



**PLANNING & DEVELOPMENT DEPARTMENT MEMORANDUM
#28-2020**

DATE: August 3, 2020

TO: Honorable Mayor Meredith Leighty and City Council Members

THROUGH: Heather Geyer, City Manager 

FROM: Brook Svoboda, Director of Planning and Development 
Becky Smith, AICP, Planning Manager

SUBJECT: Sustainability Plan Update

PURPOSE

To update City Council on the Sustainability Plan implementation progress and get Council feedback regarding the future direction of the Program and what to prioritize for 2021.

BACKGROUND

Before the adoption of the Northglenn Sustainability Plan in the fall of 2018, the City of Northglenn had begun taking steps towards sustainability through actions of individual departments and requests of City Council. Some of these actions include:

- **Water Conservation Fund** – In 2004/2005, the City began a water conservation fund of \$20,000 that offered rebates for water-efficient toilets and washers.
- **SunShare Community Solar Subscription** – In 2015, Northglenn began subscribing to SunShare Community Solar, which the City receives as solar credit on the electricity bills.
- **Connect Northglenn** – The City adopted Connect Northglenn, a bicycle and pedestrian master plan, in February 2018. Implementation of this plan is intended to make walking and bicycling in the community safer and easier. Encouraging more active transit through implementation will reduce short vehicle trips.

In fall 2018, City Council adopted the Sustainability Plan (Attachment 1). At the time of adoption, the following steps were identified:

- Identify and inventory initiatives the City already has in place;
- Establish the vision and high-level goals; and
- Propose potential new initiatives that could be explored by the City in the future.

The Sustainability Plan acted as the catalyst for the City to study, inventory, and understand the City's baseline with regards to several aspects of Sustainability. These studies are intended to provide information specific to Northglenn that will help guide policies and actions that have the most significant impact. The following is a list of the studies conducted to support the Sustainability Plan:

- **Risk and Adaption Advisory Report** (Attachment 2) – this report was completed in tandem with the Sustainability Plan. It provides a high-level view of the climate-related risks and hazards that are most likely for Northglenn. This report will be consulted when considering overall adaptation planning for the community as a proactive approach to addressing the most significant climate-related risks moving into the future.
- **City of Northglenn Inventory of Community and Municipal Operations Greenhouse Gas Emissions** (Attachment 3) – this inventory provides the City with a baseline for emissions levels and sources and activities generating emissions in the community. It will

be consulted when looking at implementation strategies and activities that will be most effective in working toward reducing greenhouse gas emissions both community-wide and for City operations.

- **City of Northglenn Energy Action Plan** (Attachment 4) – this report resulted from the City’s participation in the Xcel Partners in Energy Program. The Plan outlines tangible steps for the City to move the community toward its energy efficiency and resiliency goals.

The Sustainability Plan has also been the catalyst for the City to implement aspects of the Plan. Following adoption, the City took these actions to move towards the goals outlined in the plan:

- **Zero Waste Events** – In 2019, the City received a grant from the Colorado Department of Health & Environment Recycling Resources Economic Opportunity (RREO) Program to purchase recycling containers for City events. The City contracted with Eco-cycle to provide supportive services to keep the waste streams clean. The City purchased compost containers and piloted the addition of composting at the 2019 Pirate Festival. City Council budgeted for zero waste events in 2020. Staff had planned to contract for support services for the three largest events: Food Truck Carnival, July 4th, and Pirate Fest. The City had also planned to rent a compost roll off and contract to haul compost from City events to an industrial compost facility. Due to COVID-19, those services were not required for 2020, but it is recommended to contract supportive services when large events begin again to prevent contamination in the waste streams.
- **Residential Recycling Awareness** – The RREO grant also covered the cost to do direct residential outreach through educational materials. The materials and outreach included:
 - Utility bill inserts
 - Magnets
 - “Oops” cart tags
 - Stickers
 - Education booths at Food Truck Carnival and July 4th
 - Social media promotion
 - Northglenn Connection articles
- **Senior Center** – Is working to eliminate Styrofoam use. The Senior Center no longer purchases bowls or plates made from Styrofoam and is instead purchasing paper or compostable materials. They have also stocked their kitchen with reusable mugs.
- **Adoption of Energy Action Plan Phase 2 Memorandum of Understanding (MOU)** (Attachment 5) – The City adopted the Xcel Partners in Energy Action Plan Phase 2 MOU, which states that the City of Northglenn and Xcel Energy will work together to implement the Energy Action Plan developed by the Stakeholder group and accepted by Council.
- **Water Conservation & Rebate Programs** –
 - Northglenn currently has water conservation programming that includes water conservation rebates for indoor and outdoor water use. In 2017, the water conservation program's annual budget was increased from \$20,000 to \$30,000. The rebates include the following:
 - Conservation rebates for water-efficient toilets, clothes washers, rain barrels, irrigation timers, and sprinkler heads. The requirements for all of these programs can be found at www.northglenn.org/rebates or see Attachment 6.
 - In 2019, the City began a turf replacement rebate program that allows Northglenn residents to receive \$1/square foot of turfgrass they replace with water-efficient landscaping.

- The Water Festival is an annual event hosted by Northglenn, Thornton, and Westminster and provides educational opportunities for 5th grade students in the three cities to learn about all things water.
- Garden in A Box (Administered by Resource Central) – Northglenn provides its residents \$25 discounts on water-efficient gardening kits that include landscape designs, plants, and planting and care information.
- Indoor Slow the Flow (Administered by Resource Central) – Northglenn provides free indoor water use audits where technicians check for leaks and excessive water use and make recommendations to customers about how to improve their water efficiency.
- Outdoor Slow the Flow (Administered by Resource Central) – Northglenn provides free outdoor water use audits where technicians inspect irrigation systems and make recommendations about how to improve efficiency, fix leaks, and water their plants appropriately.
- Conservation Outreach: In 2020, there were two utility bill inserts with information about conservation programs offered to Northglenn residents. One was sent in March and another in the July billing cycles. Water resources and water utility staff are also working to build a social media audience for the Northglenn Water Facebook account where additional outreach will take place.
- Northglenn water resources staff are in the process of finalizing an Integrated Water Resources Plan (IWRP) and Water Efficiency Plan (WEP) that will help to ensure the City has a sustainable water supply into the future. The IWRP identifies the current gap between our water supplies and water demand under all conditions (drought years, wet years, changing climate) and provides the City with options to meet that gap. The WEP lays out a plan for implementing water efficiency measures, including conservation and minimizing water loss (ex. leaking pipes). This plan is being funded by a grant from the Colorado Water Conservation Board and is being done in partnership with an Integrated Water Resources Plan update. Northglenn staff are providing in-kind support through staff time contributions rather than a financial contribution towards this project. The contract amount with Element Water Consultants for both the IWRP and the WEP is \$167,650. Both of these plans will help us reach the Sustainability Plan's goal of reducing potable water consumption by 25%. Water Resources presented the final WEP to City Council on July 27, 2020, for adoption.
- **Sustainable Economy** – Economic Development continues to work on meeting the goals identified in the Sustainability Plan, including business diversity and creating investment opportunities.
 - **Capital Improvements: Grants**
 - In 2019, awarded 19 businesses with grants totaling \$158,042 that leveraged \$7.2 million in private commercial property improvements
 - January - June 2020, the Northglenn Urban Renewal Authority awarded seven businesses with grants totaling \$77,998 that leveraged \$5.5 million in private commercial property improvements.
 - **Business Diversity:**
 - In 2019, 122 new businesses. (78 storefront & 44 Home-based)
 - In 2020, 42 new businesses. (30 storefront & 12 Home-based)
- **CC4CA Membership** – In 2018, the City became a member of Colorado Communities for Climate Action (CC4CA), which is a coalition of 33 local governments across the state

advocating for stronger state and federal climate policy. Membership for CC4CA is \$5,000.00 annually.

- **USDN Membership** – In 2019, the City applied for membership in Urban Sustainability Directors Network (USDN) and was accepted. USDN is a member-led network with a mission of connecting local government practitioners to accelerate urban sustainability in the U.S. and Canadian Communities. 2020 membership dues for USDN was \$1,700.00.

New Sustainability initiatives planned in 2020 include:

- **Installing an EV Charging Station at M&O** – The City was awarded a Regional Air Quality Council (RAQC) grant up to \$9,000.00 to install an electric vehicle (EV) charging station at the Maintenance and Operations (M&O) facility. The City was also accepted into the Xcel Energy Electric Vehicle Supply Infrastructure Program, in which Xcel will install the EV supply infrastructure to serve the new station, including new service panels, conduit, and wiring up to the charger stub. The Xcel program will be used to complement the RAQC grant. The City is required to match, at minimum, 20% for the RAQC grant. Staff estimates that the City's match will be \$2,183.00. The total cost of the project is estimated to be \$10,337.00. The general break out of cost is as follows:
 - Charging Station & Mounting Equipment - \$5,022.00
 - Warranty - \$2,183.00 (not an eligible cost for grant funds)
 - Reporting for 5 years - \$2,132.00
 - Installation: ~\$1,000.00
 - Construction: Covered by the Xcel ProgramM&O was selected because the Civic Campus is currently under construction, and it provides an opportunity to charge any future fleet EV at the facility. The station will be accessible to the public.

Energy Action Plan Implementation – The Energy Action Plan outlines tangible steps for the City of Northglenn to move the community toward its energy efficiency and resiliency goals. The actions in this plan are targeting a 1 to 2 year implementation period. Items in the plan that staff is currently working to implement include:

- Set up Portfolio Manager – Portfolio Manager will track monthly energy usage at key City facilities. Tracking will allow the City to see how different measures implemented affect energy usage.
- Promote business energy literacy and share resources
 - Re-enforce Clear Choice Outreach to Multifamily Buildings
 - Send email encouraging apartment managers to consider exploring the Clear Choice program Jan. 24
- Promote Small Energy Audit program to small businesses
 - Highlight article in January 2020 Connection
 - Social Media Posts on Facebook and Twitter
 - E-newsletter feature article Jan. 24
- Promote Business Heating Rebates program
 - E-newsletter article Feb. 28
 - Social Media Posts on Facebook and Twitter Feb. 27
- Residential Communications campaign
 - Inform and encourage individual participation in the different programs offered, including articles in the Northglenn Connection and City Manager's report. Work on "Tip of the Month" with resource links.

- Challenge the four wards in Northglenn to become the “most” energy efficient through signing up for various energy savings programs in a Ward Challenge.
 - 600 LED light bulbs were distributed to Northglenn residents at the Grab N Go Food Truck events held in June.
 - 425 energy conservation kits were distributed to Northglenn residents at the front desks, the Grab N Go Food Truck events, Summer Movie and Concert night, and Immaculate Heart of Mary Food Pantry.
 - The City and Xcel Energy will host an Energy Efficiency & Renewable Energy 101 virtual workshop on August 5th.
 - Green Procurement Policies – educate staff on the Environmental Sustainable Preference in the Purchasing Policy.
- **Waste Optimization Study** – to improve the City’s diversion rates and become more fiscally, environmentally, and socially sustainable as a community, the study will consider the following:
 - Transitioning from a flat-rate refuse collection system to "pay as you throw."
 - Look at curbside and drop-off mixed stream versus single-stream recycling collection to understand if there is a better system than how we are currently collecting it:
 - Is there an opportunity to reduce contamination?
 - Should we consider limiting items we collect (i.e., some types of plastic)?
 - Residential composting – with the following options based on feasibility:
 - Curbside collection
 - Incentives for backyard composting
 - Providing drop-off locations
 - Collection efficiencies – alternating pick up schedules to maximize usage of the trucks.
 - The City is working on entering into a contract for consultant services to complete this study.
- **Northglenn Civic Center (NGCC) Recreation, Senior Center and Theatre Energy Efficient Design Standards**
 - Building Envelope
 - Roof insulation – energy-efficient continuous insulation above the roof deck
 - Exterior Walls
 - Steel-framed walls with energy-efficient batt and continuous polyiso insulation
 - 12” concrete masonry unit (CMU) walls in natatorium, theatre, and gym spaces with continuous insulation on the exterior
 - Windows: Double pane, low-E (emissivity) low-SHGC (solar heat gain efficiency) glazing with thermally broken aluminum frames for energy efficiency
 - Lighting and Interior Loads
 - 45% lighting power density reduction
 - Vacancy and occupancy sensors throughout
 - Daylighting controls in lap and leisure pools, gym, pre-school
 - Exterior lighting at 5.1 kW from 19.5 kW allowed
 - Heating, ventilation, air conditioning (HVAC) and domestic hot water (DHW)
 - Natatorium HVAC:
 - High-efficiency cooling/dehumidification

- Sensible energy recovery
 - High volume, low-speed fans
 - Theatre, gymnasium, fitness areas:
 - Variable air volume (VAV) with high-efficiency cooling and demand control ventilation
 - Hot water reheat in variable volume boxes
 - Pools:
 - 85% efficient boilers
 - Variable speed pumping
 - Regenerative filters
 - Central condensing (95% efficient) boilers
 - 97% efficient condensing water heaters
 - Low flow plumbing fixtures
 - 2 Parking Spaces will be EV ready – The City applied and was accepted into Xcel Energy’s EV Supply Infrastructure Program for this project.
 - Drought resistant landscape materials will be used in the landscaping
- **2018 International Code Council (ICC) Codes** – Planning and Development staff will be bringing forward the 2018 ICC Codes for discussion and adoption in 2020. The 2018 Codes lay out minimum efficiency standards for commercial and residential buildings that will go above and beyond what is required in the currently adopted 2009 ICC Codes. The 2018 Codes that are being recommended for adoption within the ICC are:
 - International Building Code (IBC)
 - International Residential Code (IRC)
 - International Fire Code (IFC)
 - International Plumbing Code (IPC)
 - International Mechanical Code (IMC)
 - International Fuel Gas Code (IFGC)
 - International Energy Conservation Code (IECC)
 - International Existing Building Code (IEBC)
 - International Property Maintenance Code (IPMC)
 - International Swimming Pool and Spa Code (ISPSA)

The update of the ICC Codes will not include a Green Building Code. The ICC does offer an International Green Construction Code IgCC, which is a model code that provides minimum regulations for building systems and site considerations using prescriptive and performance-related provisions. Internationally, code officials and designers recognize the need for a modern, up-to-date code governing the impact of buildings and structures on the environment. This code is designed to meet this need through model code regulations that contain clear and specific requirements with provisions that promote safe and sustainable construction in an integrated fashion with the ICC Family of Codes. The 2018 IgCC is the first fully integrated edition to be developed cooperatively by ICC and the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. Adopting the IgCC is an option for Council to consider, but many communities are drafting their own green building ordinances that are responsive to their sustainability goals, as well as to the needs of the community. There is more discussion on green building codes later in this memorandum. The adoption of the ICC, as proposed, will significantly improve efficiency in new construction and will not preclude the City from adopting a Green Building Ordinance in the future.

Discussion items to identify Sustainability Priorities:

The items listed below require direction from City Council. None of these are currently part of the 2020 work program for Sustainability and will require additional funding and staff resources. Staff

is seeking direction from the Council on how to prioritize sustainability actions in 2021. The items listed below are things staff has begun looking into, but should not limit the discussion if Council members have additional ideas of Sustainability actions that can be explored. Staff will prepare a more in-depth analysis of required funding and staff resources based on the discussion and priorities identified with the Council during the meeting. This information will be brought back to Council to consider with discussions for the 2021 budget.

Council budgeted \$25,000 for Sustainability initiatives in 2020. Not all of these funds have been spent, and availability to use unspent Sustainability funds in 2020 remains to be determined. Some opportunities could be considered for the remainder of 2020 or 2021, depending on the budget direction given the current conditions with the COVID-19 pandemic.

- **Home Energy Squad® buy downs** – This strategy from the Energy Action Plan, adopted in 2019, focuses on identifying funding to offset or completely buy down the cost of a certain number of Home Energy Squad standard or Plus visits for residents. A standard Energy Squad visit is \$50 (\$200 value). It includes installation of LED bulbs, a smart or programmable thermostat installation and programming, weather stripping of an external door, energy-efficient showerheads, kitchen and bathroom faucet aerators, and water heater insulation and temperature check. There are also options to buy additional energy-saving items. The Home Energy Squad Plus visit is \$150 (\$600 value) and includes everything in a standard Squad visit, plus a full energy audit of the home with infrared imaging, carbon monoxide check, and air leak analysis. As part of this strategy, a contract with the Home Energy Squad vendor will need to be executed. If this is deemed a priority and funding is available in the future, the City will leverage available marketing and communications channels to inform residents of the offering. This can be accomplished with the current staffing resources. It will take some time to set up the program and get the contract between the City and Xcel Energy in place to deploy the program. Home Energy Squad is currently offering free virtual visits due to COVID-19; staff will work with the Xcel Partners in Energy to communicate this opportunity to our residents this year. The virtual visits do not include any of the installations of energy-saving devices, as is included with the in-person visits.
 - **Sustainability Plan Goals** – Significantly decrease the overall community consumption (residents and businesses), specifically the consumption of non-local, non-renewable, non-recyclable, and non-recycled materials, water, and energy and fuels.
 - Sustainability Plan Target – Reduce community-wide residential energy usage by 15% by 2025
 - Sustainability Plan Target – Increase affordability by reducing energy costs. Decrease residential energy usage by 25% by 2038.
 - **Energy Action Plan Goals**
 - Achieve community-wide residential energy savings of 1% annually over the 2017 baseline for the next three years
 - Connect with 7,000 residents (half of the premises) to double participation (2,000 total participants) in Xcel Energy Programs over 2017 baseline in the next year
- **Solar Co-op** – Westminster, Northglenn, and Broomfield partnered to apply for a Department of Local Affairs (DOLA) grant through the Colorado Energy Office in 2019, but were not selected for funding. The communities have continued to meet and invite additional surrounding municipalities and counties to the conversation with Solar United Neighbors (SUN) to discuss how we could get a North Metro Solar Co-op up and running and make it sustainable. Attachment 7 contains more information about SUN. The

financial contribution for a City the size of Northglenn to get SUN mobilized is \$10,000. Launching a Solar Co-op will require some staff resources for communicating the opportunity to our residents and assisting SUN in setting up informational sessions by helping to reserve venues and assisting with logistics.

- **Sustainability Plan Goal**
 - Within renewable limits, encourage the use of local, non-polluting renewable and recycled resources (water, energy, and material resources)
 - Increase energy efficiency of City businesses through encouraging the use of alternative energy sources and partnerships with the City's energy provider.
- **Energy Action Plan Goal** – Add 250kW of renewable energy in Northglenn by 2025
- **Sustainable Neighborhoods** – Sustainable Neighborhoods Program was started in the City of Lakewood. Sustainable neighborhoods allow residents to become active partners in making Northglenn a vibrant and sustainable community. Neighborhoods are participating in this unique certification program to use guidance from City staff to organize workshops, projects, and events that enhance the livability of their neighborhood and reduce residents' ecological footprint. Participating neighborhoods earn program credits for their efforts and, depending on the number of credits earned in a given year, they may receive City designation as a “Participating Sustainable Neighborhood” or an “Outstanding Sustainable Neighborhood” from the City. Northglenn can enter into a license agreement with Lakewood for the software they created to implement the program. The initial fee is \$5,000.00, with an annual fee of \$2,500.00. The license agreements typically run for two years, after which time the license agreement fee may change. The license agreement template is included in Attachment 8. It is estimated that at a 0.5 full-time equivalent (FTE), hours would need to be dedicated to the program to manage the launch as well as maintaining neighborhoods once they've joined the program. The staff resources allocated to this program may need to be reevaluated as more neighborhoods area added. (Staff time estimates are based on discussions with staff in Lakewood running the program).
 - **Sustainability Plan Goals**
 - Through effective education and messaging, community members of all ages understand the principals of sustainability and use them to guide their decisions and actions.
 - Community members can meet their basic needs and are empowered to enhance the quality of their lives.
 - Foster community pride through environmental stewardship.
- **Connect Northglenn Implementation** – According to the greenhouse gas inventory completed in 2019, the largest city-wide contributor to greenhouse gases is vehicle miles traveled. The City adopted Connect Northglenn, a bicycle and pedestrian master plan, in 2018. Implementation of this plan is intended to make walking and bicycling in the community safer and easier. Encouraging more active transit through implementation will reduce short vehicle trips within the community. Currently, there are no funds dedicated to the implementation of this plan. Projects are being selected based on opportunities from grants, and in street projects where it makes sense to add it on. The biggest barrier to being competitive for grants is the lack of design work and cost estimates for projects recommended in Connect Northglenn.
 - **Sustainability Plan Goals**
 - Create a multi-modal transportation system that minimizes and, where possible, eliminates pollution and motor vehicle congestion while ensuring

safe mobility and access for all without compromising our ability to protect public health and safety.

- Facilitate a reduction in automobile dependency in favor of affordable alternative, sustainable modes of travel.
- **Sustainability Plan Targets**
 - Increase the number of students biking or walking to school by 25% by 2025
 - Install 10 miles of on-street bicycle facilities by 2023
 - Increase modal shift to active transportation based on baseline data by 2020
- **Study and draft Green Building Standards** – Green building codes go beyond minimum code requirements, raising the bar for energy efficiency. They can serve as a proving ground for future standards, and incorporate elements beyond the scope of the model energy codes, such as water and resource efficiency. As mentioned above in this memorandum, the International Code Council's (ICC's) International Green Construction Code (IgCC) is an overlay code, meaning it is written in a manner to be used with all the other ICC codes. The IgCC contains provisions for site development and land use, energy efficiency, water conservation, material resource conservation and efficiency, indoor environmental quality and comfort, commissioning, operations and maintenance, and existing buildings. The energy efficiency provisions use the commercial provisions of the International Energy Conservation Code (IECC) as a basis and then improve on them by generally increasing the efficiency of the IECC provisions by 10%.

Many local governments are designing and implementing successful “beyond code” programs for commercial and residential buildings. Areas that may be addressed in a beyond code or green building programs include energy efficiency, materials and resource conservation, water efficiency, indoor environmental quality, and site development and land use. Local governments can find the best approach for their jurisdiction to develop and implement an effective green building code program using the established sustainability goals, looking at best practices, and working with a stakeholder group to ensure that the additional regulations are within the community’s capacity. This process would require staff resources and stakeholder group involvement (such as the Sustainability Committee) to study different green building codes and programs and discuss what will be most effective in Northglenn.

- **Sustainability Plan Goals**
 - Significantly decrease overall community consumption (residents and businesses), specifically the consumption of non-local, non-renewable, non-recyclable, and non-recycled materials, water, and energy and fuels.
 - Within renewable limits, encourage the use of local, non-polluting, renewable, and recycled resources (water, energy, and material resources).
 - Reduce water consumption through policies that require low impact development.
- **Set a Carbon Emissions reduction goal** – The Sustainability Plan does not have a carbon reduction goal because the City did not yet have an emissions baseline. The greenhouse gas inventory conducted in 2019 provides a baseline for both City-wide emissions as well as City operations emissions. This information can be used to set the goal(s) for reducing the City’s emissions. This should be done in collaboration with the Sustainability Committee and with Council direction. Staff resources will be required to

draft the goal(s) and implementation steps to achieve the goal(s). It is likely implementation will require future funding considerations.

- **Sustainability Plan Goal**
 - Create multi-modal transportation systems that minimize and, where possible, eliminate pollution and motor vehicle congestion while ensuring safe mobility and access for all without compromising our ability to protect public health and safety.
- **Electric Vehicle (EV) charging stations (grid or solar)** – Expanding the network of accessible charging stations for electric and hybrid vehicles will make consumers considering an EV more comfortable with their charging options. Funds will need to be budgeted to continue to install stations in key locations around the City. The price to install a station connected to the grid can range between \$12,000-\$26,000 depending on the existing conduit, distance to electric panels, and panel capacity. There are also solar-powered EV stations that range from \$50,000-\$75,000. Opportunities for grants continue to be available but require a local match.
 - **Sustainability Plan Goal** – Significantly decrease overall community consumption (residents and businesses), specifically the consumption of non-local, non-renewable, non-recyclable, and non-recycled materials, water, and energy and fuels.
- **EV Fleet Vehicles** – The greenhouse gas inventory identifies that 13% of the City operations emissions come from vehicle fleet. As part of the sustainability study, a cost-benefit analysis was conducted on the conversion of the fleet to electric vehicles. The analysis showed that a complete conversion to electric would have significant upfront capital costs, and there are limited options for heavy-duty vehicles. However, with existing incentives, the price of a sedan can be brought down to \$613 more than an internal combustion engine (ICE). The City could look at a policy to replace ICE fleet sedans with EV sedans when they are due for replacement.
 - **Sustainability Plan Target** – Reduce total greenhouse gas emissions of City fleet vehicles by 30% by 2025.
- **Single-Use Plastic Ban/Fee** – The City can consider policies that either encourage or eliminate the use of single-use plastic. Some communities are banning all or some single-use plastics, such as grocery bags, plastic straws, Styrofoam containers, etc. Others are implementing a fee on plastic bags; for example, Breckenridge has a fee of 10 cents per plastic bag to discourage single-use bags. The Town provides reusable bags to lodging and retail partners to ensure residents and visitors have a reusable bag option. Drafting a policy for adoption will take staff time and research. A process like this should be done with the help of a community task force or the Sustainability Committee. If the Council would like to pursue a ban or fee on single-use plastics, staff can do an analysis on required resources and funds to implement this type of policy.
 - **Sustainability Plan Goal**
 - Significantly decrease overall community consumption (residents and businesses), specifically the consumption of non-local, non-renewable, non-recyclable, and non-recycled materials, water, and energy and fuels.
 - Demonstrate leadership by encouraging sustainable procurement, extended producer responsibility, and modeling innovative strategies to become a zero-waste city.

- **Jack's Solar Garden** – Jack's Solar Garden is a family-owned social enterprise doing more with their family farm for the betterment of our community. Through partnerships with the National Renewable Energy Laboratory, Colorado State University, and the University of Arizona, Jack's Solar Garden will put valuable research into the public sphere on co-locating solar panels with agriculture – called agrivoltaics. Partnering with Sprout City Farms will enable Jack's Solar Garden to begin cultivating crops to put back into the community while training young farmers on agrivoltaic techniques. Subscriptions are for 5, 10, or 20 years and vary in size depending on your energy needs. Subscribers receive bill credits on their monthly Xcel Energy electricity bills for the duration of their subscription. If the Council would like to learn more about this opportunity, staff can invite Byron Kominek, owner and founder, to a study session to learn more about the solar garden and how the program works.
 - **Sustainability Plan Goal**
 - Within renewable limits, encourage the use of local, non-polluting, renewable, and recycled resources (water, energy, and material resources).
 - Demonstrate leadership by encouraging sustainable procurement, extended producer responsibility, and modeling innovative strategies to become a zero-waste city.
 - **Energy Action Plan** – Add 250kW of renewable energy in Northglenn by 2025
- **Green Revolving Fund** – A Green Revolving Fund (GRF) is an internal capital pool that is dedicated to funding energy efficiency, renewable energy, and/or sustainability projects that generate cost savings. A portion of those savings is then used to replenish the fund (i.e., revolved), allowing for reinvestment in future projects of similar value. This establishes an ongoing funding vehicle that helps drive energy efficiency and sustainability over time while generating cost savings and ensuring capital is available for important projects. One of the challenges to a GRF is that the City has several enterprise funds.
 - **Sustainability Plan Target** – Increase the percentage of City spending identified as sustainable spending by 10% by 2020 and by 30% by 2025.
 - **Energy Action Plan** – increasing the efficiency of equipment the City uses in its facilities by replacing equipment with high-efficiency options, developing guidelines on efficiency, including possible updates to procurement policies, and leveraging Xcel Energy incentives to assist with upgrades.
- **Colorado Environmental Leadership Program** – Apply to the Environmental Leadership Program (ELP), a statewide environmental recognition and reward program which offers benefits and incentives to members that voluntarily go beyond compliance with state and federal regulations and are committed to continual environmental improvement. There are different levels that can be applied for: bronze, silver, and gold. To enter at a gold level, an Environmental Management Systems (EMS) plan is required. The City does not currently have an EMS plan for any of the divisions. To enter at the silver level, the City would be committing to creating an EMS plan within three years of being accepted. The City can apply as a whole or break out the divisions (i.e., Water Division, Solid Waste) The City would need to hire a consultant to help create an EMS.

Sustainability Committee versus Sustainability Advisory Board:

Towards the end of the Sustainability Plan, a resident Sustainability Committee was formed. This committee agreed to meet on a quarterly basis to discuss what the city can be doing to improve on sustainability. Due to COVID-19, the Committee has not held any meetings this year. Staff met with a member of the Town of Erie's Sustainability Advisory Board, staff liaisons for other

municipalities' sustainability boards, and one of the Northglenn Sustainability Committee members to discuss this, and have listed the advantages to both below. Staff is seeking direction from Council on creating a more formal Sustainability Advisory Board.

Advantages to a Board over a Committee include:

- Board is appointed by Council, creating more of a commitment on behalf of the member.
- Board will meet more frequently on a set schedule
- Board would have a Council appointed liaison opening up that direct line of communication between the Board and the Council
- Bylaws will be created that dictate the mission and membership requirements
- Chair will set agenda giving the Board more ownership

Advantages of a Committee include:

- It is open to allow more participants (there is no cap on the number of members)
- Actions don't require a vote
- Meetings are flexible

STAFF RECOMMENDATION

This item is for discussion purposes. Staff is seeking City Council input and consensus on the Sustainability priorities. Staff is also seeking direction on creating a Sustainability Advisory Board or keeping a resident Sustainability Committee that provides some feedback on sustainability initiatives.

BUDGET/TIME IMPLICATIONS

There are no anticipated direct budgetary impacts from this item. Staff will return to Council with an estimate of resources and funding required to implement the priorities discussed.

STAFF REFERENCE

If City Council members have any comments or questions, they may contact Brook Svoboda, Director of Planning and Development, at 303.450.8937 or bsvoboda@northglenn.org.

ATTACHMENTS

1. Sustainability Plan
2. Risk and Adaptation Advisory Report
3. Inventory of Community and Municipal Operations Greenhouse Gas Emissions
4. Energy Action Plan
5. Energy Action Plan Phase 2 MOU
6. Water Conservation Rebates
7. Solar United Neighbors of Colorado – North Metro Concept Outline
8. Sustainable Neighborhoods – License Agreement Template



City of Northglenn

Sustainability Plan | September 2018

Letter from the Mayor



Northglenn is a wonderful community in which to live, recreate, raise a family, and age in place. We hope it will remain this way for many generations to come. I feel fortunate to be part of this community and to be able to call it home.

This plan sets a long-term vision and high-level goals with targets to obtain a healthier, cleaner, more equitable, and prosperous future for Northglenn. This vision won't be achieved tomorrow, or even in another ten years, but the work we begin together will start to move the needle in the right direction to create a sustainable city for us all and for our future generations.

Achieving the results we are looking for cannot be accomplished by the Northglenn government alone. There are many things you can do to be involved with sustainability in Northglenn, including supporting our local businesses, joining the citizen sustainability advisory group, volunteering in the community, or composting in your backyard to reduce waste that ends up in the landfills. All of us—residents, neighborhoods, businesses and institutions including schools, churches, nonprofits and other governmental agencies—are part of the solution.

As members of the Northglenn community, we are all the stewards of this North Metro gem, and I sincerely hope that you will take part in our city's path to a sustainable future!

A handwritten signature in black ink, appearing to read "Carol O'Keefe". The signature is fluid and cursive.

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Sustainability Vision

Northglenn is a vibrant community that thrives on civic engagement and collaboration to use the power of our citizens to increase sustainability and enhance our resources and economic sustainability.

We creatively and thoughtfully utilize our resources—showing pride in our community—to meet our present and future generation’s needs without compromising the ecosystems on which we depend, in order to create an exceptional quality of life for every generation.

Project Purpose

We live in a time in which increased population growth, high levels of consumption and the desire to feed growing economies have increased demands on our resources—natural, human and social—on a local, regional, and global scale.

These demands negatively impact the natural environment, our communities, and the quality of our lives. In the face of these challenges, people worldwide have developed a growing concern for the environment and a desire to live sustainably.

Northglenn has an opportunity to make changes that will create jobs and benefit all residents



The Colorado front range is already experiencing heat waves, severe wind, droughts, rainstorms, floods, and wildfires, which are expected to increase in the future. These impacts have a negative impact on our economy, stress our natural resources and worsen inequities facing many individuals in our communities.

Action is required at all levels, and local governments have a unique role to play in building sustainable communities. With this Plan, Northglenn joins a number of surrounding communities—Lakewood, Longmont, Westminster, Denver, Arvada, Thornton and others that are taking action to increase sustainability.

Project Background

During 2017, Northglenn City Council directed staff to initiate a sustainability audit of current City activities and to create a work program that would bring a sustainability lens to the City’s future work plans. Through a competitive solicitation process, the City selected the team of ICLEI – Local Governments for Sustainability and Economic & Planning Systems to lead the City through this process.

An internal Sustainability Team, consisting of staff from each City department, was formed to catalogue existing sustainability activities, suggest the vision and goals, identify gaps and new opportunities. The Team will implement future activities to achieve the sustainability goals with support from Leadership Team and City Council.

Northglenn is doing its part. We have committed to follow the Five Milestones of Sustainability, a process created by ICLEI – Local Governments for Sustainability and successfully used by hundreds of U.S. cities:

- Milestone 1:** Conduct a Sustainability Assessment
- Milestone 2:** Set Sustainability Goals
- Milestone 3:** Develop a Sustainability Plan
- Milestone 4:** Implement the Sustainability Work Plan
- Milestone 5:** Monitor/Evaluate Implementation Progress

During the past nine months, the City completed Milestones 1, 2, and 3, and are committed to implement the Sustainability Plan in the coming years, as we pursue Milestones 4 and 5. This process of continuous improvement will be informed by engagement with our community and business members, supported by Council leadership and led by the City’s internal sustainability team.

Goals and related targets will be continuously evaluated and adjusted as needed. For many of the targets, baselines have not yet been established. Data collection may prove to be elusive, thus requiring elimination or modification of certain targets.



Development, Leadership and Implementation

The goals, priorities, and work program were developed by an internal Sustainability Team consisting of Northglenn staff members, facilitated by ICLEI, and led by Becky Smith, Northglenn Planning Manager and Ashley Kaade, Senior Planner.

The Plan would not be possible without the engagement of this dedicated group of employees, who recognize that the structure and development of City services have implications for livability today and the long-term success of the City.

The Plan reflects the many sustainability components present in their current service delivery as well as their aspirations for the future, informed by their daily interactions in the community.



Goal Areas

The City selected Nine Goal Areas, which best aligned with the Sustainability Vision. Indicators have been developed to measure progress toward meeting the goals. When measured over time, indicators help us tell us to determine if we are making progress and aid in decision making.



Arts, Culture,
and Events



Community
Education and
Civic Engagement



Sustainable
Economy



Environment and
Public Health



Housing



Human Dignity



Open Space and
Land Use



Resource
Conservation



Transportation

Sustainability Assessment

The Team documented that the City is already engaged in a significant number of sustainability activities. They identified 97 existing sustainability activities of City government and suggested 80 new or improved initiatives. Many of the suggested initiatives build on existing activities. The Team met regularly between November 2017 and August 2018 to discuss the plan and to hear details of existing programs from Team members. This cross-departmental understanding and collaboration will help the City to identify “nexus” opportunities as they implement the plan.

Some of the suggested initiatives were evaluated via a benefit-cost analysis and City Council provided feedback on draft plans. The Youth Commission provided their input to the sustainability vision. The consultants also created a Risk Adaptation and Advisory Report to identify the expected forthcoming changes in Northglenn’s climate—and to engage staff, leaders, residents, and businesses to achieve the City’s sustainability vision.

Finally, this internal review was informed by an external stakeholder group of Northglenn residents and representatives of Tri-County Health, and Adams County 5 Star School District. This group of citizens offered suggestions to the Vision statement and a desire to continue to meet quarterly to help the City’s sustainability team to focus on issues with high community importance and lend their expertise.

Existing Sustainability Initiatives





Relationship to Other Plans

The Sustainability Plan brings together elements from existing plans and policy reports, including the Northglenn Comprehensive Plan, Connect Northglenn Bike and Pedestrian Master Plan, and the Food Access Assessment Report.

Initiatives from these plans were examined under the framework of the Sustainability Plan's nine goal areas and opportunities for improvements were identified. Initiatives that already align with existing policy were given higher priority for implementation.

Art, Culture and Events



GOALS

- 1 Develop and nurture quality programs for the City of Northglenn's arts, culture and events programs.
- 2 Increase connectivity, allowing all people access to community classes, events and programs.
- 3 Create a thriving set of sustainable, creative and diverse event programs.

INDICATORS

- Participation levels
- Affordability
- Accessibility
- Programming levels
 - City-sponsored
 - Externally-sponsored

TARGETS

- Maintain programming levels for both City sponsored and externally sponsored theater events
- Increase participation and attendance in theater events by 10% by 2030
- Increase participation in Citywide events by 5% by 2030
- Maintain affordability and accessibility while growing recreation and theater programs by 10% by 2030
- Provide recycling containers, services, or other options at all City-sponsored festivals



Community Education and Civic Engagement



GOALS

- 1 Community members of all demographics participate actively and effectively in civic affairs and community improvement efforts.
- 2 Through effective education and messaging, community members of all ages understand the basic principles of sustainability and use them to guide their decisions and actions.

INDICATORS

- Level of Civic Engagement
- Voter registrations
- Participation in Neighborhood Activities
- Resident satisfaction

TARGETS

- Increase voter registration by 10% by 2020
- Increase voting rates by 15% by 2020
- Launch education campaign with at least 10 volunteers participation
- Hold at least 3 outreach events
- Hold at least 3 business education events

Sustainable Economy



GOALS

- 1 Create a sustainable and diverse tax base that allows the City to maintain a high level of service for Northglenn residents and businesses.
- 2 Encourage private capital investment that contributes to job creation in Northglenn.
- 3 Create social opportunities that contribute to a sense of place and attracts both new residents to the community as well as retains existing residents and businesses.
- 4 Work to become a Smart City by fostering technologies that generate and aggregate data; and analytical tools which convert that data into usable information.
- 5 Encourage collaboration, innovation, and the application of that information to solve public problems.

INDICATORS

- Business participation in sustainability programs
- Diversity in businesses and business owners

TARGETS

- Increase number of businesses participating in sustainability programs by 10% by 2020
- Increase economic opportunities for entrepreneurs and small businesses by 5% by 2025

Environment and Public Health

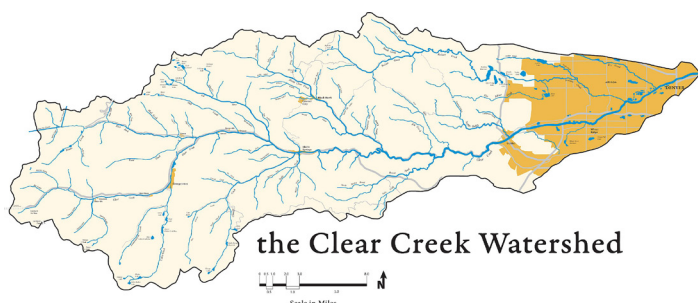


GOALS

- 1 Protect and enhance environmental health and public health by minimizing and where possible eliminating:
 - The use of hazardous or toxic materials by residents, businesses and city operations;
 - The levels of pollutants entering the air, soil and water; and
 - The risks that environmental problems pose to human and ecological health.
- 2 Ensure that no one geographic or socioeconomic group in the city is being unfairly impacted by environmental pollution.
- 3 Increase consumption of fresh, locally produced, organic produce to promote public health and to minimize resource consumption and negative environmental impacts.

INDICATORS

- Hazardous spills
- Access to fresh produce
- Participation in Community Gardens
- Perceived Safety of Residents



TARGETS

- Decrease number of neighborhoods/sites affected by hazardous spills or dumping, particularly those in low income and communities of color by 30% by 2030
- Decrease average residential distance from fresh produce access by 15% by 2030
- Increase number of participants/members for community gardens by 15% 2021
- Increase perceptions of safety that can be tracked through community survey

Housing



GOALS

- 1 Implement Land Use policies that create a diverse mix of housing that can accommodate all levels of homebuyers and renters.
- 2 Retain residents by providing new mid-level housing opportunities for next stage homebuyers and new business/social opportunities for residents in redevelopment projects.
- 3 Adopt policies that encourage healthy and sustainable housing.

INDICATORS

- Total cost of housing
- Access to housing services
- Affordability

TARGETS

- Increase number of attainable housing units (rent as 30% of income) available in city by 10% by 2020
- Increase placing individuals with available services to 10% by 2020
- Increase affordability by reducing energy costs. Decrease residential energy usage by 25% by 2038



Human Dignity



GOALS

- 1 Community members are able to meet their basic needs and are empowered to enhance the quality of their lives.
- 2 The City of Northglenn forms collaborative partnerships with service providers and communicates residents' needs to them.
- 3 Provide community members with resources to educate and connect them to housing, health, education, economic opportunity, and cultural and recreational services and program.
- 4 Demonstrate respect for and appreciation of the value added to the community by differences among its members.

INDICATORS

- Percentage of needy households connected to services
- Participation in fitness programs
- Number of volunteers



TARGETS

- Connect 100% of households needing energy and water bill assistance with resources that can help
- Increase participation in both evidence-based programs and general fitness classes to 10% by 2025
- Increase Silver Sneakers participation 15% by 2025
- Increase Senior Center attendance 10% by 2030
- Increase Citywide Volunteer base by 5% by 2030

Open Space and Land Use



GOALS

- 1 Implement Land Use and Transportation policies that encourage open space, parks, trails and mixed use communities.
- 2 Implement Land Use policies that encourage high density residential and mixed use development where appropriate.
- 3 Lead the Northglenn community by way of example by transitioning City parks and facilities to use water conserving plants for landscaping.
- 4 Foster Community Pride through Environmental Stewardship.
- 5 Create a regional and well utilized parks and trails system with amenities that are attractive to people of all ages and abilities.

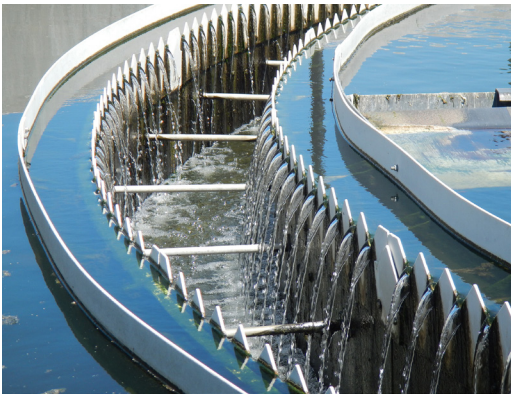
INDICATORS

- Percent of residential, mixed-use projects that are within ¼ mile of transit nodes and are otherwise consistent with Sustainable Plan goals
- Percent of new or replaced, non-turf, public landscaped area and non-recreational turf area planted with regionally appropriate plants
- Number of acres of public open space by type (including beaches, parks, public gathering places, gardens, and other public lands utilized as open space)
- Percent of open space that is permeable

TARGETS

- Create Compact & Complete Communities: Concentrate new and re-development in compact, human-scaled, walkable centers and neighborhoods that connect to transit, offer diverse uses and services, and provide housing options for families of all income levels
- Focus new growth in infill areas and on redevelopment that does not require the extension of water, sewer, and road infrastructure or facilitate sprawl. Identify these centers in the Comprehensive Plan update.
- Increase use of natural systems for stormwater management

Resource Conservation



GOALS

- 1 Significantly decrease overall community consumption (residents and businesses), specifically the consumption of non-local, non-renewable, non-recyclable and non-recycled materials, water, and energy and fuels.
- 2 Demonstrate leadership by encouraging sustainable procurement, extended producer responsibility and modeling innovative strategies to become a zero-waste city.
- 3 Within renewable limits, encourage the use of local, non-polluting, renewable and recycled resources (water, energy, and material resources).
- 4 Reduce water consumption through policies that require low impact development.
- 5 Increase energy efficiency of City businesses through encouraging the use of alternative energy sources and partnerships with the City's energy provider.

INDICATORS

- Water use
- Energy use
- Petroleum use
- Paper use
- Sustainably-sourced goods

TARGETS

- Reduce Potable Water use by 17-20 % by 2021 and by 25% by 2030
- Reduce Non-Potable Water use by 15% by 2021
- Decrease total & per capita water usage by 5% each year from the previous 5 years average”
- Reduce community-wide commercial energy usage by 15% by 2025
- Reduce community-wide residential energy usage by 15% by 2025”
- Reduce municipal energy usage by 25% by 2030
- Increase the percentage of City spending identified as sustainable spend by 10% by 2020 and by 30% by 2025
- Increase citywide landfill diversion rate to 20% by 2023
- Decrease paper use in City operations by 15% by 2021

Transportation



GOALS

- 1 Create a multi-modal transportation system that minimizes and, where possible, eliminates pollution and motor vehicle congestion while ensuring safe mobility and access for all without compromising our ability to protect public health and safety.
- 2 Facilitate a reduction in automobile dependency in favor of affordable alternative, sustainable modes of travel.
- 3 Implement policies that create vibrant business centers through multi-model transportation options.

INDICATORS

- Participation in mobility programs
- Greenhouse Gas Emissions
- Safety
- Mobility Options
 - Programs
 - Infrastructure

TARGETS

- Increase number of students biking or walking to school by 25% by 2025
- Install 10 miles of on-street bicycle facilities by 2023
- Increase number of bikes refurbished in the Bike Program participants by 15% by 2020
- Increase modal shift to active transportation based on baseline data by 2020
- Increase participation in Derby Day bike rodeo by 10% annually
- Install 100 bike racks around the community by 2028
- Zero traffic incidents involving cyclist/pedestrians by 2030
- Increase number of city employees teleworking at least one day per week by 10% by 2020 and 20% by 2025
- Increase transit ridership by 30% by 2020
- Reduce total GHG emissions of city fleet vehicles by 30% by 2025

Acknowledgments

Sustainability Team

- Alex Arnold – Industrial Pretreatment/Backflow Prevention Specialist, Public Works
- Ashley Kaade – Senior Planning, Planning & Development
- Alan Sielaff – Planner I, Planning & Development
- Bob Lehr - Director of Technology, Information Technology
- Brigid Sherrill – Administrative Assistant, Public Works
- Becky Smith – Planning Manager, Planning & Development
- Brook Svoboda – Director of Planning & Development, Planning & Development
- Christine Rucobo – Senior HR Analyst, Human Resources
- Doug Kegerreis – Parks Supervisor, Parks & Recreation
- Dana Kester – Parks Project Coordinator, Park & Recreation
- Doug Pullen – Facilities Maintenance Supervisor, Facilities Maintenance
- Debbie Tuttle – Economic Development Manager, Economic Development
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- Jason Hensel – Chief Plan Operator/ Water, Public Works
- Jason Loveland – Director of Finance, Accounting & Administration
- Jill Mendoza – Economic Development Specialist, Economic Development
- Jenni Murphy – Community Outreach Coordinator, Neighborhood Programs
- Kent Kisselman – Engineering Manager, Public Works
- Kathy Kvasnicka – Risk Manager, Risk Management
- Michael Stricker – Recreation Programs Supervisor, Theater & Arts
- Pam Acre – Stormwater Coordinator, Public Works
- Ray Reling – Utilities Manager, Public Works
- Robert Webber – Acting City Manager and Acting Director of Public Works, City Manager
- Steven Stokes – Event Supervisor, Neighborhood Programs
- Tom Carlson – Neighborhood Services Supervisor, Planning & Development
- Tami Moon – Water Resource Administrator, Public Works

Sustainability Advisory Group

- Andy Hall – NG resident
- Stephanie Pratt – NG resident
- Glynn McKenzie – NG resident
- Boysen Loesh – NG resident
- Dallas Briggs – NG resident
- Annemarie Heinrich – Tri-County Health Department
- Shannon Oliver – Adams 12 Five Star School District

City Council

- Mayor Carol Dodge
- Meredith Leighty – Ward I
- Jordan Sauers – Ward I
- Joyce Downing – Ward II
- Becky Brown – Ward II
- Marci Whitman – Ward III
- Julie Duran Mullica – Ward III
- Jenny Willford – Ward IV
- Antonio B. Esquibel – Ward IV

Project Team

- Becky Smith, Planning Manager, City of Northglenn
- Ashley Kaade, Senior Planner, City of Northglenn
- Angie Fyfe, Executive Director, ICLEI
- Hoi-Fei Mok, Program Officer, ICLEI
- Andrew Knudtsen, Principal, EPS
- Elliot Kilham, Associate, EPS

Glossary

Arts, Culture, and Events | nurturing and enhancing creative communities and providing opportunities for people to create a sense of community

Climate represents average weather together with its variability of representations of the weather conditions for a specified area during a specified time interval (usually decades or longer).

Climate Change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Community Education and Civic Engagement | activating an engaged public

Greenhouse Gases | Any gas in the Earth's atmosphere that traps heat and can contribute to climate change. Greenhouse gases include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated fluorocarbons (HCFCs), ozone (O₃), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs)

Energy independence is the concept of reducing dependence on outside sources of energy to increase resilience and secure economic conditions at the local level.

Environment and Public Health | minimizing or eliminating toxins that are harmful to humans and the natural environment.

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Hazard Mitigation | action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Housing | promoting affordable, livable, healthy, and energy and resource efficient housing

Human Dignity | Meeting the needs of all community members

Open Space and Land Use | Promoting and protecting community and our environment

Glossary *continued*

Resilience | The ability of a system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.

Resource Conservation | reducing waste, protecting natural resources and promoting renewable resources.

Sensitivity | the degree to which a built, natural, or human system is directly or indirectly affected by changes in climate conditions or specific climate change impacts. If a system is likely to be affected as a result of projected climate change, it should be considered sensitive to climate change.

Sustainable Economy | nurturing a diverse and equitable economy

Sustainability | Ensuring that equity, environment, and economy are considerations in decision-making. Often with a focus on the future, sustainability is often defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Systems | The built, natural, and human networks that provide important services or activities within a community or region. Built systems can refer to networks of facilities, buildings, and transportation infrastructure such as roads and bridges. Natural systems can refer to ecological networks of fish, wildlife, and natural resources like water. Human systems refer to networks of public health clinics, courts, and government.

Transportation | moving people and goods in an efficient and healthy manner.

Vulnerability | Susceptibility of a system to, and inability of a system to cope with the adverse effects of climate change, including climate variability. Vulnerability is a function of a system's sensitivity to climate and the capacity of that system to adapt to climate changes. Systems that are sensitive to climate and less able to adapt to changes are generally considered to be vulnerable to climate change impacts.

Ensuring Progress

Perhaps no group has adopted the maxim, “think globally, act locally” more convincingly than today’s local government leaders.

Visionary local leaders embrace actions on climate change, environmental justice, energy independence, natural resource conservation, unemployment, poverty, public health and fiscal resiliency. Local leaders also recognize that these seemingly disparate issues are inexorably linked.

When local governments align their services, land use, and infrastructure with sustainable principles, they can achieve broad benefits for their communities.

The City will track its sustainability progress and update residents, businesses, and stakeholders via the City’s website northglenn.org/sustainability

Sustainability is a community effort...

...get involved!

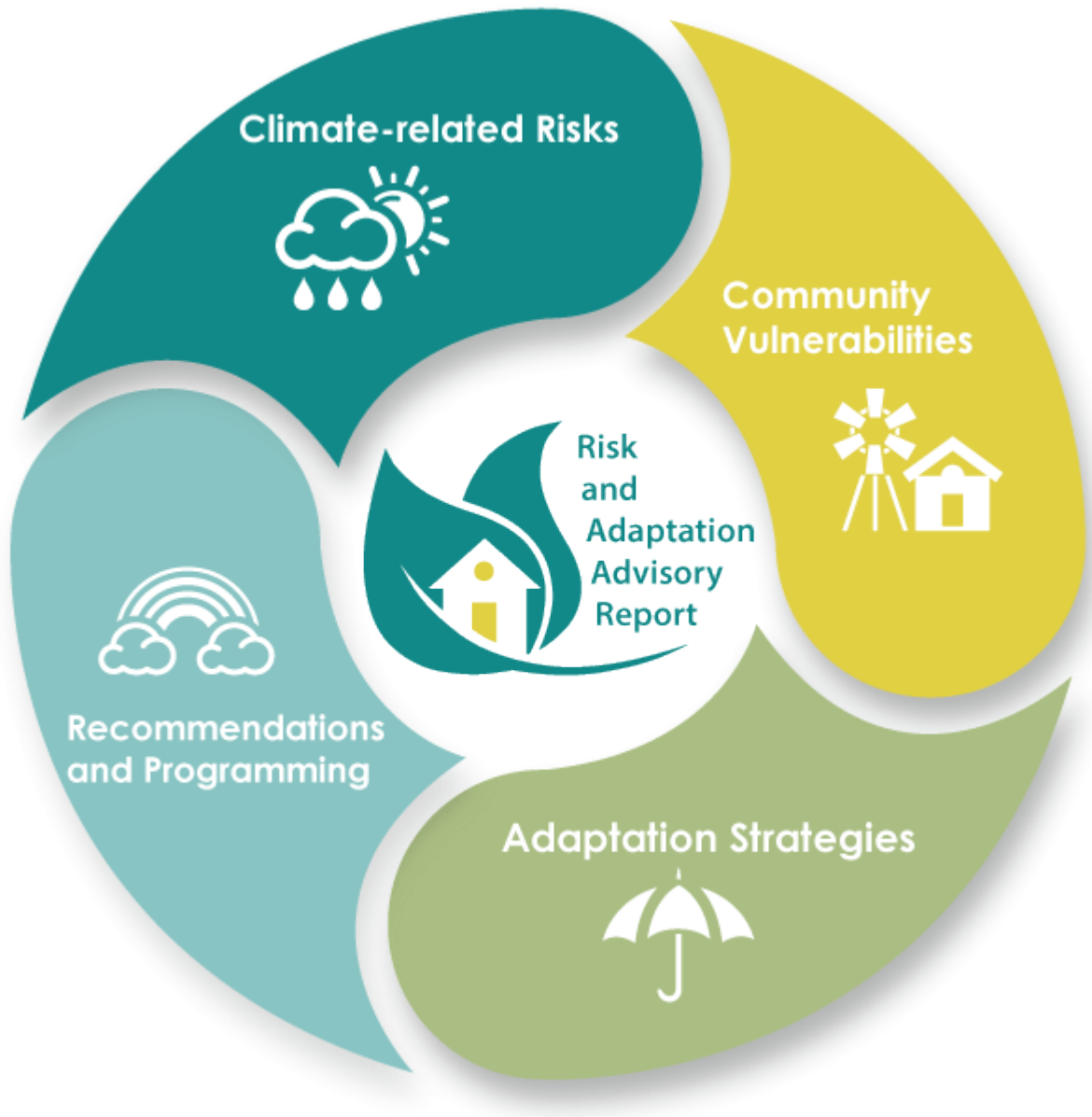
As a community member you can help us make progress.

- For updates or information about how you can get involved, visit the City’s website - northglenn.org/sustainability



CONTACT INFORMATION

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City of Northglenn, Colorado August 2018

Adaptation Services Group

ICLEI USA – Local Governments for Sustainability

www.adaptationsg.com

www.icleiusa.org



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BACKGROUND INFORMATION

About ASG

Adaptation Services Group (ASG), is a Boulder, Colorado company offering risk assessments, adaptation plans and programs, climate change planning and mitigation programs to state and local governments focused on helping their residents and businesses become more resilient in the face of climate change. ASG programs feature a customer-centric approach to implementation, putting the client at the center of the process. These programs help create more resilient communities that are adapting to the changing climate.

The ASG team has deep expertise in climate mitigation and adaptation strategies and analysis, and we focus exclusively on the challenges presented by the changing climate for governments. ASG operates in close partnership with ICLEI USA – Local Governments for Sustainability - to provide implementation of community based adaptation programs in the areas of wildfire, seismic, flooding, energy and drought.

















ASG's Risk Adaptation and Advisory Report

ASG's Risk Adaptation and Advisory Report (RAAR) is a unique report that connects the dots between academic research, climate modeling and community engagement. The RAAR is the first step in overall adaptation planning for a community. It provides a high-level view of the climate-related risks and hazards affecting community systems, as well as possible adaptation strategies and recommendations. The RAAR presents an introduction to planning for climate adaptation, which the community can then use as a foundation to build upon.



Seth Portner
Chief Executive Officer
Adaptation Services Group

Key Terms

	Anthropogenic	Generated by human activity (specifically in reference to environmental change).
	Climate Change	Significant changes in global temperature, precipitation, wind patterns and other measures of climate that occur over several decades or longer.
	Climate Adaptation	Adjustments to natural or human systems in response to actual or expected climate change, including increases in the frequency or severity of weather-related disasters.
	Changed Seasonal Patterns	Alteration of predictable weather patterns relied upon for agriculture, tourism and natural resource industries.
	Drought	Persistent lack of rainfall over one or more seasons leading to the depletion of surface and groundwater reservoirs.
	Extreme hot days	Days that are 5 degrees Celsius above normal.
	Greenhouse gases (GHGs)	Atmospheric gases that trap incoming solar radiation and contribute to the warming of the Earth's surface. The principle GHGs are carbon dioxide, methane, nitrous oxide and ozone.
	Groundwater flooding	Flooding of underground structures because of high water tables.
	Hail	Damaging frozen precipitation associated with high intensity rain events.
	Hazard mitigation	Actions taken to reduce loss of life and property by lessening the impacts of adverse events.
	Heat waves	A period of at least 5 days where the temperature is at least 5 Celsius degrees above normal.
	IPCC	Intergovernmental Panel on Climate Change
	Rainstorms	Extreme precipitation event without substantial wind.
	Reduced snowpack	Drought or temperature driven changes that reduce water reservoirs in the form of high elevation snow and ice.
	Resilience	The ability to prepare for, absorb, recover from and more successfully adapt to adverse events.
	Severe wind	Strong winds capable of property damage, dust storms and other hazards.

EXECUTIVE SUMMARY

Climate change, a widespread global occurrence, noticeably affects communities on a large scale but its effects can be felt down to the most localized level. It influences all sectors including transportation, public health, tourism, water and waste management and overall quality of life. Local governments around the country are working with their residents to develop plans for addressing climate adaptation. ASG works in partnership with these communities to envision the first steps toward creating and reaching a climate adaptation goal.

Through engagement with Northglenn and research, ASG identified and modeled (ASG uses several models – the dominant model is Temperate) the climate risks affecting Northglenn, CO. For Northglenn, model results displayed increasing average high and low temperatures. Maximum high temperatures and the number of extreme heat events also increased, while precipitation trends generally remained constant. This combination of increasingly warmer days with little to no change in precipitation could lead to drier overall conditions. Extreme heat and rising temperatures overall seemed to be the most pressing climate risks threatening Northglenn. The effects of climate change vary based on a variety of meteorological and regional factors which can be difficult to model. Increasing evaporation is often a result of increased temperatures which can in turn lead to increased humidity, average rainfall, and the frequency of heavy rainstorms; this is to say that continued severe weather is likely for Northglenn and Colorado's Front Range over time.

Adaptation recommendations were developed according to the identified risks, such as xeriscaping for drought, use of permeable pavement for flooding and implementing green roofs for extreme heat. These recommendations provide the support for Northglenn as they formulate their climate action plan and further explore climate adaptation strategies best suited for their community's needs.

The recommendations in this report are meant to inform Northglenn about possible solutions for climate-related issues. The RAAR is a preliminary report to highlight the likely major risks threatening a community based on climate projection models. It is not meant to serve as a comprehensive climate adaptation plan, but instead be a starting point for future planning. It also does not provide a comprehensive outlook for every climate related risks and threats affecting an area. There may be climate related risks that are not realized at the time this report

is written or cannot be captured accurately through climate modeling tools in creation of this report.

ASG's work with Northglenn revealed that the risks faced by the community are moderate even in comparison to other Front Range communities that may have more severe threats in the form of flood and fire. We also found that the community has already begun the process of adapting to climate change by modifying operations, pursuing water conservation, protecting the tree canopy and more. As a result of the modest risks and pro-active stance, we found Northglenn to be better positioned than many other neighboring communities with respect to adaptation.

ABOUT NORTHGLENN



Northglenn Climate Fast Facts

Climate: Northglenn enjoys a mild, sunny, and semi-arid climate.

Average July High Temp: 92

Average Jan. Low Temp: 19

*AccuWeather

Northglenn, CO is situated along the Front Range, which refers to the region along the eastern slope of the Rockies.

Being part of Colorado's Front Range Northglenn is experiencing an overall warming and drying trend in weather. High mountain desert, Colorado's high elevation and its position in the mid-latitudes among the Rocky Mountains dictates the region's dry climate.

Colorado is known for its sporadic seasonal changes, low humidity and large ranges of temperature from day to night. Thunderstorms, particularly common in the spring and summer, tend to bring short, heavy showers with the possibility of hailstorms, flooding and lightning strikes.

METHODOLOGY AND SURVEY

To assess the hazards affecting the city of Northglenn, ASG team members met with members of the Northglenn Sustainability Committee to discuss the city's current risk status and create a plan of action. Northglenn stakeholders discussed their common values as well as the climate-related issues they currently face in their community. The background knowledge of the city staff pertaining to climate change and adaptation is interwoven throughout this report. Their insight into how the changing climate is already impacting city operations is integral to this report.

ASG utilized climate adaptation planning tools to create this specialized report specific to the city of Northglenn. ASG analyzed the hazards identified as climate threats alongside the valued community systems highlighted by Northglenn staff. The final report provides results for the adaptive need of each hazard.



Survey Results for Northglenn

In order to engage the community of Northglenn and accurately capture the values of the city stakeholders, ASG created and distributed a survey using the Climate Risk and Adaptation Framework and Taxonomy (CRAFT).

The purpose of the survey was to better understand the climate-related risks affecting the community. The stakeholders completing the survey needed to consider the frequency and intensity that each of the seven hazards would have over the next five years given their local and current knowledge of the climate, which the CRAFT framework utilizes to assess risk. Stakeholders were then asked to consider the impact each hazard would have on every community system and what they believed Northglenn’s capability would be in the face of mitigating the effects of the hazards on community system. The survey offers insight into the city’s current assessment of how difficult will it be for Northglenn to adapt to each hazard. Over time, this self—reported perceived risk may rise or fall, as programs and strategies are developed and implemented.

The complete survey and results from Northglenn are found on page 37.

High Heat Days

	Low	Moderately Low	Moderate	Moderately High	High
Probability of this hazard occurring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you expect this hazard to occur in the next 5 years?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How intense do you expect this hazard to be in the next 5 years?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much impact might this hazard have on the community systems listed below over the next five years?

	Low	Moderately Low	Moderate	Moderately High	High
Quality of Life (includes community and culture, recreation and tourism)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional and Mental Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Law and Order	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forestry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waste Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water Supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Adaptive Capacity: What is the capability of your city to mitigate groundwater flooding in each of the following community systems?

	Low	Moderately Low	Moderate	Moderately High	High
Quality of Life (includes community and culture, recreation and tourism)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emotional and Mental Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Law and Order	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forestry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waste Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Water Supply	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

RISK ASSESSMENT FOR NORTHGLENN

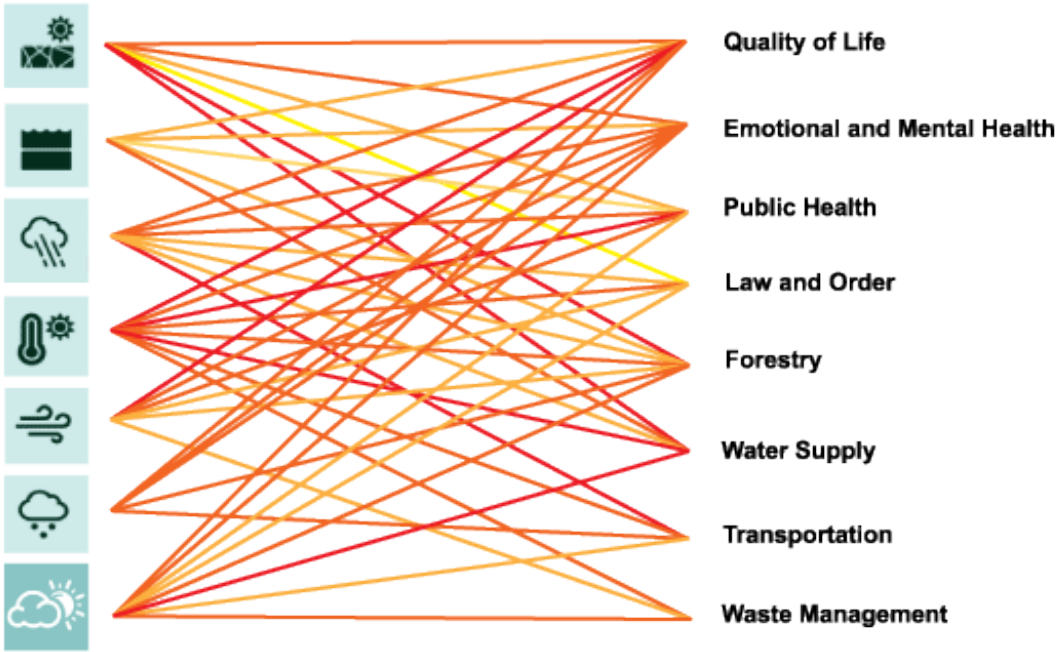
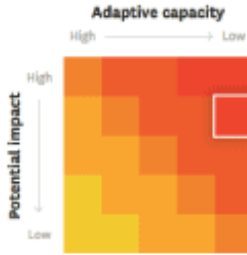
The answers from the survey were used as data points for the CRAFT framework ASG uses to assess the self-reported perceived risk. The model was populated to show trends through 2100, and the results show the forecast for each hazard.

The following climate change data indicators demonstrate the probability and frequency of the primary hazards facing the city. The data comes from Localized Constructed Analogs (LOCA, 2018), and utilizes statistics to downscale climate model projections of the future climate. Each of the climate change indicators influence at least one hazard.

Northglenn’s Adaptive Capacity

How is **adaptive need** calculated?

Adaptive need represents a risk’s priority, from yellow (lowest) to deep red (highest). Its value depends on the risk’s potential impact and your city’s **adaptive capacity** to manage it.

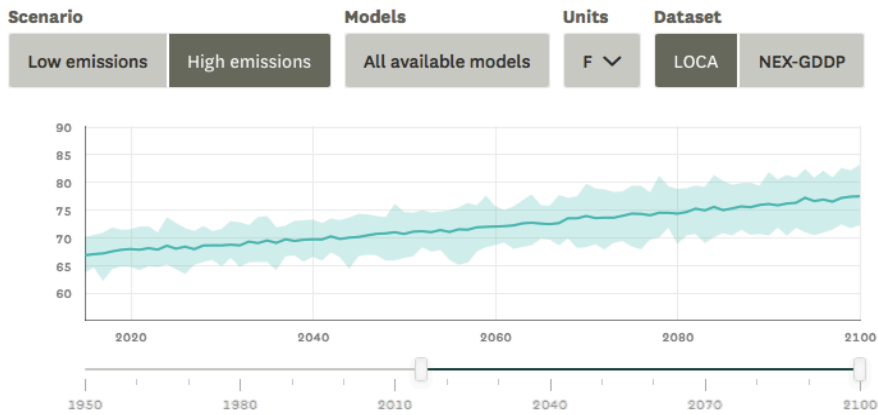


This graphic shows Northglenn staff’s responses to the adaptive capacity of various risks in July 2018.

CLIMATE CHANGE INDICATORS

The following graphs show the climate change data indicators that will influence Northglenn’s risk in the coming years. High emissions scenarios are integrated throughout to reflect current high emissions conditions and to display the forecast if these conditions were to continue through the year 2100.

Average High Temperature

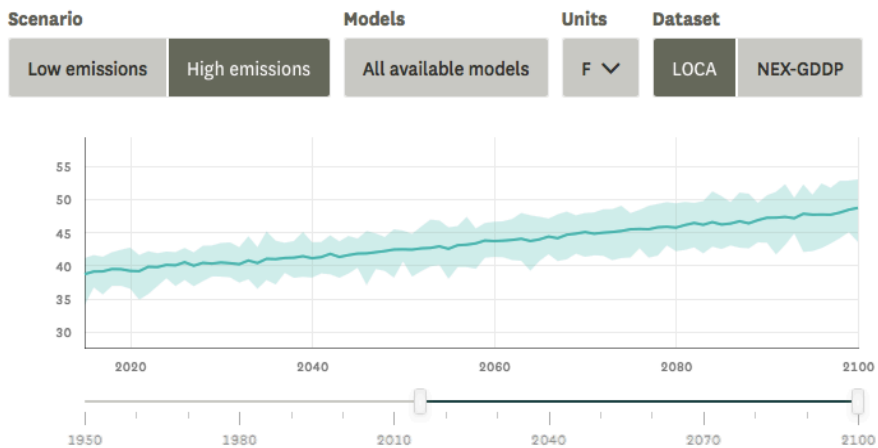


— F Range between min/max of selected models

Aggregated average high temperature, generated from daily data using all requested models

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Average Low Temperature



— F Range between min/max of selected models

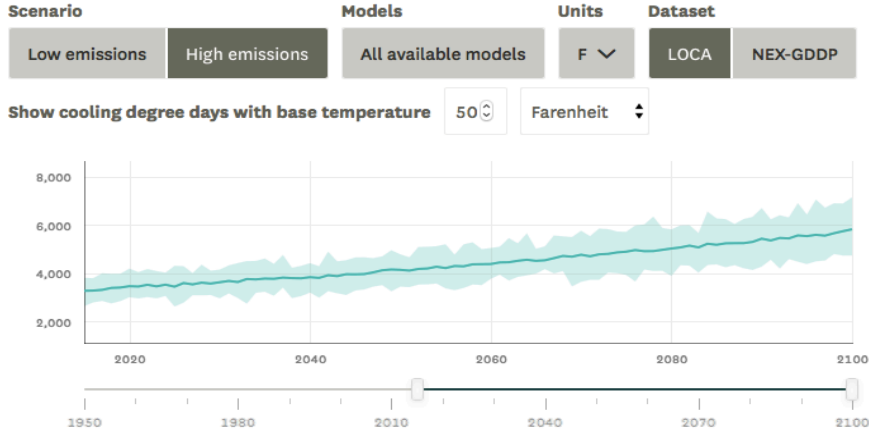
Aggregated average low temperature, generated from daily data using all requested models

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Average High Temperature:
The average high temperature of Northglenn is predicted to increase from roughly 67 degrees F to 77 degrees F.

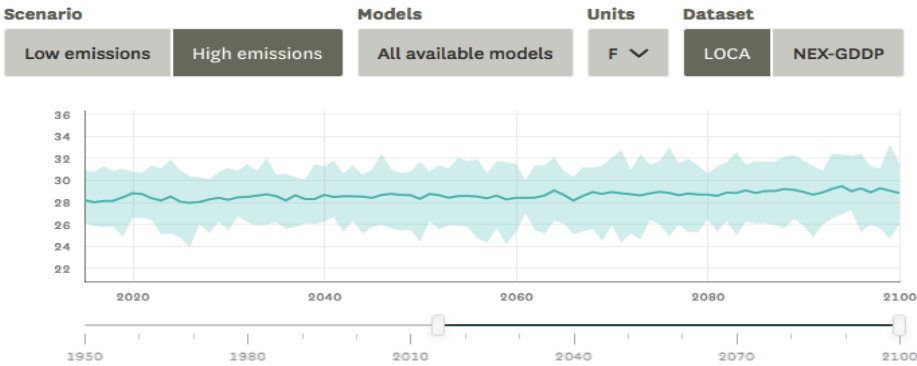
Average Low Temperature:
Likewise, the average low temperature is expected to increase from 39 degrees F to 49 degrees F by 2100.

Cooling Degree Days



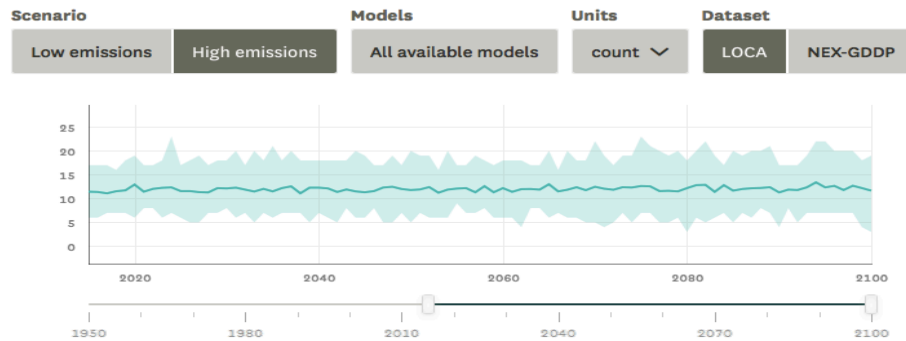
— F ■ Range between min/max of selected models
 Total difference of daily average temperature to a reference base temperature
 Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Diurnal Temperature Range



— F ■ Range between min/max of selected models
 Average difference between daily max and daily min temperature
 Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Dry Spells



— count ■ Range between min/max of selected models
 Total number of times per period that there are 5 or more consecutive days without precipitation
 Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Cooling Degree Days: Northglenn’s need for cooling as measured by cooling degree days will increase from approximately 3,500 nearly 6,000 an increase of nearly 60%.

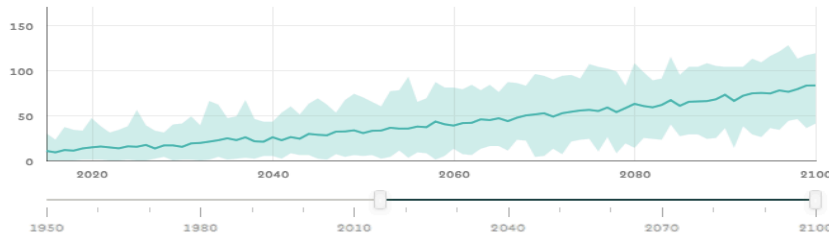
Diurnal Temperature Range: The diurnal temperature range, showing the average difference between maximum daily temperatures and minimum daily temperatures, is predicted to stay relatively constant through 2100.

Dry Spells: Dry spells, referring to 5 or more consecutive days without precipitation, is expected to stay around 11 per year.

Extreme Heat Events

Scenario: **Low emissions** | **High emissions** | Models: **All available models** | Units: **count** | Dataset: **LOCA** | NEX-GDDP

Show extreme heat events at percentile **99** with historic base range year **1971**



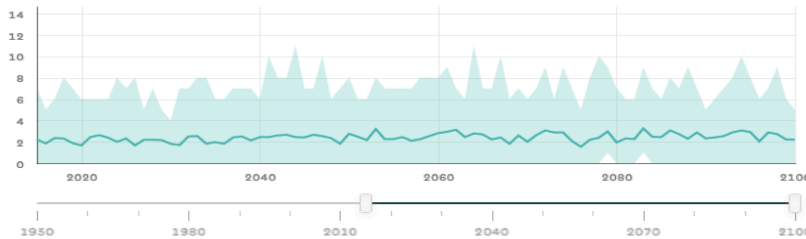
— count ■ Range between min/max of selected models
 Total number of times per period daily maximum temperature exceeds the specified percentile of historic observations

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Extreme Precipitation Events

Scenario: **Low emissions** | **High emissions** | Models: **All available models** | Units: **count** | Dataset: **LOCA** | NEX-GDDP

Show extreme precipitation events at percentile **99** with historic base range year **1971**

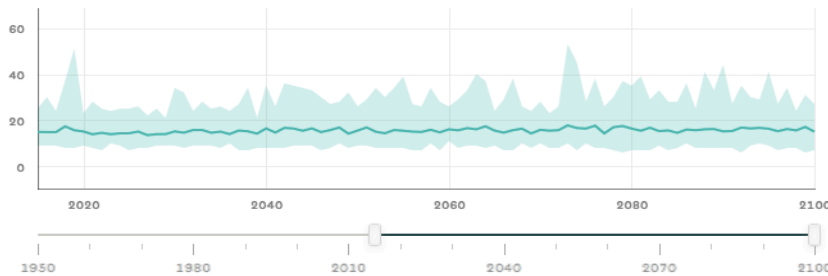


— count ■ Range between min/max of selected models
 Total number of times per period daily average precipitation rate exceeds the specified percentile of historic observations

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Max Consecutive Dry Days

Scenario: **Low emissions** | **High emissions** | Models: **All available models** | Units: **days** | Dataset: **LOCA** | NEX-GDDP



— days ■ Range between min/max of selected models
 Maximum number of consecutive days with no precipitation

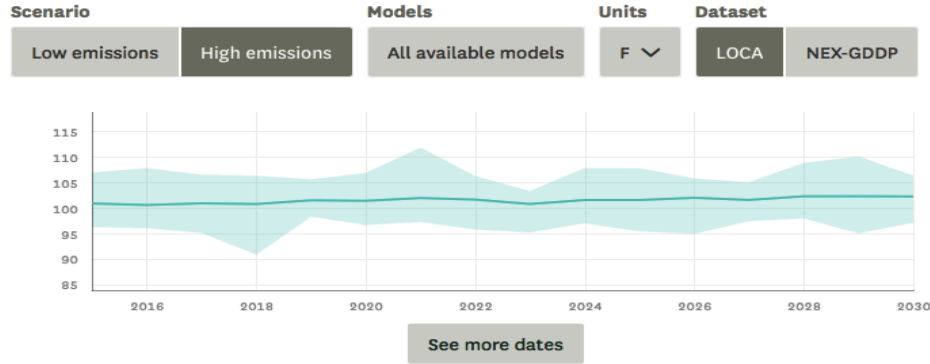
Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Extreme Heat Events: Extreme heat events, or the number of times temperatures exceed historical observations, will increase drastically from 11 times in 2018 to 84 in 2100.

Extreme Precipitation Events: Extreme precipitation events, the number of times precipitation events exceed historical observations, are likely to remain constant at 2 events annually.

Max Consecutive Dry Days: From 2018 to 2100, there is predicted to be a maximum of 15 consecutive days with no precipitation.

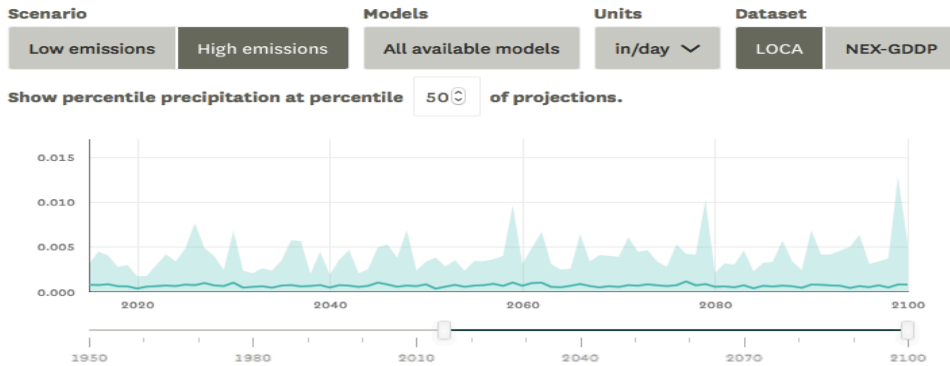
Maximum High Temperature



— F Range between min/max of selected models
 Maximum high temperature, generated from daily data using all requested models

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

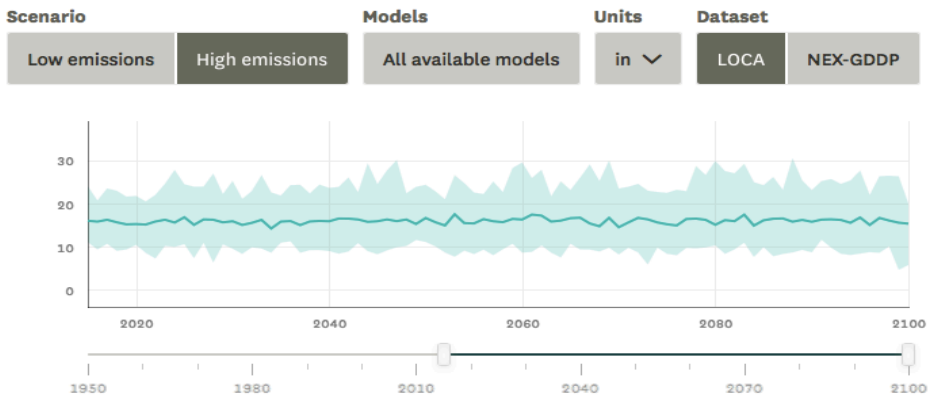
Percentile Precipitation



— in/day Range between min/max of selected models
 The specified percentile of precipitation rate for each timespan. Defaults to 50th percentile (Median)

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Total Precipitation



— in Range between min/max of selected models
 Total precipitation

Downscaled from CMIP5, using the Localized Constructed Analogs (LOCA) statistical technique. Data available at loca.ucsd.edu.

Maximum High Temperature: The maximum high temperature is predicted to increase 10 degrees from 101 in 2018 to 111 degrees F by 2100.

Percentile Precipitation: The percentile of precipitation rate is expected to remain relatively constant through 2100.

Total Precipitation: Total precipitation is expected to remain around 16 inches per year.

CLIMATE CHANGE RISKS AND ADAPTATION RECOMMENDATIONS

Drought



In the West, most of the water needed for agriculture and personal use comes from melted snowpack. Because of this reliability on a substantial snowpack, a lack of water could have dire consequences. Drought is defined as a persistent lack of rainfall over one or more seasons leading to the depletion of surface and groundwater reservoirs. Contributing factors include rainfall intensity, number of rainstorms, demand for water and the nature of the built environment (Centers for Disease Control and Prevention, 2010). As temperatures rise due to the changing climate, it will exacerbate the probability of drought. According to IPCC's 2007 Intergovernmental Panel on Climate Change (Pachauri, 2007), not only will drought-affected areas increase in extent, but the droughts themselves will increase in frequency. Drier areas are becoming drier and predicted areas of drought are increasing in size. Shifting storm patterns is one cause for the expansion of drought-prone areas.

"Throughout the West, less frequent and less severe drought conditions have occurred during the 20th century than revealed in the paleoclimate records over the last 1000 years. However, warming temperatures may have increased the severity of droughts and exacerbated drought impacts."

.....
 (Colorado Water Conservation Board, 2010)

The sectors most visibly affected by drought are agriculture, forestry and vegetation; however, public health and quality of life are also areas of concern (Pachauri, 2007). Communities with low-adaptive capacities to plan for drought may experience water stress. Drought may also bring about changes in livelihoods. Communities may feel the strain of parks no longer green and playing fields may turn brown without sufficient irrigation, droughts can be depressing to a community's spirit (Drought Effects, 2018). Northglenn discussed lower priority water rights, which may make an extended drought more impactful than for other Front Range communities.

Northglenn has been a proud member of Tree Cities USA for the past 28 years. Tree Cities USA is a community improvement program under the Arbor Day Foundation, whose purpose is to highlight the importance of city trees. The ash tree, a common tree in North America, is highly valued by the Northglenn community. The possibility of drought may threaten the growth and prosperity of Northglenn's ash trees.

By 2050, summer drought severity in Colorado is projected to be among the worst in the country.

<http://statesatrisk.org/colorado/drought>

Northglenn stakeholders identified drought as one hazard which has the potential to substantially affect forestry and water supply over the next five years. City stakeholders have also indicated that there is a moderately-low to low adaptive capacity for these factors. Because of this relationship, this indicates a priority area for Northglenn in adaptation planning.

Adaptation Recommendations for Drought

Drought is the persistent lack of rainfall that produces dry conditions and leads to reduced water resources. Drought adaptation solutions help to conserve water or remove the need for water use overall.

Restrictions on Water Use

During times of drought Northglenn can consider water restrictions as a good adaptation strategy. Limitations on how often water can be used for watering lawns and washing cars can be considered. Public educational campaigns with conservation recommendations (such as watering plants after sunset to avoid evaporation and help plants to better absorb water) can be rolled out prior to, and during drought events. Having a well thought out toolkit of water rationing strategies ready to go can alleviate city-wide water stress while still accommodating the needs of the individual community members and businesses during drought and dry conditions. Northglenn has active and effective water conservation strategies currently and these should be enhanced over time.

Reducing Overall Water Use

It is important to be conscious of overall everyday water use, regardless of a drought situation, to reduce waste. Individual action can include taking shorter showers, turning off faucets when not in use and operating the washing machine or dishwasher with only full loads.

Rainwater Harvesting

In places where there is sparse rainfall, rainwater harvesting may be beneficial. Rainwater harvesting involves using a bucket or similar container to collect rainfall as it happens with the intention of using the water at a later time. Recycled rainwater can be used instead of valuable potable, or drinkable, water for some daily activities. For example, toilet flushing accounts for roughly 35% of a household's overall water use (The Renewable Energy Hub, 2017). Water captured in a bucket in the shower can be used to water indoor plants. Water captured in rain barrels can be used to water gardens and lawns. If rainwater is used for tasks that do not necessarily require filtered water, then ultimately water costs are reduced dramatically. Some cities like Northglenn incentivize rain barrels for water storage.

Xeriscaping

Xeriscaping is a method of landscaping that minimizes the use of water. Public information campaigns can be rolled out to encourage community members and local landscapers to consider xeriscaping when replacing lawns and/or creating new yard and garden space. City grounds departments can reclaim water intensive landscapes with more drought-resistant plants over the long term. It is best to choose drought-resistant or low-water flowers, succulents, grasses and plants, while also being mindful of the soil, by choosing ones that lessen evaporation, and irrigation systems, by choosing one that applies the amount of water when you need it to. Mulch and compost have a high water-holding capacity as ground cover. Xeriscaping can be a low-maintenance solution to landscaping that is both visually appealing and environmentally-conscious (Colorado Waterwise, 2017). Northglenn can look into policies to incentivize/require xeriscaping for new construction. In addition, some communities make mulch and compost from waste products to avoid landfill tipping fees, and offer those materials to residents for their water-saving value.

Xeriscape Colorado is a program under Colorado WaterWise that specializes in promoting and educating about xeriscaping, Northglenn's use of Resource Central's programs to replace water intensive landscapes with low water landscapes is a great start.

Water Efficiency

Installing and using water efficient mechanisms in homes, businesses and other spaces can cut down on costs and water use. Water efficiency includes practices such as xeriscaping, but it also involves using innovative water efficiency technologies (American Rivers Inc., 2018).

According to American Rivers, these are some very basic steps community members can take toward long term water efficiency:

- Fixing leaks inside and outside the home, business or property
- Using rainwater, or otherwise non-potable water, for tasks that do not require filtered water. Examples: watering plants and flushing toilets.
- Updating appliances and fixtures, like toilets, faucets and showerheads, to high efficiency models. There are programs that provide rebates and discounts on water efficient appliances to help offset the upfront cost.
- Optimizing sprinkler systems. Landscapers can come out and fix and replace broken sprinkler heads. In some cases, drip systems can be set up to prevent top soil water evaporation.

Groundwater Flooding



Groundwater flooding is the flooding of underground structures due to high water tables. Groundwater flooding may become an issue in areas predicted to have increased precipitation in the coming years due to climate change.

Increased groundwater may also lead to instability of the soil underground, leading to landslides and/or erosion.

Groundwater (recharge and discharge) is considered a sensitive and complex function because of its dependence on other climate factors, geology, the topography of the land and overall land use (Dragoni & Sukhija, 2008). Although there is a wealth of resources and research done on climate change, there is still much to learn on the connection to groundwater. Changing weather and precipitation patterns are adding to this issue (Holman, 2006). Modeling and remote sensing can be used to estimate the effects of climate change on hydrological systems. In order to gain a deeper understanding of the variations that may occur, the model must be internally consistent and agree with historical data.

More chaotic precipitation events (such as those experienced by Colorado's Front Range in September 2013) paired with the inability of the ground to store water puts a community at a high risk for flooding-related issues. When excess water cannot be drained, it becomes susceptible to contamination. Agricultural runoff and combined sewage overflows threaten water quality, public health and recreation (Center for Climate and Energy Solutions, 2018).

Green infrastructure can be used as an adaptation method to prepare for possible flooding events. Green infrastructure utilizes natural processes and materials in order to manage water in an urban environment. It mimics the natural movement of water through the hydrological cycle (U.S. Climate Resilience Toolkit, 2018).

Adaptation Recommendations for Groundwater Flooding

Groundwater flooding results from high water tables and increased rainfall. The solutions below will help to move excess water on the surface while providing ecological and environmental solutions for the city to consider.

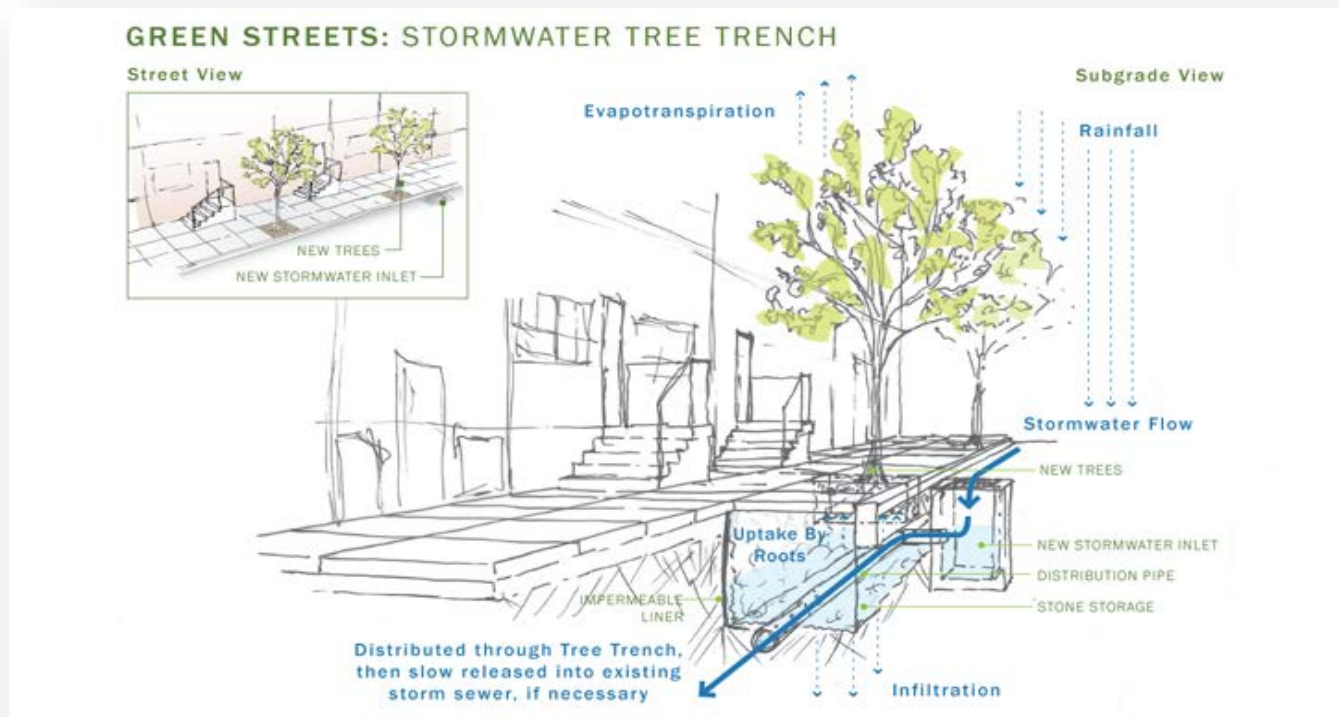
Permeable Pavement

Permeable, or porous, pavement allows for water to pass through it and mimics water's natural movement on the ground's surface. The structure of the pavement with different layers, captures loose sediment and stops it from getting into water sources underground. Using permeable pavement reduces the effect of urban heat and excess runoff that could overwhelm storm water systems. The Green Building Alliance outlines several types of permeable pavement for different purposes (Green Building Alliance, 2018). A few of these are:

- plastic grids: used to reinforce parking lots and driveways and allow for 100% porosity.
- interlocking concrete pavers: can be designed into a pattern with gravel filling in spaces.
- porous asphalt: used on highways.

Planting trees for water management

Trees have a multitude of benefits, including assisting in the natural hydrological process. Planting trees in areas that are prone to groundwater flooding and at the street-edge can lessen the strain that excess precipitation would have on storm water systems and the ground below.



Philadelphia, PA has created a storm water tree trench system that connects trees to an underground system. This system utilizes a type of permeable gravel to filter the incoming water. Here, it can be taken up by the roots or can continue flowing through the sewage system (Philly Watersheds, 2017).

Proactive Flood Management

Northglenn can consider providing flood protection programs for residents, especially those who are vulnerable or in the most need. Programs and policies may include restricting development in floodplains, setting a buffer zone for new construction and conducting a full watershed analysis to determine those areas within the city most prone to flooding and heavy rainfall.

Rainstorms



Models do not necessarily show increased precipitation in coming years, however the changing climate and unpredictability of precipitation events on the Front Range could make severe rainstorms a possibility.

Frequency and severity of rainstorms can increase over time with changing weather patterns. Increased rainfall is strongly related to flooding events and groundwater saturation. Increased precipitation can overwhelm septic tanks and sewage systems.

"In all parts of Colorado, no consistent long- term trends in annual precipitation have been detected. Variability is high, which makes detection of trends difficult. Climate model projections do not agree whether annual mean precipitation will increase or decrease by 2050."

Colorado Water Conservation Board

Bacteria, viruses and chemicals can induce the contamination of clean water

sources on the surface or underground, which leads to increased chance of illness and gastrointestinal issues in humans.

Similar to groundwater flooding, increased precipitation can create strains on the ground's ability to absorb excess water. Water management is a major concern for areas currently affected by these issues and should be a priority for Northglenn in the future.

Green infrastructure can be used by the city to adapt to more severe and frequent rainstorms and alleviating issues with water management (U.S. Environmental Protection Agency, 2018).

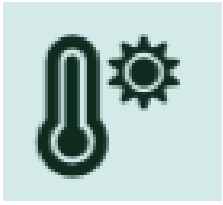
Adaptation Recommendations for Rain Storms

Climate change has the potential to influence more frequent and more severe rain storms. The excess precipitation can overwhelm water management systems and cause water contamination, so solutions should work to alleviate these issues.

Rain Gardens and Bio Swales

Rain gardens and bio swales are natural features that are built into the surrounding environment to manage excess runoff and precipitation. Rain gardens are shallow basins that are filled with plants and other natural features and are mostly used in mostly residential settings. Bio swales are similar to rain gardens in that they manage excess runoff with the use of vegetation or xeriscaping. However, they are linear in shape as opposed to a shallow basin. This allows for placement alongside streets or driveways and therefore manage more water.

Extreme Hot Days



Increasing evidence has highlighted the fact that globally averaged rising temperatures are due in part to anthropogenic factors (Pachauri, 2007). Civilization's addition of greenhouse gases in recent years has greatly contributed to the warming of the climate. Increases in temperature and

duration of warmer days has heightened concern about greenhouse gases and their ability to trap heat. Because of this awareness, local governments are utilizing strategies to offset the effect of greenhouse gases. The Front Range of Colorado is forecast to have a climate more similar to Albuquerque, NM over the coming decades, as clearly demonstrated in the climate models.

Climate change is contributing to longer, hotter and more severe heat waves. In Colorado specifically, the annual temperature has increased dramatically since 1970. Observing an increase in average annual temperature may be difficult to discern, however days of extreme heat may be more noticeable. Heat tends to linger more in urban, man-made environments due to the urban heat island effect.

"According to multiple independent measurements, Colorado temperatures have increased by approximately two degrees (F) between 1977 and 2006."

"Climate models project Colorado will warm by 2.5F by 2025 and 4F by 2050, relative to the 1950–99 baseline."

Colorado Water Conservation Board

Extreme heat has a wide range of negative impacts on society. According to the Center for Climate and Energy Solutions, extreme heat causes the most deaths when compared to other weather-related hazards. In addition, over 60,000 Americans suffer from acute heat-related illnesses every summer (Center for Climate and Energy Solutions, 2018). Public health, in general, becomes more of a concern during hotter days due to the spike in air pollution, a concern specifically called out by Northglenn. Air pollution is caused by the increase in ground-level ozone that is produced in the presence of more heat and the sun's ultraviolet rays. The interaction between volatile organic compounds (from car exhaust, for example) and nitrous oxides, a product of burning fossil fuels, creates the harmful ground-level ozone (United States Environmental Protection Agency, 2017). Air quality is diminished and creates an unhealthy

environment for those suffering from respiratory issues. Specifically the very young and the elderly are vulnerable populations that Northglenn will have to increasingly consider over time as the interaction between extreme heat conditions and the urban heat island effect and air pollution driven by hotter days that will continue to place a burden on communities on the Front Range.

Vulnerable Populations

It is arguably the most vulnerable populations that are experiencing the heaviest burden in the face of the changing climate. Low-income populations, the homeless and the elderly are more susceptible to air pollution and heat-related risks. This is because they do not have access to adequate ventilation and air conditioning. Exposure and proximity to hazardous living situations is also more common for these populations. Mental health issues, as well as issues pertaining to the criminal justice system can be exacerbated during periods of extended high heat. Providing community resources for "escape" from heat is a common strategy for local governments

(Harlan & Ruddel, 2010).

Hotter days and heat waves also have an effect on the societal aspects of a community. In Northglenn, the city has changed work schedules for park and outdoor workers to avoid being outdoors in high heat. Recreation schedules, i.e. for sports games, have also been changed for this reason. Northglenn expressed concerns about how longer summers and hotter days would impact the fabric of the community, events and overall quality of life. The research on this subject is just emerging, and Northglenn is active in considering how heat will change the community's schedules. Continuing to evolve the community's thinking about what constitutes appropriate activities during

high heat is important.

Adaptation Recommendations for Extreme Hot Days

Northglenn, like many other cities around the country, has been experiencing hotter than usual summers and generally, warmer temperatures each year. While changing the Earth's temperature is not within reach, adapting to the hotter temperatures and finding ways to cool the surrounding environment on a local scale is attainable.

Law Enforcement

Studies have shown that crime actually increases during times of warm temperatures days. This pattern may result in more police phone calls and disorderly conduct in the future. Northglenn may need to increase law enforcement during summer months and especially during extended heat waves in the future.

Researchers from Drexel University studying crime data from 2006-2015 in Philadelphia have found a positive correlation between warmer temperatures and increased crime. Crime was found to be the highest during May through September. To go even further, they were higher on the hottest days. One of the reasons for this correlation may be that more people are outdoors during warmer days, therefore increasing the probability for crime.

Science Daily, September 25, 2017

Cooling Centers

Exposure to several days of extreme heat has the potential to cause a large number of deaths in a short time period. Providing access to air conditioning can prevent heat-related illness and death (*Centers for Disease Control, 2017*). Low-income populations may have limited access to air conditioning or may be hesitant to operate air conditioning and cooling units due to potentially high electricity costs during peak heat hours. Cooling centers can provide a cool environment for these individuals. Cooling centers are a relatively low-cost strategy that can utilize existing infrastructure and personnel and can be relatively easily implemented by Northglenn during spells of high heat. Northglenn could also consider developing public heat safety education campaigns to be rolled out in late spring and early summer months. Additional cooling strategies such as wellness checks for vulnerable populations and hydration stations in public spaces can also be considered.

Green Roofs

While green roofs are a possible solution to the urban heat island effect, its benefits extend well beyond that. A green roof is essentially a vegetated and irrigated system on a building's roof. Some of the benefits of green roofs are highlighted below (*Getter & Rowe, 2006*), (*Green Roofs for Healthy Cities, 2017*):

- A green roof replaces the impervious surface of the original roof with plants, grasses and trees that can provide a natural green space in an otherwise built environment.
- Using natural elements on the roof can alleviate or slow storm water runoff.
- Green roofs provide a cooling effect for the building by increasing the albedo (or reflectivity) of the surface. Instead of incoming solar radiation being absorbed by a dark

concrete or metal roof, the heat is partially absorbed by the vegetation. Evapotranspiration from the plant surfaces also contribute to an overall cooling effect.

- This cooling effect is noticeable and cools the surrounding air temperature and the inside temperature as well. The building using the green roof uses less energy for air conditioning and other cooling mechanisms because it does not get as warm inside the building.
- Plants contribute to the reduction of CO₂ (through photosynthesis) and pollutants (through filtration) in the air, thus improving overall air quality.
- Depending on the extensiveness of the green roof, it may be used as an accessible public green space and could include features such as a community garden or playground.
- Adding a green roof can increase marketability and can also count toward green building certifications, such as LEED (Leadership in Energy and Environmental Design).

Green Spaces and Tree Planting

The loss of trees from the urban environment is an unfortunate effect of development and various climate related threats such as Emerald Ash Borer (EAB). Trees provide a wide range of benefits including natural cooling and shade in areas prone to extreme heat. By replacing asphalt, concrete and other man-made spaces with trees and vegetation, it can lower the area's air temperature. According to the EPA, shaded surfaces may be 20–45°F cooler than the peak temperatures of unshaded materials (U.S. Environmental Protection Agency, 2016). Evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2–9°F. Northglenn is well aware of the value of their tree canopy, and understands the threats to their specific tree species as a result of changing climate.

When developing future tree protection programs, Northglenn should prioritize areas that are most affected by extreme heat and plant trees there first. Care should be taken to plant trees and vegetation with larger canopies and in areas that absorb the most insolation—i.e. parking lots and streets. Northglenn can continue to encourage tree planting within the community by hosting public events centered around tree education. Northglenn could hold a tree-planting event at a local park to bring the community together and also educate the public about the importance of green spaces in a changing climate.

Energy Efficiency

Energy efficiency and reducing demand for electricity overall is a critical strategy for utilities and communities to hedge against the utility reaching peak load during high heat events

created by cooling appliances. By reducing the overall demand for electricity through installing more efficient lighting, cooling, increasing building envelope efficiency and other tactics free up generational capacity to be available for high heat days and increased cooling demand that will become necessary as Northglenn experiences higher temperatures.

“Cool” Pavement and Roofs

Incoming solar radiation (also known as insolation) is absorbed by the Earth’s surface every day. Surfaces absorb and reflect insolation differently based on their albedo value, which ranges between 0 and 1. Surfaces that have an albedo closer to 0 will absorb more insolation, and are usually warmer in temperature and darker in color. Surfaces with an albedo closer to 1 will reflect more insolation and are cooler in temperature and lighter in color (U.S. Environmental Protection Agency, 2016).

In built environments, it is increasingly important to create cooler surfaces and areas in the face of a warming climate. Cool pavements and roofs are a way in which communities can reduce the radiation being absorbed and therefore influence a cooling effect on the surrounding environment.

Roofs, whether on commercial or residential buildings, are often made with darker materials. By installing cool roof technologies or painting roofs white (or a lighter color), you can create a cooler local climate and reduce energy use as well. Similar to green roofs, cool roofs absorb less insolation therefore transfer less heat to the building below. This results in lower cooling costs.

Cool pavements are also a possible solution to extreme heat conditions in a community. Like cool roofs, cool pavements are meant to reduce absorption of insolation.

Interestingly, researchers from Ernest Orlando Lawrence Berkeley National Laboratory determined that increasing the amount of solar reflectance by 10% could decrease surface temperature by 7 degrees.

Severe Wind



It is widely known that severe wind is destructive and brings about substantial economic and social costs. Whether paired with thunderstorms or hurricanes or occurring strictly as a severe wind event, wind damages affect infrastructure for buildings and transportation, power lines, agriculture and forestry. Falling debris and trees can cause a hazard for humans and animals as well. With the changing climate, it is possible that even more destructive wind gusts and patterns may occur. Increase in waste production from landscaping, fencing and other materials is a likely outcome from wind events.

“Severe wind is more likely to occur during the winter due to the larger latitudinal temperature difference in the northern and southern U.S. The Chinook winds, warmer drier winds moving west coming off the Rocky Mountains, can have gusts up to 100mph. Areas near Denver, Boulder, Fort Collins and Colorado Springs are especially vulnerable to these winds and their destructive capability.”

weather.gov/bou/highwind

There are many ways in which a community can adapt and prepare for more frequent severe wind events. Some suggested strategies are reviewing existing building codes and adopting higher standards for building codes, specifically for regions currently experiencing high wind. Structural improvements include anchor bolts, bracing, interlocking roof shingles and impact resistant windows (FEMA, 2013). Utilizing GIS and modeling tools to identify areas prone to severe wind is a first step in helping the community to develop a plan for severe wind adaptation.

Adaptation Recommendations for Severe Wind

In order to protect community members, building codes (particularly for older buildings) should be reviewed to ensure that they are protected against wind damage.

Updating Building Codes

Adopting the International Building Code, International Residential Code and International Code Council-600 Standard (for high-wind regions) might be considered. Requiring the use of

specific design elements, such as interlocking shingles on roofs, is especially important in heavy wind-prone areas.

Structural Improvements

The community should encourage the installation of structural improvements that will mitigate severe wind damage. Some of these additions include structural braces, impact-resistant glass for windows and anchor bolts. Finding innovative ways to use natural elements and shapes in designs for new construction could minimize damage, cost and falling debris.

To prepare for a severe wind event, Northglenn should educate the public around making structural improvements, but also making sure the surrounding environment reduces the risk for wind damage as well. This involves trimming trees near the home and power lines. Northglenn expressed concerns around how wind interacts with waste creation, and considering how to manage waste after wind events will be important especially if current waste disposal services change over time.

Hail



Hail, a form of frozen precipitation associated with severe summertime thunderstorms, is known to cause significant damage to vehicles, property and crops. According to NOAA's historical event data for Adams and Weld county, damage from a just a single Colorado hail storm can result in over \$100 million in property damage and over \$20 million in crop damage (University of Oklahoma, 2018).

In climate research, there is a vast knowledge of larger scale weather events. Knowledge of thunderstorms and hailstorms, both smaller scale meteorological events, is limited. There is evidence from climate models that show favorable conditions for severe thunderstorm development, which could in turn increase the chance for hailstorms. However, the ability to model such small-scale events is difficult. Because of this, there is a limitation in discerning how these events will change with a changing climate (European Environment Agency, 2017).

The best course of action is to observe and take note of which areas are currently most prone to thunderstorms and hailstorms and implement adaptation strategies there. To minimize hail damage, new construction can include incorporating structural braces, hail resistant roofs and laminated glass for windows (FEMA, 2013). Raising awareness about what to during a

hailstorm and notifying the public about when hailstorms are most likely to occur is also increasingly significant.

Adaptation Recommendations for Hail

Hail, the frozen precipitation that is often associated with summer thunderstorms in Colorado causes damage to property, vehicles, trees and crops. It is important to make changes in order to prevent extensive damage and costly repairs.

Installing laminated windows

Because hail has the ability to crack or shatter glass upon impact, making sure that windows are able to withstand that impact is important. Laminated glass is able to hold together when struck with an object. The inner layer of laminated glass prevents the glass from being broken into large pieces, that could potentially cause harm. Laminated glass should be required for windows in places prone to hail, in order to avoid expensive repairs in the future.

Installing hail proof roofs and siding

It is just as important to protect the siding and roof of the property with hail-resistant materials. Doing this will ensure that hail will cause minimal damage.

Installing carports and covered garage space

The impact of hailstones has the potential to cause extensive damages to vehicles if they are not protected. Installing covered parking spaces and carports if possible could eliminate much of the vehicle damage often associated with hailstorms. Colorado has experienced severe hailstorms in the past, costing billions of dollars in damages to both property and cars.

Changing Seasonal Patterns



The Earth experiences predicted changes every season, however research has shown the negative impact that climate change has on this natural routine.

As mentioned before, Northglenn has a strong cultural connection to the ash tree. It is understood in Colorado that the ash tree is being threatened by the emerald ash borer (EAB), a non-native invasive insect species whose young feeds on the inner bark of ash trees. The

EAB, found in 33 states across the country, as well as Canada, has cost millions of dollars in damage and is also responsible for killing millions of ash trees as well. The EAB is unable to survive in extremely cold temperatures, however, there are few locations that can sustain these temperatures to kill the emerald ash borer. Rising temperatures across the country are making it easier for the EAB to thrive and continue invading ash trees. According to researchers, there are regions in Canada that would be able to hold cold enough temperatures that would prevent invasion but outside of this, the ash tree population would be severely affected by EAB (Mary A. Jamieson, 2012) (Emerald Ash Borer Information Network, 2011) (Colorado Department of Agriculture, 2014).

The changing climate not only affects the biological functions that rely on seasonality, but societal and cultural functions are affected as well. As mentioned before, warmer temperatures are already impacting the timing of work schedules and planning of public works projects in Northglenn. Recreation and tourism are also heavily dependent on weather conditions and seasonality, as well as the traveler comfort and preference (Sustainable Development of Tourism, 2018).

It is imperative to raise awareness of changing seasonal patterns and the changing climate, more broadly. Extreme weather and climate change-related events are already widely known to affect the quality of life and public health (Centers for Disease Control, 2018). However, mental health is also a growing concern. Anxiety, depression and post-traumatic stress disorder may result from a severe storm, flooding or other event (U.S. Climate Resilience Toolkit, 2018). In anticipation of these events, communities should find ways in order to educate the public about climate change and its effects on the surrounding environment and make resources available for support, aid and communication.

Adaptation Recommendations for Changing Seasonal Patterns

Seasonal patterns that were once easy to predict are increasingly becoming difficult to forecast. It is necessary to adapt with these climatic changes so that daily life, economic activity and community life are minimally impacted.

Increasing public education and awareness

Raising awareness and encouraging education in the face of the changing climate is an integral part of climate adaptation. In order to develop ways in which a community should adapt to

climate risks, leaders must first learn about specific risks affecting them and research solutions. On a smaller scale, community members can make mindful decisions to take climate actions in their every day life to lessen their impact on the environment.

Diversifying Seasonal Tourism and Recreation

Locations that are heavily dependent on one specific type of recreation or tourism attraction based around climate conditions may need to expand their options in the future. For example, Northglenn expressed the how much the community life relied on and revolved around summer sports fields, parks and other assets that can be imperiled by climate change. Even the ability to hold certain events can be impacted as we see the manifestation of the climate models in temperatures previously unseen in Northglenn.

Flexible Municipal Operations

Northglenn is already recognizing and adapting to changing conditions by modifying schedules both daily, and seasonally. Continuing to evaluate when work and other community operations will happen based on climate trends will be required as heat, but also less severe cold, with impact how and when work happens.








CONCLUSION

Northglenn, Colorado's focus on their residents' quality of life, community engagement and commitment to a vibrant community will necessitate continual attention to the changing climate in the coming years. Overall, Northglenn's adaptive capacity as a city is enviable by even Front Range standards. Emerging climate threats are reasonable compared with even close in neighbors where fire and flood dominate. A lower overall threat level positions Northglenn well in the time to come.

Northglenn's adaptive capacity is better than that of most cities. Many of Northglenn's threats can be mitigated with relatively low-cost/no-cost policy and behavior change strategies. Compared to other Front Range communities that may face insurmountable barriers to adapting to climate change, Northglenn is very well positioned. The Risk and Adaptation Advisory Report (RAAR) finds that though higher heat and drier overall environment will be the dominant risks that impact Northglenn, focused efforts around changing community behaviors such as timing of events, scheduling of staff and municipal projects, consumption of resources, protecting trees and other approaches can largely mitigate the changing climate.

Specific actions for Northglenn include focusing on enhancing their already important and relevant water conservation programs and considering further deeper water conservation strategies for the future. Anticipating the community needs around high-heat will become more important in coming years. Developing strategies for vulnerable populations for access to cooling and creating a reliable safety network to be able to connect with seniors and others during times of high-heat will be helpful. Continuing to evolve municipal operations to account for heat, and knowing that some cherished community events may need to evolve to avoid high temperatures.

SUMMARY OF HAZARDS AND RECOMMENDATIONS FOR NORTHGLENN

Icon	Hazard	Recommendations
	Drought	<ul style="list-style-type: none"> • restrictions on water use • reducing overall water use • rainwater harvesting • xeriscaping • water efficiency
	Groundwater Flooding	<ul style="list-style-type: none"> • permeable pavement • planting trees for water management • proactive flood management
	Rainstorms	<ul style="list-style-type: none"> • rain gardens and bio swales
	Extreme Hot Days	<ul style="list-style-type: none"> • law enforcement • cooling centers • green roofs • planting/protecting trees and increase green spaces • energy efficiency • cool pavement and roofs
	Severe Wind	<ul style="list-style-type: none"> • updating building codes for new construction • structural improvements
	Hail	<ul style="list-style-type: none"> • installing laminated windows • installing hail proof roofs and siding • installing carports and covered garage space
	Changing Seasonal Patterns	<ul style="list-style-type: none"> • increasing public education and awareness • diversifying seasonal tourism and recreation • flexible municipal operations

RISK AND ADAPTATION ADVISORY REPORT

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SURVEY RESULTS

Hazard	Community System	Risk Probability	Risk Frequency	Risk Intensity	Risk Impact Magnitude	Risk Adaptive Capacity
Changed seasonal patterns	Emotional and mental health	mod high	increasing	increasing	moderate	mod low
Changed seasonal patterns	Forestry	mod high	increasing	increasing	moderate	mod low
Changed seasonal patterns	Law and order	mod high	increasing	increasing	low	low
Changed seasonal patterns	Public health	mod high	increasing	increasing	mod low	mod low
Changed seasonal patterns	Quality of life	mod high	increasing	increasing	moderate	mod low
Changed seasonal patterns	Transportation	mod high	increasing	increasing	low	low
Changed seasonal patterns	Waste management	mod high	increasing	increasing	mod high	moderate
Changed seasonal patterns	Water supply	mod high	increasing	increasing	mod high	low
Drought	Emotional and mental health	high	increasing	increasing	mod high	moderate
Drought	Forestry	high	increasing	increasing	high	mod low
Drought	Law and order	high	increasing	increasing	low	mod high
Drought	Public health	high	increasing	increasing	moderate	moderate
Drought	Quality of life	high	increasing	increasing	mod high	moderate
Drought	Water supply	high	increasing	increasing	high	low
Extreme hot days	Emotional and mental health	high	increasing	increasing	high	moderate
Extreme hot days	Forestry	high	increasing	increasing	mod high	mod low
Extreme hot days	Law and order	high	increasing	increasing	moderate	mod low
Extreme hot days	Public health	high	increasing	increasing	high	mod low
Extreme hot days	Quality of life	high	increasing	increasing	high	mod low
Extreme hot days	Transportation	high	increasing	increasing	moderate	mod low
Extreme hot days	Waste management	high	increasing	increasing	mod high	moderate
Extreme hot days	Water supply	high	increasing	increasing	high	low
Groundwater flooding	Emotional and mental health	mod low	increasing	increasing	mod low	mod low
Groundwater flooding	Forestry	mod low	no change	no change	low	low
Groundwater flooding	Public health	mod low	no change	no change	mod low	moderate
Groundwater flooding	Quality of life	mod low	no change	no change	low	low
Groundwater flooding	Water supply	mod low	no change	no change	mod low	low
Hail	Emotional and mental health	high	increasing	increasing	moderate	mod low
Hail	Forestry	high	increasing	increasing	moderate	mod low
Hail	Public health	high	increasing	increasing	moderate	low
Hail	Quality of life	high	increasing	increasing	moderate	mod low
Hail	Transportation	high	increasing	increasing	mod low	low
Rain storms	Emotional and mental health	high	increasing	increasing	mod low	low
Rain storms	Forestry	high	increasing	increasing	low	low
Rain storms	Law and order	high	increasing	increasing	mod low	mod low

Rain storms	Public health	high	increasing	increasing	moderate	low
Rain storms	Quality of life	high	increasing	increasing	moderate	low
Rain storms	Transportation	high	increasing	increasing	mod high	low
Rain storms	Water supply	high	increasing	increasing	low	low
Severe wind	Emotional and mental health	high	increasing	increasing	mod high	mod low
Severe wind	Forestry	high	increasing	increasing	moderate	moderate
Severe wind	Law and order	high	increasing	increasing	low	low
Severe wind	Public health	high	increasing	increasing	mod low	low
Severe wind	Quality of life	high	increasing	increasing	mod high	low
Severe wind	Waste management	high	increasing	increasing	mod low	mod low

City of Northglenn, CO

Inventory of Community and Municipal Operations Greenhouse Gas Emissions



Produced for City of Northglenn
By ICLEI - Local Governments for Sustainability USA
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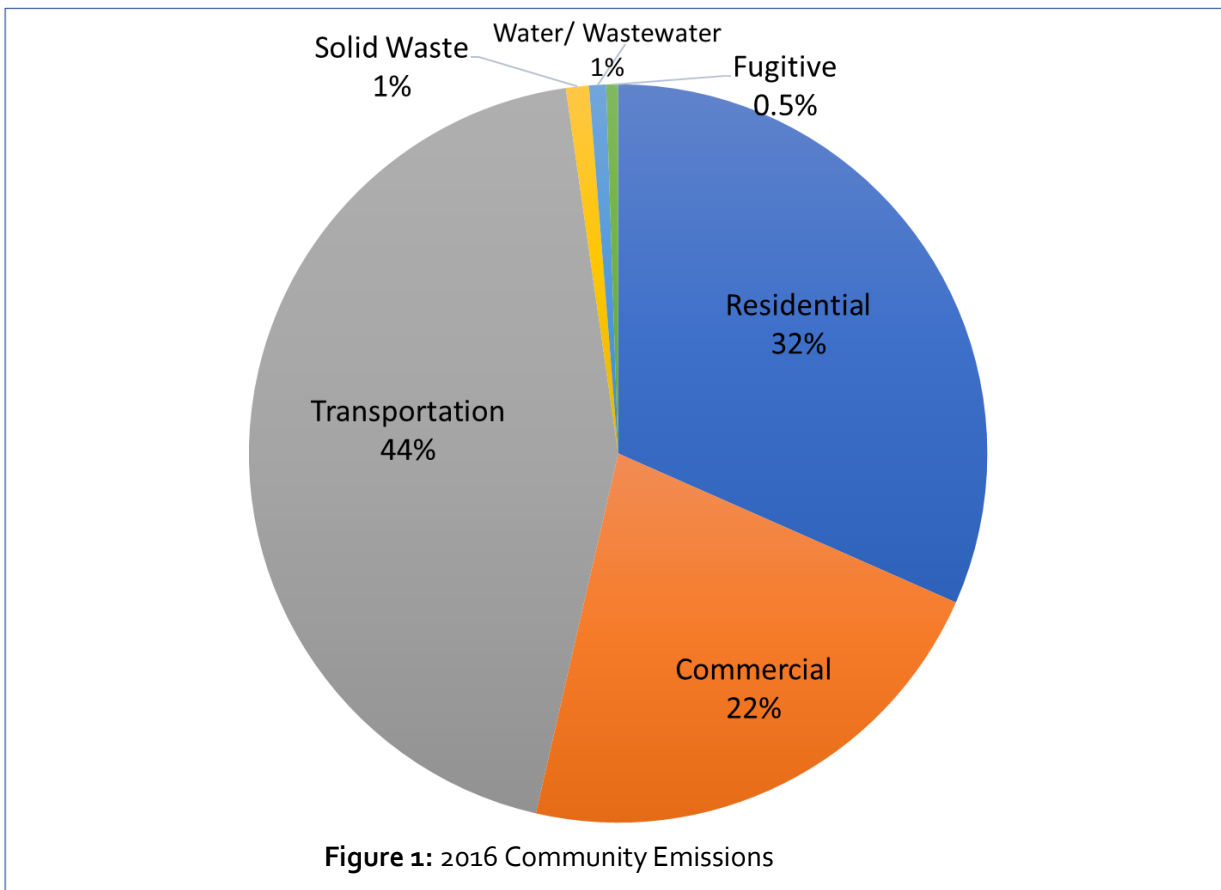
Executive Summary

The City of Northglenn recognizes that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, wellbeing, and prosperity of our community. Furthermore, City of Northglenn has multiple opportunities to benefit by acting quickly to reduce community GHG emissions.

This GHG inventory is a continuation of work begun with the City's [2018 Sustainability Plan](#). The emissions inventory will inform these ongoing planning efforts, and sets the baseline from which the city can measure progress towards sustainability goals and targets. This report provides estimates of greenhouse gas emissions resulting from activities in City of Northglenn as a whole in 2016 as well as the separate emissions from City of Northglenn operations. City operations emissions are for 2017, as more recent data were available than for community emissions.

Key Findings

Community-wide Northglenn GHG emissions for 2016 are shown in Figure 1. Transportation was the largest contributor to community emissions, followed by residential energy and then by commercial energy.



Emissions from City of Northglenn operations for 2017 are shown in Figure 2. Energy use in water and wastewater facilities, followed by energy use in other City buildings and facilities are the largest contributors to operations emissions.

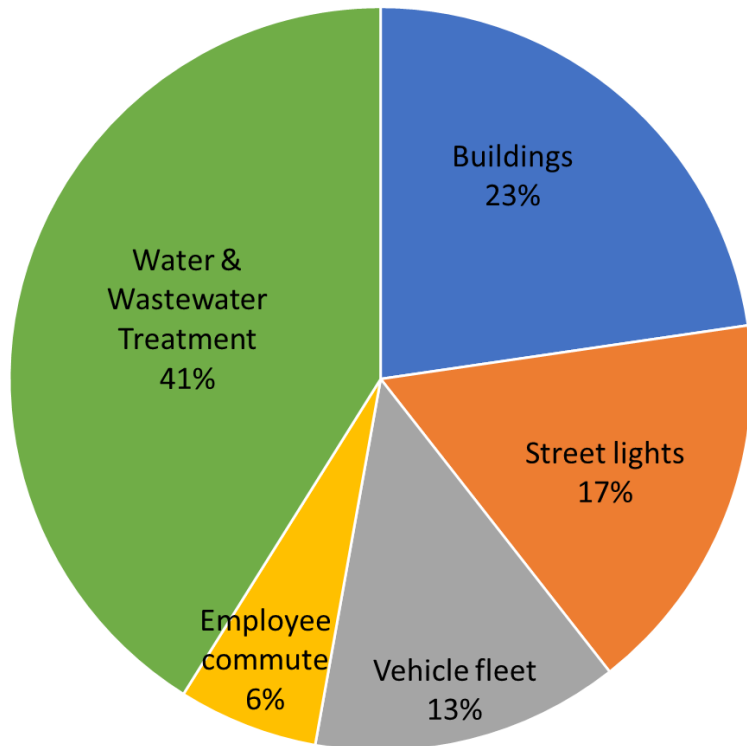


Figure 2: 2017 Government Operations Emissions

Climate Change Background

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise.

Impacts in Colorado include increased risk of drought and reduced snowpack with earlier runoff¹. Both of these contribute to water scarcity. Heat waves and wildfires are also increased risks.

Many communities in the United States have taken responsibility for addressing climate change at the local level. Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, money not spent on energy is more likely to be spent at local businesses and add to the local economy. Reducing fossil fuel use improves air quality, and increasing opportunities for walking and bicycling improves residents' health.

ICLEI Climate Mitigation Program

In response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong

role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, waste diversion, and

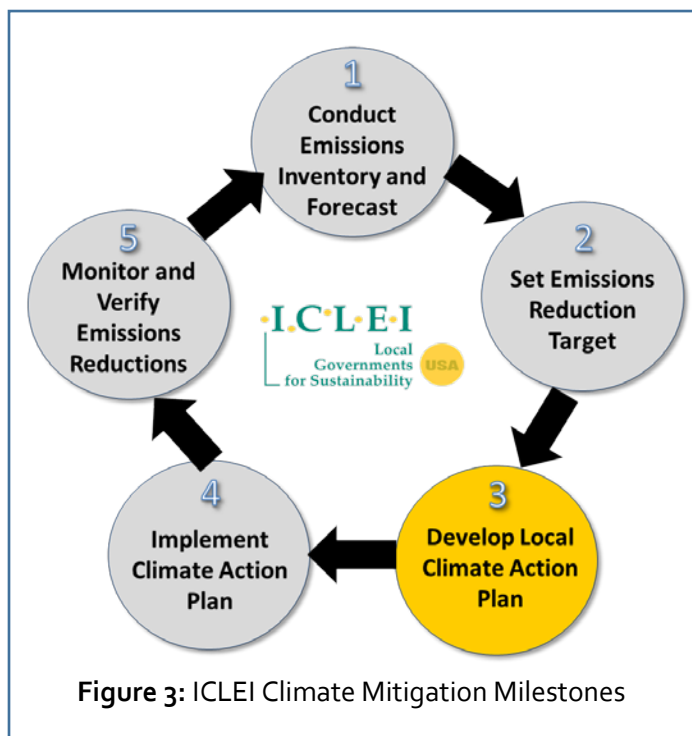


Figure 3: ICLEI Climate Mitigation Milestones

¹ Fourth National Climate Assessment. <https://nca2018.globalchange.gov/chapter/25/>

more, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, also shown in Figure 3:

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions reduction target;
3. Develop a climate action plan for achieving the emissions reduction target;
4. Implement the climate action plan; and,
5. Monitor and report on progress.

This report represents the completion of ICLEI's Climate Mitigation Milestone One, and provides a foundation for future work to reduce greenhouse gas emissions in City of Northglenn.

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. This report presents emissions from the City of Northglenn community as a whole and also emissions from operations of the City of Northglenn government. The government operations inventory is a subset of the community inventory (see Figure 4); for example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

As local governments have continued to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the Community Greenhouse Gas Emissions Protocol (Community Protocol)².

Community Emissions Protocol

The Community Protocol was released by ICLEI in October 2012, and represents a new national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

The community inventory in this report includes emissions from the five Basic Emissions Generating Activities required by the Community Protocol. These activities are:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment
- On-road passenger and freight motor vehicle travel

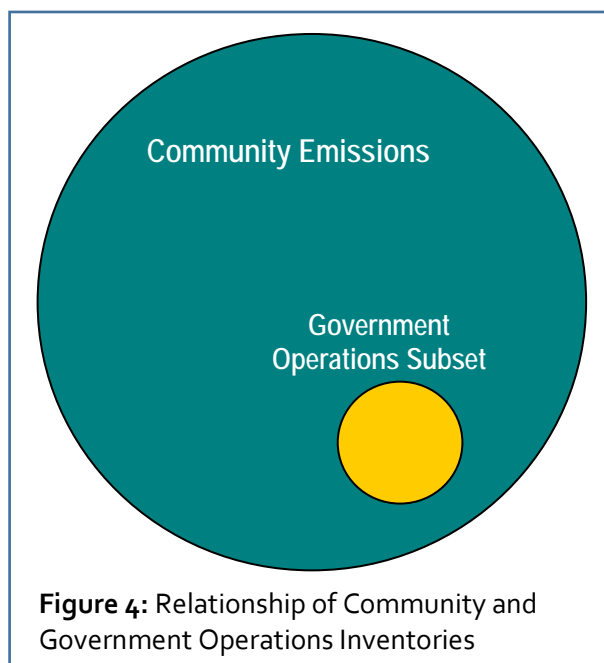


Figure 4: Relationship of Community and Government Operations Inventories

² <http://www.icleiusa.org/tools/ghg-protocol/community-protocol>

- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

In addition, the inventory includes wastewater process emissions and fugitive emissions from local natural gas distribution system leakage. Three greenhouse gases are included in this inventory: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Carbon dioxide represents the vast majority of the community emissions and is produced from burning fossil fuels such as coal, gasoline, diesel, and natural gas. Methane accounts for about two percent of community-wide emissions, and comes primarily from waste decomposition in landfills and from local natural gas distribution system leakage, as well as small amounts as a byproduct of fuel combustion. Nitrous oxide is the smallest contributor to the inventory and comes from wastewater treatment process emissions, as well as small amounts as a byproduct of fuel combustion.

Quantifying Greenhouse Gas Emissions

Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations of emissions are used in the community inventory: 1) GHG emissions that are produced by “sources” located within the community boundary, and 2) GHG emissions produced as a consequence of community “activities”.

Source	Activity
Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere	The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A purely source-based emissions inventory could be summed to estimate total emissions released within the community’s jurisdictional boundary. In contrast, a purely activity-based emissions inventory could provide perspective on the efficiency of the community, even when the associated emissions occur outside the jurisdictional boundary.

Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used:

$$\text{Activity Data} \times \text{Emission Factor} = \text{Emissions}$$

All emissions sources in this inventory are quantified using calculation-based methodologies. Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. Please see Methodology Details section for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs. CO₂/kWh of electricity).

Community Emissions Inventory Results

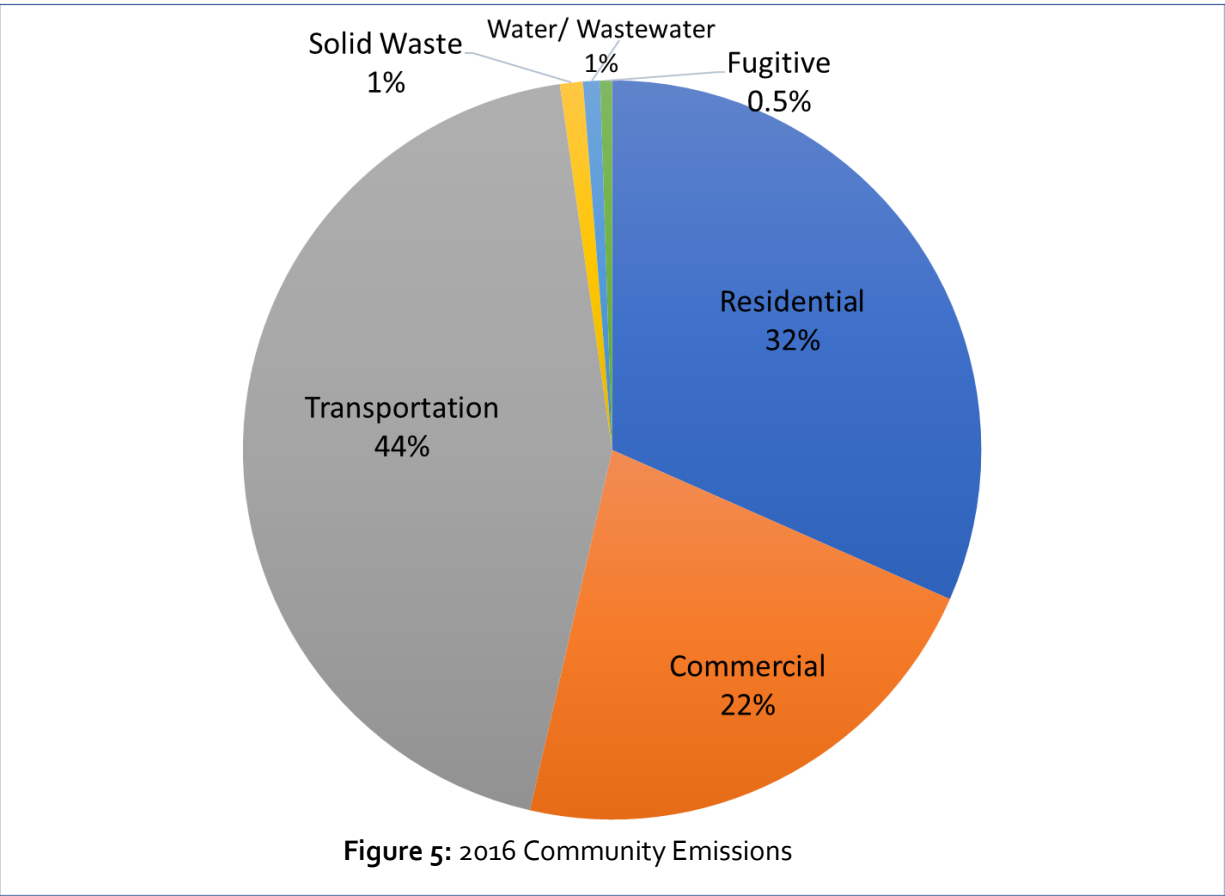
The total emissions for the 2016 inventory were calculated at 327,087 MTCO_{2e} (Table 1). On-road transportation was the largest contributor to community emissions, followed by residential and then commercial energy use. Within residential and commercial energy, electricity is the largest contributor to emissions, although emissions from natural gas are also significant.

Table 1: Community Inventory

Sector	Fuel or source	Usage	Usage unit	Emissions (MTCO _{2e})
Residential energy	Electricity	108,055,237	kWh	65,598
Residential energy	Natural gas	7,109,414	therms	37,804
Residential energy total				103,402
Commercial energy	Electricity	84,383,968	kWh	51,227
Commercial energy	Natural gas	3,878,372	therms	20,623
Commercial energy total				71,850
On-road transportation	Gasoline	262,436,942	vehicle miles	102,667
On-road transportation	Diesel	26,918,410	vehicle miles	41,608
Transit use	Diesel	14,209	gallons	145
Transportation total				144,420
Solid Waste	Waste sent to landfill	14,877	tons waste	3,288
Solid waste total				3,288
Water and wastewater	Electricity ³	3,653,252	kWh	2,282
Water and wastewater	Wastewater process ⁴	N/A	N/A	143
Water and wastewater total				2,425
Fugitive	Leakage from natural gas distribution	10,987,786	therms	1,702
Fugitive total				1,702
Community total emissions				327,087

³ Electricity use shown is from United Power, and *is not* included in the commercial electricity use above. In addition, there are 1,074,738 kWh and 19,182 therms of natural gas used for community water and wastewater treatment that are supplied by Xcel Energy. These are included in the commercial energy totals above rather than in the water and wastewater electricity total.

⁴ This value is smaller than that shown in the government operations inventory because the plant serves some areas outside the city boundary.



Next Steps

The inventory results should be used to focus and prioritize actions to reduce emissions. Based on the inventory results, the following areas have the greatest potential for emissions reduction:

- Reducing per-capita VMT through land use planning and encouraging use of transit, bicycling and walking.
- Promotion of electric vehicles (EVs) to replace gasoline passenger vehicles.
- Energy efficiency for residential and commercial buildings.
- Continued reductions in the electricity emissions factor through added renewable energy and coal plant retirements (largely driven by state policy and Xcel Energy actions).

Completion of another GHG inventory in three to five years is recommended in order to assess progress resulting from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath tool and a master data Excel file provided to the City of Northglenn, will be helpful to complete a future inventory consistent with this one.

Government Operations Inventory Results

Government operations emissions for 2017 are shown in Table 2 and Figure 6. Water and wastewater treatment facilities are the largest contributors to government operations emissions, followed by energy use at other buildings and facilities.

Table 2: Government Operations Inventory

Sector	Fuel or source	Usage	Usage unit	Emissions (MTCO _{2e})
Buildings	Electricity	2,511,247	kWh	1,483
Buildings	Natural gas	85,502	therms	454
Buildings total				1,937
Street lights	Electricity	2,414,833	kWh	1,427
Street light total				1,427
Vehicle fleet	Gasoline	56,002	gallons	492
Vehicle fleet	Diesel	63,923	gallons	653
Vehicle fleet total				1,144
Employee commute	Gasoline	1,179,040	vehicle miles	485
Employee commute	Diesel	63,501	vehicle miles	35
Employee commute total				520
Water & wastewater treatment	Electricity	5,168,885	kWh	3,192
Water & wastewater treatment	Natural gas	23,956	therms	127
Water & wastewater treatment	Process emissions	N/A	N/A	186
Water & wastewater treatment total				3,506
Government operations total emissions				8,532

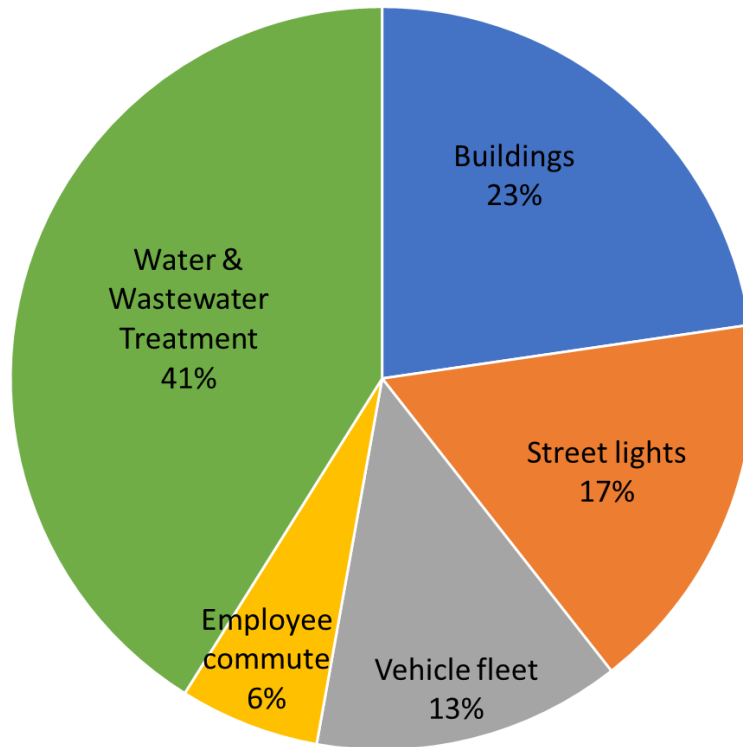
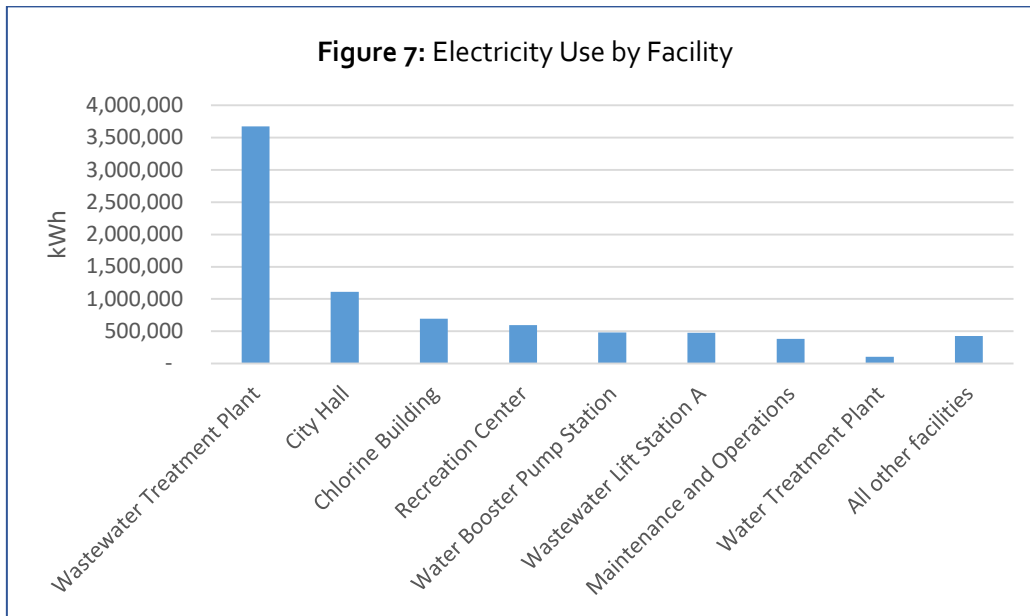


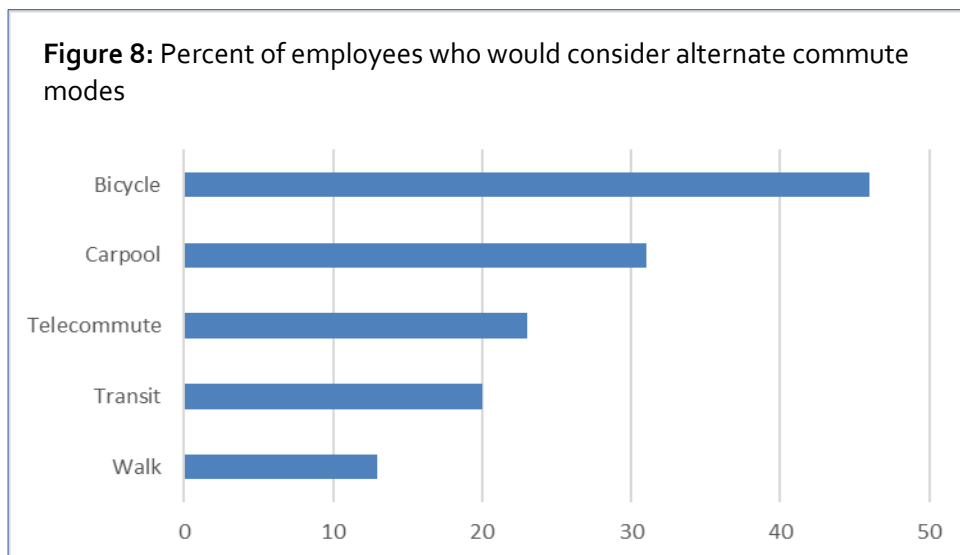
Figure 6: 2017 Government Operations Emissions

Figure 7 shows electricity usage by facility. The wastewater treatment facility dominates electricity usage. This is typical for cities that operate wastewater treatment, as many energy intensive processes are needed to safely and effectively treat the wastewater. Nevertheless, the wastewater treatment plant should be a high priority for evaluating energy efficiency and onsite renewable energy opportunities. City Hall and the Recreation Center are also major energy users, as are other water or wastewater pumping facilities. It should be noted that the Water Treatment Operations have separate energy accounts with Xcel, so facilities associated with Water Treatment are shown separately in Figure 7. The Chlorine Building, Water Booster Pump Station and Water Treatment Plant office building if combined, does constitute a high energy using operation.

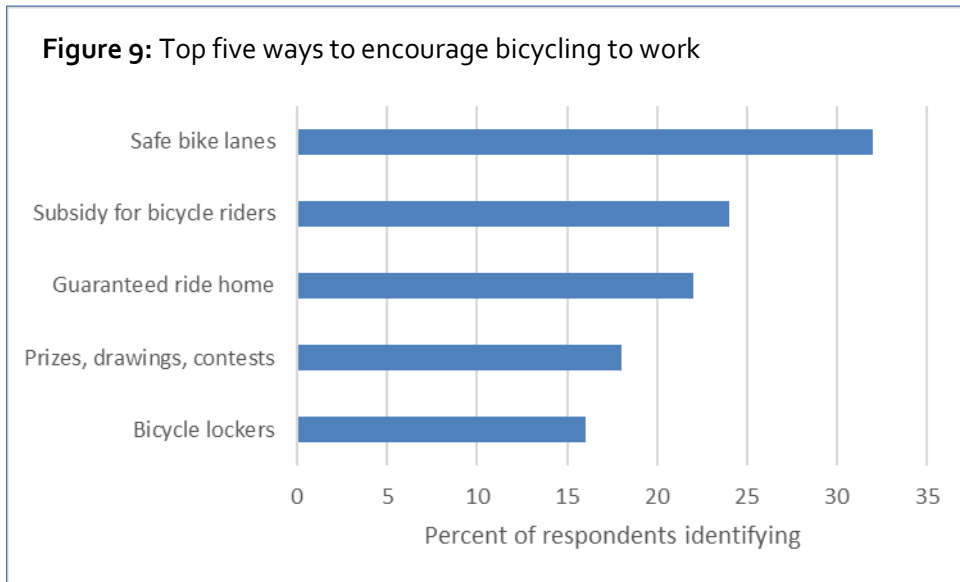


Employee Commute Survey

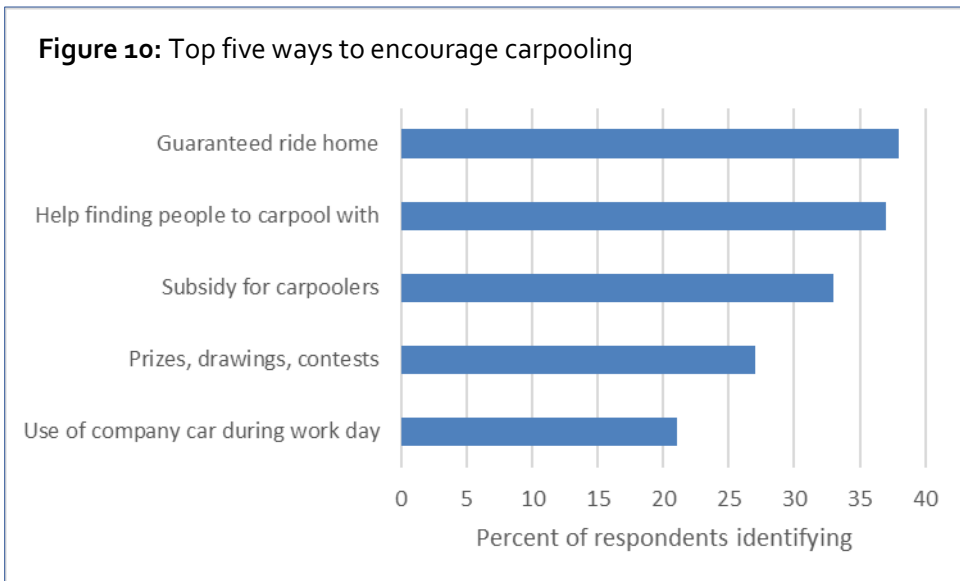
A survey of employee how employees get to work was conducted in order to obtain data needed to calculate employee commute emissions. The survey also asked questions about willingness to consider different transportation options, and what would encourage them to use a different option. Currently, 95% of Northglenn employees normally drive alone to work. However, many employees are willing to consider different modes, as shown in figure 8. Almost half would consider bicycling, and almost 1/3 would consider carpooling.



Employees reported that safe bike lanes are the number one thing that would encourage them to bike to work, as shown in Figure 9. Employees who already bike to work, either daily or occasionally, would be a good starting point for additional engagement to identify priorities for improved bike infrastructure.



A guaranteed ride home would be the number one thing to encourage carpooling, as shown in Figure 10, and would also be important to potential bicycle riders. Help in finding people to carpool with is also important to encourage carpooling.



Government Operations Next Steps

The inventory results should be used to focus and prioritize actions to reduce emissions. Based on the inventory results, the following areas have the greatest potential for emissions reduction:

- Energy efficiency at wastewater treatment plant and chlorine building.
- Onsite solar at wastewater treatment plant and other facilities.
- Energy efficiency at City Hall, recreation building and other facilities.

Annual tracking of energy use in City buildings and facilities, with completion of another complete GHG inventory in three to five years, is recommended in order to assess progress resulting from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath tool and a master data Excel file provided to the City of Northglenn, will be helpful to complete a future inventory consistent with this one.

Methodology Details

Community Inventory Data

Energy

Electricity and natural gas usage data were obtained from the Xcel Energy community energy report⁵ for the residential and commercial sectors. Electricity emissions factors were obtained from Xcel Energy⁶, while CH₄ and N₂O factors were obtained from eGRID⁷. These factors are shown in Table 3.

Table 3: Electricity Emissions Factors for 2016

	CO ₂ (lbs./MWh)	CH ₄ (lbs./GWh)	N ₂ O (lbs./GWh)
Emissions factor	1329	137	20

Transportation

On Road Passenger and Commercial Transportation

Total annual vehicle miles traveled (VMT) for City of Northglenn was obtained from the Denver Regional Council of Governments (DRCOG). Steve Cook⁸ with DRCOG provided modeled weekday VMT for all vehicles travelling in Northglenn for 2015 and 2020. This is an in-boundary VMT estimate. 2016 VMT was estimated from the data provided assuming a linear increase between 2015 and 2020. The weekday VMT was then multiplied by 330 for annual VMT (330⁹ is used rather than 365 because weekend traffic is typically lower than weekday). This provided a total estimated VMT for 2016 of 289,355,352 miles.

To calculate emissions, the VMT needs to be allocated to different vehicle and fuel types. This was done using data from the EPA State Inventory Tool,¹⁰ which provides statewide VMT by vehicle type and fuel. This data was used to calculate the percent of VMT for each vehicle type and fuel, which are shown in Table 5. These percentages were applied to the total Northglenn VMT above.

⁵ https://www.xcelenergy.com/working_with_us/municipalities/community_energy_reports

⁶ <https://www.xcelenergy.com/staticfiles/xe-responsive/Environment/Carbon/Energy-Carbon-Summary.pdf>

⁷ <https://www.epa.gov/energy/egrid-summary-tables>

⁸ scook@drcog.org

⁹ This is a standard multiplier used by ICLEI in GHG inventories when a locally specific multiplier is not available.

¹⁰ <https://www.epa.gov/statelocalenergy/download-state-inventory-and-projection-tool>

Table 5: Colorado VMT by Fuel and Vehicle Type

Fuel	% of VMT	
Gasoline	90.7	
Diesel	9.3	
Vehicle type	% of Gasoline VMT	% of Diesel VMT
Passenger car	75.8	3.5
Light truck	22.0	8.4
Heavy truck	1.5	88.1
Motorcycle	0.7	0

Next it is necessary to apply average miles per gallon and emissions factors for CH₄ and N₂O to each vehicle type. The factors used are shown in Table 6.

Table 6: MPG and Emissions Factors by Vehicle Type¹¹

Fuel	Vehicle type	MPG	CH ₄ g/mile	N ₂ O g/mile
Gasoline	Passenger car	23.86	0.0187	0.011
Gasoline	Light truck	23.86	0.0201	0.017
Gasoline	Heavy truck	5.36	0.0333	0.0134
Gasoline	Motorcycle	23.86	0.0187	0.011
Diesel	Passenger car	23.86	0.005	0.001
Diesel	Light truck	23.86	0.001	0.0015
Diesel	Heavy truck	6.02	0.0051	0.0048

Public Transit

Northglenn is served by RTD transit buses. System wide fuel use for RTD buses was obtained from <http://www.rtd-denver.com/factsAndFigures.shtml>. Because this source provided fuel use only for buses operated by RTD (not buses leased to private carriers), fuel use for leased buses was estimated assuming the same usage per bus as for RTD operated buses. This fuel use was allocated to Northglenn based on ridership. Nataly Handlos with RTD provided system wide average daily bus boardings and average daily boardings by stop for the period Jan through May 2018. City of Northglenn Planning Staff identified bus stops within the city boundary. Stops located across the street from the city boundary were included, where linked with a stop on the same route that was within the city boundary. Boardings at stops within the city were divided by total system boardings, to give 0.16% of boardings

¹¹ These are standard defaults provided by ICLEI USA for many GHG inventories, and are derived from the following sources: Table 2.8 Motor Vehicle Mileage Fuel Consumption and Fuel Economy 1949-2010, <https://www.eia.gov/totalenergy/data/annual/showtext.php?t=ptb0208>; Freight Existing Trucks Fuel Efficiency Heavy Motor Gasoline Reference AEO2015, https://www.eia.gov/opa/data/qb.php?category=1373322&sdid=AEO.2015.REF2015.EFI_NA_FGHT_RADS_MGS_NA_NA_MPG.A; Freight Existing Trucks Fuel Efficiency Heavy Diesel Phase 2 AEO2016, https://www.eia.gov/opa/data/qb.php?sdid=AEO.2016.PHASEII.EFI_NA_FGHT_RADS_DSL_NA_NA_MPG.A; Table 4-23M: Average Fuel Efficiency of U.S. Light Duty Vehicles, [Bureau of Transportation Statistics \(2015\)](#).

coming from Northglenn. System wide fuel use was multiplied by 0.16%, resulting in 14,209 gallons diesel for transit use associated with Northglenn.

Wastewater

Wastewater is treated by the City of Northglenn. For more detail on wastewater treatment energy, see the government inventory methodology details on p. 22. For fugitive emissions from the wastewater treatment plant, a portion of the total plant emissions were allocated to the community, based on the Northglenn population of 38,473 out of a total population of 50,000 served by the plant.

Potable Water

Energy use for the City of Northglenn’s water utility was supplied by Xcel energy, and the emissions factors in Table 3 were used. For more detail on wastewater treatment energy, see the government inventory methodology details on p. 22.

Solid Waste

Data on solid waste generated and sent to landfill from the Northglenn community was provided by Public Works Sanitation Staff with the City of Northglenn. 14,877 tons of waste were collected from single family residences in 2017. Data on waste from multifamily apartments and businesses was not available.

In order to calculate emissions from landfilled waste, data is needed on the percentage of different material types, such as paper, food waste, leaves and branches. This is referred to as a waste characterization. Waste characterization data for waste generated in Northglenn was not available, so a 2010 characterization study from Boulder County was used. The waste composition is shown in Table 4.

Table 4: Solid Waste Composition

Material	% of Waste
Newspaper	0.8
Office Paper	0.8
Corrugated Cardboard	4.5
Magazines/3 rd Class Mail	0.9
Food Scraps	14.1
Grass	4.55
Leaves	4.7
Branches	4.55
Lumber	1.7

Fugitive Emissions

Fugitive emissions from natural gas distribution were calculated from the ClearPath calculator, following a default 0.3% leakage rate¹². The total natural gas usage from the residential and commercial sectors was used as the input.

Inventory Calculations

The 2017 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. The 4th IPCC Climate Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO₂ equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO₂e emissions.

¹² EDF User Guide for Natural Gas Leakage Rate Modeling Tool. <https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf>

Government Operations Inventory Data

Electricity Emissions Factors

Electricity for most City of Northglenn facilities is provided by Xcel Energy, and electricity for the wastewater treatment plant and a few minor wastewater facilities is provide by United Power. Xcel Energy publishes a CO₂ emissions factor for its electricity¹³, while CH₄ and N₂O factors were obtained from eGRID¹⁴. United Power does not calculate an emissions factor, so regional eGRID factors were used for United Power electricity. These factors are shown in Table 6.

Table 6: Electricity Emissions Factors for 2017

Utility	CO ₂ (lbs./MWh)	CH ₄ (lbs./GWh)	N ₂ O (lbs./GWh)
Xcel Energy	1293	137	20
United Power (eGRID)	1367.8	137	20

Buildings and Facilities

Xcel provided an energy use history for all City facilities served by Xcel. Electricity emissions factors were used as shown in Table 6.

Street Lights and Traffic Signals

Data on street light energy use was obtained from the Xcel Energy community energy report for 2017¹⁵. Most streetlights were not metered, so energy usage was estimated by Xcel based on the fixture type. Electricity emissions factors were used as shown in Table 6.

Vehicle Fleet

Diesel fleet vehicles are refueled through a city operated refueling station. Data was provided on deliveries to refill the storage tank at this fueling station, which totaled 63,923 gallons in 2017. Gasoline vehicles are refueled from private fueling stations in the community, and data was obtained for monthly total gallons purchased using a City fuel card; this totaled to 56,002 gallons in 2017. Emissions were calculated using per gallon emissions factors from Table G.1 of the LGO Protocol.

Employee Commute

A survey of how employees get to work was conducted in March 2019. 169 employees out of a total of 291 responded to the survey, a participation rate of 58%, which is very good. Survey respondents reported their

¹³ <https://www.xcelenergy.com/staticfiles/xe-responsive/Environment/Carbon/Energy-Carbon-Summary.pdf>

¹⁴ <https://www.epa.gov/energy/egrid-summary-tables>

¹⁵ https://www.xcelenergy.com/working_with_us/municipalities/community_energy_reports

one-way commute distance, the number of days/year they worked, and the fuel type and miles per gallon (MPG) of their vehicle. In addition, they reported how often they used carpooling, transit, bicycling and walking to get to work (every day, half the week, one time per week or one time per month). This data was used to calculate the annual commute VMT and gallons of fuel for each responding employee. For those employees who used alternate commute modes some of the time, VMT and fuel use were reduced based on the percent of days using the alternate mode (half of week = 50%, one day per week = 20%, one day per month = 5%). VMT was reduced by 50% on carpool days (assuming a two-person carpool).

From these numbers, average MPG was calculated for gasoline and for diesel vehicles. The VMT from respondents was then multiplied by 291/169, to estimate VMT for all employees. The average MPG numbers were used along with the VMT for each fuel type to calculate emissions. These values are shown in Table 7. In addition, transit use was estimated, but was extremely small at 506 passenger miles.

Table 7: Employee Commute VMT and MPG

Fuel ¹⁶	Employee commute VMT	Average MPG
Gasoline	1,179,040	21.6
Diesel	63,501	18.3

Water and Wastewater Treatment Facilities

Electricity for the wastewater treatment plant, chlorine building, and small pumps located at 340 County Rd 11, is supplied by United Power. United Power provided a report of energy use at these facilities. The remaining water and wastewater facilities receive power from Xcel Energy. Natural gas for all facilities is provided by Xcel Energy. Xcel provided an energy use history for all City facilities served by Xcel. Electricity emissions factors were used as shown in Table 6.

N₂O emissions from effluent discharge were calculated based on data provided by the Laboratory Technician for the City of Northglenn. The Laboratory Technician indicated 85 kg N/day released in colder months and 45 kg/day released in warmer months; an average of 65 kg N/day was used to calculate emissions, using factors from the Local Government Operations Protocol.¹⁷

¹⁶ Two employees reported driving electric vehicles, and one indicated that their vehicle uses E-85. Energy use from these vehicles was not included in the analysis because of the small numbers; as the number of electric vehicles increases, future inventories may need to look at electricity use from these vehicles.

¹⁷ <https://www.theclimateregistry.org/tools-resources/reporting-protocols/local-government-operations-protocol/>

In addition, nitrification/denitrification process emissions from the wastewater treatment facility were calculated based on a population of 50,000 served by the facility, as indicated by John Winterton, and default emissions factors from the Local Government Operations Protocol.¹⁸

Conclusion

A greenhouse gas inventory is an excellent baseline from which to measure your progress. ICLEI's ClearPath tool allows your community to use the inventory results to conduct a business-as-usual scenario, set targets for reductions, and analyze opportunities to reduce GHG emissions. This inventory report also provides an opportunity to look at the 2018 Sustainability Plan and think about any updates needed to the goals or targets in that plan.

Local governments can act directly in areas for which they have judicial authority, operational control or ownership and through advocacy to regional, state, and national bodies with these levels of authority.

Some of these strategies are highlighted on pages 16 and 22 of this report, including:

- Encourage bicycling, walking and transit use by City employees and the public.
- Promotion of electric vehicles (EVs) to replace gasoline passenger vehicles.
- Energy efficiency for both City facilities and residential and commercial buildings.
- On-site solar energy for both City facilities and residential and commercial buildings.

Local actions in each of these areas can make a significant contribution to reducing GHG emissions, and to maintaining cost-effective local government services and a high quality of life for Northglenn residents.

¹⁸ <https://www.theclimateregistry.org/tools-resources/reporting-protocols/local-government-operations-protocol/>

An Energy Action Plan for City of Northglenn



September 2019

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City of Northglenn Planning Team

Acknowledgements

The planning team was formed from a varied group of city and county staff, local and regional organizations, local businesses, and committed community members. Thanks to the following organizations and individuals for participating in developing this Energy Action Plan.

Northglenn's Energy Action Planning Team

City Staff and Team Members

- Matt Cashman, City of Northglenn, Electrical/Mechanical Supervisor
- Julia Ferguson, Northglenn Resident, Lotus Engineering and Sustainability
- Shannon Fields, City of Northglenn, Economic Development Specialist
- Angie Fyfe, ICLEI, Executive Director
- Terry Hansen, SAFEbuilt / Northglenn Buildings, Building Inspector
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- Alan Sielaff, City of Northglenn, Planner
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- Jenny Willford, Northglenn Ward 4 Council Member

Xcel Energy Representatives

- Michelle Beaudoin, Xcel Energy, Partners in Energy Colorado lead
- Channing Evans, Xcel Energy Communications
- Susan Bartlett, Partners in Energy Facilitator
- Melody Redburn, Partners in Energy Facilitator

Executive Summary

This Energy Action Plan outlines tangible steps for the City of Northglenn to move the community toward its energy efficiency and resiliency goals. Xcel Energy Partners in Energy facilitated a series of workshops with the Energy Action Planning Team (planning team), starting in the spring of 2019, to develop this plan. The planning team included representatives from Northglenn's municipal operations, planning, economic development, and communications departments, as well as the school district, the county health department, United Power, and local community stakeholders.

Our Starting Point

The baseline energy use and costs for Northglenn are based on 2017 to align with the Sustainability Plan completed in 2018 and greenhouse gas inventory completed in 2019. In 2017, Northglenn's energy profile includes the following:

- 190+ GWh of electricity consumed
- 10.8 million therms of natural gas consumed
- \$24.4 million spent community-wide on energy

Our Vision

The Northglenn community will conserve its resources and promote sustainability through energy awareness, renewable sources, and collaboration to provide an exceptional quality of life and resilient future for residents and businesses.

Our Goals

The City of Northglenn aspires to achieve the following energy goals:

- Connect with 7,000 residents (half of premises) to double participation (2,024 total participants) in Xcel Energy programs over 2017 baseline in the next year.
- Achieve community-wide residential energy savings of 1% annually over 2017 baseline over the next year.
- Connect with 400 businesses and engage 115 (15 new participants) in Xcel Energy programs over 2017 baseline in the next year.
- Achieve community-wide commercial energy savings of 2% annually over 2017 baseline for the next 3 years.
- Reduce average municipal facility energy use intensity (EUI) by 5% in the next 3 years
- Add 250 kW of renewable energy in Northglenn by 2025

Our Actions

To move toward its goals, the City of Northglenn's planning team identified strategic initiatives and targets for three important focus areas and a cross-cutting theme focus area that touches all three focus areas. These focus areas and strategic initiatives are the working elements of the Energy Action Plan and will generate measurable impacts. The focus areas are shown in the table below.

<p>Residences</p>	<p>Strategies:</p> <ul style="list-style-type: none"> • Communications Campaign • Home Energy Squad® Buy-Down
<p>Commercial/Small Businesses</p>	<p>Strategies:</p> <ul style="list-style-type: none"> • Business Education & Awareness • Property Managers/Owners Education & Awareness • Incentive Program
<p>Municipal Leadership</p>	<p>Strategies:</p> <ul style="list-style-type: none"> • Education & Awareness Campaign • Building Energy Teams • High-Efficiency Equipment Installations • Building Benchmarking
<p>Cross-Cutting Theme</p>	<p>Renewable Energy Strategy</p> <ul style="list-style-type: none"> • Solar Bulk Purchase Program

Our Impact

By reaching this plan's near-term targets in 2020-2021, Northglenn will:

- Save over 3.8 GWh of electricity
- Increase overall efficiency rebate program participation by 100%
- Save 2,582 MT CO₂e - equivalent to taking 548 vehicles off the road!¹

¹ EPA Greenhouse Gas Equivalencies Calculator, <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator> (2019)

Introduction

In 2018, the City of Northglenn developed its first Sustainability Plan that established a long-term vision and goals for the community in the areas of arts, culture, and events; community education and civic engagement, sustainable economy, environment and public health, housing, and human dignity, open space and land use, resource conservation, and transportation. The Partners in Energy planning process was an opportunity to take a closer look at energy conservation at the municipal and community levels and to develop priorities and strategies to increase conservation and raise awareness about energy use and renewable energy options. These two plans work in tandem for the City of Northglenn and demonstrate the collaboration necessary among the City and its utilities to achieve shared goals.

The community's main energy priorities are outlined below:

- Raise awareness about energy efficiency and renewable energy in all sectors
- Address energy use in older building stock throughout the City
- Lead by example at the municipal level to demonstrate what is possible and necessary to achieve long-term energy and sustainability goals
- Create resiliency among residents and businesses, as well as municipal facilities, through conservation and renewable energy options

This plan begins with documentation of the Xcel Energy Partners in Energy planning process, an overview of the City of Northglenn's demographics, and the community's baseline energy use and profile. Next it introduces the energy vision, supporting energy focus areas, and community goals. Each focus area contains strategies that define more specific direction for the coordination, steps, and timelines necessary to achieve the goals. Finally, the plan concludes with information about ongoing plan monitoring and maintenance.

Xcel Energy Partners in Energy

Xcel Energy is the main electric and gas utility serving the City of Northglenn. In the summer of 2014, Xcel Energy launched Partners in Energy to support communities, such as the City of Northglenn, in developing and implementing energy action plans that supplement existing sustainability plans, strategies, and tools. 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, following the process provided by partners in Energy (Figure 1) and implementing plan strategies.

Partners in Energy will work with the City of Northglenn to coordinate support for implementing the plan and will develop a Memorandum of Understanding that outlines specific support Xcel Energy will provide to help Northglenn deploy its strategies and achieve its goals. Typical resources provided to communities during implementation are summarized in Figure 2.



Figure 1. Partners in Energy Process for Success

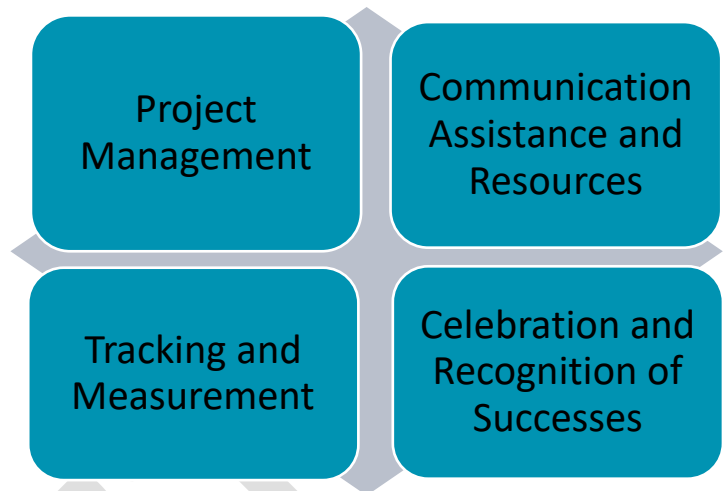


Figure 2. Resources from Xcel Energy for Implementation

Who Are We? – Community Background

The City of Northglenn was founded in 1969, after several years of dedicated residents working to incorporate the city. The City saw significant growth in the late 1970s as many city services were established and has seen steady growth in population and businesses since then. The City of Northglenn is strategically located north of the Denver-metro area along Interstate 25 and two dynamic business corridors.

Geography and Energy Utilities

The City of Northglenn is 6.45 square miles of urban area located in Adams County, with an additional 1 square mile of rural area located 7 miles north in Weld County. The rural square mile is the site of the City's Wastewater Treatment Plant (see Figure 3). Cities surrounding Northglenn include Westminster, Thornton, and Federal Heights.

There are four City Council wards in the City of Northglenn, with two representatives from each ward (see Figure 4)². The mayor represents the community at large.

² City Wards Map of Northglenn, CO. https://www.northglenn.org/government/city_council/index.php

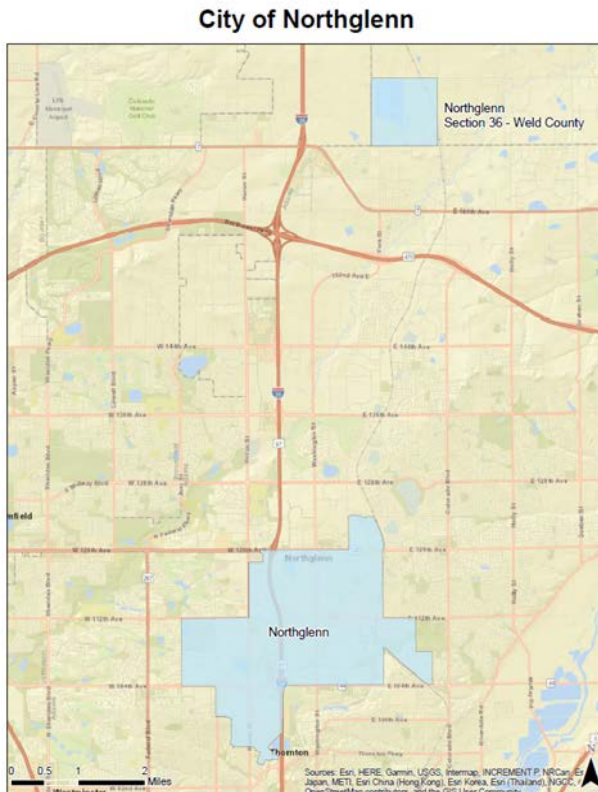


Figure 3: City of Northglenn Boundary



Figure 4: City of Northglenn Ward Districts

Xcel Energy provides natural gas to the entire Northglenn community and electricity to the urban area. United Power provides electricity to the rural square mile in Weld County. This Energy Action plan focuses on sharing energy efficiency and renewable energy information with the community regardless of utility service territory; however, specific goals and targets focus on participation in Xcel Energy’s programs and will be coordinated with United Power programs as applicable.

Population and Demographics

The Colorado State Demography Office estimates the population of Northglenn was 38,905 in 2016³, representing an 8 percent growth rate over the previous 7 years⁴. Northglenn is not expected to see significant growth over the next 5 years, with an estimated 0.5 percent growth rate⁵. Energy use is expected to follow this trend. The median age in Northglenn is 34, less than the state average of 36.5.⁴ Most of the population (86.3 percent) is under the age of 65, with a third of the population under the age of 25.⁴ This shows the potential for growth in future years as the young population comes of home-buying age. Many first-time home buyers are also moving in to Northglenn, contributing to the younger demographic.

³ City of Northglenn Demographics. https://www.northglenn.org/residents/about_northglenn/demographic_information.php

⁴ U.S. Census Bureau, Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2016_PEPANNRES&prodType=table

⁵ Northglenn ESRI Community Profile

The majority of Northglenn identifies as white, at 61.2 percent of the population, and is becoming increasingly diverse – 32.5 percent identify as Hispanic or Latino, 2.4% as Asian, 2.1 percent as other, 1.6 percent as Black, and less than 0.5 percent as Native American or Alaskan Native.²

The median household income in Northglenn is \$57,354⁴, less than the state average of \$65,458⁶. Energy savings and the corresponding cost savings to residents is a meaningful target for greater resiliency in the community, especially for households with a high energy burden compared to their income.

Housing

As of 2016, Northglenn has an estimated 14,161 housing units, with 68.2 percent of those being single family homes, including duplexes, with the remainder being multifamily housing ranging from 2 to more than 50 units.⁷ The majority (59.4 percent) of Northglenn’s homes were built between 1960 and 1979. A breakdown of the ages of Northglenn’s housing stock is provided in Table 1.⁶

Owner-occupied homes make up 55.7 percent of homes, with renters occupying another 41.5 percent.⁶ Because renters typically are not responsible for energy efficiency upgrades in their units, this population will require different outreach tactics and presents opportunities to engage property managers and multifamily building owners.

Table 1: Age of Northglenn Housing Stock

Year Built	Percent of Units
2000 - 2014	13.7%
1990 – 1999	12.8%
1980 – 1989	7.7%
1970 – 1979	19.1%
1960 – 1969	40.3%
1950 or earlier	6.4%

Business and Economy

Northglenn’s unemployment rate was estimated to be 4.2 percent in 2018⁴, slightly higher than the state-wide average of 3.6 percent⁸. The top industries are services (40.5 percent); retail trade (19.6 percent); finance, insurance, real estate (13.1 percent); and construction (8 percent)⁹.

There are just under 1,000 businesses in Northglenn and the City experienced growth in capital, new jobs, new businesses, and tax revenue in 2018. Northglenn also has a strong Urban Renewal Authority (NURA) that promotes private development and redevelopment and commercial related improvements.¹⁰ This growth provides opportunities for new builds and additions to incorporate energy efficiency into their designs.

Commitment to Sustainability (Values and Beliefs)

The City of Northglenn adopted its first city-wide sustainability plan in 2018 to create a process for bringing a sustainability lens to all future work plans. Recognizing the opportunity to create jobs and benefit all

⁶ U.S. Census Bureau, 2013 – 2017 American Community Survey 5-Year Estimates.

https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

⁷ ESRI – ACS Housing Summary for Northglenn City, CO

⁸ Bureau of Labor Statistics, Colorado Economy at a Glance, <https://www.bls.gov/eag/eag.co.htm>

⁹ ESRI – Business Summary for Northglenn City, CO

¹⁰ City of Northglenn, 2018 Economic Development Year in Review.

https://www.northglenn.org/Departments/ED/Year%20In%20Review/ED_Year_in_Review_web.pdf

residents, as well as the threats posed by increasing demands on natural, human, and social resources, Northglenn aims to build a sustainable community.

The Case for a Community Energy Action Plan

This Energy Action Plan supports the energy resource conservation goals set in the sustainability plan by providing supporting data for the energy goals and targets, as well as developing actionable strategies that will have the greatest impact on the community. Northglenn chose to take part in the Partners in Energy process to understand where the community currently uses energy and to identify opportunities to reduce energy use.

Where Are We Now? – Baseline Energy Analysis

Baseline Energy Analysis

An introductory step in the Partners in Energy planning process is to develop a community energy profile. The Partners in Energy team analyzed historical energy data in Northglenn by source (electricity, natural gas) and sector (residential, commercial, and municipal). Three years of data were used for the analysis (2016-2018), and 2017 was established as the baseline year for this plan to match with the City of Northglenn’s greenhouse gas inventory. Electricity data analysis also included United Power data for the rural portion of Northglenn.

Community Energy Use

Based on aggregated utility data provided by Xcel Energy and United Power, in 2017 the City of Northglenn had 15,758 residential, commercial, and municipal premises (see Figure 5). A premise is a unique identifier for the location of electricity or natural gas service. In most cases, it is a facility location. This total includes premises served by electricity, natural gas, or both. Over 90 percent of premises in Northglenn are residential (14,359).

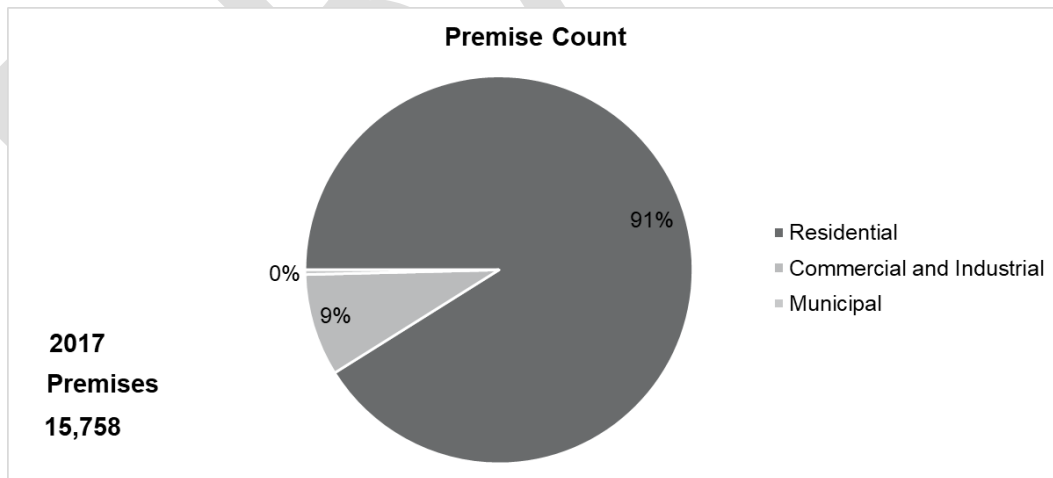


Figure 5: Northglenn Premise Count

Residential premises account for 61 percent of total energy consumption in Northglenn (Figure 6) and 59 percent of energy costs (Figure 7). Although commercial and industrial premises only account for 9 percent of total Northglenn premises, this sector makes up 37 percent of total energy consumption and 37 percent of total energy costs. Municipal premises make up only 0.4 percent of the premise count but are 2 percent of consumption and 4 percent of costs.

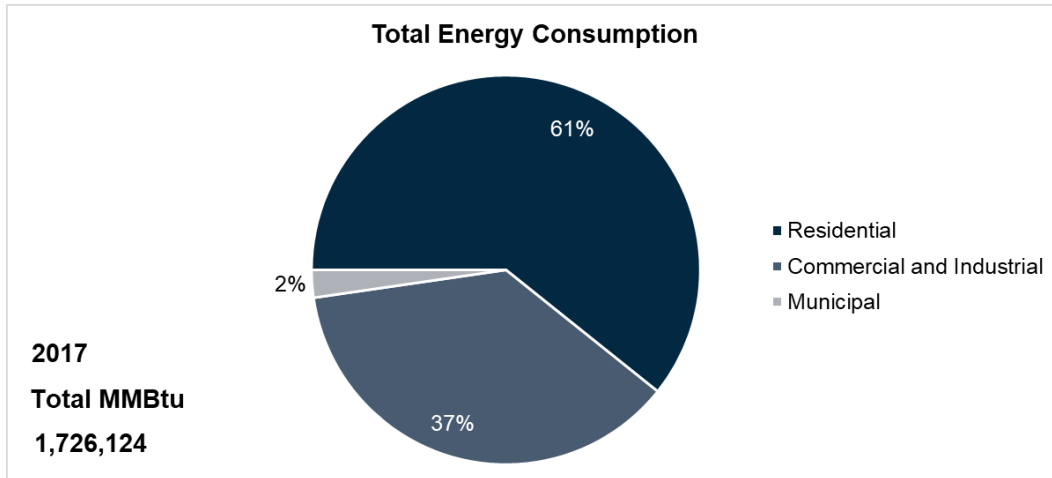


Figure 6: Northglenn Total Energy Consumption

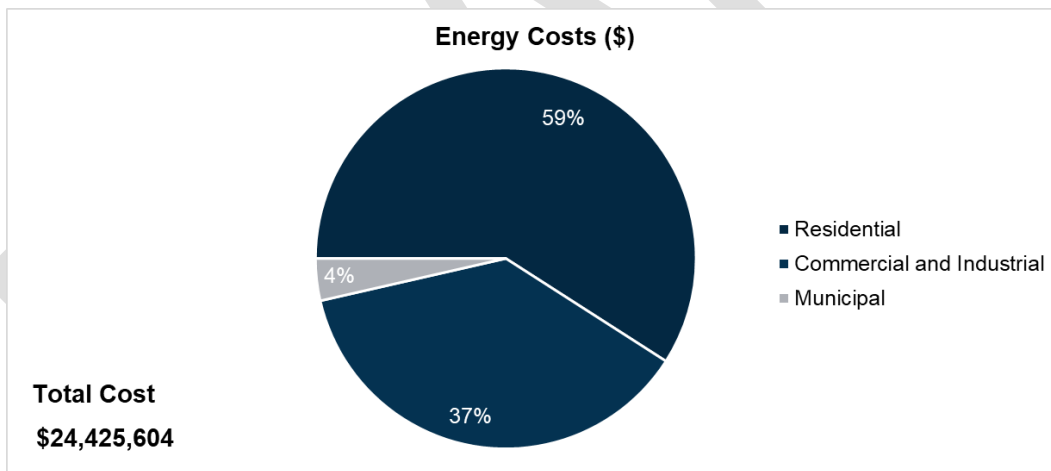


Figure 7: Overall Energy Costs

The bulk of energy costs are spent on electricity across all sectors, as shown in Figure 8, which also shows the natural gas costs across all sectors. Although municipal facilities make up a small portion of the total energy costs, they have the highest annual cost per premise, illustrating opportunities for savings in this sector.

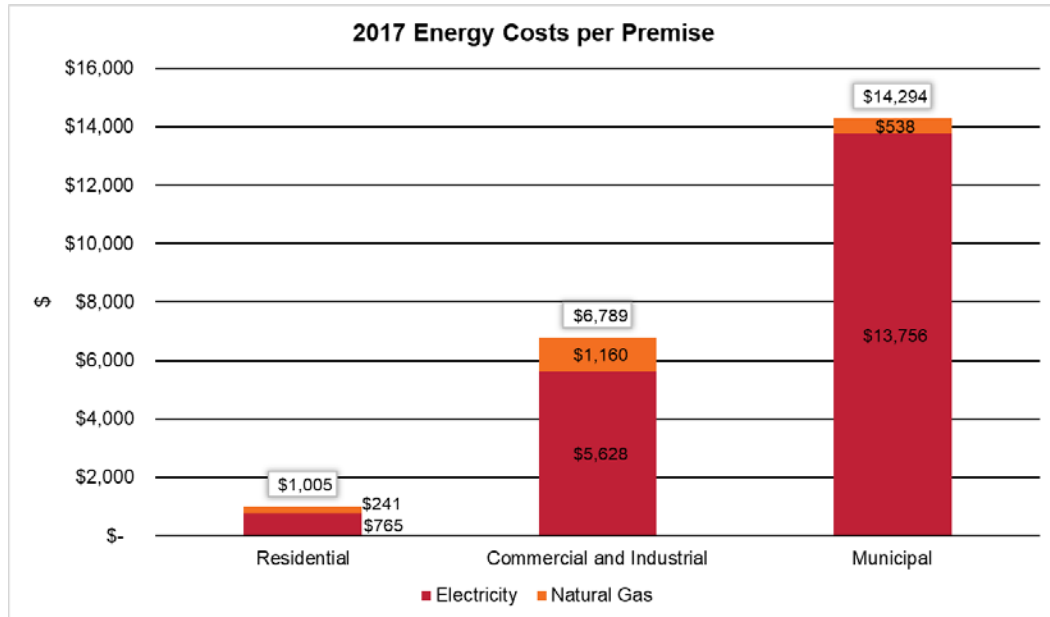


Figure 8: Energy Costs per Premise

In total, approximately 190 million kilowatt-hours (kWh) of electricity and 10.8 million therms of natural gas were consumed by residents, businesses, and municipal facilities in Northglenn in 2017. The residential sector consumed the majority of the electricity, accounting for 105 million kWh (55 percent), while the commercial sector consumed 76.6 million kWh (40 percent), and the municipal sector consumed 8.9 million kWh (5 percent) (see Figure 9).

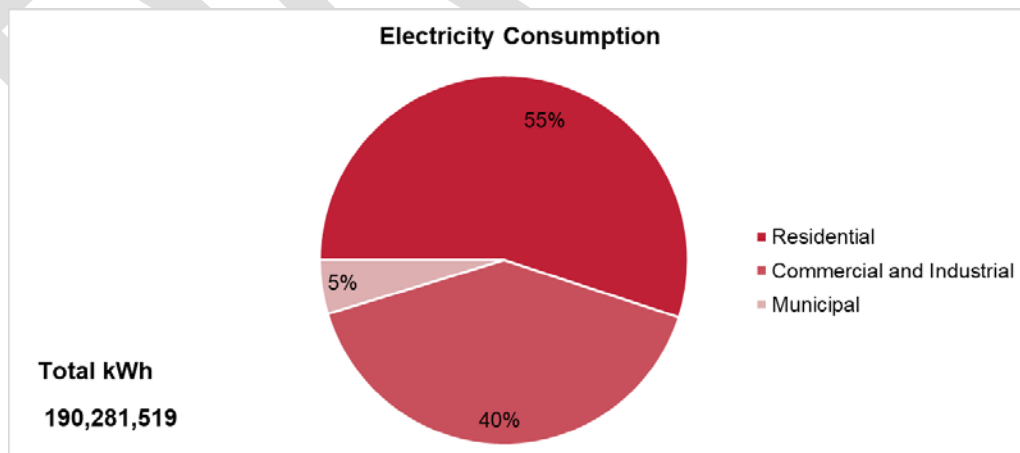


Figure 9: Electricity Consumption by Sector

Natural gas was primarily consumed by the residential sector, accounting for 6.9 million therms (64 percent), while the commercial sector consumed 3.8 million therms (35 percent), and the municipal sector consumed 0.09 million therms (1 percent).

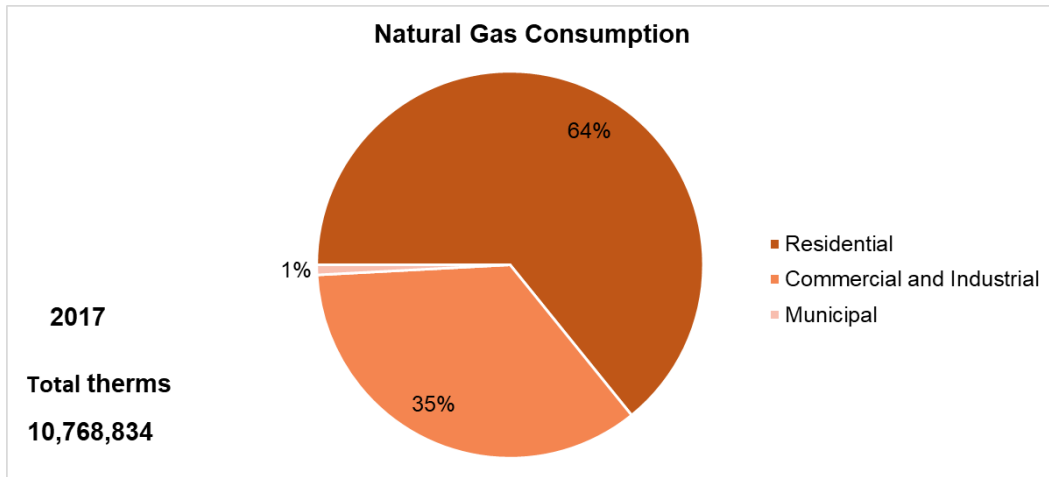


Figure 10: Natural Gas Consumption by Sector

The municipal sector energy use breakout is shown in Figure 11. The majority of municipal energy consumption is electricity, at 77 percent.

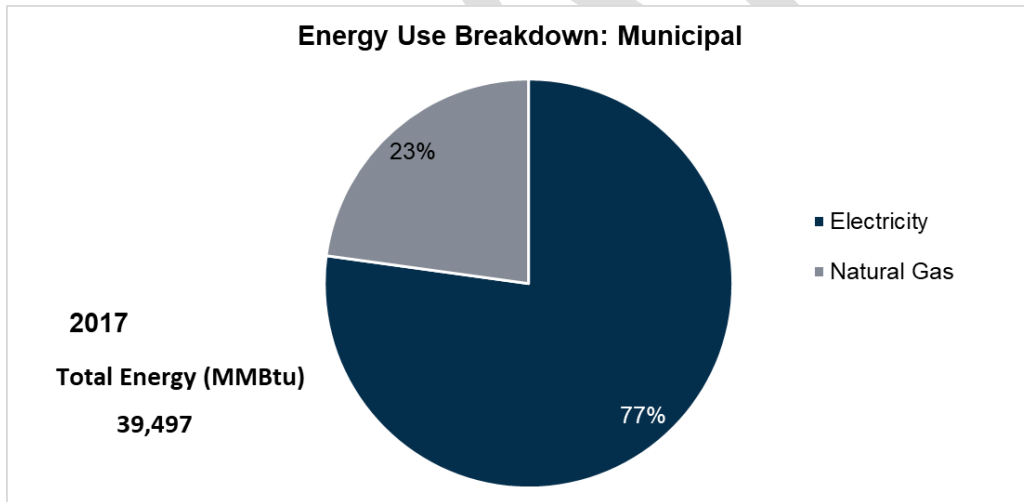


Figure 11: Municipal Energy Consumption

Community Energy Trends

Overall energy consumption in Northglenn increased by 3.6 percent from 2016 to 2018 with a very slight increase in premises (0.13 percent). The residential sector showed the largest increase (4.6 percent) (see Figure 12). This increase may be related to weather, as both the number of heating degree days (HDD) and cooling degree days (CDD) increased in 2018 compared to the previous 2 years. A summary of premise, electricity, natural gas, and total energy trends by sector is provided in Table 2. In 2017, the City added a new justice center and a new headworks facility at the wastewater treatment plant, which

contributes to the increase in natural gas usage and total energy. Electricity may have decreased due to improved efficiency when these facilities were upgraded.

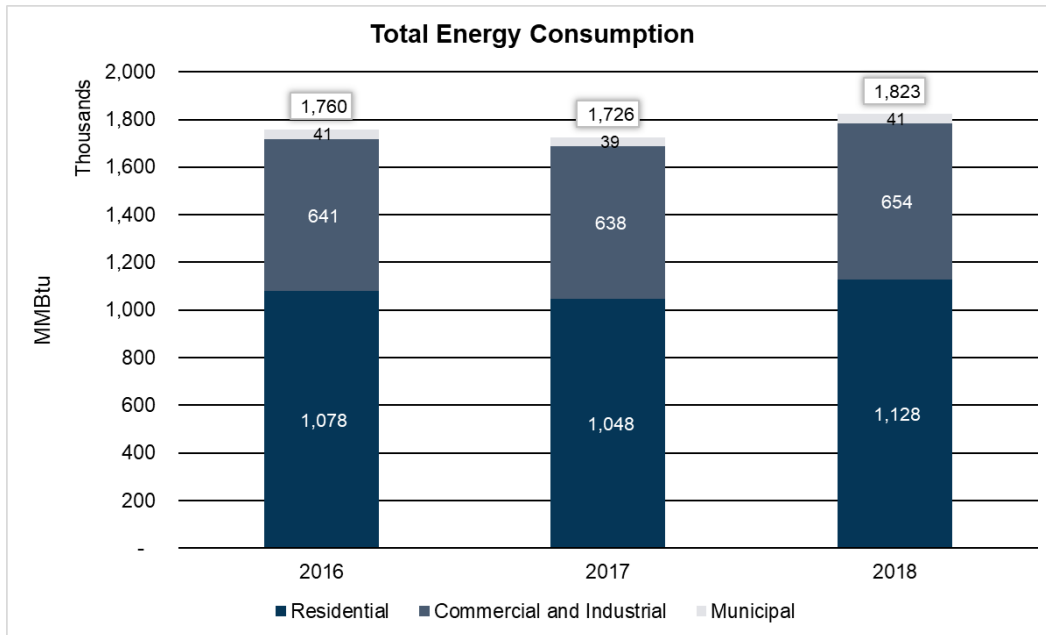


Figure 12: Total Energy Consumption Trends

Table 2: Summary of Energy Trends

Trends (2016 - 2018)	Premises	Electricity	Natural Gas	Total Energy
Residential	0.09%	-0.20%	7.06%	4.58%
Commercial & Industrial	0.52%	-2.99%	5.69%	2.13%
Municipal	1.67%	-1.77%	16.87%	1.95%
Overall	0.13%	-1.38%	6.66%	3.63%

Electricity use in Northglenn has decreased slightly (1.4 percent) since 2016. Most of this decrease has come in the commercial and industrial sector, with a 3 percent decrease (see Figure 13).

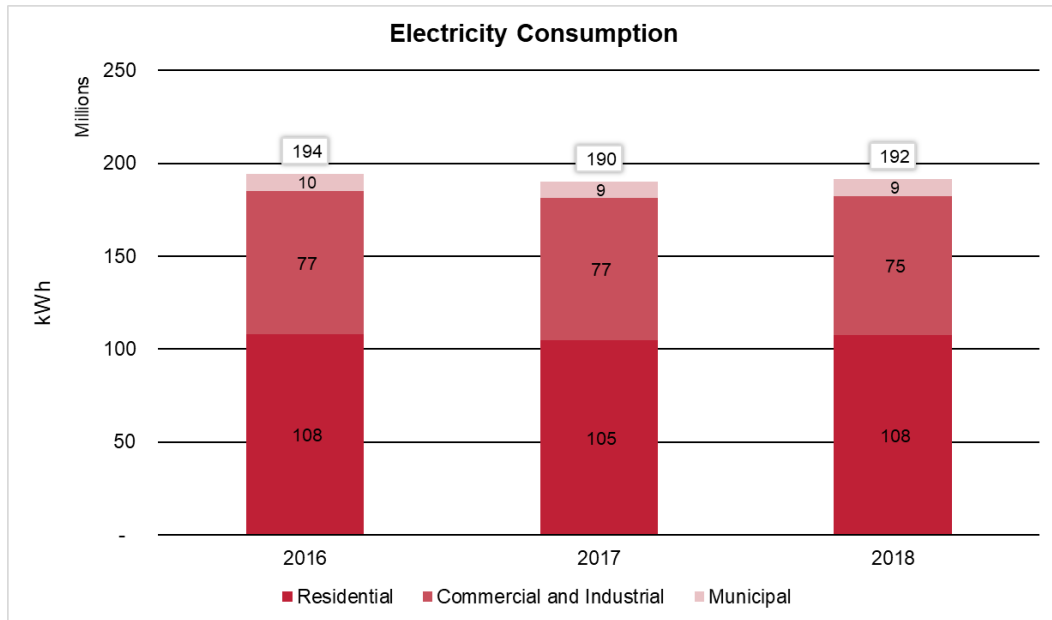


Figure 13: Electricity Consumption Trends

Natural gas use has increased by 6.7 percent since 2016, with the largest increase in the municipal sector (17 percent) (see Figure 14). This increase may be related to weather conditions. As previously mentioned, there was a 12 percent increase in cooling degree days from 2016 to 2018, indicating an increased need for heating typically supplied by natural gas. Further, a new administration building and headworks facility at the wastewater treatment plant were added in 2017, contributing to the municipal increase from 2017 to 2018.

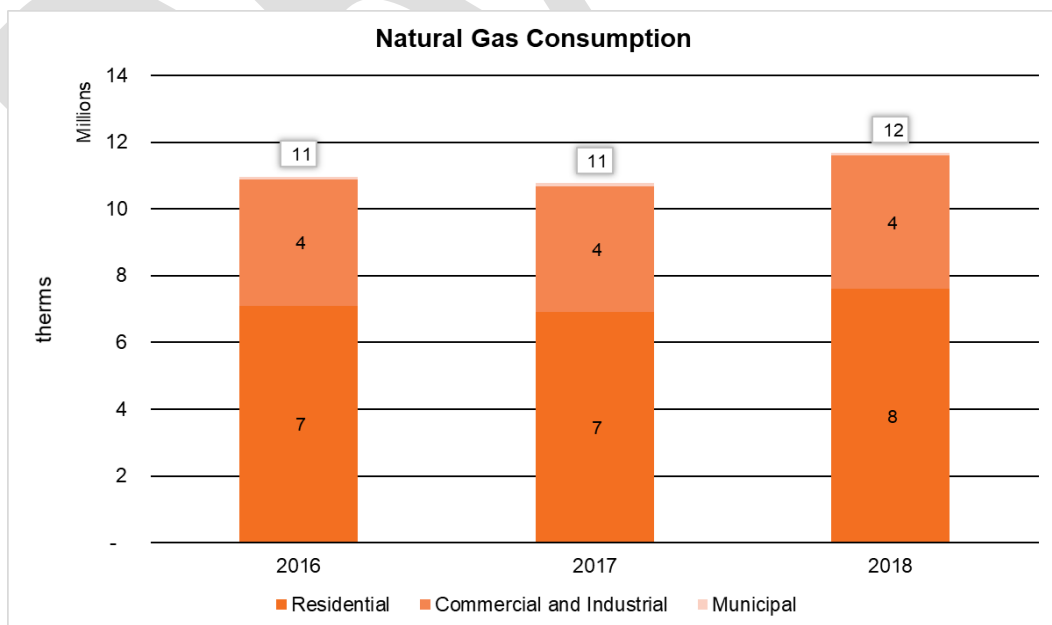


Figure 14: Natural Gas Consumption Trends

Greenhouse Gas Emissions

Community-wide greenhouse gas (GHG) emissions are expressed as metric tons of carbon dioxide equivalent (MTCO₂e). GHG emissions in this plan are calculated from electricity and natural gas consumption data provided by Xcel Energy and United Power but use only Xcel Energy emissions factors. The 2018 emissions by sector are shown in Figure 15 and trends are shown in Figure 16.

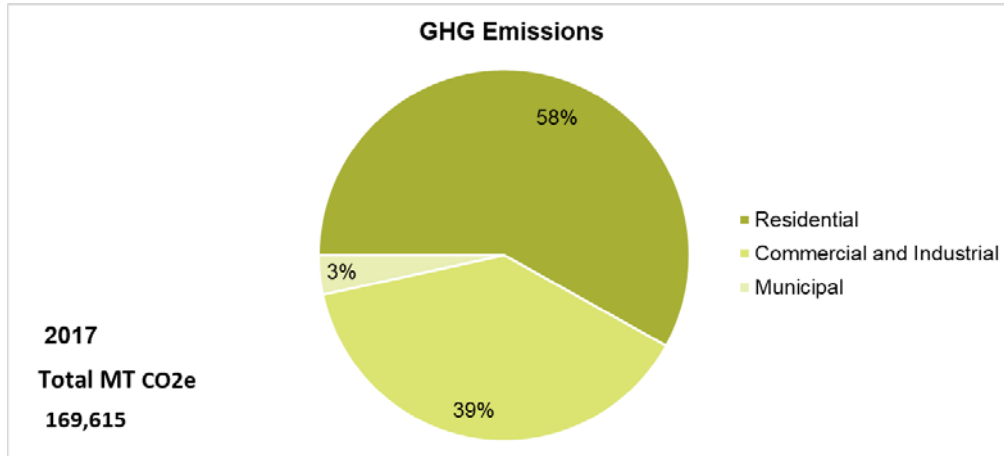


Figure 15: GHG Emissions

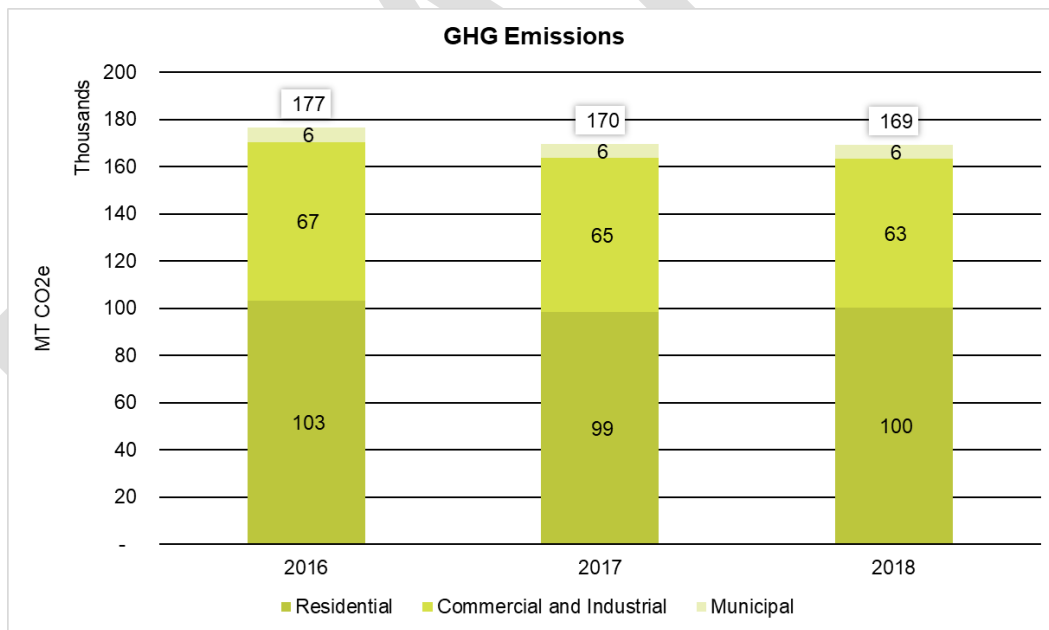


Figure 16: GHG Emissions Trends

Efficiency Program Participation

Part of the community energy profile includes historic demand-side-management (DSM) program participation and energy savings for the residents and businesses of Northglenn. These data provide a snapshot of what programs customers are using and to what degree. The data also show opportunities for greater participation in the available programs and the need for increased education and awareness.

Figure 17 shows the average participation in Xcel Energy DSM programs from 2016 to 2018. In 2018, about 8 percent of residential premises participated in these programs, saving nearly 300,000 kWh and over 20,000 therms. This equates to an average annual cost savings of \$32 per participating residence.

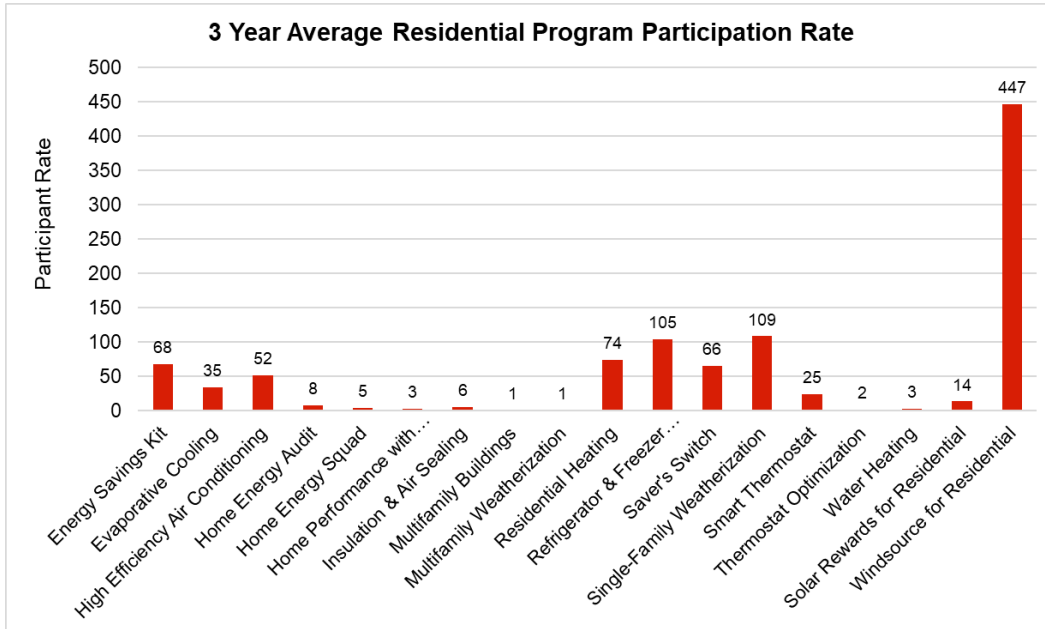


Figure 17: Residential DSM Program Participation, 3-year Average

Figure 18 shows the average commercial and industrial participation in DSM programs from 2016 to 2018, including municipal facilities. In 2018, about 3 percent of commercial and industrial premises participated in DSM programs, saving 1.7 million kWh. This equates to an average annual cost savings of nearly \$3,500 per participating customer.

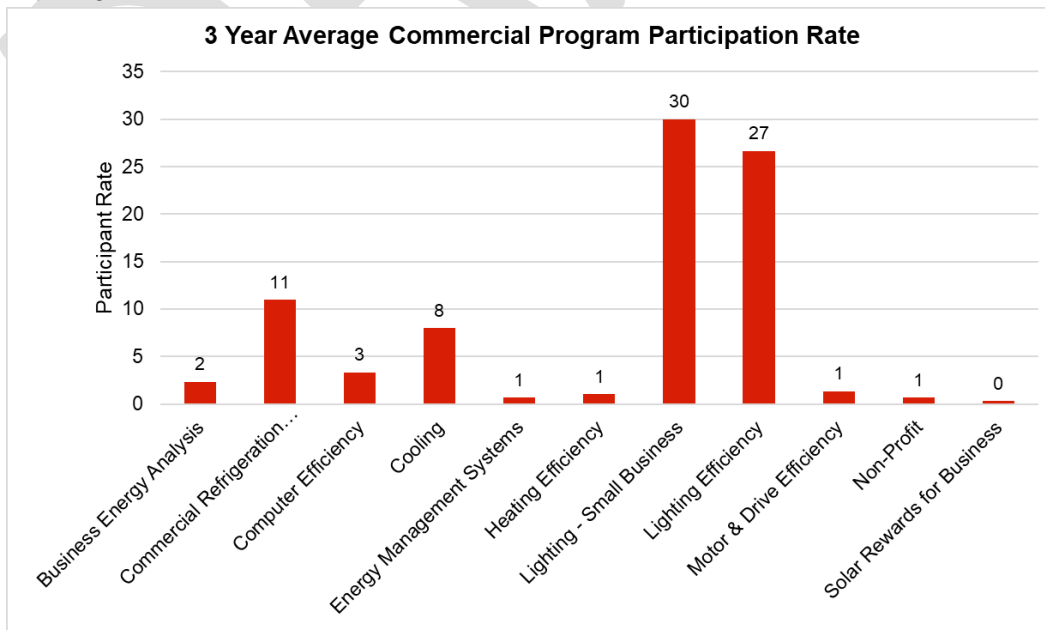


Figure 18: Commercial DSM Program Participation, 3-year Average

Overall participation across both sectors has increased from 2016 to 2018, as shown in Figure 19, with the gains primarily being in the residential sector.

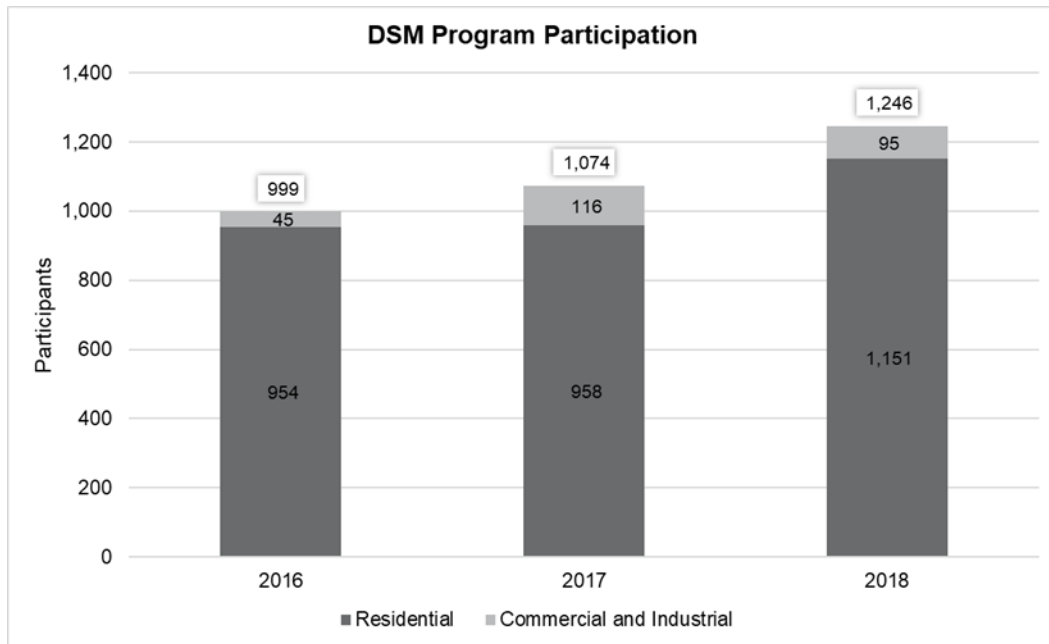


Figure 19: DSM Program Participation Trends

Existing Energy Practices

Table 3. Community Energy Initiatives

Community Energy Initiatives

- Wastewater Treatment Plant – upgraded lighting to LEDs
- New City Recreation Center using Xcel Energy new construction programs
- Community outreach campaign for LED lighting
- Updating energy codes to 2018 IECC (tentative adoption by end of 2019)

Local Outreach and Communication Channels

Engaging the community is critical to reaching the Energy Action Plan goals. Below are some of the ways that Northglenn residents and businesses currently receive information. These communication channels will be helpful during implementation efforts.

Table 4. Local Outreach

Local Outreach Channels	
Communications	
<ul style="list-style-type: none"> • City of Northglenn Connection • City of Northglenn Facebook & Twitter pages <ul style="list-style-type: none"> ○ Official City Page ○ Economic Development • City of Northglenn events webpage • Channel 8 • Economic Development E-Newsletter • North Metro Chamber of Commerce newsletters • Adams County Economic Development newsletter • Press releases • Targeted emails from Xcel Energy • Nextdoor • Tri-County Health Department • Northglenn/Thornton Sentinel (ads) 	
Events	
<ul style="list-style-type: none"> • Food Truck Carnival • 4th of July Festival • Red, White, and Blue BBQ Cook-Off (tentative) • Summer Concert Series • National Night Out • Canal Clean-up – volunteer event • Magic Fest • Noel Northglenn • Senior Center events 	
Community Spaces for Collateral Distribution	
<ul style="list-style-type: none"> • Anythink Libraries • Northglenn Recreation Center / Senior Center • Adams County school district 	



Figure 20. Northglenn Connection Monthly Newsletter

Where Do We Want to Go?

Our Energy Vision

During the first planning workshop, team members reviewed the sustainability plan vision statement and brainstormed words and phrases that express the Northglenn community's energy intentions and values. From this brainstorming session, the stakeholder group provided feedback on three draft vision statements to narrow to a single vision statement, shown below:

The Northglenn community will conserve its resources and promote sustainability through energy awareness, renewable sources, and collaboration to provide an exceptional quality of life and resilient future for residents and businesses.

The Northglenn planning team chose to realize this vision by focusing on three key areas based on the needs of the community: residences, commercial and small businesses, and municipal facilities, with the cross-cutting theme of renewable energy.

How Are We Going to Get There?

Focus Areas and Goals

Northglenn will work to achieve its energy vision by establishing ambitious but achievable goals and implementing strategies across three focus areas: residences, commercial/small businesses, and municipal facilities. Across these focus areas, Northglenn will also work to achieve renewable energy targets in the community.

In 2018, the City of Northglenn developed the city's first Sustainability Plan, which has 9 goal areas, one of which is resource conservation for which several energy goals were identified:

- Reduce community-wide residential energy use by 15% by 2025
- Reduce community-wide commercial energy use by 15% by 2025
- Reduce municipal energy use by 25% by 2030

The Energy Action Team used these goals as a starting point to develop the Energy Action Plan goals for each focus area. The Energy Action Plan goals are intended to be achievable within the Partners in Energy timeframe of 2 years and will propel the community toward its longer-term Sustainability Plan goals.

During workshops, the stakeholder team reviewed and discussed the current status of each of the three focus areas and what successful implementation of the Energy Action Plan would look like. Historic program participation was used to aid in goal setting and strategy development for each focus area, along with the workshop discussions. The goals and accompanying strategies for each focus area are outlined in the following sections.

Focus Area 1: Residences

The residential sector in Northglenn accounts for 91 percent of Xcel Energy premises, 55 percent of electricity consumption, and 64 percent of natural gas consumption. This customer group represents a significant opportunity to reduce energy consumption and save money in Northglenn by impacting how residents view and consume energy. The aging housing stock in Northglenn also represents a significant opportunity, as many homes are likely to realize savings through efficiency upgrades. The large number of multifamily housing units and proportion of renters present opportunities for savings for both building owners and tenants. Further, during the baseline year of 2017, 7 percent of residential premises participated in efficiency and renewable energy programs, representing considerable room for increased participation and engagement.

Historical Program Participation

Figure 17 shows the 3-year average participation rate in each of Xcel Energy's residential efficiency and renewable programs. In 2017, there were 958 participants, representing 7 percent of the residential premises in Northglenn. This participation resulted in a 0.4 percent energy reduction across the community. The planning team used this information to inform the residential focus area goals, primarily targeting increasing participation rates and overall community energy savings.

Goals

- *Connect with 7,000 residents (half of premises) to double participation (2,000 total participants) in Xcel Energy programs over 2017 baseline in the next year.*
- *Achieve community-wide residential energy savings of 1% annually over 2017 baseline for the next 3 years.*

Annual savings are an approximation based off the number of participants in each program and the savings associated with each program. The savings indicated are a percentage of the baseline year total energy savings for the residential focus area.

Strategies

Table 5: Residential Focus Area Strategy 1

Strategy 1: Residential Communications Campaign

Description

The primary focus of this strategy is to raise awareness and educate residents about their energy use and available programs for energy efficiency and renewable energy. This strategy will leverage existing channels of communications and events, along with city communications staff and Xcel Energy resources.

Scope

- Align with current Communications Department planning cycle (18 months)
- Identify what to communicate and desired actions around two initiatives:
 - Light up a Senior's Life
 - Connect high school students (Youth Commission) with seniors to help install give-away energy efficiency items in their homes and share other efficiency information that encourages:
 - Home Energy Squad® audits
 - Refrigerator recycling
 - Heating and cooling rebates
 - Xcel Energy Store
 - Ward/Building Adoption Challenge (3-6 months)
 - Assign a city building to each of the four wards for friendly challenge (City Hall, Recreation Center, Police Department, Maintenance & Operations)
 - Develop initiative that encourages:
 - Efficiency improvements in the buildings
 - Points for the ward for resident activities, such as:
 - Home Energy Squad audits
 - Refrigerator recycling
 - Heating and cooling rebates
 - Renewable energy options
 - Council-member engagement
 - Resident recognition two times each month during the challenge (Be like ___")
- Enlist trusted channels of communication
 - Light up a Senior's Life
 - Youth Commission
 - Northglenn High School liaison
 - Adams 12 liaison
 - Senior Center
 - Northglenn Connection
 - Faith communities
 - Channel 8 (for older residents who aren't as media savvy)
 - Ward/Building Adoption Challenge
 - Ward meetings and council members
 - Festivals (calendar of appropriate events)

- Nextdoor
 - Facebook
 - Healthy Eating Active Living (HEAL)
 - Instagram
 - Twitter
- Design campaign features
 - Light up a Senior's Life
 - Develop content and flyer for seniors with efficiency information and resources
 - Identify sources for installation items
 - Develop process for identifying students and seniors and connecting the two groups
 - Develop process for tracking installation and activities
 - Determine how to recognize efforts (students and seniors)
 - Share results community wide
 - Ward/Building Adoption Challenge
 - Identify and engage council members, ward liaisons, and building champions
 - Determine schedule such that winning ward can have summer picnic
 - Develop point system and process for self-reporting and tracking (pledges)
 - Develop process for recognizing actions (story telling)
 - Develop messaging content (social media, Northglenn Connection, Nextdoor, etc.)
 - Cross-post on all platforms on set schedule
 - Measure success and report out community wide

Responsible Parties

- Lead: Summer Nettles and Diana Wilson
- Other Responsible Parties:
 - Partners in Energy staff
 - City planning staff
 - Mayor/Council members
 - School district liaison
 - Senior Center liaison
 - Youth Commission liaison
 - Sustainability Committee
- Responsibilities:
 - Build communications campaign framework
 - Develop schedule
 - Outline materials
 - Develop content
 - Recruit champions and volunteers to deliver content and materials
 - Administer initiatives

Timeline

- Align with current 18-month Communications Department planning timeline to incorporate campaign
- Use the 4th quarter of 2019 to plan
- Be ready to deliver starting in 1st and 2nd quarters of 2020

- Report findings at end of each campaign

Outreach Channels

- City Communications Department
- School district
- Ward liaisons
- Building champions

Measurement

- Xcel Energy participation data
- Pledges and resident self-reporting process
- Youth service tracking
- Social media analytics
- Website analytics

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Table 6: Residential Focus Area Strategy 2

Strategy 2: Home Energy Squad Buy-down
<p>Description</p> <p>This strategy focuses on identifying funding (either from City budget or through a grant) to offset or completely buy down the cost of a certain number of Home Energy Squad® standard or Plus visits for residents. As part of this strategy, a contract with the Home Energy Squad vendor will need to be executed. The City will leverage available marketing and communications channels to inform residents of the offering.</p>
<p>Scope</p> <ul style="list-style-type: none"> • Identify funding source to pay some or all of the fee for residents (between \$50 and \$150 depending on standard or Plus option) (up to a certain number or amount) to encourage Home Energy Squad participation • Contract with Xcel Energy Home Energy Squad vendor to track and pay for visits • Develop marketing strategy to let residents know about the opportunity as part of communications campaigns for Light up a Senior's Life and Ward/Building Challenge • May address low-income residents only or first-come first-served
<p>Responsible Parties</p> <ul style="list-style-type: none"> • Lead: Becky Smith • Other Responsible Parties: <ul style="list-style-type: none"> ○ Xcel Energy Home Energy Squad vendor ○ Partners in Energy staff ○ City communications staff • Responsibilities: <ul style="list-style-type: none"> ○ Identify funding and timeline ○ Develop contract with Home Energy Squad vendor and method for payment and tracking ○ Develop outreach efforts ○ Track participation
<p>Timeline</p> <ul style="list-style-type: none"> • Develop program in 2020 <ul style="list-style-type: none"> ○ Target audience ○ Outreach ○ Tracking ○ Administration • Identify outside funding or build into 2021 budget • Begin marketing first quarter 2021 • Deliver through 2021 or until funding is exhausted
<p>Funding</p> <ul style="list-style-type: none"> • To be identified as part of strategy execution
<p>Partners</p> <ul style="list-style-type: none"> • Home Energy Squad vendor

- Xcel Energy

Outreach Channels

- Residential communications campaign

Measurement

- Number of Home Energy Squad participants taking advantage of buy-down opportunity

Focus Area 2: Commercial and Small Business

The commercial sector, including industrial facilities and both large and small businesses, makes up 9 percent of premises in Northglenn and accounts for 755 storefront businesses (based on Economic Development data). Despite the low percentage of premises, this sector represents 37 percent of all energy consumption in Northglenn, including 40 percent of electricity consumption, and 35 percent of natural gas consumption. The significant portion of energy consumption in this sector provides an opportunity for reduced energy use in the Northglenn community.

Historical Program Participation

Figure 18 shows the 3-year average participation rate in each of Xcel Energy's commercial efficiency and renewable programs over the last three years. The 3-year average participation rate is 85 participants, due to low participation in 2016. However, in 2017 and 2018, there were 116 and 95 participants respectively, representing approximately 9 percent of the commercial premises in Northglenn. This participation resulted in a 0.8 percent energy reduction across the community. The planning team used this information to inform the commercial and small business focus area goals, primarily focused on increasing participation rates and overall community energy savings.

Goals

- *Connect with 400 businesses and engage 115 (15 new participants) in Xcel Energy programs over 2017 baseline in the next year.*
- *Achieve community-wide commercial energy savings of 2% annually over 2017 baseline for the next 3 years.*

Annual savings are an approximation based off the number of participants in each program and the savings associated with each program. The savings indicated are a percentage of the baseline year total energy savings for the commercial and small business focus area.

Strategies

Table 7: Commercial & Small Business Strategy 1

Strategy 1: Businesses - Awareness, Education & Participation

Description

The primary focus of this strategy is to generate awareness through educating and encouraging businesses to participate in energy efficiency and renewable energy programs.

Scope

- Identify and promote success stories/case studies of businesses who have successfully reduced energy costs by utilizing energy efficiency and renewable energy programs and resources (website, Connection, business e-newsletter, social media, events etc.)
- Develop business sector specific marketing materials to inform businesses about efficiency for their business type using the Partners in Energy Small Business toolkit as a resource (e.g., restaurants, office space, etc.)
- Provide a table at the annual Business Appreciation Breakfast to educate businesses on energy efficiency and renewable energy opportunities
- Develop talking points for tenants to discuss energy efficiency upgrades with property managers and owners
- Determine if Tri-County health inspectors are able to distribute materials during inspections and provide them with Xcel Energy commercial refrigeration program flyers
- Educate other partnering agencies (Adams County Economic Development, Metro North Chamber of Commerce, Small Business Development Center, etc.) about available Xcel Energy resources and programs

Responsible Parties

- Lead: Shannon Fields (Northglenn Economic Development)
- Other Responsible Parties:
 - Annemarie Heinrich (Tri-County Health)
 - Partners in Energy staff
 - Communications staff
- Responsibilities:
 - City of Northglenn:
 - Provide information to businesses to promote energy programs and resources (through City communication channels, Design Review Committee, business packets, etc.)
 - Identify and develop success stories/case studies to promote energy efficiency and renewable energy
 - Tri-County Health
 - Request that inspectors distribute information to restaurants
 - Provide inspectors with collateral
 - Partners in Energy Staff
 - Develop co-branded collateral for distribution via all channels
 - Support success stories/case study development

Timeline

- Begin outreach to businesses and information sharing starting Q1 2020

- Determine potential success/case studies by Q2 2020
 - Malley Center – HVAC upgrades
 - Boondocks – Lighting and equipment upgrades
 - Future development projects (Civic Center, Karl's Farm, etc.)

Funding

- No additional funding required

Partners

- Tri-County Health
- Case study businesses

Outreach Channels

- Newsletters
- Economic Development Division
- Social Media & Website
- Northglenn Connection
- New & Business Retention/Expansion meetings
- Business Appreciation Breakfast
- Business Walks
- Design Review Committee
- Metro North Chamber of Commerce
- Adams County Economic Development
- Tri-County Health

Measurement

- Xcel Energy participation data
- Event participation/contacts
- Direct connections with businesses
- Attendance at Business Appreciation Breakfast

Table 8: Commercial & Small Business Focus Area Strategy 2

Strategy 2: Property Managers & Owners - Awareness, Education & Participation

Description

The primary focus of this strategy is to generate awareness through education and encourage commercial property managers and owners to participate in energy efficiency and renewable energy programs.

Scope

- Identify commercial property managers and owners for targeted outreach
- Develop talking points to discuss energy efficiency upgrades with property management and owners
- Share energy efficiency best practices and success/case stories demonstrating potential increased property value and marketability
- Provide a table at the annual Business Appreciation Breakfast to educate property managers and owners on energy efficiency and renewable energy opportunities

- Educate property managers and owners about CPACE for financing energy upgrades

Responsible Parties

- Lead: Shannon Fields (Northglenn Economic Development)
- Other Responsible Parties:
 - Partners in Energy staff
 - City communications staff
- Responsibilities:
 - Identify property managers and owners
 - Conduct outreach to generate awareness, educate and encourage energy efficiency and renewable energy participation

Timeline

- Develop list of property managers and owners to target by Q2 2020
- Identify potential success story to share by Q2 2020
 - Malley Center – HVAC upgrades
- Conduct outreach to property managers and owners starting in Q3/Q4 2020

Funding

- No additional funding required

Partners

- To be identified for case study development

Outreach Channels

- Economic Development Department
- Business Retention & Expansion meetings
- Targeted outreach to property managers and owners

Measurement

- Xcel Energy participation data
- Connections made with property managers and owners

Table 9: Commercial & Small Business Focus Area Strategy 3

Strategy 3: Explore City Incentives for Commercial Projects

Description

The City will explore opportunities for providing additional incentives to the commercial and industrial sector to support energy efficiency and renewable energy projects, including Xcel Energy DSM program participation, to increase impact over time, saving businesses money and reducing community energy use.

Scope

- Study municipal incentive programs in other communities to identify best practices and successful programs

- Identify or create with City constructs an ongoing funding source to support energy efficiency and renewable energy project buy-downs
- Based on cost and savings information from Xcel Energy (Appendix 3), develop a financially feasible and motivating process to incentivize commercial projects
- Prepare a policy proposal for adoption
- Present proposal during City Council work session and guide through to adoption
- Once adopted, develop an outreach effort to let community members know about the available incentives and the process for applying to receive them
- Include participant recognition to encourage more participation

Responsible Parties

- Lead: Brook Svoboda
- Other Responsible Parties:
 - Economic Development Department
 - City Manager
 - Partners in Energy staff
 - Communications staff
- Responsibilities:
 - Develop policy and process
 - Provide project information to support incentive guidelines and appropriate levels of support and documentation

Timeline

- Q1-Q2 2020: Conduct research
- Q2-Q3 2020: Develop proposed policy and program plan
- Q4 2020: Solicit Council approval
- Q1-Q2 2021: Implement communications and outreach
- Q3 2021: Launch and maintain program

Funding

- Ongoing funding source from within City budgets

Partners

- Xcel Energy

Outreach Channels

- Northglenn Connection
- Social media
- Economic Development channels
- City website

Measurement

- Number of applicants for City incentives
- Number of incentives awarded

Focus Area 3: Municipal Leadership

Although community facilities represent only 4 percent of energy use in Northglenn, there is an opportunity to lead by example within city facilities, schools, and parks and recreation facilities. Further, energy savings in these facilities has an impact on all Northglenn community members by enabling organizations to save taxpayer dollars.

Historical Program Participation

Community facilities program participation is included in commercial participation, as shown in Figure 18. There are about 61 total premises in the municipal facilities category, including facilities owned by the City of Northglenn. One of the largest municipal energy users, the City's wastewater treatment plant, receives electricity from United Power. The wastewater treatment plant has leveraged LED lighting rebates from United Power for upgrades to the facility.

The planning team chose to focus on reducing energy use across these facilities by tracking and reducing energy use intensity (EUI), or the energy used per square foot of a building, through employee education and awareness and energy-efficient equipment upgrades. This goal may be reassessed once a baseline EUI is developed to determine if the goal is still the appropriate level of feasibility.

Goal

- *Reduce average municipal facility energy use intensity (EUI) by 5% in the next 3 years*

Strategies

Table 10: Municipal Focus Area Strategy 1

Strategy 1: Education & Awareness
Description
This strategy focuses on raising awareness and educating both City employees and residents about the City's participation in Partners in Energy and energy efficiency. This will be done through education and signage in City buildings, via the City employee intranet, and the City Manager report.
Scope
<ul style="list-style-type: none"> • Increase awareness of City's participation in Partners in Energy • Educate City staff on current use of energy and best practices to conserve energy • Challenge each facility to conserve energy through reward-based behavior and employee pledges • Deploy banners/signage in each building about energy use • Utilize NIC (employee intranet) to share information • Utilize biweekly City Manager report to share information
Responsible Parties
<ul style="list-style-type: none"> • Lead: Planning department staff will coordinate with the City Manager's office to get messages out • Other Responsible Parties: <ul style="list-style-type: none"> ○ Communications Department ○ Leadership team ○ Sustainability Committee

- Staff Green Team (communicate energy savings to community; get the word out to City employees)
- Finance department (manage)
- Partners in Energy staff (support collateral, outreach, materials, etc.)

Timeline

- Start planning messaging before end of 2019 – continuous updates on progress to community
- Begin sharing messaging in Q1 2020
- Engage staff throughout 2021 (pledges, etc.)

Funding

No additional funding required

Partners

No other partners required

Outreach Channels

- Signage in buildings (by lights, other public facing spaces)
- Informational emails through Communications Department
- Employee lunch & learns
- City Manager's report
- City intranet

Measurement

- Number of employee pledges
- Participation in lunch & learns
- Energy savings

Table 11: Municipal Focus Area Strategy 2

Strategy 2: Building Energy Teams

Description

This strategy builds on Strategy 1: Education and Awareness by creating teams within each City building responsible for education and awareness via signage and friendly competitions. By engaging employees in the process, this strategy will increase awareness of energy use both in City facilities and at home, allowing the City to lead by example and improve residential efficiency as well.

Scope

- Identify teams and team lead within each building
- Conduct a building-level competition – which building energy team can reduce building energy use the most within an 18-month timeframe
- Empower teams to make decisions about energy efficiency upgrades and operational improvements

Responsible Parties

- Lead: Becky Smith

- Other Responsible Parties:
 - Building champions
 - Partners in Energy staff
 - Communication Department
- Responsibilities:
 - Develop and promote building energy challenge
 - Develop signage/education materials for City buildings (branding should be consistent among all strategies)
 - Determine appropriate upgrades in each building

Timeline

- Determine Building Champions – end of Q2 2020
- Develop Building Energy Challenge – end of Q2 2020
- Begin Building Challenge – Q3 2020

Funding

- If prizes for building challenge are considered, will require additional funding

Partners

No additional partners required

Outreach Channels

- Email blasts to City staff about building champions, building challenge
- Signage within City buildings
- All employee emails

Measurement

- Energy use intensity within buildings
- Pre and post challenge surveys to gauge employee awareness

Table 12: Municipal Focus Area Strategy 3

Strategy 3: High-Efficiency Equipment Installations

Description

This strategy focuses on increasing the efficiency of equipment the City uses in its facilities by replacing equipment with high efficiency options, developing guidelines on efficiency, including possible updates to procurement policies, and leveraging Xcel Energy incentives to assist with upgrades.

Scope

- Replace equipment and lighting with high efficiency options; ensure that anything new is a higher efficiency option
- Develop efficiency design guidelines for simple things
- Research a green revolving fund to use rebates and/or savings to pay for additional high-efficiency equipment
- Balance HVAC system in City Hall – leverage rebate programs to pay for analysis

Responsible Parties

- Lead on equipment: Jason Hensel, Rob Webber
- Other Responsible Parties:
 - Matt Cashman, Doug Pullen
 - IT department – identify technology that can help achieve goals
 - Becky Smith and Brook Svoboda – revolving fund policy
- Responsibilities:
 - Communicate importance of equipment replacements with higher efficiency equipment
 - Review procurement policies and consider implementing a green revolving fund (so that utility incentives or other incentives get put back into the budget of the division that received the incentive instead of into the general fund)
 - Document and memorialize green procurement policy as a priority by having it adopted by decision makers

Timeline

- Put some focus on energy efficiency in the Capital Improvement Plan (CIP)
- Ongoing: manage jobs for higher efficiency equipment replacement
 - Incorporate Xcel Energy rebates, when applicable
- Research and adopt green procurement policy and green revolving fund (develop and adopt within 1 to 2 years)
 - Develop draft procurement policy Q1/Q2 2020
 - Develop draft green revolving fund guidelines Q1/Q2 2020
 - Bring policy proposals to City Council study session by Q2/Q3 2020 with target for Q4 adoption

Funding

- Incorporate upgrades into capital improvements planning process to allocate funding
- Revolving fund, if adopted
- Xcel Energy and United Power incentives

Partners

No additional partners required

Outreach Channels

- City Manager report
- Information to City Council about costs/benefits (see Appendix 3 for project types, potential costs, savings, and simple paybacks)

Measurement

- Energy savings (weather normalized using 3-year baseline)

Table 13: Municipal Focus Area Strategy 4

Strategy 4: ENERGY STAR Portfolio Manager® setup
<p>Description</p> <p>Setting up ENERGY STAR Portfolio Manager will allow the City to benchmark its facilities and track EUI, which is the basis of the municipal goal. This will provide monthly information about the performance of City buildings to inform decisions about energy upgrades and improvements.</p>
<p>Scope</p> <ul style="list-style-type: none"> • Collect previous year(s) gas and electric bills • Collect building information (area, floors, occupant, etc.) • Set up Portfolio Manager account; add building/utility data • Monitor Portfolio Manager account • Communicate progress
<p>Responsible Parties</p> <ul style="list-style-type: none"> • Lead: City Public Works or Finance department • Other Responsible Parties: Partners in Energy staff, building team leads • Responsibilities: <ul style="list-style-type: none"> ○ Partners in Energy staff: set up Portfolio Manager account, train City responsible party on use ○ Building team leads: login for view only to monitor building progress
<p>Timeline</p> <ul style="list-style-type: none"> • End of 2019: Gather utility bills for previous 2-3 years; fill out building information spreadsheet • Q1 2020: Set up Portfolio Manager account • Ongoing: regular monitoring • End of 2020: Communicate progress to City staff and public
<p>Funding</p> <p>No additional funding required</p>
<p>Partners</p> <p>No additional partners required</p>
<p>Outreach Channels</p> <ul style="list-style-type: none"> • Communicate through Building Energy Teams • Message about benchmarking through Education and Awareness strategy • Employ online resources to communicate progress
<p>Measurement</p> <ul style="list-style-type: none"> • Number of buildings set up in Portfolio Manager (benchmarked) • EUI of buildings

Cross-Cutting Focus Area: Renewable Energy

The City of Northglenn is also focused on increasing renewable energy generation throughout the community. As such, the planning team chose to develop a community-wide renewable energy goal and strategy, rather than a renewable energy target within each focus area. This cross-cutting focus area is intended to cover residences, commercial and small businesses, and municipal leadership.

Goal

- *Add 250 kW of renewable energy in Northglenn by 2025*

Strategy

Table 14: Cross-Cutting Focus Area Strategy

Strategy 1: Solar Bulk Purchase Program

Description

The Solar Bulk Purchase Program will be a joint effort with other Denver North Metro area cities to spur development of distributed renewable energy. The program will create a solar cooperative that residents can join to get discounted solar panel installations, including materials and labor, because of the ability to purchase materials in bulk. This strategy will involve partnering with the City of Westminster and the City of Broomfield to develop and administer the offering, conduct outreach about the solar bulk purchase program, and track participation.

Scope

- Partner with Westminster and other communities to develop a grant proposal to the Department of Local Affairs (DOLA) to develop and offer a bulk purchase option for rooftop solar to residents
- Get City Council endorsement and support to spend City resources to implement if the grant is awarded
- Identify funding source for 25%-50% match to DOLA grant
- Review successful models elsewhere in the state and develop similar process
 - Engage with administrative organization, like Solar United Neighborhoods
 - Solicit solar installation partners
 - Develop marketing materials and outreach campaign
 - Conduct outreach
 - Assist participants with permitting needs
 - Track participation and capacity installed

*Note: Strategy is dependent upon successful DOLA grant application

Responsible Parties

- Lead: Becky Smith
- Other Responsible Parties:
 - City communications staff
 - Other City liaisons (Westminster, etc.)
 - Solar program administrative organization (e.g., Solar United Neighborhoods)
 - Solar installer
 - Permitting department
 - Partners in Energy staff

- Responsibilities:
 - Collaborate on grant efforts
 - Identify matching funding
 - Develop process
 - Communicate about opportunity
 - Measure participation

Timeline

- DOLA Applications due December 1, 2019
- Decision by March 2020
- Planning/development 2nd through 4th quarters 2020
- Delivery starting first quarter 2021

Funding

- DOLA grant application – due December 2019

Partners

- City of Westminster
- City of Broomfield

Outreach Channels

- Ward meetings
- Connection
- Nextdoor
- Facebook
- Festivals/events

Measurement

- Number of participants in bulk purchase program
- kW of installed solar

How Are We Going to Stay on Course?

The planning team has worked hard to develop ambitious and achievable goals that align with the energy vision. To achieve the targets and energy goals outlined in this plan, the City of Northglenn and its partners identified in the strategies above will work to maintain consistent and clear communication among themselves and with the community at large. Each strategy will have sub-teams that will communicate regularly to work out the details of implementation, carry through on identified actions, and share progress and results. In the first months of implementation, a core subset of the planning team will meet as a large group via online meetings to ensure effective group coordination and communication.



Figure 21. Actions and Tracking

Operational Actions and Tracking

Partners in Energy staff will track energy data for Northglenn on a bi-annual basis and will report out on quantifiable progress. This tracking and reporting will include participation in Xcel Energy's programs and the associated savings. Each strategy team also will track supplemental quantitative and qualitative information about implementation, such as social media and website analytics, number of materials distributed, event dates, and estimated participants, etc.

Communication and Reporting

The City of Northglenn Partners in Energy staff will coordinate the use of the various communication channels to support the strategies with outreach efforts, updates, progress, and successes.

In addition to internal team communications, the City also wants to leverage the Energy Action Plan to increase awareness of energy use and the City's sustainability goals in the community. Updates and progress will be shared via the City website, social media outlets, and the Northglenn Connection.

Changing Course: Corrective Action

Even though this Energy Action Plan is designed for greatest impact over the next 18 months, the residual effect and momentum gained by showcasing efficiency, raising awareness, and encouraging action will have long-term positive implications. An effective energy plan is cyclical in nature (see Figure 21). In addition, the nature of implementation requires staging, flexibility, and course adjustments when necessary to be successful and to sustain progress. To ensure this plan remains on track, the planning team will review bi-annual tracking information and compare it against any supplemental strategy tracking metrics and information to assess whether the efforts appear to be making an impact.

To accommodate the fluid nature of action and implementation and learn from experience early in the process, the regularly scheduled team meetings as well as the bi-annual data check-ins will be a forum for agreeing on course adjustments or new approaches necessary to hit plan targets. Any adjustments will be documented and shared with the broader group and community as they occur.

During the implementation period, the best process for obtaining involvement from team members will be determined and lined up with appropriate cycles. These may include budget cycles, school calendars, seasonal events, etc. As these cycles and the appropriate review points in these cycles are incorporated, there may be different times of the year that specific elements may change, and at a minimum there should be at least one time every year for the major stakeholders to review progress, weigh in, and suggest changes to direction.

Beyond the Plan Horizon

Looking forward beyond the plan horizon, it is recommended that Northglenn reassess the energy efficiency and renewable energy goals and successes achieved over the implementation period. Future updates to this plan may be necessary as goals are achieved and new energy opportunities and ideas emerge. Communities with a successful track record of implementing their goals are welcome and encouraged to apply to future Partners in Energy offerings if new community goals or opportunities arise.

DRAFT

Appendix 1: Glossary of Terms

Use whichever appendices are appropriate. The following is a preliminary glossary.

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.

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: Home owners' 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.

MTCO_{2e}: 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 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.

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Appendix 2: Implementation Memorandum of Understanding

To be added.

DRAFT

Appendix 3: Xcel Energy Commercial Programs Payback Analysis

Program	Average Elec. Savings / Participant (kWh/yr)	Average Gas Savings / Participant (therms)	Average Rebate / Participant (\$)	Average Cost Savings / Participant (\$)	Average Total Cost / Participant (\$)	Payback Period (years)	Notes
Recommissio ning	85,804	814	\$5,728	\$5,907	\$13,701	1.3	Xcel Energy funds up to 75% of study costs, up to \$25,000. Pay up to \$400/kW or \$0.08/kWh for upgrades
Lighting- Small Business	6,540	199	\$682	\$545	\$1,894	2.2	Free analysis. Rebates on installation varies by light, see more
Motor & Drive Efficiency	79,904	0	\$8,526	\$5,430	\$23,578	2.8	Controllers: \$188 - \$3,000 Drives: \$400 - \$10,500, dependent on hp Motors: \$25 - \$5,500, dependent on type, hp, new vs early retirement
Commercial Refrigeration	5,029	300	\$377	\$437	\$1,664	2.9	Free assessment, rebate varies by equipment, see more
Energy management systems	162,443	3,204	\$12,701	\$14,506	\$73,733	4.2	Up to \$600/kW saved and/or \$4/Dth saved
Lighting Efficiency	33,394	0	\$3,047	\$2,077	\$13,063	4.8	Rebates on installation varies by light, see more

SPONSORED BY: MAYOR ESQUIBEL

COUNCILMAN'S RESOLUTION

RESOLUTION NO.

No. CR-144
Series of 2019


19-143
Series of 2019

A RESOLUTION APPROVING A MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY OF NORTHGLENN AND XCEL ENERGY FOR THE PHASE 2 PLAN IMPLEMENTATION OF THE PARTNERS IN ENERGY PROGRAM

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF NORTHGLENN, COLORADO, THAT:

Section 1. The Memorandum of Understanding between the City of Northglenn and Xcel Energy, as attached hereto, for the Phase 2 Plan Implementation of the Partners In Energy Program is hereby approved and the Mayor is authorized to execute same on behalf of the City of Northglenn.


DATED, at Northglenn, Colorado, this 25th day of November, 2019.


ANTONIO B. ESQUIBEL
Mayor

ATTEST:


JOHANNA SMALL, CMC
City Clerk

APPROVED AS TO FORM:


COREY Y. HOFFMANN
City Attorney

Memorandum of Understanding Phase 2 – Plan Implementation

Rebecca Smith
City of Northglenn
11701 Community Center Drive
Northglenn, CO 80233

The intent of this Memorandum of Understanding is to recognize the achievement of the City of Northglenn 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 Northglenn 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 November 1, 2019 through June 30, 2021.

Xcel Energy will support the City of Northglenn in achieving the goals of its Energy Action Plan in the following ways:

Residences

- **Residential Communications Campaign**
 - Coordinate strategy team organization, meetings, and communication
 - Provide development of co-branded marketing materials
 - Support promotion of events through coordinated development of email content, website content, or other social media content
 - Serve as liaison to the City to coordinate with Xcel Energy program staff on Demand Side Management (DSM) and renewable energy
 - Provide 200 LEDs for installation at senior residences
 - Support development of ward challenge structure, as applicable
 - Support one in-person event to celebrate and recognize winning ward (tabling, LEDs, one Partners in Energy staff to attend)
 - Support tracking and reporting progress to goals

- **Home Energy Squad (HES) Buy-down**
 - Coordinate with City staff on schedule and outreach
 - Support development of co-branded marketing materials
 - Support promotion of buy-down through coordinated development of email content, website content, or other social media content
 - Serve as liaison to support communications between City and Xcel Energy program delivery staff, as applicable
 - Track and report participation

- **Solar Bulk Purchase Program**

- Support for this strategy is dependent upon the City of Northglenn identifying partners and funding to support a North Metro co-op program.
- Coordinate with City staff as needed on how to align outreach around options for clean energy and link bulk solar installations and Solar*Rewards incentives
- Provide development of co-branded marketing materials that describe incentives available, including Solar*Rewards
- Support promotion of bulk purchase program through coordinated development of email content, website content, or other social media content as appropriate
- Note: Xcel Energy is not able to promote one solar installer over any other but can promote the bulk purchase program and incentives available for installing solar

Support funded by Xcel Energy for this strategy is not to exceed 110 hours. These hours will include those provided through the Partners in Energy team from Brendle Group and do not include support provided by Xcel Energy internal program staff.

Municipal Facilities

- **Increased Education & Awareness and Building Energy Teams**

- Coordinate strategy team organization, meetings, and communication
- Provide development of co-branded marketing materials
- Support development of messaging for staff (efficiency tips, signage, email content, website content)
- Support approach to sharing success and project highlights with staff and community
- Help track project and building EUI progress
- Provide support for building team rewards (LEDs)

- **City Facility Benchmarking and High-efficiency Equipment**

- Assist City staff to establish guidelines to identify high-priority buildings and help set up ENERGY STAR Portfolio Manager® accounts for these City buildings
- Support tracking and reporting progress to goals

Support funded by Xcel Energy for this strategy is not to exceed 100 hours. These hours will include those provided through the Partners in Energy team from Brendle Group and do not include support provided by Xcel Energy internal program staff.

Commercial & Small Business

- **Business Energy Efficiency Education & Awareness**

- Support strategy team organization, meetings, and communication
- Serve as liaison among City and Xcel Energy program and vendor staff
- Support development, publishing, and printing of case studies showcasing local businesses and building owners/property managers that have implemented energy efficiency projects and develop other sector-specific collateral targeting conservation
- Coordinate with City economic development, building department, and communications staff to share program opportunities
- Provide development of co-branded marketing materials

- Support Business Appreciation Breakfast and one additional event for businesses to learn about Xcel Energy programs (up to two events)
- Support tracking and reporting progress to goals

Support funded by Xcel Energy for this strategy is not to exceed 100 hours. These hours will include those provided through the Partners in Energy team from Brendle Group and do not include support provided by Xcel Energy internal program staff.

Project Management and Reimbursed Expenses

- Provide presentation content outlining Partners in Energy process, identified focus areas and goals, and benefits to community to be presented to Council as part of approval process
- Facilitate regular check-in meetings, track and report energy impacts and activities (process annual data from Xcel Energy), and help coordinate implementation kick-off activities
- Provide up to \$3,800 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.

Support funded by Xcel Energy for project management is not to exceed 85 hours. These hours will include those provided through the Partners in Energy team from Brendle Group and do not include support provided by Xcel Energy internal program staff.

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

- Working to achieve the energy savings impacts outlined in the energy action plan and shown in the table below:

City of Northglenn Conservation Goals

	Electricity Savings (in kWh)	Natural Gas Savings (in therms)
Baseline Historic Energy Savings	1,813,300	27,200
Incremental Plan Energy Savings (11/1/19-3/31/2021)	3,570,000	126,000
Total Plan Energy Savings (baseline + plan energy savings)	5,383,300	153,200

- Performing the coordination, tracking, and outreach duties as outlined in the Energy Action Plan that include but are not limited to the following:

Residences

- **Residential Energy Efficiency Campaign**
 - Provide strategy team leadership

- Lead campaign development to educate residents and drive conservation actions through ward challenge
- Support development of printed marketing materials, event materials, and social media and other outreach content
- Use City's media outlets to deliver outreach and communicate with residents
- Launch activities and track metrics pertaining to number of residences reached
- Coordinate with School District, Youth Commission, and senior organizations to promote home installation support
- Lead event tabling at community events (including coaching volunteers to support)
- Share City's Energy Action Plan information at city events as appropriate
- Coordinate with other City staff on building challenge (in conjunction with building team efforts)
- **Home Energy Squad Buy-down**
 - Identify funding mechanism
 - Work directly with HES program and vendor staff to contract buy-down and payment logistics
 - Coordinate on co-branded marketing materials
 - Promote buy-down through coordinated development of email content, website content, or other social media content
 - Administer buy-down program
 - Track and share participation
- **Solar Bulk Purchase Program (if funding is identified)**
 - Develop offering based on grant outline, including matching funding and administration
 - Coordinate with Partners in Energy staff on any useful co-branded marketing materials
 - Support promotion of program through coordinated development of email content, website content, or other social media content
 - Administer program
 - Track and share participation

Municipal Facilities

- **Increased Staff Awareness, Building Teams & Benchmarking**
 - Provide strategy team leadership
 - Coordinate with Partners in Energy staff to develop outreach/awareness content for building teams and staff communications
 - Maintain ENERGY STAR Portfolio Manager® and analyze energy data for participating municipal buildings
 - Develop process for tracking energy use intensity data for city facilities to help measure progress
 - Identify appropriate efficiency projects for City facilities and share results
 - Use City's media outlets to share case studies and perform outreach to share successes on internal energy saving efforts

Commercial & Small Business

- **Business Energy Efficiency Campaign**
 - Provide strategy team leadership
 - Support development of success stories or case studies, printed marketing materials, and other sector-specific collateral and provide review and input as appropriate for social media content
 - Develop list of commercial property managers and owners
 - Publish success stories in selected city-owned or managed outreach channels
 - Coordinate strategy efforts with other current business initiatives that incorporate outreach (economic development, building department, etc.) delivered by the City
 - Use City's media outlets to deliver outreach and communicate with local businesses
 - Lead development of detailed outreach action plan
 - Provide energy efficiency and program information and tabling support at business community events, as applicable, and at the Annual Business Appreciation Breakfast
 - Share City's Energy Action Plan information at City events as appropriate

- **City Incentives for Commercial Projects**
 - Provide strategy team leadership
 - Identify funding mechanism
 - Develop process for businesses to apply and receive incentives
 - Propose to City Council and guide through adoption process, if required
 - Promote incentive program buy-down through coordinated development of email content, website content, or other social media content

Project Management

- Participate in coordination and tracking of scheduled check-ins, activities, and events
- Provide Xcel Energy an opportunity to review marketing materials to assure accuracy when they incorporate the Xcel Energy logo or reference any of Xcel Energy's products or services
- Share the plan document, supporting work documents, collateral, and implementation results from the Energy Action Plan with the public - the experience, successes, and lessons learned from this community will inform others looking at similar or expanded initiatives
- Share progress on upcoming sustainability planning as it relates to activities outlined in the Energy Action Plan

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 Northglenn. 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 Northglenn ordinances, City of Northglenn regulatory jurisdiction, or Colorado's utility regulatory jurisdiction.

Single Points of Contact

All communications pertaining to this agreement shall be directed to Becky Smith on behalf of the City of Northglenn and Tami Gunderzik on behalf of Xcel Energy.

Xcel Energy is excited about this opportunity to support the City of Northglenn 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.

For City of Northglenn:

Signature: Antonio B. Esquibel

Name: Antonio B. Esquibel

Title: Mayor

Date: November 25, 2019

For Xcel Energy:

Signature: Hollie Velasquez Horvath

Name: Hollie Velasquez Horvath

Title: Director, Community Relations

Date: 1/10/2020

Water Conservation Rebates

Save money on your water bill when you make your home more efficient with water conservation rebates!

Northglenn utility customers are eligible to receive water bill credit when they purchase and install the following items:

- Water Efficient Toilet (1.28 GPF or less) - up to \$75 rebate
- Water Efficient Washing Machine (Energy Star) - up to \$100
- Rotary Sprinkler Head - \$3 per head
- Irrigation Timer (WaterSense) - up to \$100
- Rain Barrel - up to \$50
- *Turf Replacement - \$1 per square foot replaced (up to \$1000)*

**Please contact conserveH2O@northglenn.org to ensure your project will qualify.
Rebates available while funding lasts**



Apply for a rebate in 3 easy steps:

1. Read rebate rules at www.northglenn.org/rebates and print applications.
2. Fill out an application to bring to City Hall (11701 Community Center Drive, Northglenn CO) along with your receipt.
3. Receive credit on your water bill within 60 days.

 Find us on Facebook @NorthglennWater



Questions?

Contact Water Conservation at 303.450.4045 or
conserveH2O@northglenn.org.



North Metro Solar Co-op Concept Memo

February 2020

About Solar United Neighbors

Solar United Neighbors is a vendor-neutral 501(c)3 nonprofit dedicated to building a clean, equitable energy system with rooftop solar as the cornerstone. We facilitate a prosperous and just energy transition by providing free public education about solar energy, organically growing market demand for distributed rooftop solar, and supporting local solar jobs and businesses in economically distressed areas. We utilize co-ops (group purchases) to jump-start and grow local clean energy markets, bring new constituencies into the movement, and build support for inclusive clean energy policies.

North Metro Solar Co-op

The North Metro Solar Co-op is an ongoing initiative of participating municipalities dedicated to supporting the adoption of distributed solar throughout the region through ongoing collaboration to streamline permitting, facilitate a group-buy process, and support community engagement to support solar adoption for all.

Achieving progress for community goals around energy and climate reductions requires collaboration and ongoing commitment. The North Metro Solar Co-op (geographically focused north of I-70 and south of Northwest Parkway / E-470) is designed to be a multi-year municipal-supported collaboration to catalyze home- and business-scale solar, storage, and electric vehicle charging adoption throughout the region. Locales providing dedicated funding and/or in-kind support will receive services from Solar United Neighbors which can include solar information sessions, engagement activities, and facilitating a solar co-op (group-buy) process for community members.

How to Participate in North Metro Solar Co-op as a Municipality

The North Metro region consists of a variety of municipal entities with varying populations and program funding. We do not want to turn away any municipality that is interested in partaking in a solar co-op and want to create a means for fair entry. As a not-for-profit, we do seek financial support and have tiered recommended financial contributions based on population below. In addition, we ask each participating municipality to appropriately support our local community outreach efforts as they can commit. **Higher levels of contribution will be provided a higher level of ongoing support from SUN, determined on a case-by-case basis.**

Population	Financial Contribution	Programming Contribution	Resources Provided by SUN
≤ 25,000	\$5,000	<ul style="list-style-type: none"> Provide representation at quarterly coordination meetings 	<ul style="list-style-type: none"> Participation in localized solar co-op 1-2 solar information sessions Ongoing support
≤ 50,000	\$10,000	<ul style="list-style-type: none"> Outreach support including: <ul style="list-style-type: none"> Recruit participants for active solar co-ops in region Support media campaign to recruit and engage public Support venue reservations and logistics Publicly represent solar co-op with media when applicable 	<ul style="list-style-type: none"> Dedicated localized solar co-op 3 solar information sessions Ongoing support
≤ 100,000	\$15,000		
≥ 100,000	\$20,000		
N/A	< \$5,000	<ul style="list-style-type: none"> Optional, but encouraged: <ul style="list-style-type: none"> Participate in Colorado Solar Congress Pursue SolSmart designation 	<ul style="list-style-type: none"> Consult with Solar United Neighbors

Solar Co-op Process

Solar co-ops (group-buying process) generally require 8-10 months to complete and are divided into four phases. During each phase, the roles and responsibilities of the community partner may vary, depending on the size of the community.

- **Phase 1: Outreach and Promotion**

Months 1-3

Create and execute an outreach strategy to drive prospective participants to the solar co-op website and in-person solar information sessions. The goal is to get 50-100 people to attend and at least 30 participants to sign up for the solar co-op. Community partners help identify appropriate media and community venues that will drive sign ups and spread the word about the solar co-op.

- **Phase 2: Request for Proposals and Bid Selection**

Month 3

Once the solar co-op has at least 30 participants, Solar United Neighbors issues a Request for Proposals (RFP) to area installers for them to bid on the project. Solar United Neighbors will then convene a selection committee made up of co-op participants and they will select the group's installer. Solar United Neighbors facilitates the process but does not make the selection. Once the installer is chosen, Solar United Neighbors and participating partners coordinate a media strategy to announce the installer selection and drive further sign-ups to grow the group. Depending on interest and demand, the RFP may include residential and/or commercial projects and prioritize options for battery and/or Level-2 electric vehicle charging products.

- **Phase 3: Additional Recruitment**

Months 3-6

Once the solar co-op's installer is chosen, they will visit each participant's home and provide them with an individualized proposal for a solar PV system based on the group pricing. While this is taking place, Solar United Neighbors and community partners will continue to recruit additional solar co-op participants to join the group. A successful solar co-op will have, at minimum, 100 sign ups when it closes.

- **Phase 4: Assessment, Celebration, and Ongoing Support and Engagement**

Months 6-10

Once the sign-up deadline for the solar co-op passes, Solar United Neighbors will continue to work with solar co-op participants to ensure they have a positive experience as they sign contracts and have solar PV systems installed. Community partners will help plan and implement a celebration party for solar co-op participants, local elected officials, and any other groups interested in celebrating the successful co-op. Members of the solar co-op will be invited to continue to participate in regional activities.

Tentative North Metro Solar Co-op Program Goals and Timeline

These goals and timelines are tentative and will be reviewed and approved by members of the North Metro Solar Co-op

- **January – April 2020**
Outreach, recruitment, and strategic planning with municipal partners
- **April 2020**
Formal announcement of North Denver Solar Co-op with municipal partners
- **April – December 2020**
Launch 1-2 solar co-ops in the North Metro Co-op territory. These locations will be determined based on available resources and strategy. A typical solar co-op delivers:
 - 500 community members educated about solar
 - 100 - 150 participating members
 - Approximately 30% of members install solar
 - Average 7 kW system size
 - \$850,000 local investment made in solar; average of 7 solar jobs created
 - Eliminate emissions from 10 million kWh of electricity over lifetime of systems
 - Average 20-30% cost savings to the homeowner from a typical solar installation
- **June 6, 2020**
Colorado Solar Congress held in Denver at the Auraria Campus (program is member-focused, covering topics including solar 101, policy, and sharing of best practices for localities)
- **TBD Quarterly Check-ins**
Gathering of municipal partners to reflect on progress, challenges, and opportunities for further collaboration

Beyond 2020

Upon successful deployment and expansion of the North Metro Solar Co-op, communities will seek funding support to facilitate the launch of a Solar for All program to support low-to-moderate income installations throughout region.

Contact Information

Bryce Carter
Colorado Program Director
Solar United Neighbors
bcarter@solarunitedneighbors.org
720-295-3804



19-XXXXXX

**CITY OF LAKEWOOD
SUSTAINABLE NEIGHBORHOOD PROGRAM
LICENSE AGREEMENT NO. XXXX**

THIS LICENSE AGREEMENT (“Agreement”) is made by and between the City of Lakewood, Colorado, a Colorado Home Rule Municipality, with offices located at 480 South Allison Parkway, Lakewood, Colorado 80226 (“Licensor”), and the City of _____ with offices located at _____ (“Licensee”).

RECITALS

Licensor owns and controls certain exclusive rights in the Sustainable Neighborhood Program (“Program”), as defined below, in connection with educational and incentive-based services for the promotion of sustainability, environmental awareness and the reduction of the environmental footprint in urban communities. Licensee desires to be granted the right to participate in the Program and to utilize Licensor’s expertise, and instructional services in such efforts. The parties desire to memorialize their agreement and relationship concerning the Program as set forth below, effective as of this ____ day of _____, YEAR (“Effective Date”).

AGREEMENT

In consideration of the mutual promises herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

- I. **PROGRAM DEFINED.** As used herein, “Program” means and includes all of the following:
- A. The Program trademarks (both registered and common law): “Sustainable Neighborhood,” “Sustainable Neighborhood Network,” “Sustainable Neighborhood Program;” and the following logos and any and all variations thereof:



- B. The right to participate in Licensor's award and recognition programs;
- C. All printed, graphical, web-based and other tangible materials furnished or produced by Licensor as part of the Program;
- D. Use of the Sustainable Neighborhood Network website. Refer to Attachment B for website integration and responsibilities of the Licensor and Licensee.
- E. Licensor's instructional, supervisory and educational services.

II. GRANT OF NON-EXCLUSIVE LICENSE; FEES.

- A. Authorization. Subject to all provisions of this Agreement, and in consideration of the Fees set forth herein, Licensor grants to Licensee, subject to the terms and conditions of this Agreement, a non-exclusive license ("License") to participate in the Program; to use, display and reproduce Program trademarks and materials in any reasonable manner associated with the Program; and to display awards and recognition earned from Licensor upon successful completion of the Program. Licensor will make reasonable efforts to furnish Licensee with Program modifications and improvements. Licensee is further authorized to fund future Program enhancements upon written approval from Licensor. Any such Program enhancements shall be shared with participating Sustainable Neighborhood Network communities.
- B. Restrictions on Licensee. Licensee **shall not**: (a) alter or modify any of the Program trademarks in any manner; provided, however, that Licensee shall be permitted to submit requested changes to Program trademarks, and upon written approval from Licensor, add text above, below or within a Program trademark for the purpose of identifying Licensee; (b) offer, sponsor or conduct a Sustainable Neighborhoods Program for unrelated communities using the Program trademarks or Program materials; (c) alter or remove any trademark or copyright designations on Program materials identifying Licensor as the owner of such materials; (d) contest Licensor's ownership of the Program trademarks and Program materials; (e) make any representation or warranty concerning the Program or its results that is not authorized in writing by Licensor; or (f) commit any act or omission that reflects adversely on the Program or on the goodwill or reputation of the Program, the License or Licensor.
- C. No Restrictions on Licensor. Nothing in this Agreement shall prohibit or limit Licensor from or in offering, modifying and exploiting the Program for itself and for the benefit of third parties.
- D. Ownership and Goodwill. Licensor shall remain owner of all right, title and interest in the Program, the Program materials and the Program trademarks, and all goodwill arising from Licensee's exercise of this License will inure to the benefit of Licensor.

E. Fees.

1. Licensor hereby acknowledges that Licensee has paid to Licensor an Initial Licensing Fee of Five Thousand Dollars (\$5,000). Following the initial year and for the duration of this Agreement, Licensee shall pay to Licensor an annual Licensing Fee of Two Thousand Five Hundred Dollars (\$2,500) (collectively, the “Licensing Fees”).
2. The Licensing Fees are in consideration for use of the Program and the Program Trademarks and to defray Licensor’s costs associated with providing the Program, including, but not limited to, Program enhancements, development of Program infrastructure, customized logos, collateral, website maintenance and staff time, all as identified in Attachment A.

III. TERM AND TERMINATION.

A. Initial and Renewal Terms. The initial term of this Agreement shall be __ years from the Effective Date (the “Initial Term”). The term of this Agreement may be extended by written agreement of the parties.

B. Expiration and Termination.

1. Licensee. Licensee may terminate this Agreement at any time for any reason, upon written notice to Licensor.
2. Licensor. This Agreement may be terminated by Licensor for cause immediately if: (i) Licensee materially breaches this Agreement and fails to cure such breach within thirty (30) days after receipt of written notice; or (ii) Licensee ceases to participate in or adhere to the Program.

3. Rights and Obligations of Parties upon Expiration/Termination.

- a. Upon any expiration or termination of this Agreement, all rights of Licensee hereunder shall immediately terminate, and Licensee shall cease active conduct of the Program and use of the Program trademarks, shall permanently destroy and cease use of all copies of the Program materials and other tangible items bearing or displaying the Program trademarks, *to the extent such materials are then in Licensee’s possession or under Licensee’s control*, and shall provide written certification to Licensor of such destruction.
- b. If this Agreement is terminated by either party for any reason within the first six (6) months of any calendar year, Licensor shall refund to Licensee the Licensing Fee on a prorated basis as follows: Licensee shall receive one-twelfth (1/12) of the Licensing Fee for each full calendar month remaining in the calendar year after such termination.

IV. NOTICES. All notices required by the terms of the Agreement must be hand delivered; sent by overnight courier service; mailed by certified mail, return receipt requested; or mailed via United States mail, postage prepaid, to the following:

If to Licensor:

Sustainability Manager
City of Lakewood Planning Department
480 S. Allison Pkwy.
Lakewood, CO 80226
jonwac@lakewood.org

With a copy of any such notice to:

City of Lakewood
Attn: City Attorney
480 S. Allison Pkwy.
Lakewood, CO 80226
gregra@lakewood.org

If to Licensee:

Licensee Department
Street Address
City, State Zip

With a copy of any such notice to:

Licensee City Attorney's Office
Street Address
City, State Zip

Notices hand delivered or sent by overnight courier are effective upon delivery. Notices sent by certified mail are effective upon receipt. Notices sent by regular U.S. Mail are effective three (3) days after mailing. The parties may designate substitute addresses where, or persons to whom, notices are to be mailed or delivered. However, these substitutions will not become effective until actual receipt of written notification.

V. MISCELLANEOUS.

- A. Disclaimer. Licensee acknowledges that the Program is for informational purposes only and is not designed or warranted to achieve or result in any specific or objectively or scientifically measurable impact on utility usage, energy costs or other environmental factors. Licensee accepts the Program as is, without warranty, and at Licensee's sole risk.

- B. Entire Agreement; Inurement; Assignment. This document states the entire agreement of the parties with respect to the subject matter addressed, and supersedes all prior discussions and representations. It shall be binding upon and inure to the benefit of the parties and their respective successors and assigns. Licensee shall not transfer, sublicense or assign any of its rights or privileges hereunder without the prior written consent of Licensor in its sole discretion.
- C. Severability. Should any part or provision of this Agreement be held by a court of competent jurisdiction to be unenforceable, the validity of the remainder of the Agreement shall not be affected, and the affected provision shall be amended by the court to the minimum extent necessary to conform its terms to the law, consistent with the intent of the parties.
- D. Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado.
- E. Open Records. The parties recognize that Licensor and Licensee are governmental entities and as such are subject to the Colorado Open Records Act, C.R.S. §§ 24-10-101, *et seq.*
- F. Counterparts; Electronic Disposition. This Agreement may be executed in any number of counterparts, each of which shall be deemed to be an original and all such counterparts taken together shall be deemed to constitute one and the same instrument. The parties acknowledge and agree that the original of this Agreement, including the signature page, may be scanned and stored in a computer database or similar device, and that any printout or other output readable by sight, the reproduction of which is shown to accurately reproduce the original of this Agreement, may be used for any purpose as if it were the original, including proof of the content of the original writing.
- G. Electronic Signatures. Licensor consents to the use of electronic signatures by Licensee. This Agreement, and any other documents requiring a signature under this Agreement, may be signed electronically by Licensee in the manner specified by Licensee. Notwithstanding the foregoing, nothing herein shall constitute a requirement or obligation on the part of Licensor to use any form of electronic signature, regardless of Licensee's policies or procedures to the contrary.

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SIGNATURE PAGES AND EXHIBITS FOLLOW

IN WITNESS WHEREOF, the parties have executed this Agreement as of the Effective Date.

LICENSEE:

CITY OF LAKEWOOD

Kathleen E. Hodgson, City Manager

ATTEST:

Margy Greer, City Clerk

Approved as to form:

Gregory D. Graham, Deputy City Attorney

Recommended for approval:

Jonathan Wachtel, Sustainability Manager
Department of Planning

LICENSOR:

ATTEST:

By: _____
_____, Clerk

By: _____

APPROVED AS TO FORM:

By: _____
City Attorney

ATTACHMENT A

LICENSE FEES AND SERVICES:

This Agreement authorizes Licensee to use the Program for the time period of MONTH DAY, YEAR through MONTH DAY, YEAR.

Licensor will provide Licensee with resources and services that will assist in the continued development of the Program. These services may include, without limitation:

1. Customized Program logos
2. Print and digital materials
 - a. Program overview
 - b. Credit brochure
 - c. Goals, targets and suggested projects brochure
 - d. Application and Launch resources
 - e. Neighborhood interest survey
 - f. Presentations
3. Sample Marketing Materials
 - a. Postcard and newsletter
 - b. Press release
 - c. Social media posts
4. Design standards for Program
5. One-on-one training
6. Use of the Sustainable Neighborhood Network website (SustainableNeighborhoodNetwork.org) as outlined in Attachment B.

Licensee will provide Licensor with resources and services that will assist in the continued development of the Program. These services may include, without limitation:

1. Revised Program materials;
2. Identification of additional materials that could enhance the Program;
3. Suggestions for Program-related trainings, expanded resources and website enhancements;
4. Review and critique of the Program certification requirements;
5. Involvement in Network events and;
6. Participation in check-ins and updates with the Licensor

ATTACHMENT B**WEBSITE INTEGRATION AND RESPONSIBILITIES:**

The Licensor will provide the Licensee with administrative access to manage the portion of the Sustainable Neighborhood Network website (SustainableNeighborhoodNetwork.org) that supports the Licensee Sustainable Neighborhoods Program.

Licensor will provide the Licensee with:

1. Integration of the Licensee into the Sustainable Neighborhood Network website
 - a. Agency creation
 - b. Menu bar addition
 - c. Landing page
 - d. Neighborhood page template
 - e. Quick URLs
 - f. Universal widgets for tracking neighborhood credits and projects
 - g. Email templates
 - h. Disclaimer language and privacy policy
2. Training
 - a. Adding new neighborhood pages
 - b. Administrative pages
 - c. Page design
 - d. Adding documents and images to libraries
 - e. Reviewing forms and updating credits
3. Timely response to website issues and update requests

Licensee responsibilities include, without limitation:

1. Inform Licensor when there are website issues in a timely manner
2. Send Licensor website update requests and identify preference of how to handle them
 - a. The request will either be entered into a que with the Licensor's IT department or
 - b. If approved by licensor, the request may be funded by the licensee and completed and managed by the Licensor's third party for faster implementation
3. Maintain City and Neighborhood Pages to include:
 - a. A City Landing page providing information about the Program
 - b. Most relevant, up-to-date content
 - c. Neighborhood credits earned
 - d. Program logos
4. Ensure all SNN documents and logos uploaded to site meet the design standards set forth by the Licensor