings by water fixture. | | |
| | Plug load control (<i>quick win</i>) | Check out the Xcel Energy Store for programmable thermostats and power supplies Adjust thermostats to match occupancy schedule | Savings will vary based on the items you choose. | | |
| | Energy Audit (<i>informed investment</i>) | Schedule your site visit and review your report for best projects to implement, including process improvements and equipment recommendations | Businesses under 50,000 sq. ft. qualify for a free audit. Savings vary based on the projects you choose to implement. Your report will include recommended energy-efficient improvements along with their estimated costs, rebates, and paybacks. | | |

Table notes: ¹ State of Colorado average

Appendix D: Preliminary Analysis of Renewable*Connect Eligibility

Xcel Energy's Renewable*Connect program is currently being considered by the Public Utilities Commission. If approved, Thornton should consider subscribing qualifying meters under a 10-year contract term (the longer the contract term, the more financially beneficial the terms are to the city).

A screening analysis was conducted in the preparation of this plan to assess the city's potential to enroll in Round 2 of the program if and when it becomes available in 2022. Based on the terms of the first offering made in 2018-2019, a theoretical maximum of 9,781 kW of the city's energy use could be subscribed under the program - resulting in an estimated 26.1 million kWh of renewable energy produced each year, which would cover more than 99% of the city's energy use (**Table 16**). However, the actual subscription amount that the city can access will be limited by the program capacity and the program demand from other customers. In the first round of the program offering, customers were limited to 25% of the requested subscription amount. For the purposes of establishing planning targets, 2,445 kW is assumed to be the maximum subscription that the city could access in round 2 when it becomes available.

Table 16. Preliminary Analysis of Municipal Meter Eligibility for Renewable*Connect Enrollment

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|--------------------|------------------------|--------------|---------|-------------------|
| 1 | 304258724 | 6,077 | 100% | 6,077 | 2.00 | Pass |
| 2 | 304287666 | 4,657 | 100% | 4,657 | 1.50 | Pass |
| 3 | 304300755 | 7,309 | 100% | 7,309 | 2.50 | Pass |
| 4 | 304310554 | 1,550 | 100% | 1,550 | 0.50 | Pass |
| 5 | 304332380 | 9,604 | 100% | 9,604 | 3.50 | Pass |
| 6 | 304360427 | 6,889 | 100% | 6,889 | 2.50 | Pass |
| 7 | 304367901 | 832 | 100% | 832 | - | Fail |
| 8 | 304385982 | 6,927 | 100% | 6,927 | 2.50 | Pass |
| 9 | 304478876 | 6,682 | 100% | 6,682 | 2.50 | Pass |
| 10 | 304519864 | 7,580 | 100% | 7,580 | 2.50 | Pass |
| 11 | 304633330 | 4,817 | 100% | 4,817 | 1.50 | Pass |
| 12 | 304748942 | 3,330 | 100% | 3,330 | 1.00 | Pass |
| 13 | 304758627 | 357 | 100% | 357 | - | Fail |
| 14 | 300683066 | 972,620 | 100% | 972,620 | 365.00 | Pass |
| 15 | 300685277 | 146,080 | 100% | 146,080 | 54.50 | Pass |
| 16 | 300687286 | 259,680 | 100% | 259,680 | 97.50 | Pass |
| 17 | 300687309 | 3,109,457 | 100% | 3,109,457 | 1,168.0 | Pass |
| 18 | 300691371 | 8,516 | 100% | 8,516 | 3.00 | Pass |
| 19 | 300694303 | 51 | 100% | 51 | - | Fail |
| 20 | 300699604 | - | 100% | - | - | |
| 21 | 300722159 | 72 | 100% | 72 | - | Fail |
| 22 | 300736329 | 200,888 | 100% | 200,888 | 75.00 | Pass |
| 23 | 300736931 | 14,000 | 100% | 14,000 | 5.00 | Pass |
| 24 | 300784251 | 1 | 100% | 1 | - | Fail |

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|--------------------|------------------------|--------------|--------|-------------------|
| 25 | 300785501 | 3,172 | 100% | 3,172 | 1.00 | Pass |
| 26 | 300788838 | 114 | 100% | 114 | - | Fail |
| 27 | 300792865 | 729 | 100% | 729 | - | Fail |
| 28 | 300811803 | 44 | 100% | 44 | - | Fail |
| 29 | 300831908 | 40 | 100% | 40 | - | Fail |
| 30 | 300832510 | 3,225 | 100% | 3,225 | 1.00 | Pass |
| 31 | 300844520 | 344,800 | 100% | 344,800 | 129.50 | Pass |
| 32 | 300934338 | 885,748 | 100% | 885,748 | 332.50 | Pass |
| 33 | 300936251 | 24 | 100% | 24 | - | Fail |
| 34 | 300936934 | 2,936 | 100% | 2,936 | 1.00 | Pass |
| 35 | 300938126 | 10,000 | 100% | 10,000 | 3.50 | Pass |
| 36 | 300943152 | 10 | 100% | 10 | - | Fail |
| 37 | 300947933 | 158,017 | 100% | 158,017 | 59.00 | Pass |
| 38 | 300962747 | 83,934 | 100% | 83,934 | 31.50 | Pass |
| 39 | 300964654 | 1,807 | 100% | 1,807 | 0.50 | Pass |
| 40 | 300984611 | 45 | 100% | 45 | - | Fail |
| 41 | 300989566 | 2,695 | 100% | 2,695 | 1.00 | Pass |
| 42 | 300993191 | 3,991 | 100% | 3,991 | 1.00 | Pass |
| 43 | 301039517 | 347,040 | 100% | 347,040 | 130.00 | Pass |
| 44 | 301088454 | 208 | 100% | 208 | - | Fail |
| 45 | 301088593 | 3,810 | 100% | 3,810 | 1.00 | Pass |
| 46 | 301093742 | 6 | 100% | 6 | - | Fail |
| 47 | 301106498 | 33 | 100% | 33 | - | Fail |
| 48 | 301116467 | - | 100% | - | - | |
| 49 | 301121271 | 2,800 | 100% | 2,800 | 1.00 | Pass |
| 50 | 301121279 | 1,416 | 100% | 1,416 | 0.50 | Pass |
| 51 | 301135994 | 2,040 | 100% | 2,040 | 0.50 | Pass |
| 52 | 301147189 | 1,359 | 100% | 1,359 | 0.50 | Pass |
| 53 | 301169696 | 9 | 100% | 9 | - | Fail |
| 54 | 301172901 | 1,682 | 100% | 1,682 | 0.50 | Pass |
| 55 | 301188762 | 20 | 100% | 20 | - | Fail |
| 56 | 301236425 | 19,840 | 100% | 19,840 | 7.00 | Pass |
| 57 | 301238848 | 1,116 | 100% | 1,116 | - | Fail |
| 58 | 301239544 | 18,236 | 100% | 18,236 | 6.50 | Pass |
| 59 | 301239825 | 2,141,640 | 100% | 2,141,640 | 804.50 | Pass |
| 60 | 301245135 | 84 | 100% | 84 | - | Fail |
| 61 | 301246224 | 107 | 100% | 107 | - | Fail |
| 62 | 301259216 | 51 | 100% | 51 | - | Fail |
| 63 | 301273053 | 2,139 | 100% | 2,139 | 0.50 | Pass |
| 64 | 301274897 | - | 100% | - | - | |
| 65 | 301296465 | 447 | 100% | 447 | - | Fail |

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|--------------------|------------------------|--------------|---------|-------------------|
| 66 | 301296541 | 1,934,754 | 100% | 1,934,754 | 726.50 | Pass |
| 67 | 301343978 | 60 | 100% | 60 | - | Fail |
| 68 | 301350284 | - | 100% | - | - | |
| 69 | 301356470 | 140 | 100% | 140 | - | Fail |
| 70 | 301387733 | 280 | 100% | 280 | - | Fail |
| 71 | 301390705 | 265,440 | 100% | 265,440 | 99.50 | Pass |
| 72 | 301399036 | 834,400 | 100% | 834,400 | 313.50 | Pass |
| 73 | 301399713 | 71 | 100% | 71 | - | Fail |
| 74 | 301399723 | 49 | 100% | 49 | - | Fail |
| 75 | 301438034 | 1,060 | 100% | 1,060 | - | Fail |
| 76 | 301443140 | 1,960 | 100% | 1,960 | 0.50 | Pass |
| 77 | 301443191 | 2,564 | 100% | 2,564 | 0.50 | Pass |
| 78 | 301447004 | 67 | 100% | 67 | - | Fail |
| 79 | 301447550 | 1,281 | 100% | 1,281 | - | Fail |
| 80 | 301465339 | 8,631 | 100% | 8,631 | 3.00 | Pass |
| 81 | 301512649 | 41,080 | 100% | 41,080 | 15.00 | Pass |
| 82 | 301514030 | 547 | 100% | 547 | - | Fail |
| 83 | 301566202 | 3,615 | 100% | 3,615 | 1.00 | Pass |
| 84 | 301567805 | 15,028 | 100% | 15,028 | 5.50 | Pass |
| 85 | 301586860 | 169,538 | 100% | 169,538 | 63.50 | Pass |
| 86 | 301592517 | 52 | 100% | 52 | - | Fail |
| 87 | 301597525 | 1,446 | 100% | 1,446 | 0.50 | Pass |
| 88 | 301599664 | 3,878 | 100% | 3,878 | 1.00 | Pass |
| 89 | 301634437 | 2,875 | 100% | 2,875 | 1.00 | Pass |
| 90 | 301692065 | 1 | 100% | 1 | - | Fail |
| 91 | 301698037 | 47,201 | 100% | 47,201 | 17.50 | Pass |
| 92 | 301698318 | 35 | 100% | 35 | - | Fail |
| 93 | 301702585 | 3,191 | 100% | 3,191 | 1.00 | Pass |
| 94 | 301718455 | 1,059,423 | 100% | 1,059,423 | 398.00 | Pass |
| 95 | 301726919 | 4,679 | 100% | 4,679 | 1.50 | Pass |
| 96 | 301727646 | 1,702 | 100% | 1,702 | 0.50 | Pass |
| 97 | 301738414 | 1,718 | 100% | 1,718 | 0.50 | Pass |
| 98 | 301761595 | 2 | 100% | 2 | - | Fail |
| 99 | 301781127 | 86,920 | 100% | 86,920 | 32.50 | Pass |
| 100 | 301810554 | 8,165,270 | 100% | 8,165,270 | 3,068.0 | Pass |
| 101 | 301815415 | 49 | 100% | 49 | - | Fail |
| 102 | 301836934 | 21,818 | 100% | 21,818 | 8.00 | Pass |
| 103 | 301842547 | 71,840 | 100% | 71,840 | 26.50 | Pass |
| 104 | 301850183 | 3,024 | 100% | 3,024 | 1.00 | Pass |
| 105 | 301852879 | 1,071 | 100% | 1,071 | - | Fail |
| 106 | 301853401 | 31,201 | 100% | 31,201 | 11.50 | Pass |

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|-----------------------|---------------------------|-----------------|--------|----------------------|
| 107 | 301869436 | - | 100% | - | - | |
| 108 | 301878949 | 130 | 100% | 130 | - | Fail |
| 109 | 301944808 | 14,333 | 100% | 14,333 | 5.00 | Pass |
| 110 | 301947984 | 793 | 100% | 793 | - | Fail |
| 111 | 301993376 | 101 | 100% | 101 | - | Fail |
| 112 | 301999291 | 1,936,973 | 100% | 1,936,973 | 727.50 | Pass |
| 113 | 302003667 | 43 | 100% | 43 | - | Fail |
| 114 | 302016264 | 75 | 100% | 75 | - | Fail |
| 115 | 302025386 | 353 | 100% | 353 | - | Fail |
| 116 | 302032831 | 444 | 100% | 444 | - | Fail |
| 117 | 302040529 | 4,996 | 100% | 4,996 | 1.50 | Pass |
| 118 | 302041343 | 752 | 100% | 752 | - | Fail |
| 119 | 302041362 | 1,800 | 100% | 1,800 | 0.50 | Pass |
| 120 | 302041605 | 169,400 | 100% | 169,400 | 63.50 | Pass |
| 121 | 302043650 | 38 | 100% | 38 | - | Fail |
| 122 | 302045975 | 145,520 | 100% | 145,520 | 54.50 | Pass |
| 123 | 302046425 | 184,960 | 100% | 184,960 | 69.50 | Pass |
| 124 | 302049759 | 136 | 100% | 136 | - | Fail |
| 125 | 302051730 | 1,848 | 100% | 1,848 | 0.50 | Pass |
| 126 | 302104456 | 818 | 100% | 818 | - | Fail |
| 127 | 302104577 | 630 | 100% | 630 | - | Fail |
| 128 | 302121205 | 38 | 100% | 38 | - | Fail |
| 129 | 302125111 | 18,166 | 100% | 18,166 | 6.50 | Pass |
| 130 | 302127267 | 21,760 | 100% | 21,760 | 8.00 | Pass |
| 131 | 303918868 | 71 | 100% | 71 | - | Fail |
| 132 | 303926658 | 56 | 100% | 56 | - | Fail |
| 133 | 303929950 | 46,765 | 100% | 46,765 | 17.50 | Pass |
| 134 | 303941017 | 67 | 100% | 67 | - | Fail |
| 135 | 303971978 | 51,803 | 100% | 51,803 | 19.00 | Pass |
| 136 | 303973603 | 1,320 | 100% | 1,320 | - | Fail |
| 137 | 303981603 | 3,525 | 100% | 3,525 | 1.00 | Pass |
| 138 | 303999488 | 2,252 | 100% | 2,252 | 0.50 | Pass |
| 139 | 303999604 | 107 | 100% | 107 | - | Fail |
| 140 | 304045380 | 3,255 | 100% | 3,255 | 1.00 | Pass |
| 141 | 304045381 | 2,221 | 100% | 2,221 | 0.50 | Pass |
| 142 | 304047558 | 50 | 100% | 50 | - | Fail |
| 143 | 304047754 | 2,132 | 100% | 2,132 | 0.50 | Pass |
| 144 | 304050192 | 729,051 | 100% | 729,051 | 273.50 | Pass |
| 145 | 304060010 | 288,000 | 100% | 288,000 | 108.00 | Pass |
| 146 | 304070745 | 3,564 | 100% | 3,564 | 1.00 | Pass |
| 147 | 304079507 | 38,461 | 100% | 38,461 | 14.00 | Pass |

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|-----------------------|---------------------------|-----------------|-------|----------------------|
| 148 | 304079872 | 404 | 100% | 404 | - | Fail |
| 149 | 304081830 | 45 | 100% | 45 | - | Fail |
| 150 | 304086264 | 41 | 100% | 41 | - | Fail |
| 151 | 304089074 | 76 | 100% | 76 | - | Fail |
| 152 | 304108611 | 61,306 | 100% | 61,306 | 23.00 | Pass |
| 153 | 304114181 | 21,120 | 100% | 21,120 | 7.50 | Pass |
| 154 | 304132071 | 5,991 | 100% | 5,991 | 2.00 | Pass |
| 155 | 304132151 | 237,120 | 100% | 237,120 | 89.00 | Pass |
| 156 | 304133795 | 1,391 | 100% | 1,391 | 0.50 | Pass |
| 157 | 304133867 | 2,380 | 100% | 2,380 | 0.50 | Pass |
| 158 | 304138416 | 95,880 | 100% | 95,880 | 36.00 | Pass |
| 159 | 304146027 | 100 | 100% | 100 | - | Fail |
| 160 | 304166235 | 74 | 100% | 74 | - | Fail |
| 161 | 304168719 | 171,200 | 100% | 171,200 | 64.00 | Pass |
| 162 | 304170853 | 3,366 | 100% | 3,366 | 1.00 | Pass |
| 163 | 304205265 | 43 | 100% | 43 | - | Fail |
| 164 | 304214772 | 14,069 | 100% | 14,069 | 5.00 | Pass |
| 165 | 304225741 | 64 | 100% | 64 | - | Fail |
| 166 | 304227735 | 405 | 100% | 405 | - | Fail |
| 167 | 304235214 | 54 | 100% | 54 | - | Fail |
| 168 | 304244997 | 798 | 100% | 798 | - | Fail |
| 169 | 304254239 | 231 | 100% | 231 | - | Fail |
| 170 | 304275118 | 1,390 | 100% | 1,390 | 0.50 | Pass |
| 171 | 304288278 | 82 | 100% | 82 | - | Fail |
| 172 | 304298324 | 33,685 | 100% | 33,685 | 12.50 | Pass |
| 173 | 304298517 | 16,856 | 100% | 16,856 | 6.00 | Pass |
| 174 | 304299321 | 3 | 100% | 3 | - | Fail |
| 175 | 304305959 | 527 | 100% | 527 | - | Fail |
| 176 | 304307011 | 640 | 100% | 640 | - | Fail |
| 177 | 304307014 | 1,840 | 100% | 1,840 | 0.50 | Pass |
| 178 | 304307018 | 838 | 100% | 838 | - | Fail |
| 179 | 304310338 | 13,637 | 100% | 13,637 | 5.00 | Pass |
| 180 | 304313398 | 3,241 | 100% | 3,241 | 1.00 | Pass |
| 181 | 304336004 | 10,842 | 100% | 10,842 | 4.00 | Pass |
| 182 | 304434491 | 81 | 100% | 81 | - | Fail |
| 183 | 304479640 | - | 100% | - | - | |
| 184 | 304494506 | 51 | 100% | 51 | - | Fail |
| 185 | 304523594 | 2,997 | 100% | 2,997 | 1.00 | Pass |
| 186 | 304524283 | 1,244 | 100% | 1,244 | - | Fail |
| 187 | 304613027 | 2,666 | 100% | 2,666 | 1.00 | Pass |
| 188 | 304665628 | 121,320 | 100% | 121,320 | 45.50 | Pass |

| No. | Premise | Premise Annual kWh | Subscription Level (%) | Selected kWh | kW | Eligibility Check |
|-----|-----------|-----------------------|---------------------------|-----------------|----|----------------------|
| 189 | 304748942 | - | 100% | - | - | |
| 190 | 304758627 | - | 100% | - | - | |

Appendix E: Residential Energy Efficiency Programs



Home Energy Squad & Home Energy Squad PLUS

Engages residential customers with the goal of improving energy-efficiency in their homes with one quick and affordable visit from our expert technicians.

How do I qualify for a Squad Visit?

- ☐ Live in a single-family home or a town home with 4 or less units
- ☐ Receive residential combination natural gas and electric service from Xcel Energy
 - ☐ Residential electric-only customers also qualify, but are limited in receivable measures
- ☐ Authorization form completed by Xcel Energy account holder

Schedule an appointment online or call (303) 446-7910

5

Home Energy Squad

Schedule an appointment online or call (303) 446-7910

For \$50 (\$200 value), customers receive professional installation of energy-saving equipment that may include:

- LED bulbs
- Programmable thermostat installation and programming
- Weather stripping for (1) one external door
- Energy-efficient showerheads
- Kitchen and bathroom faucet aerators
- Water heater insulation and temperature assessment



6

Home Energy Squad Plus

For \$150 (\$600 value) you will receive a standard Squad Visit from our expert technicians, plus a full Energy Audit of your home.

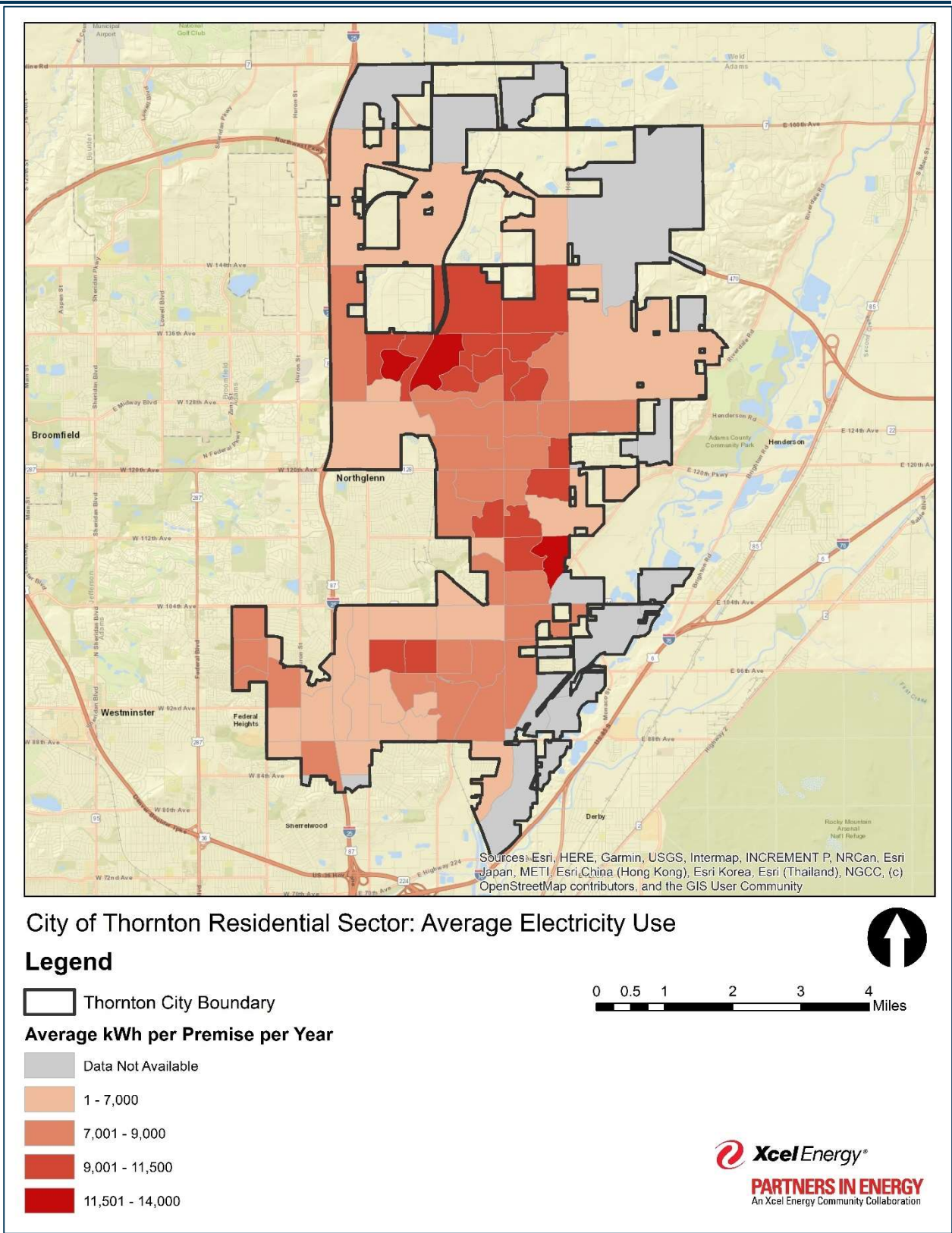
Additional benefits include:

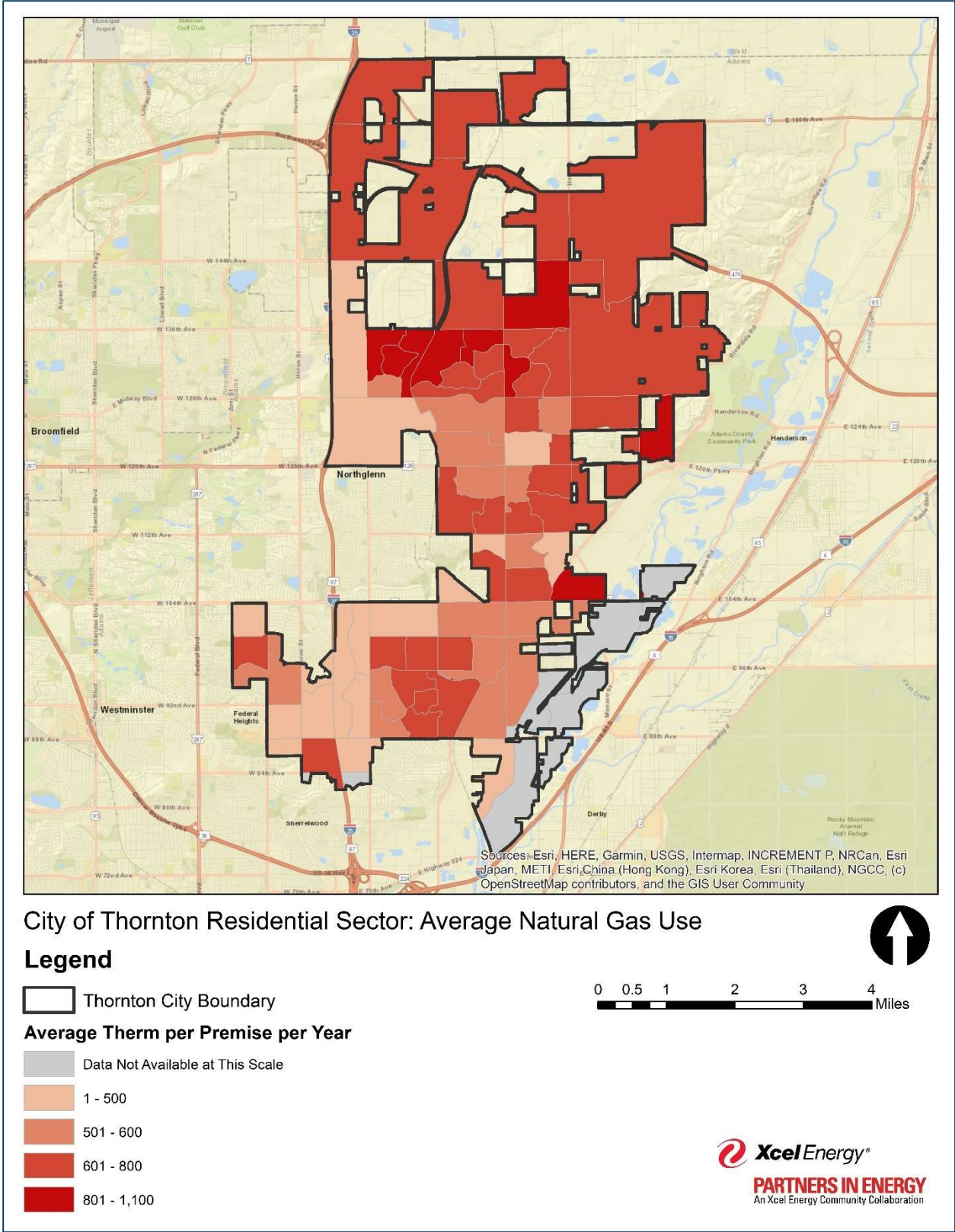
- Inspection of home exterior, insulation, and mechanical systems
- Air Leak analysis with Blower-Door diagnostic test
- Combustion safety test
- Carbon monoxide check
- Infrared imaging and analysis
- Full summary report with findings and recommendations

Schedule an appointment online or call (303) 446-7910



Appendix F: Residential Energy Heat Maps





Appendix G: Memorandum of Understanding for Phase 1 – Plan Development



Memorandum of Understanding Phase 1 – Plan Development

Brett Henry
City of Thornton
12450 Washington St.
Thornton, CO 80241

Congratulations on being selected to participate in Xcel Energy's Partners in Energy. This offering is designed to provide your community with the tools and resources necessary to develop and implement an energy action plan that reflects the vision your community has for shaping energy use and supply in its future. Participation is intended to span 24 months with the initial 6-8 months dedicated to developing a strategic energy action plan and the remaining time focused on implementing that plan.

The intent of this Memorandum of Understanding is to confirm the City of Thornton's intent to participate in the initial plan development phase of Partners in Energy and outline the commitment that your community and Xcel Energy are making to this collaborative initiative. The primary objective of this phase of Partners in Energy is to develop your energy action plan.

In order to achieve this Xcel Energy will provide:

- Consulting support to assist in identifying potential community stakeholders and constructing or delivering an invitation or informational announcement regarding the planning process.
- Data analysis of community energy use and Xcel Energy program participation to the extent that it is legally and technically prudent and feasible. The results can be used to identify potential opportunities to implement plan strategies. Xcel Energy will attempt to integrate data provided by the City of Thornton into the analysis if feasible.
- Professional facilitation of 4 plan development work sessions with the community stakeholder group to develop the energy action plan's vision, focus areas, goals and implementation strategies.
- Assistance as needed in synthesizing the community and program data collected with the vision of the community to identify attainable goals that align with suitable strategies and tactics.
- Development of the documented energy action plan that will incorporate inputs from the stakeholder planning team and will be accessible to the community.
- Commitment to delivering an actionable and complete energy action plan within 8 months of the City of Thornton and Xcel Energy signing this Memorandum of Understanding.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Plan Development Phase

Although participation in the Plan Development phase of Partners in Energy requires no monetary contribution, the City of Thornton does agree to provide:

- A single contact point to recruit active and engaged stakeholders, coordinate planning meeting logistics and distribute deliverables, and lead participation of the community in the planning process.
- Community staff engagement in developing workshop agendas, participating in regular check-in meetings, and supporting follow-up work between workshops.
- Commitment to ensuring community stakeholder engagement throughout the planning workshops. This could include consultation with key community stakeholders who may be relevant to the plan but not present on the energy action planning team to gain input on proposed goals and strategies.
- Timely review of the energy action plan document, as well as shepherding the completed plan through stakeholder review process.
- Good-faith evaluation of the recommendations and analysis provided, as well as fair consideration of the potential strategies and tactics identified to ensure alignment with the City's goals and priorities.
- Meeting facilities to host the stakeholder group during the development of the plan.
- Identification of existing community energy plans, programs, or initiatives that could be leveraged in successful development and delivery of this plan.
- Commitment to delivering an actionable and complete energy action plan within a 9-month timeframe of the City of Thornton's and Xcel Energy signing this Memorandum of Understanding. Within this period, the City of Thornton is committed to completing the formation of the energy action planning team and the development and approval of the energy action plan.
- Public distribution of the work products developed with the support of Xcel Energy's Partners in Energy.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Plan Development Phase

**Resource Commitment Summary
Plan Development Phase**

| The City of Thornton | Xcel Energy |
|--|---|
| <ul style="list-style-type: none"> • Single point of contact • Support in maintaining community stakeholder engagement throughout the planning process • Involvement in development and review of energy action plan content. • Meeting facilities • Access to existing energy-related plans and programs • Commitment to completing the plan development and approval • Agreement that the energy action plan resulting from this work will be available to the public | <ul style="list-style-type: none"> • Assistance identifying and recruiting stakeholders • Analysis of community energy use and program participation • Facilitation of planning sessions • Training and guidance developing goals and strategies • Documentation and delivery of the energy action plan • Commitment to completing energy action plan development |

The Memorandum of Understanding for the Implementation Phase of Partners in Energy will be developed upon completion of the energy action plan and will outline the City of Thornton's goals and the resource commitment from Xcel Energy and the City of Thornton.

Legal Applicability and Waiver

This is a voluntary agreement and not intended to be legally binding for either party. This Memorandum of Understanding has no impact, nor does it alter or modify any existing Franchise Agreement or other existing agreements between Xcel Energy and the City of Thornton. Parties agree that this Memorandum of Understanding is to memorialize the intent of the Parties regarding Partners in Energy but does not create a legal agreement between the Parties. It is agreed by the Parties that nothing in this Memorandum of Understanding will be deemed or construed as creating a joint venture, trust, partnership, or any other legal relationship among the Parties. This Memorandum of Understanding is for the benefit of the Parties and does not create third party rights. Nothing in this Memorandum of Understanding constitutes a waiver of the City of Thornton's ordinances, the City of Thornton's regulatory jurisdiction, or Colorado's utility regulatory jurisdiction.

Single Points of Contact

All communications pertaining to this agreement shall be directed to John Orr on behalf of the City of Thornton and Tami Gunderzik on behalf of Xcel Energy.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Plan Development Phase

Xcel Energy is excited about this opportunity to support the City of Thornton in advancing its goals. The resources outlined above and provided through Partners in Energy are provided as a part of our commitment to the communities we serve and Xcel Energy's support of energy efficiency and renewable energy as important resources to meet your future energy needs.

Thank you again for your continued interest in Xcel Energy's Partner in Energy. We look forward to assisting the City of Thornton in developing its energy action plan.

For City of Thornton:

Signature:



Name:

Brett E. Henry

Title:

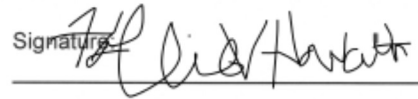
Executive Director - Infrastructure

Date:

10/2/2019

For Xcel Energy:

Signature:



Name:

Hollie V Horvath

Title:

Director, Community Relations

Date:

10/7/2019

Appendix H: Memorandum of Understanding for Phase 2 – Plan Implementation



Memorandum of Understanding Phase 2 – Plan Implementation

Kevin Woods, City Manager
City of Thornton
9500 Civic Center Drive
Thornton, Colorado 80229

The intent of this Memorandum of Understanding is to recognize the achievement of the City of Thornton (the city) in developing an Energy Action Plan. Xcel Energy, through its Partners in Energy offering, has supported the development of this Energy Action Plan. This document outlines how the City of Thornton and Xcel Energy will continue to work together to implement this Energy Action Plan. The term of this joint support, as defined in this document, will extend from approximately July 1, 2020 through March 31, 2022.

Partners in Energy Contributions

Xcel Energy will support the City of Thornton in achieving the goals of its Energy Action Plan in the following ways. Please note that hour estimates include those provided through our Partners in Energy team from Brendle Group and do not include support provided by Xcel Energy internal program staff.

Focus Area 1: Municipal Facilities and Operations

- **Strategy 1-1: Manage Energy Action Plan Implementation.** Support funded by Xcel Energy for this strategy is not to exceed 84 hours for:
 - Project management activities (monthly project coordination calls).
 - Partners in Energy program management activities (coordinate MOU execution, monthly invoice and status reporting, monthly portal updates, develop Energy Action Plan summary).
 - Develop a one-page summary of the energy action plan and sustainability action agenda to share with residents and businesses.

Xcel Energy will also provide up to \$900 for reimbursed expenses related to printing and distribution of co-branded marketing materials, venue fees, food, and other related needs associated with outreach and education. Xcel Energy funding will not be provided for the purchase of alcohol.

- **Strategy 1-2: Manage Energy Program.** Support funded by Xcel Energy for this strategy is not to exceed 86 hours for:
 - Partners in Energy program management activities (implementation data pulls, analysis, and reporting every six months).
 - Support enrollment in the Xcel Energy Benchmarking program.
 - Support development of the municipal facility inventory and setting up ENERGY STAR Portfolio Manager.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase

- **Strategy 1-3: Promote Existing Facility Efficiency.** Support funded by Xcel Energy for this strategy is not to exceed 42 hours for:
 - Support identifying top buildings for energy audits based on benchmarking results, building energy usage and size, or other available factors.
 - Support development of a game plan to conduct building audits through Xcel Energy's Energy Audit program. Buildings < 50,000 sq ft in size often qualify for free audits.
 - Provide on-call support to review or utilize outcomes from Xcel Energy's Strategic Energy Management program in achieving energy efficiency in the water system.
 - Provide on-call support to conduct additional cost-benefit analysis and outreach to other Denver metro communities on the pros and cons of retrofitting streetlights to LEDs.
 - Provide on-call support to investigate best practices on streetlighting controls, benefits of policies targeting occupant behaviors, and/or sharing utility program information.
 - Conduct ad hoc coordination calls as needed.
- **Strategy 1-4: Promote Efficient New Development.** Support funded by Xcel Energy for this strategy is not to exceed 21 hours for:
 - Provide on-call support to share policies and design requirements that promote sustainable design and construction practices in municipal facilities.
 - Share information on energy code or other relevant training opportunities.
 - Develop one piece of collateral on utility programs targeted at new construction (e.g., Energy Star New Homes) and other programs to share with developers.
- **Strategy 1-5: Promote Carbon-Free Energy Sources.** Support funded by Xcel Energy for this strategy is not to exceed 13 hours for:
 - Act as liaison with Xcel Energy's renewable energy product development team to stay informed about upcoming subscription offerings.
 - Support application to Renewable*Connect program if the program opens during the implementation period.
 - Provide on-call support for net metering, interconnection agreement, and/or need for grounding transformer for solar project at Thornton Water Treatment Plant.
- **Strategy 1-6: Promote Energy Awareness and Training.** Support funded by Xcel Energy for this strategy is not to exceed 28 hours for:
 - Support development of onboarding materials about Thornton's climate and energy goals, improving energy efficiency, and increasing carbon-free energy supplies
 - Design one poster or flyer to recognize the completion of the LED lighting conversion project.
 - Design a poster or flyer to recognize buildings supplied by renewable energy.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase**Focus Area 2: Institutional**

- **Strategy 2-1: Collaborate with Adams 12 Five Star School District.** Support funded by Xcel Energy for this strategy is not to exceed 7 hours for:
 - Provide a social media calendar to share information about energy efficiency and renewable energy.
 - Support up to one event with collateral, giveaways, and attendance.
 - Provide on-call support for scoping and helping identify funding for a joint technical assistance engineering study among Xcel Energy, Thornton, and Adams 12 Five Star School District to identify future energy projects at shared facilities (Aquatic Center and the Consolidated Service Center).
- **Strategy 2-2: Engage with Other Institutional Stakeholders.** Support funded by Xcel Energy for this strategy is not to exceed 27 hours for:
 - Develop tailored utility program collateral for up to three institutional business types.

Focus Area 3: Residential

- **Strategy 3-1: Promote Residential Energy Improvements.** Support funded by Xcel Energy for this strategy is not to exceed 35 hours for:
 - Coordinate and market the Home Energy Squad campaign with Thornton and CLEAResult, including sending marketing e-mails to Thornton residents.
 - Develop and print one piece of utility program collateral for residents, to be distributed by Resource Central and other program visits. Translation services can be provided if needed.
 - Plan and attend up to two educational workshops.
 - Provide tabling support (e.g., collateral development, printing, giveaways, attendance) for up to one event.

Focus Area 4: Business

- **Strategy 4-1: Promote Business Energy Improvements.** Support funded by Xcel Energy for this strategy is not to exceed 35 hours for:
 - Help coordinate and market the business lighting campaign.
 - Develop one piece of collateral to support one-on-one business engagement. Translation services can be provided if needed.
 - Provide tabling support (e.g., collateral development, printing, giveaways, attendance) and attend up to three business networking events.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase

City of Thornton Contributions

The City of Thornton commits to supporting the Energy Action Plan to the best of its ability by:

- Achieving the energy savings impacts outlined in the energy action plan and shown in the table below:

City of Thornton Conservation Goals

| | Electricity Savings (in kWh) | Natural Gas Savings (in therms) |
|--|---------------------------------|------------------------------------|
| Baseline Annual Historic Energy Savings | 5.7 million | 142,000 |
| Incremental Plan Energy Savings (7/1/20-3/31/22) | 2.0 million | 54,000 |
| Total Plan Energy Savings over 18-month implementation period (1.5 * annual baseline + incremental energy savings) | 10.5 million | 267,000 |

Focus Area 1: Municipal Facilities and Operations

- **Strategy 1-1: Manage Energy Action Plan Implementation for the period 2020-2022**
 - Designate a project management team responsible for administering the energy plan implementation project.
 - Designate an implementation advisory team to advise on the priority and resources available to support the city's energy implementation activities within the context of the broader sustainability action agenda.
 - Designate energy teams within each strategy to execute the city's energy projects.
 - Print materials to help publicize the plan and educate businesses and residents.
- **Strategy 1-2: Manage Energy Program**
 - Conduct energy data management and analysis.
 - Coordinate funding need assessments and annual budget requests.
- **Strategy 1-3: Promote Existing Facility Efficiency**
 - Complete LED lighting upgrades at city facilities in 2020 as planned.
 - Identify new opportunities for energy efficiency improvements in existing buildings.
 - Continue participation in Xcel Energy's Strategic Energy Management Program for the water system.
 - Continue conversations and cost-benefit analyses of upgrading existing streetlights served by Xcel Energy and United Power to LEDs and installing lighting controls.
 - Evaluate the pros and cons of moving to a four-day work week and/or promoting work-from-home policies.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase

- **Strategy 1-4: Promote Efficient New Development**
 - Establish a policy governing the design and construction of city facilities.
 - Evaluate all planned new buildings in the design phase (Fire Station 7 and Police Training Facility) for the feasibility of pursuing LEED certification, beneficial electrification, and renewable energy sources.
 - Explore options to incentivize above-code construction.
 - Engage and educate the developer community on energy codes and energy-efficient design guidelines.
 - Print collateral for distribution to development community.
- **Strategy 1-5: Promote Carbon-Free Energy Sources**
 - Build the proposed 294 kW solar project at the Thornton Water Treatment Plant, which is estimated to generate 0.4 million kWh of energy annually.
 - Complete the Northern Properties Stewardship plan and include solar projects and carbon sequestration projects as two potential future land uses that are evaluated.
 - Evaluate facilities (buildings and parking structures) to determine feasibility of new solar projects.
 - If requested by Xcel Energy as part of the regulatory filing process, write a letter of support to the Public Utilities Commission for Xcel Energy's Renewable*Connect program.
- **Strategy 1-6: Promote Energy Awareness and Training**
 - Include materials about Thornton's climate and energy goals, improving energy efficiency, and increasing carbon-free energy supplies in new employee onboarding and training materials, using intranet and Neogov platform.
 - Recognize the completion of LED lighting conversion project through posters or flyers or other effective communication method(s).
 - Recognize the buildings supplied by renewable energy through posters or flyers or other effective communication method(s).
 - Print posters and/or flyers intended to recognize energy efficiency and renewable energy projects.

Focus Area 2: Institutional

- **Strategy 2-1: Collaborate with Adams 12 Five Star School District**
 - Promote energy awareness by printing collateral, participating in, and/or tabling at one event per year (Colorado Association of School District Energy Managers (CASDEM) meetings, and/or annual Water Festival).
 - Continue working with Adams 12 Five Star School District to exchange information on energy efficiency and sustainability projects and to share information with the community.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase

- **Strategy 2-2: Engage with Other Institutional Stakeholders**
 - Print tailored collateral for each type of institution or for Regional Transportation District (RTD) transit modes within Thornton.
 - Identify points of contact for each institution and schedule one-on-one meetings to share information, gauge interest in and potential for energy projects (energy efficiency and/or renewable energy), and opportunities to promote energy awareness.

Focus Area 3: Residential

- **Strategy 3-1: Promote Residential Energy Improvements**
 - Purchase (or buy-down) Home Energy Squad® visits for 500 residents, beginning with low-income residents or targeted neighborhoods with relatively high energy use; and then open up the offering to any qualified resident.
 - Print collateral pieces for residents.
 - Use existing city programs with customer outreach channels to cross-promote energy programs.
 - Raise energy awareness in the community by holding one educational workshop per year.
 - Promote energy education and awareness at city events (e.g., tabling and distributing conservation kits at Thorntonfest and Harvestfest or through food banks).
 - Promote energy efficiency in multifamily buildings by working with CLEAResult and promoting the Xcel Energy Multifamily Buildings and Multifamily Weatherization Programs.
 - Consider Community Development Block Grant (CDBG) funding to help homeowners with energy efficiency improvements.

Focus Area 4: Business

- **Strategy 4-1: Promote Business Energy Improvements**
 - Conduct a business lighting campaign for a selected business corridor in Thornton.
 - Develop an engagement strategy, for large businesses, that includes tailored energy packets by business type (collateral and case studies) and one-on-one engagement led by the Economic Development Department.
 - Leverage connections with the Businesses In Thornton Advisory Council (BTAC) to share general collateral and program information suitable for small businesses. Identify business types that are interested in more detailed or tailored information. Networking events, hosted twice per year (May/June and Sept/Oct), allow tabling and networking opportunities with small businesses.
 - Leverage connections with the Alianza organization, to connect with Spanish-speaking businesses.
 - Incorporate information from the Partners in Energy Small/Medium Business Toolkit.
 - Evaluate whether Annual Green Business Award (given out in April) can be used to recognize businesses that have achieved energy excellence, whether through efficiency or renewable energy initiatives.
 - Print collateral pieces for businesses.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase**Single Points of Contact**

All communications pertaining to this agreement shall be directed to John Orr on behalf of the City of Thornton, and Channing Evans, on behalf of Xcel Energy.

Legal Applicability and Waiver

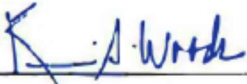
This is a voluntary agreement and not intended to be legally binding for either party. This Memorandum of Understanding has no impact, nor does it alter or modify any existing Franchise Agreement or other existing agreements between Xcel Energy and the City. Parties agree that this Memorandum of Understanding is to memorialize the intent of the Parties regarding Partners in Energy but does not create a legal agreement between the Parties. It is agreed by the Parties that nothing in this Memorandum of Understanding will be deemed or construed as creating a joint venture, trust, partnership, or any other legal relationship among the Parties. This Memorandum of Understanding is for the benefit of the Parties and does not create third party rights. Nothing in this Memorandum of Understanding constitutes a waiver of City of Thornton's ordinances, City of Thornton's regulatory jurisdiction, or Colorado's utility regulatory jurisdiction.

Xcel Energy is excited about this opportunity to support the City of Thornton in advancing its goals. The resources outlined above and provided through Partners in Energy are provided as a part of our commitment to the communities we serve and Xcel Energy's support of energy efficiency and renewable energy as important resources to meet your future energy needs.

XCEL ENERGY PARTNERS IN ENERGY

Memorandum of Understanding
Implementation Phase

For the City of Thornton:

Signature: 

Name: Kevin S. Woods

Title: City Manager

Date: 7/4/20

For Xcel Energy:

Signature: 

Name: Kelly Flenniken

Title: Director, Community Relations

Date: 8/10/2020