City of Falcon Heights
Environment Commission

City Hall
2077 Larpenteur Avenue W.

Monday, April 11, 2022
6:30 p.m.
Zoom: https://us02web.zoom.us/j/85171419171

A G E N D A

A. CALL TO ORDER: 6:30 p.m.

B. ROLL CALL:

Martin McCleery ____	Patrick Mathwig ___
Esha Seth ____	Pedro De Filippo Vannucci___
John Pellegrini_____	Amy Christiansen_____
Council Liaison Meyer ____	Staff Liaison Moretto ____

C. APPROVAL OF MINUTES: February 15, 2021

D. AGENDA

1. Review and Discuss the GreenStep Worksheet – GreenStep 5 Achieved.
2. Climate Action Plan Discussion

E. NEWS AND ANNOUNCEMENTS

1. Other

F. ADJOURN

Next Meeting: May 9, 2022

If you have a disability and need accommodation in order to attend this meeting, please notify City Hall 48 hours in advance between the hours of 8:00 a.m. and 4:30 p.m. at 651-792-7600. We will be happy to help.

City of Falcon Heights
Environment Commission

City Hall
2077 Larpenteur Avenue W.

Tuesday, February 15, 2022
6:30 p.m.

MINUTES

A. CALL TO ORDER: Chair Mathwig called the meeting to order at 6:30 p.m.

B. ROLL CALL:

Members present: Mathwig, Vannucci, Pellegrini, Christiansen

Also present: Council Liaison Meyer, Staff Liaison Moretto

C. APPROVAL OF MINUTES: September 12, 2021

Moved, seconded to approve revised minutes for September 12, 2021; motion carried.

D. AGENDA

1. 2022 Priorities
    i. Identified some priorities for the commission. Will need to circle back with a core plan.
    ii. Recruit more members to the commission
    iii. Use technology like Google Docs to increase collaboration
    iv. Work on Recycling Contract
    v. Try to get someone from Ramsey County to talk on Recycling
    vi. Possible Single Trash Hauler Discussion
2. Partner with UMN
    i. Look to find projects from UMN
    ii. Recruit commission members from UMN
    iii. Find ways to identify resources from the university that are readily available.
3. Climate Emergency Declaration

i. Work with the Chair and Council Liaison to work through details
ii. Bring back to the commission to discuss and establish a deadline
iii. Bring examples of the Plan to the commission for consideration (Saint Louis Park)

E. ADJOURN

The meeting was adjourned at 9:30 p.m.

The City That Soars!

ENVIRONMENT COMMISSION MEMO

Meeting Date	March 14, 2022
Agenda Item	Agenda D2
Submitted By	Paul Moretto, Community Development Coordinator/Planner

Item	Climate Action Plan
Description	Many cities around the state have adopted Climate Action Plans addressing the pressing issues of climate change. Staff and City Council has requested the Environment Commission study the issues and actions the City has taken and identity future action through a Climate Action Plan. Attached to this memo is a Plan presentation, resolution template, and a one-page description of the Climate Action Plan. Staff requests a discussion and a road map for the development of this Climate Action Plan and Policy recommendations to City Council.

A RESOLUTION JOINING CITIES AND COUNTIES ACROSS MINNESOTA DECLARING A CLIMATE EMERGENCY AND ASKING THE STATE AND FEDERAL GOVERNMENTS TO HELP ADDRESS IT AND PROVIDE VALUABLE RESOURCES)

WHEREAS Falcon Heights has just this past year experienced numerous climate change related impacts including a record June heat wave, dangerous air quality from drought-fueled forest fires where even healthy people were encouraged to remain inside, and water restrictions from the same drought, making it clear that the climate crisis is not only a future issue — it is affecting us here and now;

WHEREAS extreme weather will create new challenges for [the City of Falcon Height's infrastructure and finances and will pose a threat to the economic vitality of our residents and businesses;

WHEREAS the greatest burden from an inadequate response to the climate crisis will be felt by historically marginalized or underserved communities as well as the youngest generation, including the children and grandchildren of Falcon Heights;

WHEREAS in Minnesota, the ten warmest and wettest years ever recorded have all occurred since 1998, warming surface waters are leading to a significant loss of fish habitat for many prominent species as well as increasing the risk of harmful algae blooms, forests are changing as native northern species are strained by warming temperatures, crops are stressed by cycles of drought and floods, home insurance rates are rising far faster than the national average from an average of $368 in 1998 to $1348 in 2015, and faster warming winters are leading to new pests as well as shorter winter recreation seasons;

WHEREAS, the bi-partisan Next Generation Energy Act, passed by the Minnesota State Legislature and signed by then Governor Tim Pawlenty in 2007, committed our State to achieving to an 80% reduction in greenhouse gas (GHG) emissions by 2050 and with interim goals of 15% and 30% below 2005 GHG emissions levels by 2015 and 2025, respectively, with cities being key drivers of achieving these goals;

WHEREAS, our State did not meet its 2015 goal, and is not yet on track to reach our future targets;

WHEREAS, in April 2016 world leaders from 175 countries, including the United States, recognized the threat of climate change and the urgent need to combat it by signing the Paris Agreement, agreeing to "pursue efforts to limit the temperature increase to 1.5 degrees Celsius";

WHEREAS, we have already reached a temperature increase of nearly 1.1 degrees Celsius (nearly 2 degrees Fahrenheit) as compared to pre-industrial times and the death and destruction already wrought by this level of global warming demonstrate that the Earth is

already too hot for safety and justice, as attested by increased and intensifying wildfires, floods, rising seas, diseases, droughts, and extreme weather;

WHEREAS, in August 2021 the Intergovernmental Panel on Climate Change (IPCC), the United Nations body responsible for assessing the science related to climate change, released a report that stated “It is unequivocal that human influence has warmed the atmosphere and land,” and that “Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years,” and “with every additional increment of global warming, changes in extremes continue to become larger”;

WHEREAS, recent scientific research indicates that to achieve the goal of limiting temperature increase to 1.5 degrees Celsius, carbon emissions must be halved by 2030 and reach net zero global emissions by 2050;

WHEREAS, a transition to a clean energy economy, if not carefully planned, would have a disruptive effect on impact on the livelihoods of many in our community while a well-planned transition may provide expanded job opportunities for local residents;

WHEREAS, 2,012 jurisdictions in 34 countries including Minnesota leaders Duluth, Minneapolis, and Crystal Bay Township, have already declared climate emergencies in order to focus attention on the need for rapid action to address climate change;

NOW, THEREFORE, BE IT RESOLVED, that the City of Falcon Heights declares that a climate emergency threatens our city, region, state, nation, humanity and the natural world.

BE IT FURTHER RESOLVED, the City of Falcon Heights commits to working for a just transition and climate emergency mobilization effort and will [pick or create what works for your city]:

- Create/Implement a Climate Action Plan
- Improve the efficiency and quality of street lighting, traffic signals and outdoor public lighting.
- Replace the city's **existing street lighting** with Dark Sky-compliant LEDs, modifying any city franchise/utility agreement and adding smart grid attributes.
- Position city with shovel-ready (or identified) projects to take advantage of state and federal climate action funding opportunities

BE IT FURTHER RESOLVED, the City of Falcon Heights calls on the Minnesota legislature and executive branch to immediately and aggressively support cities of all sizes around Minnesota to both mitigate and adapt to the effects of climate change including providing funding and resources for the development and implementation of climate action plans.

BE IT FURTHER RESOLVED, the City of Falcon Heights calls on the federal government to immediately commit resources to support the climate mitigation and adaptation efforts of cities large and small, to invest in the infrastructure needed for a sustainable future, to ensure that

investment is at the scale needed, and to provide the necessary global leadership to keep global warming to 1.5 degrees Celsius (2.7 degrees Fahrenheit).

Climate Emergency Declarations/Resolutions

Minnesota Coordinated Effort

"The time is now to come together as a united force, to insure a livable future for us, for your children, for your grandchildren, and for the generations to come. The time is now to create a sustainable future." *- From then high school junior Sophia Skinner before St. Louis Park City Council*

What we're doing:

- Local governments of all sizes, and in all regions of Minnesota will join in declaring a Climate Emergency on January 24th or 25th, calling for immediate action at all levels of government to address the climate crisis. By acting simultaneously, these state-wide localities expect to amplify their impact, speaking together to urge local, state and federal action.

Why declare a Climate Emergency?

- **The dramatically evident shift in our climate IS an emergency!** It's here now; it's going to get worse; and it's impacting all regions of our state, country, and world.
    - The United Nations Intergovernmental Panel on Climate Change recently declared (August 21) that world leaders at all levels must take immediate action to reduce greenhouse emissions to prevent catastrophic impacts.
- **It's impacting Minnesota now!** Unanticipated occurrences of drought, higher annual temperatures and sustained heat waves, dangerous air quality, repeated incidences of "hundred year" floods, and forest fires of unprecedented size - are all happening now in Minnesota.
- **Opportunity to mobilize and magnify:** Declaring an emergency will call attention to the issue and can mobilize people to action. Working together we can magnify our impacts on our own communities and on Minnesota.
    - Acting together will increase our visibility and leverage for *state and federal assistance*
    - This conspicuous action will provide bold local leadership in a way that connects to a larger statewide effort. People are empowered when they feel what they do matters and when they are part of something larger than themselves.

The **Climate Emergency declaration** customizable template includes local, state, and global impacts, a commitment to local action, and a call for state and federal support.

Background on "Climate Emergency"

- Started in U.S. by The Climate Mobilization organization - calling for a mobilization of government and society to make significant progress on climate change by 2030
- 2000+ jurisdictions in 34 countries have declared a Climate Emergency, including three leaders in MN (Crystal Bay Township and Minneapolis in 2019, Duluth earlier this year).

There are 15-25 **MN jurisdictions** actively considering participating with three already having declared a climate emergency (Duluth, Minneapolis, Crystal Bay.)

Climate Emergency Declaration

A Minnesota Collaboration Climate Group

Background

- MN's bipartisan Next Generation Energy Act signed by Governor Pawlenty in 2007 setting goals for the state
- Climate Emergency Declarations
  - Call to make significant progress on climate change by 2030
  - 2,012 jurisdictions in 34 countries have declared a Climate Emergency

MN Leaders include Crystal Bay Township, Minneapolis, and Duluth

This is of Global Importance

- **The dramatically evident shift in our climate <u>IS</u> an emergency!** It's here now; it's going to get worse; and it's impacting all regions of our state, country, and world.
    - The United Nations Intergovernmental Panel on Climate Change recently declared (August 21) that **world leaders at all levels must take immediate action** to reduce greenhouse emissions to prevent catastrophic impacts.

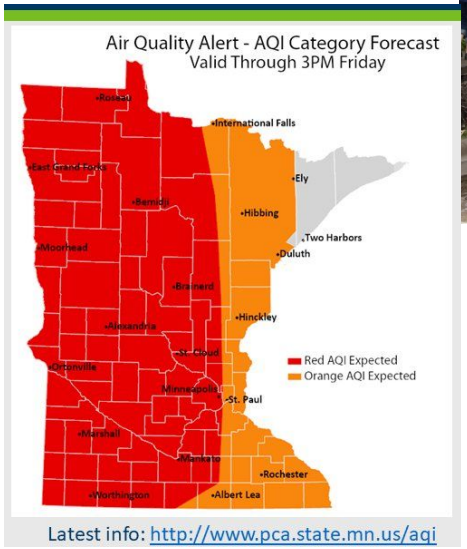
"It is *unequivocal* that human influence has warmed the atmosphere, ocean, and land."

-United Nations IPCC Climate Change 2021 Report

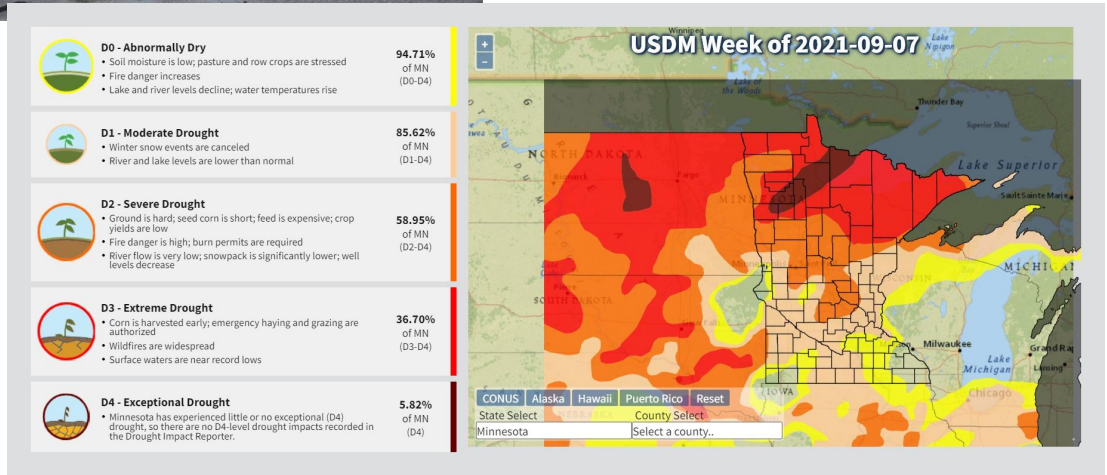
It’s impacting Minnesota now!


2012 Flooding damage, Vermilion Road, Duluth, MN. Photo Credit: John Goodge


Delta Fire in Superior National Forest, east of Ely, MN 2021. Photo Credit: Timo Rova, USDA Forest Service

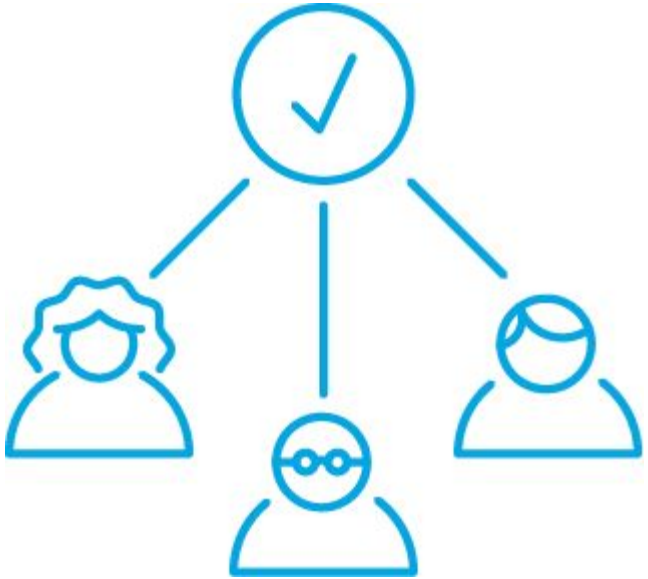


MPCA Air Quality Alert, July 29, 2021



Opportunity to Lead

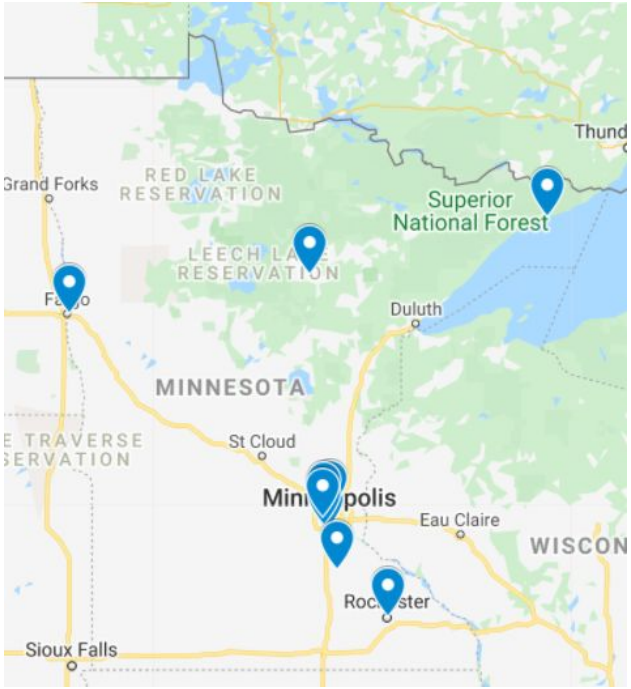
- Mobilize
- Amplify
- Leverage



Acting together will increase our visibility and leverage *state and federal assistance*

What are we doing?

- Local governments of all sizes, and in all regions of Minnesota are joining to simultaneously take action by declaring a Climate Emergency
- Multiple communities are considering taking this action



Moving Forward

- Tools Overview
  - One-pager
  - Declaration/Resolution Template
- January 24-25th, 2022
- Communications Plan in progress

“The time is now to come together as a united force, to ensure a livable future for ourselves, for our children, our grandchildren, and generations to come. The time is now to create a sustainable future.” -

From then high school junior Sophia Skinner before St. Louis Park City Council

Questions/Discussion

Next Steps and Follow-up

- Plan your community's climate emergency resolution (with existing templates)
  - Generate interest in your community
- Join other elected officials for further discussion and planning
  - November 3rd 4:00-5:15 pm, reach out to Emma Pierson (epierson@gpisd.net) for the Zoom information
  - Share the sample resolution, webinar recording, and resolution template with others
- Keep us informed
  - Fill out this form when you have updates or email us with questions
  - Emma Pierson (epierson@gpisd.net)
  - Larry Kraft (lkraft@stlouispark.org)

St. Louis Park
Climate Action Plan

February 2018

2040

Setting a course toward carbon neutrality

St. Louis Park
MINNESOTA
Experience LIFE in the Park

Acknowledgements

The St. Louis Park Climate Action Plan is the result of collaboration between representatives from community members from various parts of the city, members of the Environment & Sustainability Commission, youth members of the Roots & Shoot Environmental Club at St. Louis Park High School, and with iMatter — a nonprofit supporting young people wanting to end the climate crisis. The City of St. Louis Park would like to thank all who have contributed to this project, as it would not have been possible without your time, effort, and passion.

Elected Officials: Mayor Jake Spano, Tim Brausen, Steve Hallfin, Rachel Harris, Anne Mavity, Thom Miller, Margaret Rog

Former Elected Officials: Gregg Lindberg, Sue Sanger

Youth Team: Larry Kraft, Executive Director & Chief Mentor at iMatter, Ethan Brown, Philip Djerf, Owen Geier, Nathan Kempf, Meili Liss, Anya Lindell Paulson, Leila Raymond, Anna Roethler, Sofia Roloff, Sophia Skinner

Environment & Sustainability Commission: Susan Bloyer, Nicole Ciulla, Stefan Collinet, Terry Gips, Ryan Griffin, Claire Lukens, Julie Rappaport, Keir Steigler, Lukas Wrede

Former Commissioners: Chris Anderson, Mark Eilers, Cindy Larson O'Neil, Nancy Rose, Jayne Stevenson, Judy Voigt, Paul Zeigle

Prepared for the City of St. Louis Park by:

GREAT PLAINS INSTITUTE

Better Energy. Better World.

LHB

ORANGE ENVIRONMENTAL

Letter from the Youth of St. Louis Park

Dear Neighbors,

We are St. Louis Park High School students from the Roots and Shoots Environmental Club. In March of 2016, in partnership with iMatter, we presented a Youth Climate Report Card and asked the St. Louis Park City Council to adopt a Climate Inheritance Resolution demonstrating the city's commitment to protect our future and the lives of generations to come. That Climate Inheritance Resolution passed and has led to this Climate Action Plan.

The climate crisis will have a huge impact on our future. An inadequate response now will cause dangerous economic and environmental disruptions, many of which are already being felt around the globe. But we see this as an opportunity to rethink our current actions and imagine a better, more sustainable future.

By committing to reach net zero greenhouse gas emissions by 2040, the city will be on a path to no longer contribute to the climate crisis. St. Louis Park has an opportunity to be a leader in the movement to restore a healthy climate and set the standard for the rest of the state and country.

We are proud of St. Louis Park and the City Council for this Climate Action Plan and for supporting environmental stewardship – there is much left to do! Accomplishing the goals of the Climate Action Plan will require the participation of citizens, businesses, and organizations throughout our community. We envision St. Louis Park as a resilient and healthy city for generations to come, and for this to happen, all of us have to be involved.

So, St. Louis Park, we challenge you to have the creativity and courage to imagine a new future with us. A future with clean, renewable energy, non-polluting forms of transportation, minimized waste, and a renewed appreciation of our reliance on nature.

Signed,

Lukas Wrede, on behalf of the SLP High School Roots and Shoots Club and iMatter

"The time to act is now… we shouldn't have to be afraid of our future."
– Jayne Stevenson, Class of 2017

"We believe in a better future for St. Louis Park."
– Lukas Wrede, Class of 2018

"The time is now to come together as a united force, to insure a livable future for us, for your children, for your grandchildren, and for the generations to come. The time is now to create a sustainable future."
– Sophia Skinner, Class of 2017

Letter from the Environment and Sustainability Commission

To Our Neighbors,

The St. Louis Park Climate Action Plan is a critical element in our vision for a sustainable city. It is a tremendous milestone for St. Louis Park and reflects the environmental leadership of our citizens, staff, and elected officials, as well as our commitment to the youth of our community and planet. This plan is in full alignment with, and builds upon, the many years of environmental and conservation leadership of the City of St. Louis Park. Through the Environmental and Sustainability Commission's four-year existence, we have worked to further build consensus that climate change is a core challenge that we as a city must collectively address. This plan represents many contributions from commission members and the broader community.

Global climate change is one of the most challenging problems we will face in the twenty-first century. The urgency with which we must act decisively on this issue is unprecedented, and cities like ours will be the leaders that can enact meaningful change. The fate of millions of people worldwide as well as an estimated half of the plant and animal species on Earth could be determined by the speed at which governments of all sizes come together to halt and reverse the current global temperature trend. We, as a city, embrace this plan as an important step forward, understanding all the hard work that it will take to fulfill this plan over the next two decades.

The Climate Action Plan acknowledges our city's contribution to global climate change, the urgency of action, and the steps we intend to take to lead the transition to a carbon-free economy. Equally important is realizing that the pollution we emit and can control locally is only part of our overall contribution to climate change, with food and goods produced outside of the city also playing a very significant, but much harder to measure role. Finally, while climate change is the most significant risk to global sustainability, there are untold other risk factors to the environment in addition to climate change that we must be mindful of and continue our work toward fully addressing.

We, as the St. Louis Park Environment and Sustainability Commission, fully endorse the Climate Action Plan as a critical first step toward achieving long-term sustainability for our city. We believe that this will become one element of many in a holistic sustainability vision and action plan for the city. We also feel that it is important to understand that while the Climate Action Plan represents the best strategies and forecasts that can currently be projected, it must also be a living document, updated as new trends, technologies, and ways of measuring evolve in this ever-advancing field. We must also keep in mind that it is up to us not to rest on our laurels, but to continually stay current on the actions other leading cities around the world are taking to advance sustainability, mitigate climate change, and improve the human condition.

We applaud the efforts of City Staff and City Council to take on this challenge and believe it is our collective responsibility to act with urgency on executing the plans and strategies contained within this St. Louis Park Climate Action Plan.

Sincerely,

The St. Louis Park Environment and Sustainability Commission, 2017

Table of Contents

Executive Summary

St. Louis Park is a leader in local clean energy initiatives, having passed the most ambitious municipal climate goals in Minnesota. With its sights set on carbon neutrality by 2040, a bold yet achievable goal, the city must continue to challenge status quo energy usage and associated greenhouse-gas emissions. The Climate Action Plan (CAP) that follows begins with three kick-start projects to help spur clean energy changes in the community and build momentum for the implementation of this plan. This is followed by seven climate goals, supporting strategies, and specific initiatives and actions to help guide St. Louis Park toward intermediary progress by 2030. The purpose of setting goals to 2030 rather than 2040 is to get the city on a trajectory toward its carbon neutral goal and allow an interim point to examine progress and reassess its course of action. The CAP then outlines more aggressive, advanced strategies that are necessary for the achievement of carbon neutrality by 2040. The CAP concludes with guidance on how the city itself can strive to improve its climate impact to lead the community toward its collective goals.

Recognizing the difficulty of transitioning into this plan, three kick-start projects are designed to catalyze engagement with the community and build momentum for change. The first project is a youth-led initiative, building on the city's history of engaging its young residents. The second project aims to centralize information about the plan and other climate action resources into one, easy-to-find hub for households and businesses to reference. The third project is to accelerate the adoption of electric vehicles by installing chargers in public parking lots.

The next section states seven climate goals, with each accompanied by a series of strategies and specific initiatives and actions. The following goals address the greatest areas for climate impact:

1. **Reduce energy consumption in large commercial buildings 30% by 2030**
2. **Reduce energy consumption in small to mid-size commercial buildings 30% by 2030**
3. **Design and build all new construction to be net-zero energy (NZE) by 2030**
4. **Reduce energy consumption in residential buildings 35% by 2030**
5. **Achieve 100% renewable electricity by 2030**
6. **Reduce vehicle emissions by 25% by 2030**
7. **Reduce solid waste 50% by 2030 from Business as Usual**

Specific reduction targets are assigned to each strategy that were calculated using the wedge diagram tool (Appendix F). The strategies are supported by initiatives and actions intended to help the city achieve these targets. The impact of each of the listed initiatives is aggregated to demonstrate the total emissions reductions. At the end of each section is a list of resources that are available to support the city in implementing these actions. The seven mid-term goals will jointly accomplish a 55% reduction in emissions by 2030 and a 62% reduction by 2040. The remaining emissions will come from fossil fuel use in buildings and travel, including vehicle and air travel. The remaining sources of emissions will require the city to identify additional advanced strategies (e.g., fuel switching, thermal solutions, and carbon offsets) to achieve carbon neutrality.

Following the seven mid-term goals are examples of longer-term, deep decarbonization initiatives St. Louis Park must begin to plan for in the next five to ten years in order to address the remaining 38% of emissions. The city is encouraged to begin long-range planning for the following Advanced Strategies:

A. **Identify opportunities for thermal energy grids**
B. **Explore opportunities for combined heat and power**
C. **Anaerobic digesters for waste heat and compressed natural gas**
D. **Fuel switching**
E. **Carbon offsets**
F. **Emerging technologies**
G. **Scope 3 emissions**

The CAP concludes with recommendations for how city operations can be improved to help reach carbon neutrality by 2040. While these operations only account for a small portion of overall carbon outputs, city leaders serve as visible examples to demonstrate that achieving these goals is possible.

Background

St. Louis Park is among Minnesota's leading communities in addressing its climate change impact. The climate and energy goals included in this CAP are among the most ambitious in the nation. Climate change is altering the way communities think about their public and private sector infrastructure, operations, local resources, and social norms. With this plan, St. Louis Park is leading the way in rethinking how local resources are used and how to leverage new opportunities for residents and businesses to reduce their impact on climate change.

A long-time leader in its commitment to environmental stewardship, the city was among the first communities to offer curbside compost pick-up and now has a Zero Waste Packaging Ordinance. In 2009, the city created an urban reforestation program to enhance the health of the tree canopy. St. Louis Park is a Step 3 GreenStep City and participated as one of the original pilot cities, helping to launch Minnesota's most successful city sustainability program.

In early 2015, the St. Louis Park Environment and Sustainability Commission (ESC) made the case to Council to participate in the Partners in Energy (PiE) program offered by Xcel Energy in order to drive more action in reducing energy use and ultimately citywide greenhouse gas (GHG) emissions. Council approved participating in PiE and by 2015 a community team was formed to develop an Energy Action Plan. Four priorities emerged as the hallmark elements of the Energy Action Plan: 1) create a climate plan with the goal of achieving carbon neutrality by 2040, 2) drive energy efficiency in business, 3) increase renewable energy purchases, and 4) create a partnership with youth. The first was developed in consideration of what the city could do to help prevent a global temperature rise of another 1.5° Celsius, as was agreed upon at the Paris Climate Agreement meetings in 2015.

The Energy Action Plan was presented to City Council in April 2016 and a Memorandum of Understanding (MOU) for implementing the plan was presented to Council in September 2016. As instructed, the City Manager signed the MOU in support of providing resources to implement the plan. Key components of the PiE plan included climate action planning and a partnership with youth going forward. Youth involvement resulted in high school students from the Roots and Shoot Environmental Club to partner with a nonprofit, iMatter, to produce and present a report card, a petition, and a climate inheritance resolution to Council. Council adopted the resolution in May 2016, stating:

NOW THEREFORE BE IT RESOLVED that the St. Louis Park City Council commits to working constructively, using ingenuity, innovation, and courageous determination to create a St. Louis Park Climate Action Plan for consideration that significantly reduces St. Louis Park's greenhouse gas emissions to levels that would protect our community's children and grandchildren from the risk of climate destruction.

The plan that follows is a direct result of the Climate Inheritance Resolution (Appendix B), offering a roadmap for the city to work toward its ambitious goals. Actions and technologies included in this plan exist today and are ready for implementation. Leveraging existing programs and expanding collaboration will be key to successful implementation.

Plan Development

The Climate Inheritance Resolution, passed by the City Council in May 2016, included a commitment to creating a Climate Action Plan (CAP) that significantly reduces greenhouse gas levels to protect the community's children and grandchildren from the risk of climate destruction. The development of the CAP was spearheaded by the city's Environment and Sustainability Coordinator, Shannon Pinc, and the Climate Action Plan Advisory Committee. The advisory committee was formed to develop goals and to be the citizen-led decision-making body. The advisory committee was made up of several residents — many of whom participated in the PiE process — and one staff member. Members of the Roots and Shoots Program at St. Louis Park High School were invited to review the plan and develop ideas for how the youth can be a part of implementation.

Greenhouse gas assessments were completed for both city operations and community-wide energy use. Preparation of the Greenhouse Gas Assessment for City Operations (Appendix E) involved data collection for building, fleet, contractor, and personnel-related travel, consistent with the *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories,* produced by ICLEI. This information was used to develop recommendations for city operations to guide the city's efforts in leading the community toward carbon neutrality.

As a Regional Indicator Initiative (RII) participant, the city had already completed and established a benchmark from which it could set targets toward achieving its goals. RII is a program that measures annual performance metrics (including energy, water, travel, waste, and GHG emissions) to help cities meet their environmental goals. This data was updated to include the most recent years and provide a better picture for how the city has used energy the previous ten years.

The city is also a participant in the Local Government Planning for Energy Project (LoGoPEP), a new program designed to help local governments achieve energy goals. As part of LoGoPEP, a wedge diagram tool was created for energy and greenhouse gas reduction planning (See Appendix F for methodology). The analysis of the wedge diagram tool reflects the specific energy use and GHG generation pattern in St. Louis Park, helping to identify the most impactful strategies.

Utilizing the wedge diagram tool, specific strategies were identified to reduce emissions. This information informed the decisions of the advisory committee as it developed goals across seven action areas to move the city toward its 2040 carbon neutral goal. The action areas with the greatest potential for impact are:

1. **Large Commercial Efficiency**
2. **Small Commercial Efficiency**
3. **Net Zero Construction**
4. **Residential Efficiency**
5. **Renewable Electricity**
6. **Transportation Emissions Reduction**
7. **Waste Reduction and Diversion**

The CAP is organized by Goals, Strategies, Initiatives, and Actions. The goals were set for 2030 as midway point for the city to assess its progress toward becoming carbon neutral by 2040. The strategies were determined through the development of the wedge diagram tool and illustrate targets for potential emissions reductions. Specific initiatives and actions were designed to support implementation of the plan and produce significant emissions reductions across sectors, both now and into the future.

Implementation of the strategies under all goals will result in a 55% reduction of GHG emissions from business as usual by 2030, and 62% by 2040. Because the actions will not achieve carbon neutrality by 2040, it is necessary to implement more aggressive measures to further reduce emissions from natural gas and vehicles. The CAP identifies advanced strategies for the city to explore and implement both in the immediate future and in the long-term.

The final section was developed specifically for city operations, which include city buildings and facilities, fleets, streetlights, and water and wastewater processes. These functions only make-up 1.5% of total community-wide GHG emissions, but represent a significant opportunity for the city to lead on emissions reduction efforts. The Greenhouse Gas Assessment for City Operations provided the energy use and associated emissions data that were used to make recommendations for these reductions.

Implementation of this CAP will take tremendous effort from city personnel, residents, and the business community. The Climate Action Plan is designed as a guiding document that balances flexibility in implementation with specific actions that will result in emissions reductions. Beyond reducing GHG emissions, there are important co-benefits to be gained through implementation of this plan. Energy-saving and clean energy measures have important economic benefits, including reduced energy costs and job opportunities. Land use changes can improve physical and mental health, as well as improve individual behavior to be more sustainable. Equitable implementation of this plan should support small businesses and low-income residents through direct engagement and incentives, and should ensure job creation opportunities for underemployed residents.

The city continues to advance race equity and inclusion through activities, outreach, programs, policies, projects, initiatives, contracting, budgeting, hiring, and all other areas of work and service delivery. The Climate Action Plan will impact everyone in the community and it is important that racial equity considerations are made and used as part of achieving the targets and goals outlined in the document.

Implementation of this ambitious plan will support the city in its efforts to reduce the risks associated with climate change while creating a more resilient community.

Community-wide Greenhouse Gas Emissions Profile

St. Louis Park has participated in the Regional Indicators Initiative (RII) since 2009. RII has completed a greenhouse gas inventory for the city for all years between 2007 and 2016, and has made projections for "businesses-as-usual" emissions looking out to 2040. Business-as-usual shows the anticipated emissions if the city were to take no action to reduce its emissions. This information was captured using the wedge diagram tool, which divides the emissions by sector (building energy, transportation, waste, and wastewater), as seen in Figure 1. This graph illustrates that if the city were to do nothing to actively reduce emissions, there would be a slight rise in emissions overtime.

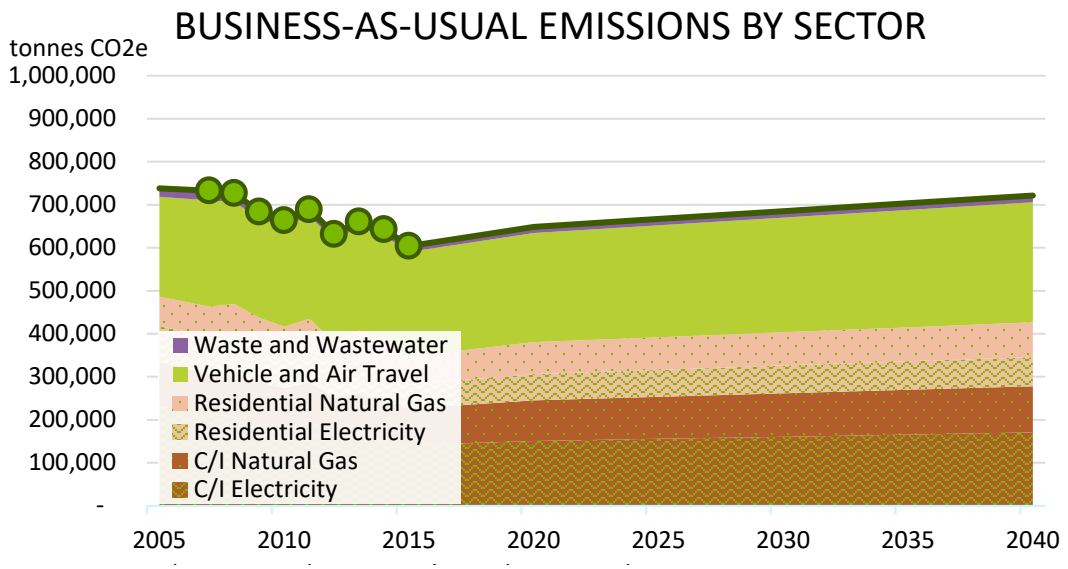


Figure 1 Business as usual emissions by sector. Data from the Regional Indicators Initiative.

The greatest emissions sources are from buildings and transportation. The building sector includes emissions from all commercial, industrial, and residential buildings. This includes electricity, which is primarily used for lighting, appliances, and other electronic devices, but can be used for space and water heating as well. Natural gas is the main fuel for space and water heating, cooking, and many industrial processes. Emissions from buildings make up 58% of all emissions in St. Louis Park (Figure 2).

Transportation makes up 39% of total emissions within the community. Emissions from transportation are attributable to car and truck travel, and are estimated by vehicle miles traveled within the city boundaries (regardless of through traffic or with an origin or destination in the city). The remaining emissions come from waste and waste water treatment, which make up less than 3% of total emissions.

Building emissions can be broken down further into two sectors: residential and commercial.

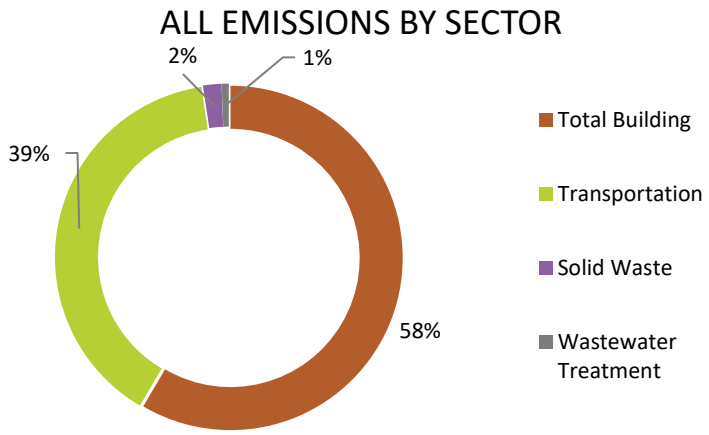


Figure 2 Percent of emissions by sector. Source: Regional Indicators Initiative

Emissions from the commercial sector are nearly double the emissions of the residential sector. Commercial buildings offer greater opportunity for deep efficiency improvements as they use significantly more energy per building as compared to residential. There are nearly 630 commercial buildings in St. Louis Park, 157 of which that are greater than 20,000 square feet. While larger buildings do not necessarily use more energy, size can be a good indicator of potential opportunities for energy savings.

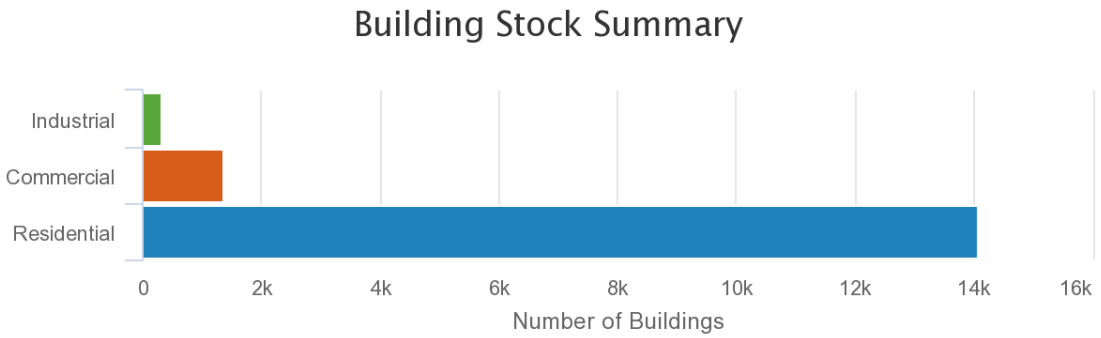


Figure 3 Source: U.S. Department of Energy, State & Local Energy Data

There are more than 23,000 households in the city; 11,400 are single family, the remaining are multi-family. Emissions from multi-family buildings are found in both the commercial and residential sector: CenterPoint Energy typically includes multi-family in commercial, while Xcel Energy includes it in residential. This is important to consider when tracking emissions reductions by sector as improvements in multi-family buildings will result in emissions reductions in both the commercial and residential sector.

Transportation emissions are measured by the Vehicle Miles Traveled (VMT) within the city's boundaries. The VMT includes commercial and freight vehicles, personal cars, and mass transit vehicles. In 2016, more than 436,500,000 miles were driven within St. Louis Park, 65.9% were from light duty passenger vehicles. Of the light duty vehicles, 89% are fueled by gasoline and flex fuel (e85) is the next most common fuel (Figure 4).

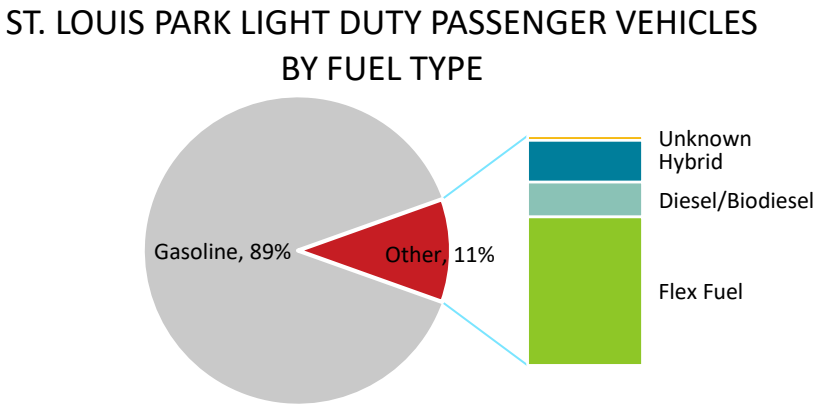


Figure 4 Light Duty Vehicles Fuel Type, Data Source: Department of Energy State and Local Energy Data

Understanding the baseline emissions from each sector allows targets to be set to decrease emissions over time. Using the wedge diagram tool, emissions reductions can be visualized to see which strategies have the greatest impact. The planned emissions graph (Figure 5) shows businesses-as-usual emissions to demonstrate the emissions reductions that result from the actions in this plan. The gray line across the top of the wedges depicts the business-as-usual (BAU) emissions; the wedges beneath the BAU line represent carbon emissions reduction by sector over time. The CAP focuses on strategies that can be implemented by 2030 (orange dashed line) to set the city on a trajectory toward its ultimate goal of being carbon neutral by 2040. The gray and dark gray wedges at the bottom represent the remaining emissions that will need to be met through implementation of the advanced strategies. In other words, realizing the targets of every strategy of the seven action areas will not get the city to carbon neutral. The remaining emissions come from transportation (especially heavy-duty vehicles and air travel), and natural gas consumption in buildings that have exhausted efficiency measures. The city will need to evaluate its progress and make adjustments along the way to ensure that it continues to reduce emissions.

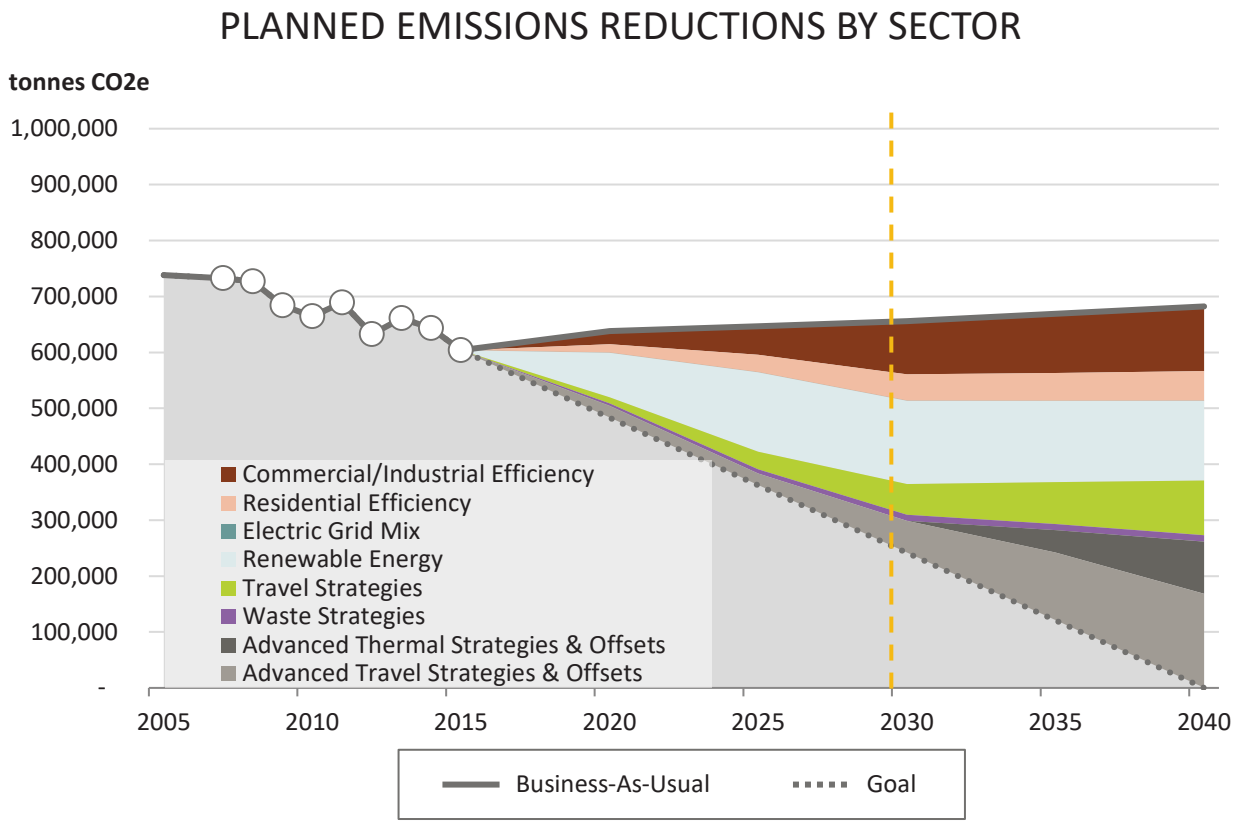


Figure 5 Total emissions reductions resulting from CAP implementation

The Advanced Strategies section of the CAP offers suggestions for various technologies that, while more complicated to implement and require long-range planning, will have significant impact on reducing the city's carbon emissions. Advances in technologies may be available in the future to help further reduce those emissions. For instance, there are companies that are working on electric heavy-duty trucks; electric buses are increasingly integrated into public fleets; and building efficiency and renewable technologies continue to show promise to displace emissions from natural gas.

St. Louis Park Climate Action Plan

The City of St. Louis Park has committed to a bold, yet achievable, goal to become carbon neutral by 2040. This will require aggressive action on the part of the city, its residents, and its businesses. The following lays out a Climate Action Plan (CAP) that will set the city in motion to achieve its ambitious climate goals. The CAP is designed to guide the city through various strategies and initiatives to achieve seven broad goals to reduce energy consumption, increase renewable energy, and transform travel.

The CAP is broken into four sections that will help the city make continuous progress toward achieving carbon neutrality. The plan begins with three kick-start projects. These projects are designed to help city staff, residents, and businesses hit the ground running upon the launch of the plan. These tangible projects will allow the city to claim early success and generate momentum to continue buildings its efforts to implement this plan. The three projects are:

Project 1: Youth-led initiative to increase energy efficiency and renewable energy in the community

Project 2: Develop a climate action plan resource hub

Project 3: Install electric vehicle (EV) charging infrastructure in public parking lots

The second section includes **seven goals** to reduce energy consumption in the commercial and residential sectors, achieve 100% renewable electricity by 2030, reduce transportation emissions by 25%, and accomplish the city's waste reduction goal. These goals and their supporting strategies will help the city reduce emissions 55% by 2030, and 62% by 2040.

Impact	Goals
Building Energy Efficiency **21.7%**	Reduce energy consumption in large commercial buildings 30% Reduce energy consumption in small to mid-size commercial buildings Design all new construction to be net-zero energy Reduce energy consumption in residential buildings by 35%
Renewable Electricity **23.3%**	Achieve 100% renewable electricity
Travel **8.4%**	Reduce vehicle emissions 25%
Solid Waste **1.1%**	Reduce solid waste 50%

The third section of the CAP identifies opportunities for **Advanced Strategies** the city will need to explore in more depth to meet the final 38% reduction in emissions. Of the remaining emissions, 36% are from natural gas used in buildings and industrial processes, 44% are from vehicle travel, and 19% are from air travel. These will need to be met using the acceleration of existing technologies, carbon offsets, and taking advantage of technological innovations.

The final section of the CAP focuses on **city operations** emissions reductions. By implementing deep energy efficiency practices, increasing renewable energy installations, and cleaning its fleet, the city can set an example for residents and businesses to support and follow.

KICK-START PROJECTS

Three projects, described herein, have been identified to help launch the city's CAP. The intention of these projects is to provide initial focus for the city and its partners to implement specific actions that will provide momentum for implementing the CAP.

PROJECT 1: Youth-led initiative to increase energy efficiency and renewable energy in the community

St. Louis Park's youth have been instrumental in working with the city to advance its efforts to reduce greenhouse gas emissions, and it will be critical to maintain the involvement of students to accomplish the goals of the plan. The Roots and Shoots Club, supported by iMatter, at St. Louis Park High School will initiate a student-led project to increase the adoption of green power purchases, clean energy, and/or energy efficiency actions in the city. This may involve working directly with the school district to help it adopt and achieve goals consistent with the city's goals; an outreach effort to get fellow students to encourage their families to sign-up for green power and decrease energy use; or an educational campaign for residents and small businesses to understand their solar resource and guide them toward installing solar on their rooftops.

While it is important for this project to be initiated and implemented by the youth, the city should support efforts, identify big-impact opportunities, and maintain an active relationship as the project advances.

PROJECT 2: Develop a climate action plan resource hub

This effort will require city staff, residents, and businesses to move together to achieve deep emissions reduction by 2040. Through branding, communication, and outreach, the city can make it clear what it needs from the community and provide resources to help people participate in energy saving and clean energy initiatives. A CAP Resource Hub (see Seattle) will serve as a one-stop destination for businesses and residents to find information to improve efficiency, install solar, purchase green power, participate in a bulk purchase of electric vehicles, and more. The hub should be easily accessible on the city's website and have clearly identified resources for residents and businesses to take advantage of multiple opportunities.

City staff will be responsible for developing the CAP Resource Hub. There are several recommendations and resources throughout this document to include in this project (Appendix D).

PROJECT 3: Install electric vehicle (EV) charging infrastructure in public parking lots

Transforming how people move within the city will be one of the biggest challenges for St. Louis Park. There are several options the city can consider to reduce greenhouse gas emissions from vehicles. While the biggest impact will come from reducing vehicle miles traveled, there will still be people who need and want to drive. In recognition of this limitation, the city should encourage residents to choose electric vehicles (EVs) and accelerate the adoption of zero emission vehicles.

For this project, the city will provide charging infrastructure for EVs in public parking lots. This will include parking lots associated with city-owned buildings, city parks, and school buildings. The charging stations should be highly visible, educational, and incorporate any branding the city develops as part of its climate action efforts. The city already has a charger in the City Hall parking lot and has included an additional electric vehicle charger in its 2019 Capital Improvement Plan; this should be expanded to include public locations listed above, as well as educational material.

GOALS, STRATEGIES, INITIATIVES, AND ACTIONS

The following goals were developed in coordination with the Climate Action Plan Advisory Committee. The goals look at GHG emissions out to the year 2030 and put the city on a trajectory to reduce emissions 55% by that time. The year 2030 was selected to serve as mid-point where the city could reassess the CAP to determine how to accomplish the remaining emissions reductions. While some of the remaining emissions can be reduced through the continuation of these strategies, it will take more aggressive action to get to zero emissions. Advanced technologies and practices that will drive down the remaining emissions are included in the next section.

GOAL 1: Reduce energy consumption in large commercial and industrial (C/I) buildings by 30% by 2030, as compared to the business-as-usual forecast.

Large commercial buildings are defined here as 20,000 square feet or larger. These buildings currently comprise 25% of the total number of commercial buildings in St. Louis Park (157 out of 626), and are estimated to make up 64% of commercial energy consumption.

STRATEGIES:

- **Building Retrofits:** 79 buildings complete retrofits by 2030, saving an average of 18% (1.5% of total building emissions).
- **Appliance Equipment and Fixture Efficiency:** 79 buildings replace equipment with high efficiency models by 2030, saving an average of 25% (3.3% of total building emissions).
- **Efficient Building Operations:** By 2030, 143 buildings are actively engaged in building operations best management practices (BMPs), saving an average of 15% (7.7% of total building emissions).
- **Behavior Change:** By 2030, occupants of 52 buildings are engaged in sustained behavior change strategies, saving an average of 8% (0.7% of total building emissions).

IMPACT: By reducing energy consumption in large commercial buildings by 30% from the business-as-usual forecast, these strategies are estimated to result in a 13.2% reduction in total buildings emissions in 2030, which equates to a 7.8% reduction in community-wide emissions.

GOAL 1 INITIATIVES AND ACTIONS

1.1. Create an internal team to lead large commercial energy efficiency efforts

The city has limited control over the energy decisions made by building operators of large commercial and industrial (C/I) facilities. It can, however, enable and advance energy efficiency through efforts to encourage, incentivize, and support more aggressive energy action. This team will be largely responsible for implementing the following actions.

1.1.1. Appoint specific staff to lead and organize the internal large commercial building energy efficiency team
1.1.2. Determine who should participate on the large commercial building energy efficiency team
1.1.3. Establish goals and milestones to complete the actions to achieve the large commercial buildings goals
1.1.4. Hold regular check-in meetings to track milestones and identify next steps
1.1.5. Engage and recruit large commercial business stakeholders to support this effort; identify companies with energy/climate goals to be leaders
1.1.6. Institutionalize large commercial energy efficiency as a normal function of this team

1.2. Adopt a building energy disclosure ordinance for all public buildings and all commercial buildings greater than 20,000 square feet.

A building energy disclosure ordinance is a policy tool that uses market forces to increase building energy performance and motivate building owners and operators to invest in energy efficiency improvements. Adopting such an ordinance will allow the city to see how energy is used among its largest buildings, lead to accelerated energy reductions, and strengthen relationships between the city and the business community through more active engagement.

- **1.2.1.** Designate a project lead among city staff; coordinate with Initiative 1.1
- **1.2.2.** Participate in energy disclosure pilot program through Hennepin County
- **1.2.3.** Hold stakeholder meetings with managers of largest buildings to explain the goals of an ordinance, minimize barriers, and gain input
- **1.2.4.** Host a "data jam" session where building managers can enter energy with technical assistance providers present
- **1.2.5.** Communicate to businesses that the city needs their help to achieve climate goals
- **1.2.6.** Identify businesses in the community that have climate goals and highlight as leaders
- **1.2.7.** Determine who will manage the program at the city, what the budget will be, how much staff time will be needed, and what resources are available
- **1.2.8.** Work with stakeholders to draft a building energy disclosure ordinance
- **1.2.9.** Present draft ordinance language to City Council
- **1.2.10.** Adopt the building energy disclosure ordinance
- **1.2.11.** Manage the program: track progress, share resources, and promote successes
- **1.2.12.** Provide on-going individualized technical assistance for benchmarking to help drive participation

1.3. Support energy efficiency and clean energy projects

Utilize, promote, and encourage existing tools, programs, and incentives to support C/I energy projects.

- **1.3.1.** Encourage Energy Star certification for eligible facilities
  - Establish an annual goal of new certifications
  - Designate a section of the CAP Resource Hub to large C/I and include a link to Energy Star Portfolio Manager, which is a free resource available for all buildings
  - Track and promote certifications each year
  - Explore city's legal authority to require disclosure of EPA Energy Star rating at the time of sale or lease in commercial buildings
- **1.3.2.** Continue to encourage participation in other certification programs like U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) for existing buildings
- **1.3.3.** Continue to provide information about financing options such as commercial PACE (Property Assessed Clean Energy), Trillion BTU, and Rev It Up loan program in CAP Resource Hub
- **1.3.4.** Provide opportunities for existing building operators to participate in training, including training for new and emerging building technologies such as net zero energy

1.4. Communicate and market project progress, results, and success

Continue to market the success of the CAP, make it a part of regular city communications.

- **1.4.1.** Implement Partners in Energy (PiE) strategies for top 100 largest businesses
  - Provide a call to action for large business leaders from the mayor/city council
  - Setup a public website to track business participation and results
  - Provide ongoing mayoral/city council recognition of energy leaders

- Publicize individual accomplishments using case studies

1.4.2. Create business-facing energy use cases/company spotlights

1.4.3. Develop business-specific outreach materials on opportunities, incentives, and tangible and intangible benefits

1.4.4. Launch a public-private energy efficiency campaign to catalyze action in large businesses

1.4.5. Identify large commercial entities with climate goals to act as community leaders, coordinate with Action 1.1.5

1.4.6. Expand use of behavioral strategies (e.g. turning off electronics, programming thermostats, etc.) to drive energy reductions

RESOURCES

- Property Assessed Clean Energy (PACE) – The Property Assessed Clean Energy (PACE) program allows home and business owners to finance efficiency projects through a voluntary assessment on their property.
- Saint Paul Port Authority (Trillion BTU) – The Trillion BTU program, administered by Saint Paul Port Authority, provides rebates and loans to businesses to complete energy improvements
- MN Department of Commerce (Rev It Up) – Commerce annually solicits a request for proposals (RFP) from units of local government seeking low-cost, long-term capital to finance community energy efficiency and renewable energy system projects that are financed via energy savings and/or projected revenues created by the systems.
- Xcel Energy – Offers a variety of rebates and efficiency programs to customers.
- CenterPoint – Offers a variety of rebates and efficiency programs to customers.
- Institute for Market Transformation – Provides more rationale behind this type of policy, along with case study examples and a tool to compare policies across the country.
- American Council for an Energy-Efficient Economy – The State and Local Policy database includes many cities' building energy disclosure policies and their requirements.
- Minneapolis – The City of Minneapolis has passed a Building Rating & Disclosure Policy. This document lays out the rationale of the policy, how it is designed, its benefits, and how it will be enforced.

GOAL 2: Reduce energy consumption in small to mid-size commercial buildings by 30% by 2030, as compared to the business-as-usual forecast.

Small and mid-sized commercial buildings are defined here as less than 20,000 square feet. These buildings currently comprise 75% of the total number of commercial buildings in St. Louis Park (460 of 626), but are estimated to consume only 36% of the commercial energy; an effective engagement strategy will be necessary to reduce the burden on time and staff resources and achieve high participation.

Strategies:

- **Building Retrofits:** 117 small and mid-sized buildings complete retrofits by 2030, resulting in an average energy savings of 18% (0.7% of total building emissions).
- **Appliance Equipment and Fixture Efficiency:** 188 buildings replace equipment with high efficiency models, resulting in an average energy savings of 17% (2.6% of total building emissions).
- **Efficient Building Operations:** By 2030, 235 buildings are actively engaged in building operations BMPs, saving an average of 23% (3.0% of total building emissions).

- **Behavior Change:** By 2030, occupants of 155 buildings are engaged in sustained behavior change strategies, saving an average of 5% (0.4% of total building emissions).

IMPACT: By reducing energy consumption in small to mid-size commercial buildings by 30% from the business-as-usual forecast, these strategies are estimated to result in a 6.7% reduction in total building emissions in 2030, which equates to a 4.0% reduction in community-wide emissions.

GOAL 2 INITIATIVES AND ACTIONS

2.1. Develop an outreach strategy to engage small and mid-size businesses

There are more than 600 commercial properties in St. Louis Park. Most of these businesses will need to engage in energy improvements by 2030, and all will need to by 2040.

- **2.1.1.** Determine who will lead outreach efforts to engage small and mid-size business (e.g. Environment & Sustainability Commission (ESC) workgroup)
- **2.1.2.** Designate a staff person to serve as city liaison to the outreach efforts
- **2.1.3.** Establish goals for the number of properties reached each year
  - The city would need to reach an average of 38 businesses each year between now and 2030, or
  - Target market segments (grocery stores, restaurants), or specific geographies (small business districts)
- **2.1.4.** Engage local business associations (e.g., TwinWest Chamber of Commerce/St. Louis Park Business Council) to develop strategies for small to mid-sized business energy efficiency programs
- **2.1.5.** Integrate energy efficiency technical assistance into existing economic development programs and partnerships with local business associations
- **2.1.6.** Utilize the 'small business coach' model (see Resources) to educate business owners on energy savings opportunities and benefits

2.2. Support energy efficiency and clean energy projects

Utilize, promote, and encourage existing tools, programs, and incentives to support small to mid-sized C/I energy projects.

- **2.2.1.** Encourage Energy Star certification for eligible facilities, in coordination with Initiative 1.3
  - Establish an annual goal of new buildings achieving certification
  - Include a link to Energy Star Portfolio Manager on city's Small Business Resources page, and include information on the CAP Resource Hub
  - Track and promote certifications each year
  - Explore requiring disclosure of EPA Energy Star rating at the time of sale or lease in commercial buildings
  - Help businesses promote themselves as environmentally friendly companies
- **2.2.2.** Promote behavioral energy efficiency strategies
  - Expand use of behavioral strategies to drive energy reductions (Clean Energy Resource Teams (CERTs) and Center for Energy and Environment (CEE) have multiple resources for behavior change strategies)
- **2.2.3.** Set up a public website to track business participation and results – this should be a part of the CAP Resource Hub

2.2.4. Include educational and promotional material in building permit processes to increase greater awareness and adoption of energy efficiency, clean energy, and water conservation improvements

2.2.5. Continue to promote financing and rebate opportunities, such as PACE and utility efficiency rebate programs; add to CAP Resource Hub

2.2.6. Encourage or require improvements to a building's energy or water performance during major renovation, sale, or certain types of improvements

- Incentivize private investment into energy efficiency with a cost-share program (see Minneapolis example under Resources)

2.2.7. Incorporate city climate goals into the 2036 contract renewal for utility franchise agreements

2.3. Ensure small business efficiency programs are implemented equitably

Some small businesses may need additional financial and technical assistance to take advantage of available programs. Ensure that these businesses have equitable and affordable access to energy efficiency programs.

2.3.1. Be intentional about engaging small businesses in low-income communities

2.3.2. Target minority-owned small businesses and share benefits and energy efficiency and resources

2.4. Communication and Marketing

The city should continue to promote its goals, projects, and successes among small and mid-sized businesses in the community.

2.4.1. Provide ongoing mayoral/city council recognition of energy leaders

2.4.2. Partner with private, public, or non-profit organizations (Local companies, CERTs, GreenStep Cities, TwinWest) to publicize individual accomplishments using case studies

2.4.3. Create an intra-city energy competition among small businesses

RESOURCES

- Lake Street Small Business Energy Coaching Pilot Program – Lake Street Council did extensive outreach to small businesses on energy efficiency and documented their strategies and lessons learned.
- Minnesota Center for Energy and Environment – offers a range of programs targeted at commercial energy efficiency, including lighting HVAC, financing, and more.
- Minnesota Clean Energy Resource Teams – provides resources, tools, and engagement efforts to implement local energy projects.
- Minneapolis green business cost-share program – This is an example of an incentive program implemented by the City of Minneapolis.
- Energy Star for Small Business – Energy Star provides resources and recognition for small and medium sized businesses.
- Xcel Energy Rebates – Offers rebates for efficiency improvements
- CenterPoint Small Commercial Efficiency Program – Offers rebates for high-efficiency equipment.
- ACEEE – Successful Practices of Small Commercial Energy Efficiency Programs

GOAL 3: By 2030, design all new construction to be net-zero energy (NZE).

Strategies:

- **Energy Code Enforcement:** Continue to ensure all new and renovated buildings meet the current energy code, reducing energy use by 35% from the baseline building for new construction and 17% for renovations (1.2% of total building emissions).
- **Stretch Energy Code:** By 2030, all new and renovated buildings are constructed to green building standards (NZE), reducing emissions by 67-100% from the baseline buildings for new construction and 34-50% for renovations, depending on the year designed (3.3% of total building emissions).

IMPACT: These strategies are estimated to result in a 4.5% reduction in total building emissions in 2030 over the business-as-usual forecast, which equates to a 2.7% reduction in community-wide emissions.

GOAL 3 INITIATIVES AND ACTIONS

3.1. Strengthen the city's green building policy

The city has a green building policy that requires development projects that receive city financial assistance to use green building or LEED standards in the design of the buildings. Expanding this policy to the extent possible will have long-term impacts on future development.

- **3.1.1.** Include a voluntary element of this policy to reach development projects that are below the required size or do not receive city funds
- **3.1.2.** Incentivize and promote development projects that voluntarily comply with this code
- **3.1.3.** Expand community outreach efforts to ensure developers and new residents are aware of the policy and the city's climate goals
- **3.1.4.** Consider how the voluntary element (3.1.1) of the Green Building policy may be integrated into the city's zoning code

3.2. Support the State's adoption of a green building stretch code

The city cannot currently exceed the State's energy code. However, if the State were to add a green building code as an appendix (stretch) code, local authorities would be able to adopt it to increase their standards.

- **3.2.1.** Collaborate with other communities, industry, and state agencies to support the State through legislation or rule-making in adopting a green building stretch code

3.3. Adopt the green building stretch code as soon as it becomes available

It is unclear if or when the State will adopt a green building code. The city should prepare for how the code will be integrated into its practices.

- **3.3.1.** Track the progress of any potential legislation that includes a stretch code
- **3.3.2.** Train local government staff and building officials about the appendix building code so they are ready to enforce it once the city is able to adopt it
- **3.3.3.** Update website and educational materials to include the new green building code

3.4. Encourage existing energy code to ensure development meets the highest standards

Some buildings in the State do not perform to the designed standards. Education and stricter enforcement of the energy code can help improve the energy performance of new development.

3.4.1. Continue to educate building designers and contractors of the Minnesota Code requirement and ensure 100% compliance with the existing energy code for all new and renovated building

3.4.2. Provide educational materials to homeowners and businesses who are completing their own construction projects to ensure they are aware of energy standards

RESOURCES

- Maplewood – The City of Maplewood has adopted a strong Green Building Program.
- SB 2030 – Sustainable building energy standards that achieve net zero development by 2030.
- St. Louis Park Green Building Policy - Requires building construction projects that receive or use city financial assistance to incorporate sustainable development practices.

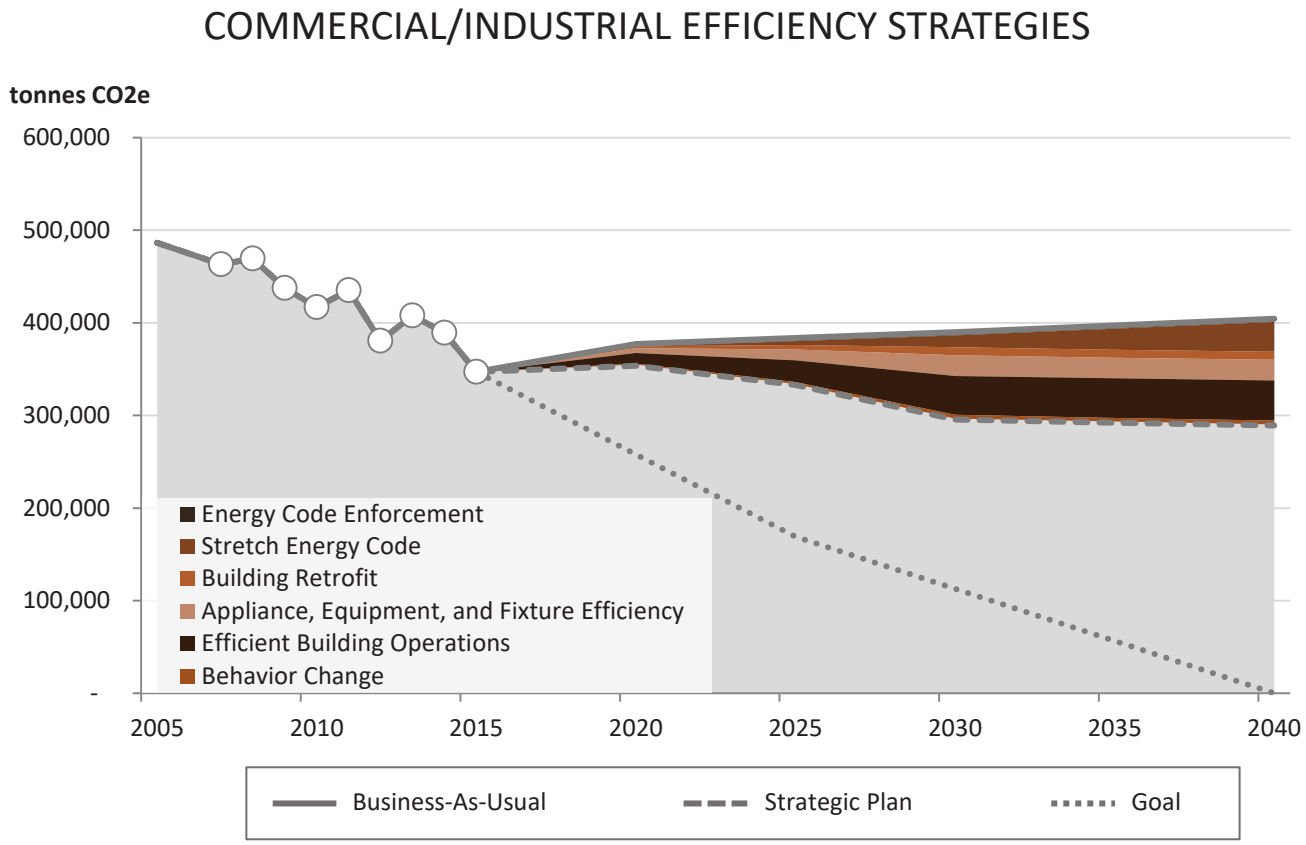


Figure 6 Total building emission reductions from all commercial/industrial energy efficiency strategies.

The strategies included in Goals 1-3 will have a significant impact on emissions reduction in the Commercial and Industrial sector, illustrated by the wedges in Figure 6. In 2030, the total impact of Goal 1-3 strategies is a 41.0% reduction in commercial/industrial emissions. This results in a 24.4% reduction in building energy emissions and a 14.5% reduction in community-wide emissions.

GOAL 4: Reduce energy consumption in residential buildings by 35% by 2030, as compared to the business-as-usual forecast.

Strategies:

- **Energy Code Enforcement:** Continue to ensure all new and renovated residential buildings meet the current energy code, reducing energy use by 39% from the baseline building for new construction and 19% for renovations (0.8% of total building emissions).
- **Stretch Energy Code:** By 2030, all new residential buildings are built to net zero energy (NZE) standards reducing emissions by 67-100% from the baseline building, depending on the year designed (0.5% of total building emissions).
- **Building Retrofits/Weatherization:** 9,000 single- family households complete retrofits/weatherization by 2030, saving an average of 37% for natural gas and 6% for electricity (4.9% of total building emissions).
- **Appliance, Equipment, and Fixture Efficiency:** 17,820 (75%) households replace electrical equipment with high efficiency models, and 7,200 households replace natural gas equipment with high efficiency models by 2030, saving an average of 13% (2.9% of total building emissions).
- **Behavior Change:** By 2030, 90% of households will be engaged in sustained behavior change strategies, saving an average of 10% (3.0% of total building emissions).

IMPACT: By reducing energy consumption in residential buildings by 35% from the business-as-usual forecast, these strategies are estimated to result in a 12.1% reduction in total building emissions in 2030, which equates to a 7.2% reduction in community-wide emissions.

GOAL 4 INITIATIVES AND ACTIONS

4.1. Establish a residential outreach team through Sustainable St. Louis Park

The city has more than 23,000 households; just over 50% are single-family homes. Actions must be tailored to different household types.

4.1.1. Through the Environment and Sustainability Commission and the Roots and Shoots Club, create a residential outreach team
- Establish annual targets of households to reach (use average kWh use per premise by neighborhood maps created for the PiE Energy Action Plan to target high users)
- Collect communication materials to share with residents
- Develop a plan to drive residents to action
- Identify other community groups that can build capacity for effective outreach
- Track annual progress
- Combine efforts with increased renewable energy purchases and installations

4.1.2. Utilize existing outreach programs such as Home Energy Squad visits

4.1.3. Identify opportunities to promote energy efficiency action at existing and future city events

4.2. Use city policy tools to encourage energy efficiency

The city has policy and regulatory tools that it could use to encourage energy efficiency action at the time of sale, or when a lease changes hands.

4.2.1. Include educational and promotional material in building permit processes to increase greater awareness and adoption of energy efficiency, clean energy, and water conservation improvements

4.2.2. Encourage home energy performance report at the time of sale or a new lease agreement in order to promote better understanding of home comfort, indoor air quality, and utility costs

4.2.3. Include information about energy efficient mortgages on CAP Resource Hub

4.3. Provide energy efficiency programs and resources to residents

Numerous programs exist to help residents finance and complete energy efficiency projects.

4.3.1. Work with Xcel Energy to pilot and deploy smart meters in homes. Smart meters two-way communication between the meter and the utility, supporting better energy management

4.3.2. Connect residents to Home Energy Squad to receive energy audits, ensure equitable outreach to all residents

4.3.3. Regularly host utility bill clinics offered by Minnesota Citizens Utility Board to help residents understand their bills, discuss energy savings options, and hear about rebate availability and clean energy options

4.3.4. Provide low-income residents information on weatherization programs that may be available to them through the Minnesota Weatherization Assistance Program or Hennepin County Community Action Partnership

4.3.5. Adopt residential PACE if it becomes available in Minnesota

4.3.6. Promote the usage of smart home devices that help save energy (e.g. smart thermostats)

4.3.7. Promote and help market on-bill financing by the utility companies as it becomes available

4.3.8. Connect residents to lending options through CEE and Minnesota Housing Finance Agency

4.4. Communication and marketing

Maintain regular communication with residents through direct outreach and normal communications,

4.4.1. Ensure energy efficiency rebate opportunities are listed on the CAP Resource Hub

4.4.2. Create a welcome packet for new businesses and residents, which will provide information on all the resources and opportunities listed above

4.4.3. Share success of efforts to encourage more residents to act

RESOURCES

- Center for Energy and Environment – CEE provides a range of services including home energy audits, home energy squad visits, financing, and assistance implementing energy saving measures.
- Energy Fit Homes – CEE has developed an Energy Fitness Score for residential buildings that allows home owners to see the relative efficiency of their homes.
- Xcel Energy – Offers energy audits and a variety of rebates to customers.
- CenterPoint Energy – Offers energy audits and a variety of rebates to customers.
- Minnesota Weatherization Assistance Program – Provides free home energy upgrades to low-income homeowners and renters to help save energy and protect against harsh weather.
- Hennepin County CAP – The Community Action Partnership provides free energy related repairs and heating bill assistance to low income residents.
- Minnesota CUB – Minnesota Citizens Utility Board is a consumer advocacy organization that offers assistance to utility customers.
- Fix-up Program – Financing program offered by Minnesota Housing Finance Agency.

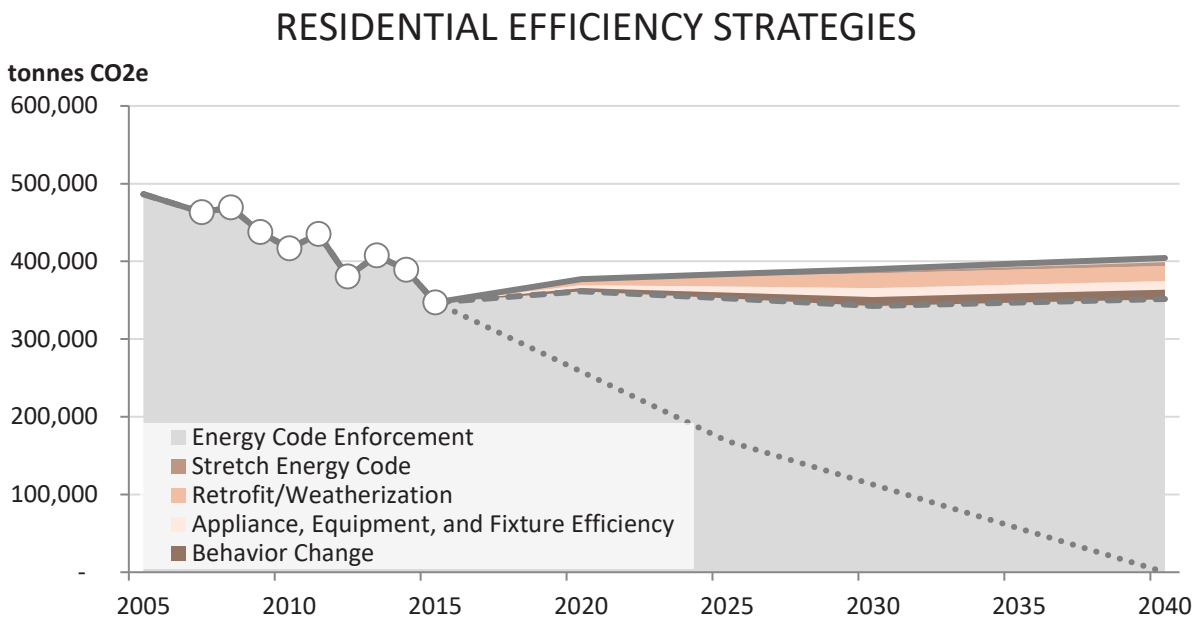


Figure 7 Total building emission reductions from residential energy efficiency strategies.

Figure 7 depicts 12.11% emissions reductions from residential energy efficiency strategies. Although there are more residential buildings in the community, these strategies result in relatively smaller emissions reductions than the more energy-intensive commercial and industrial sector. This means that the city will have to consider how to best balance its efforts against the impact and avoid burdening resources for a smaller result. The city should focus its outreach efforts both on high energy users (as identified in the PiE Energy Action Plan) and low-income households. High energy users will have greater opportunities for efficiencies, and low-income households may be burdened by unnecessarily high energy bills.

GOAL 5: Achieve 100% renewable electricity by 2030

Strategies

- **Commercial/Industrial Green power purchase Commercial:**
  - 40% of businesses (~920) purchase all their electricity from green power by 2020
  - All businesses purchase all their electricity from green power by 2030 (36.3% of total building emissions in 2030)
- **Residential Green power purchase Commercial**:
  - 40% of households (~9,840) purchase 100% of their electricity from green power by 2020
  - All households purchase 100% of their electricity from green power by 2030 (14.1% of total building emissions in 2030)
- **On-site solar photovoltaic (PV):** Meet 10% of building electricity consumption with rooftop solar by 2030 (5.6% of total building emissions in 2030)

IMPACT: By achieving 100% renewable electricity by 2030, these strategies are estimated to result in a 56.0% reduction in total building emissions in 2030, which equates to a 33.3% reduction in community-wide emissions. These savings do not account for changes in electricity electric vehicles or fuel switching from natural gas to electricity.

GOAL 5 INITIATIVES AND ACTIONS

5.1. Encourage the purchase of renewable energy credits by all businesses and residents

Renewable Energy Credits (RECs) can be purchased through utility programs like WindSource® and Renewable*Connect. By purchasing credits, utility customers can support additional renewable energy in the generation mix from wind and solar.

- **5.1.1.** Implement renewable energy strategies from the PiE Energy Action Plan
  - Create a near-term web presence on the SLP website for nonprofits, local government, faith-based organizations, and businesses to learn more and have access to relevant resources such as financing (integrate with CAP Resource Hub)
  - Conduct direct outreach to businesses and residents
  - Create materials for neighborhood associations to distribute
- **5.1.2.** Increase participation in green power purchase programs like WindSource® and Renewable*Connect that are offered by Xcel Energy
  - Include links to these programs on the CAP Resource Hub
  - Encourage sign-ups through regular communication channels (newsletters, social media, etc.)
  - Charge ESC with developing an outreach strategy that includes annual goals and engagement tactics
  - Engage youth in outreach efforts
  - Track annual participation using the community energy report from Xcel

5.2. Encourage participation in community solar

Many residents and business owners are unable to install solar on their rooftop because they don't have a good solar resource, are renters, or cannot afford to. Community solar allows utility customers to subscribe to a solar garden that is sited in another location.

- **5.2.1.** Provide resources to help residents and businesses make informed decisions about community solar
  - Include information and resources on the CAP Resource Hub
- **5.2.2.** Host a community solar garden site that allows residents and businesses to participate
- **5.2.3.** Stipulate in the contract that the project will maintain the RECs
- **5.2.4.** Reserve a portion of the project for low-income residents at a discounted rate
- **5.2.5.** Engage community members throughout the project
- **5.2.6.** Request technical assistance from objective entities like CERTs

5.3. Support and accelerate installation of on-site solar

More than half of the city's energy consumption can be met by rooftop solar generation within the community. Investment in on-site solar keeps energy dollars local, and helps the community meet its climate goals.

- **5.3.1.** Encourage and educate residents on the benefits of on-site solar
  - Post the state solar resource map on city's CAP Resource Hub
  - Provide a link the Clean Energy Project Builder
  - Provide a link to Energy Sage, an online marketplace that helps reduce the cost of solar energy installations for business and residential consumers
  - Include a link to the National Renewable Energy Lab's solar calculator, PVWatts®

5.3.2. Organize a bulk purchase of solar installations through programs like Solarize and the Solar Power Hour
- Promote and host workshops to offer residents the opportunity to receive discounted prices on solar installations
- Coordinate with Roots and Shoots Club to expand outreach efforts to residents, businesses, and the school district

5.3.3. Over time, continue to encourage more residents and businesses to shift from purchasing green power to on-site generation to capture co-benefits like property investment, job creation, or resilient grid infrastructure

5.3.4. Encourage businesses and residents to participate in Solar*Rewards, a production incentive from Xcel Energy; RECs can be reclaimed by the owner of the solar energy system after 10 years

5.3.5. Achieve SolSmart certification by implementing prescribed best practices

5.3.6. Encourage solar plus storage (and EV) ready homes

5.3.7. Include solar plus storage-installed in homes as an eligible amenity in PUD ordinance

5.4. Install solar on all public facilities with an adequate solar resource

The city can lead by example with public installations of solar energy systems.

5.4.1. Complete a solar resource assessment to determine optimal public sites for solar installation
- Use available mapping tools to identify potential sites for solar installations
- Use public facility solar installations as demonstration projects
- Share production data and cost savings with the community

5.4.2. Determine whether any sites are suitable for community solar gardens

RESOURCES

- Minnesota Solar Suitability App – allows users to enter their address and see an estimate of their solar resource and production.
- Google Project Sunroof – similarly allows users to see an estimate of solar resource and production.
- CERTs - The Clean Energy Resource Teams have a wide variety of resource on solar energy, particularly community solar gardens.
- Clean Energy Project Builder - This site aims to bring together all the information you need to plan a clean energy project, including a search function for installers and funding sources.
- SolSmart Certification - SolSmart provides recognition and no-cost technical assistance to help local governments reduce barriers to solar energy growth.
- Solarize - The Solarize approach allows groups of homeowners or businesses to work together to collectively negotiate rates, competitively select an installer, and increase demand through a creative limited-time offer to join the campaign.
- Solar Power Hour – One hour seminars on how solar PV systems work, financial benefits, and an explanation of the installation process.

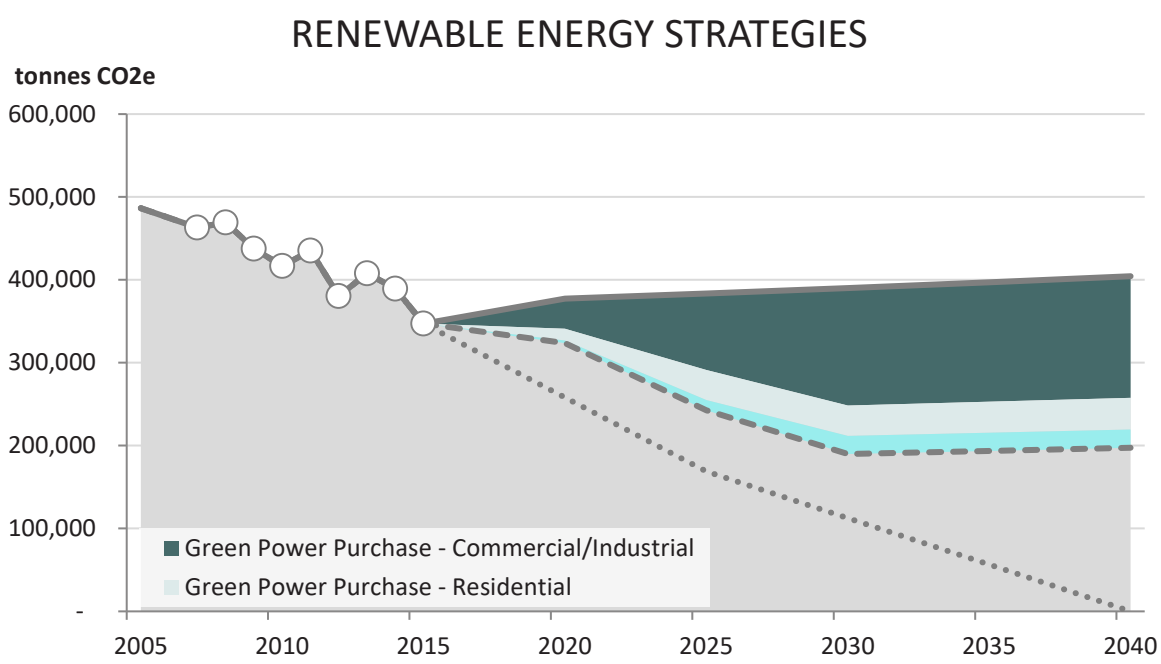


Figure 8 Total building electric emissions reductions from renewable energy.

Achieving 100% renewable electricity by 2030 will have the greatest impact on carbon emissions in St. Louis Park, reducing total emissions by nearly 33%. The emissions reduction calculation assumes the building efficiency goals are met through 2030. The total rooftop generation potential was calculated using a GIS mapping tool. The rooftop resource is estimated to be equal to approximately 44% of the total electricity used St. Louis Park. The rooftop estimate does not consider various impediments to solar energy systems, like air handling units, vents, green roofs, or patios, and therefore may overestimate the available resource. However, it serves as an indicator of how much solar electricity could be generated within the city boundary. This number is significantly greater when ground mount applications are considered, particularly where there is underutilized land, such as large surface parking lots or brownfields.

GOAL 6: Reduce vehicle emissions by 25% by 2030, as compared to the business-as-usual forecast.

Strategies

- **Reduce Vehicle Miles Traveled (VMT):** By 2030, VMT per person in St. Louis Park will be reduced by 12% from 2014 (11.6% of total vehicle emissions).
- **Vehicle Efficiency:** By 2030, 24% of the existing car stock and 40% of the existing light truck stock will be replaced with models that comply with CAFE Standards (federal fuel economy regulations), resulting in 39% savings for cars and 43% savings for light trucks (7.2% of total vehicle emissions).
- **Increase Adoption of Electric Vehicles** (7.5% of total vehicle emissions).
    - **For city residents:** By 2030, 100% of new car and 10% of new truck purchases by St. Louis Park residents are electric vehicles, such that EVs comprise 28% of total car ownership and 1% of all truck ownership in SLP. Assuming these vehicles are charged within St. Louis Park with carbon-neutral electricity, they will achieve savings of 100%.
    - **For non-city residents:** By 2030, 57% of new car and 5% of new truck purchases by non-SLP residents are electric vehicles. EVs will make-up 14% of total non-resident cars and 1% of the non-resident trucks that drive in SLP. Assuming these vehicles are charged within Xcel service territory, they are estimated to achieve savings of 71%.
- **Fuel Switching for Heavy Duty Vehicles:** By 2030, 10% of heavy duty vehicles will use alternatives to conventional fuels (i.e. electric, hybrid, and/or soybean-based BD20), achieving an average emissions reduction of 39% (0.7% of total vehicle emissions).

IMPACT: These strategies are estimated to result in a 27.0% emissions reduction in vehicle travel emissions by 2030, which equates to an 8.4% reduction in community-wide emissions.

GOAL 6 INITIATIVES AND ACTIONS

6.1. Expand infrastructure for electric vehicle charging

Electric vehicles have a lower carbon emissions rate in Xcel Energy territory than combustion engine vehicles. As the grid gets cleaner, the emissions rate will decline.

6.1.1. Expand public infrastructure for electric vehicle charging
- Implement Kick-start Project 3 of this Plan within one year of Plan adoption
- Identify priority locations for EV charging stations
- Engage Drive Electric Minnesota to help determine charger type (Level 1, 2, or Fast Charger) and appropriate rate structure for charging
- Ensure EV parking spaces have high visibility and educational signage

6.1.2. Expand private EV charging infrastructure
- Encourage private businesses to offer charging stations for EVs
- Increase access to workplace charging stations (PlugIn Connect, businesses, utilities)
- Include EV parking spaces in parking standards for new development

6.2. Promote and encourage accelerated adoption of EVs

The normal adoption rate for new vehicles types will not be fast enough to have the impact necessary to achieve the city's goals.

6.2.1. Promote benefits of and opportunities for EVs on CAP Resource Hub
- Educate on green power options, time-of-day pricing

- Promote state, local, and other incentives for purchasers of new EVs (tax credits, preferential parking, reduced fees)

6.2.2. Work with Drive Electric Minnesota to coordinate a bulk discount program or public awareness campaign

6.2.3. Work with businesses to increase the number of EVs that are a part of commercial fleets

6.2.4. Host Ride and Drive electric vehicle events

6.2.5. Support electrification of Metro Transit buses

6.3. Encourage alternative low-carbon fuels and fuel-efficient vehicles

Alternative fuels include E85 (ethanol blend), biodiesel, and hydrogen fuel cells. Both vehicles that accept these fuels, and efficient vehicles emit less carbon than gasoline vehicles.

6.3.1. Provide educational materials on the benefits of fuel efficient vehicles

6.3.2. Promote alternative low-carbon fueling stations (e85, biodiesel)

6.3.3. Encourage alternative fuel for commercial fleets (e.g., delivery vehicles)

6.3.4. Look into anaerobic digestion to produce bio-based natural gas for heavy-duty vehicles

6.4. Enable reduction of vehicle miles traveled (VMT) from single-occupancy vehicles

The biggest impact on transportation emission reductions is from reducing VMT, which requires an increase in the use of alternatives to single-occupancy vehicles.

6.4.1. Continue to modify land use to encourage alternative modes of transportation, consistent with the city's complete streets policy and any future living streets policy
- Accelerate investment in alternative transportation infrastructure
- Continue to implement Connect the Park to increase commuter bicycling and pedestrian opportunities
- Install roundabouts to reduce vehicle fuel consumption
- Implement transit-oriented development (TOD) near anticipated LRT stops
- Allow building owners to unbundle parking to be rented separately from the building space

6.4.2. Encourage reduced vehicle ownership (there are currently 1.4 vehicles per household) through education and incentives

6.4.3. Support and enable car sharing services such as HOURCAR®, Zipcar®, car2go, or any future reputable service

6.4.4. Review current parking ordinance that contains minimum parking requirements, and modify to use national best practices that set appropriate parking standards to encourage multi-modal alternatives

6.4.5. Consider instituting flexible parking requirements for future transit-oriented development that provides services, infrastructure and/or mitigations to reduce parking demand, such as:
- Access to electric, autonomous car-sharing and bicycle sharing programs to increase mobility options for all residents
- Dedicated parking for low carbon fuel vehicles
- Resident and/or employee transit incentives
- Higher-than-required bicycle parking

6.4.6. Develop a wayfinding signage program to promote use of pedestrian trails and stairs, especially to improve pedestrian access to schools (e.g. Safe Routes to School) and transit

6.4.7. Consider GHG emissions in planning, resource allocation, and right-of-way management decisions

6.4.8. Improve the city's average Walk Score from 47 to 60 by 2030
- Implement the city's complete streets policy for all transportation projects

6.4.9. Participate as a community in the National Bike Challenge, a nationwide event uniting bicyclists and encouraging new riders
- Promote the National Bike Challenge on the CAP Resource Hub
- Share progress and success of the challenge
- Award top riders twice a year (winter and summer)

RESOURCES:
- Drive Electric Minnesota: Partnership to accelerate the adoption of electric vehicles in Minnesota.
- Metropolitan Area Planning Council, example of flexible parking standards and national examples.

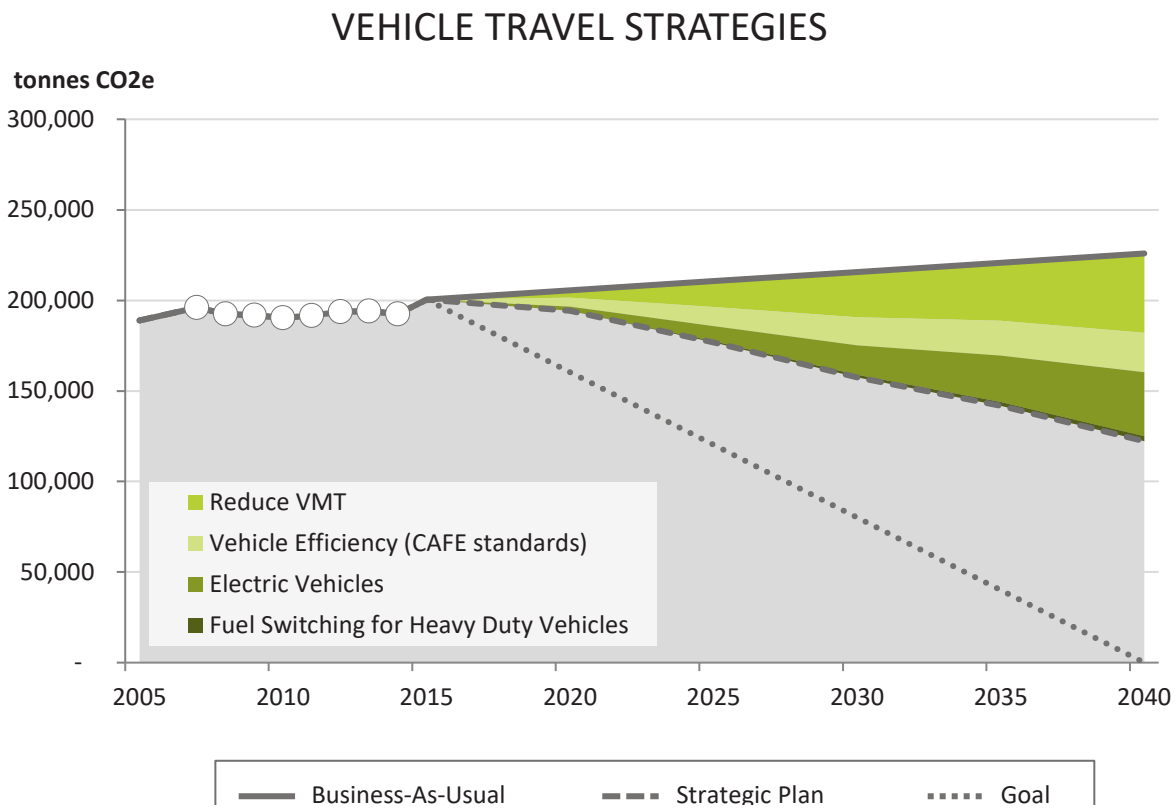


Figure 9 Total vehicle travel emission reductions through efficiency and decarbonization strategies.

Figure 9 shows the reduction in emissions from the transportation strategies. Strategies that reduce VMT will have the greatest impact, followed by switching to EVs. Many of the EV strategies will rely, to some extent, on market forces and the grid mix. The city will need to consider alternatives to offsetting remaining travel emissions. Overall, these strategies will result in a 27% reduction in vehicle emissions and 8.4% reduction in overall emissions.

GOAL 7: Achieve a 50% reduction in waste by 2030, as compared to the business-as-usual forecast

IMPACT: Reducing emissions from municipal solid waste 50% by 2030 is estimated to result in a 1.1% reduction in community-wide emissions.

Emissions from solid waste accounts for 1.7% of total community emissions and are generated from landfills and incinerators (Note: this does not include lifecycle emissions). While this is relatively small, it is nevertheless important to address to achieve 2040 goals. The city has a history of working to reduce waste through its long-standing curbside organics and recycling programs and the more recent Zero Waste Packaging Ordinance. The Zero Waste Packaging Ordinance went into effect on January 1st, 2017 and requires that all licensed food establishments use packaging that is reusable, recyclable, or compostable when serving food and beverages that are intended for immediate consumption.

GOAL 7 INITIATIVES AND ACTIONS

7.1. Adopt a waste reduction plan to achieve a 50% reduction in garbage by 2030 from BAU

- **7.1.1.** Conduct a review of existing waste sort data to determine where more outreach and information is needed to reduce waste
- **7.1.2.** Work to increase participation in curbside organics recycling to achieve 50% participation by 2030
- **7.1.3.** Implement expanded recycling requirements at multi-family and commercial buildings
- **7.1.4.** Close the loop on organics recycling; require that compost be used as a soil amendment for public and private construction projects that disturb the soil cover by a set amount

7.2. Continue to improve and enforce the city's Zero Waste Packaging ordinance

- **7.2.1.** Continue to work with businesses to ensure compliant packaging, as well as proper collection for recyclable and compostable items
- **7.2.2.** Research lifecycle impacts of acceptable packaging materials; encourage the use of lower carbon intense products
- **7.2.3.** Continue to require that city-hosted events comply with the Zero Wastes Packaging Ordinance and relevant environmental purchasing policies; expand to require that outside users of certain city facilities also use compostable, reusable, or recyclable food service items

7.3. Communication and Marketing

- **7.3.1.** Include resources on city's website and through social media to inform residents of recycling and organics programs
- **7.3.2.** Include resources on city's website and through social media to inform residents about waste reduction opportunities, such as how to opt-out of phone book and junk mail deliveries
- **7.3.3.** Expand outreach and education on recycling and organics programs and waste reduction opportunities (e.g. community chat forums for recycling, reusable shipping materials, waste reduction, and reuse mobile apps)

Plan Impact

The Goals, Strategies, and Initiatives outlined above are estimated to achieve a 55% reduction in total GHG emissions from business as usual in 2030. Most of these savings are achieved through strategies associated with the energy used in buildings. Figure 10 represents the carbon reductions across each sector. The wedges denoted by shades of red indicate buildings emissions reductions. The blue shading indicates reductions from an increase in renewable electricity, the green and purple wedges represent travel and waste emissions reductions, respectively. Building energy efficiency reduces energy consumption, resulting in a 21.7% reduction in community-wide emissions. Increasing the use of renewable electricity results in an additional 23.0% emissions reduction. Vehicle travel efficiency and decarbonization strategies provide 8.4% emissions reduction, and the elimination of emissions from solid waste contributes the final 1.1% savings. By 2040, many of the implemented actions will continue to reduce emissions such that the city will achieve an estimated 62% reduction in emissions by 2040, as compared to business as usual. The light gray space between the dotted and dashed lines represents the 38% of emissions that remain if city is successful in achieving the 2030 goal. Achieving carbon neutrality by 2040 will require the city to explore and implement the advanced strategies that are described in the next section.

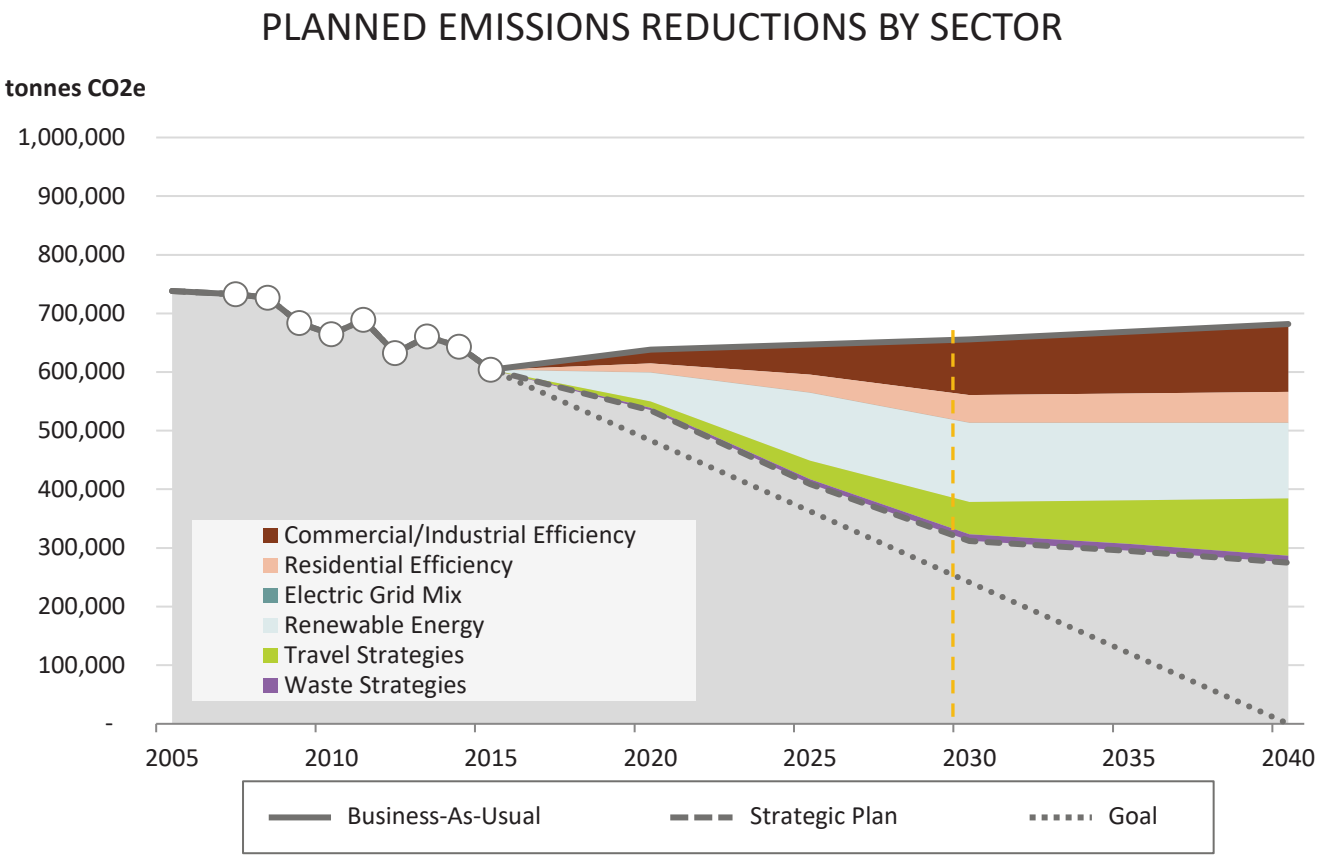


Figure 10 Planned emissions reductions by sector through 2030.

Advanced Strategies

The Goals, Strategies, Initiatives, and Actions outlined above will continue to reduce GHG emissions from 2030 to 2040 – achieving an estimated 62% reduction from business-as-usual by 2040, leaving 38% that will need to be addressed with deeper, more long-term strategies. Of the remaining emissions, 36% are from natural gas used in buildings and industrial processes, 45% are from vehicle travel, and 19% are from air travel (Figure 10).

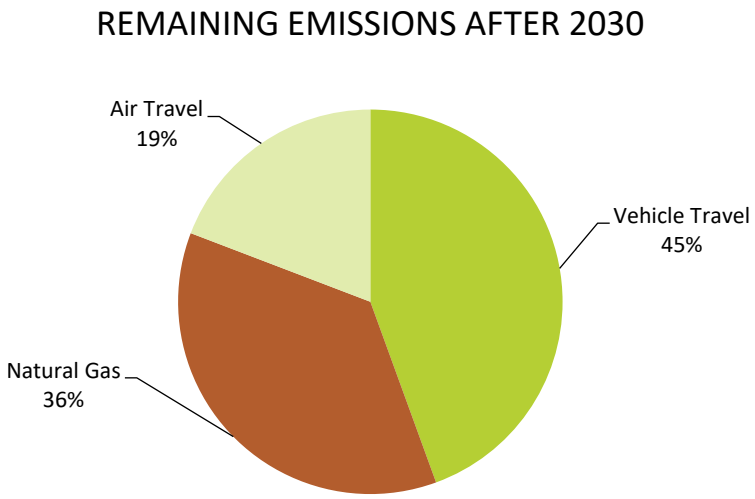


Figure 11 By 2030, the city will have reduced its emissions 62% from BAU; this graph shows the breakdown of the remaining 38% that will need to be reduced through advanced strategies.

These sources and activities will not get the city to carbon neutrality without deep decarbonization efforts and carbon offsets. Buildings depend on natural gas primarily for space and water heating, and industrial processes. Efficiency alone cannot reduce natural gas consumption enough to achieve carbon neutrality and biogas is not currently commercially available to replace this energy resource. Technologies that capture waste heat (e.g. heat from data centers), or can generate heat and/or power have the potential to dramatically reduce natural gas consumption and move the city closer to its goal. Similarly, there are limitations to achieving a carbon-neutral transportation system, particularly among heavy-duty vehicles and airplanes. There will likely be some technological innovations that will be available to address some of the remaining emissions. For the emissions that cannot be reduced through any of the identified strategies, the city should look to carbon offsets to capture and store carbon long-term.

Finally, this plan only addresses GHGs that are either emitted within the boundary of the city (Scope 1) or are emitted indirectly through the purchase of electricity or other energy sources (Scope 2). These are emissions that can be directly impacted by residents and businesses in the community. Scope 3 emissions include those that come from the supply chain, such as emissions from food production and distribution. These make up a substantial amount of global emissions and should be considered for future action plans.

The advanced strategies identified below are long-term strategies that need to begin in the near-term.

A. IDENTIFY OPPORTUNITIES FOR THERMAL ENERGY GRIDS

District heating is an underutilized technology that makes use of thermal energy grids. Wherever there is waste heat, there may be an opportunity to use the heat to meet demands of a nearby thermal load (i.e. heating and cooling needs). Waste heat can come from sewer mains, anaerobic digestion processes, data centers, or processing facilities, among others. Opportunities for district heating should be considered for new developments and in the early planning stages of infrastructure projects to make projects the most cost effective.

- ☐ Identify facilities in the community with excess waste heat
- ☐ Identify facilities with high thermal demand
- ☐ Determine locations with opportunities to pair waste heat with large thermal loads
- ☐ Explore recommendations made in the Minnesota 2025 Energy Action Plan

B. EXPLORE OPPORTUNITIES FOR COMBINED HEAT AND POWER

Combined heat and power (CHP) systems simultaneously generate electricity and thermal energy within a single system. By using the thermal energy, CHP systems achieve much greater efficiency than conventional power generating systems. While this system is well established in Minnesota, there is still great potential to harness this resource. Work with the Minnesota Department of Commerce, Division of Energy Resources to explore opportunities for combined heat and power.

C. ANAEROBIC DIGESTERS FOR WASTE HEAT AND COMPRESSED NATURAL GAS

Anaerobic digestion is a process that uses captured biogas (methane and carbon dioxide) from the decomposition of organic material to generate heat and/or electricity. Biogas generated from this process can also be cleaned to remove carbon dioxide and other impurities to produce a renewable product equivalent to conventional natural gas, referred to as renewable natural gas. Renewable natural gas can serve as a replacement for any natural gas application and can also be compressed to provide a source of transportation fuel in place of conventional natural gas. Biogas can also be used to generate electricity in a process called combined heat and power (mentioned above). Organic materials may include waste from crop residue, manure, food processing residues, urban yard waste, or organic waste collected from businesses and residents.

- ☐ Coordinate with Minneapolis, Hennepin County, and the State to explore opportunities for regional anaerobic digester from organics collection
- ☐ Identify opportunities to purchase compressed natural gas from methane capture at closed landfill sites (e.g. Eden Prairie)
- ☐ Promote development projects like the Eco-Village and Creative Center that uses anaerobic digestion to supply electricity

D. FUEL SWITCHING

Deep decarbonization efforts may require shifting end-uses to low or no-carbon energy sources. By 2040, to be carbon neutral, many appliances that currently use natural gas will need to be switched to an alternative fuel (e.g. electricity, biomass, or renewable gas). For instance, many water heaters, boilers and furnaces, gas ranges, and dryers use natural gas to operate. Implementing energy efficiency actions alone will not get these systems to carbon neutral. They will either need to be offset through additional renewable energy credit purchases, or be replaced by an alternative clean fuel. There may also be opportunity to use energy saving technologies like ground-source heat pumps for new construction, or air-to-air heat pumps for existing buildings.

Because these types of appliances are long-term investments (e.g. a new boiler can have a 20 to 30-year life-cycle), there are few opportunities within the 2040 timeframe to replace them with electric options. The shift to alternative fuels would need to begin to occur in the early 2020s and ramp up toward the end of the decade. A challenge to achieving widespread fuel switching is that in many cases natural gas is cheaper than electricity and it may not make economic sense for people to switch to electricity. However, there may be opportunities to combine fuel switching with solar energy systems and storage to minimize or eliminate the cost difference.

Pathways to Deep Decarbonization - This report, completed by the Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations (IDDRI) examines the technical and economic feasibility of such a transition in the United States, evaluating the infrastructure and technology changes required to reduce U.S. GHG emissions in the year 2050 by 80% below 1990 levels, consistent with a global emissions trajectory that limits the anthropogenic increase in earth's mean surface temperature to less than 2°C.

E. CARBON OFFSETS

The city may wish to consider carbon offsets to meet its goals. Carbon offsets can include the purchase of renewable energy credits or the promise of carbon sequestration (i.e., the storing of carbon dioxide) through tree planting. The city has a goal to receive 100% of its energy from renewable sources by 2030; it may wish to expand that goal to produce more electricity than is consumed and set a goal to achieve 120% of its electricity from renewable sources by 2030. The additional electricity can be used to offset travel emissions or natural gas consumption. Renewable Energy Credits can be purchased through utility programs or through a RECs broker.

The city is planning to implement an aggressive tree planting project. The city can use iTree to inventory trees in its urban forest and calculate current and future carbon sequestration.

F. EMERGING TECHNOLOGIES

It is in an exciting time for advances in energy technologies. Tesla continues to advance the EV market, storage, and integrated rooftop solar. New companies start up with frequency and bring innovation to the market that can transform the way we use energy in impactful ways. The city should continue to be aware of technologies as they emerge, pilot innovations, and encourage further deployment.

G. SCOPE 3 EMISSIONS

Carbon accounting is measured across three categories of emissions which are referred to as "scopes". Scope 1 emissions are those that occur within the boundary of a city. For example, all transportation emissions, industrial processes, or cooking with a gas range within a city are Scope 1. Scope 2 emissions include all grid-supplied energy. Electricity is used in homes and businesses, but the emissions are often outside a city's boundary at a centralized power plant. Scope 1 and 2 emissions are included in this plan. A consideration for the city in future, is to study its impact on Scope 3 emissions — indirect, out-of-boundary emissions — and determine if and how it wants to address them. These emissions include travel by residents and businesses

outside the city boundary, emissions of goods brought into the community, etc. They are often more complicated to accurately capture, however they have a big impact on global emissions.

Successful implementation of the advanced strategies will help the city become carbon neutral by 2040. The darker gray wedges in Figure 12 represent how the advanced strategies help the city achieve its goal. In this graph, much of these emissions reductions occur after 2030. However, for these strategies to be successful, the city will need to start planning for implementation in the next five to ten years as many will require considerable time for study, development, and deployment.

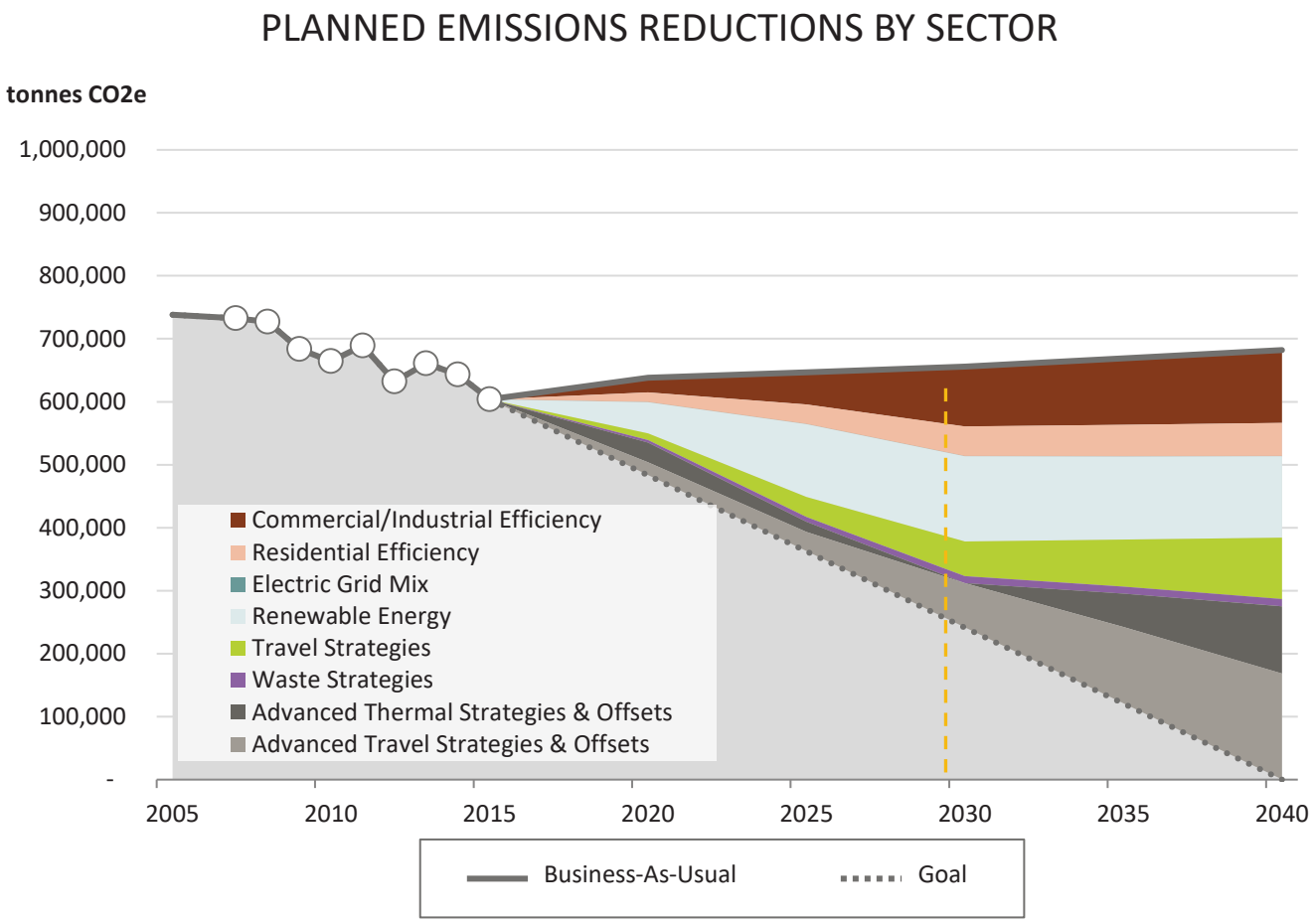


Figure 12 Greenhouse gas emissions by sector, City of St. Louis Park, City Operations. 2015.

City Operations

While city operations comprise just 1.5% of total city emissions, it is important for city leaders to track and demonstrate how goals in the Climate Action Plan can be achieved. The following provides recommended actions to guide city leaders and staff as they set internal targets to achieve emissions reductions.

A greenhouse gas assessment was completed for St. Louis Park City Operations and involved a thorough review of energy consumption and associated emissions. The report identified the largest energy users and breaks down GHG emissions by source. This assessment serves as the basis for informed decision-making to reduce emissions, supporting the city's goal of being carbon neutral by 2040. Using this information, city staff can set annual targets to achieve emissions reduction through efficiency, conservation, and to make plans for renewable energy procurement, through on-site installations, community solar subscriptions, or the purchase of renewable energy credits.

Figure 13 illustrates GHG emissions by sector from the city's various operations. The largest emitter of GHG emissions is the building and facilities sector, making up over half of total emissions. Pumping water, transportation fuels, and streetlights are also significant sources of GHG emissions. The data contained in this assessment may be used by city staff to develop targets and track progress.

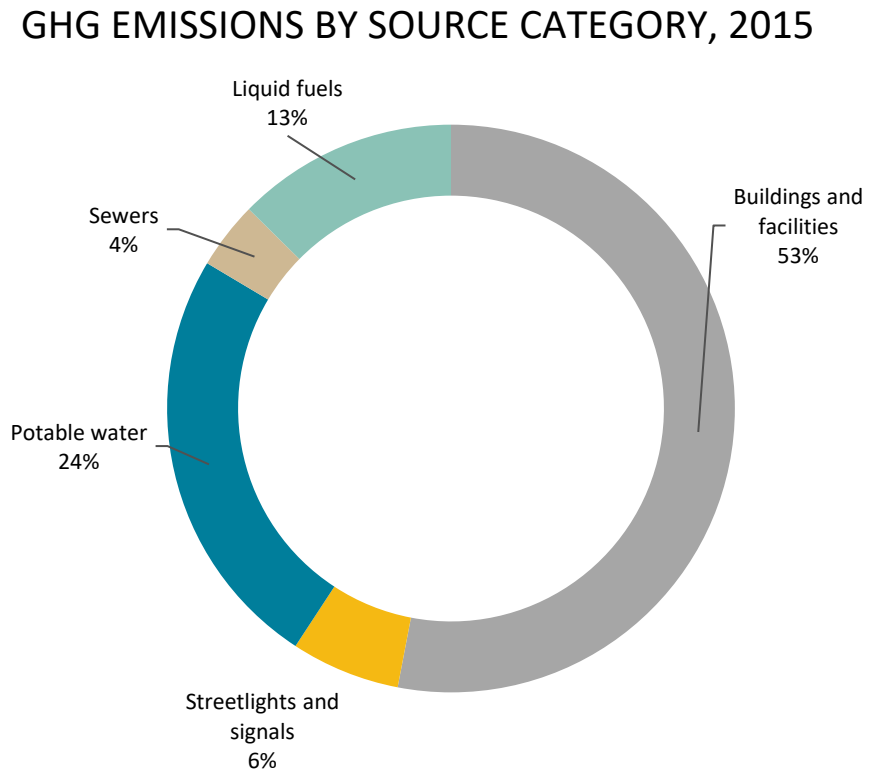


Figure 13 Data source: City Operations GHG assessment

CITY BUILDINGS AND FACILITIES

The city operations greenhouse gas inventory identified the largest energy users among public buildings. These buildings have the greatest opportunity to achieve carbon reductions. The Rec Center stands out as the largest emitter of GHGs, while the Westwood Hills Nature Center is the lowest.

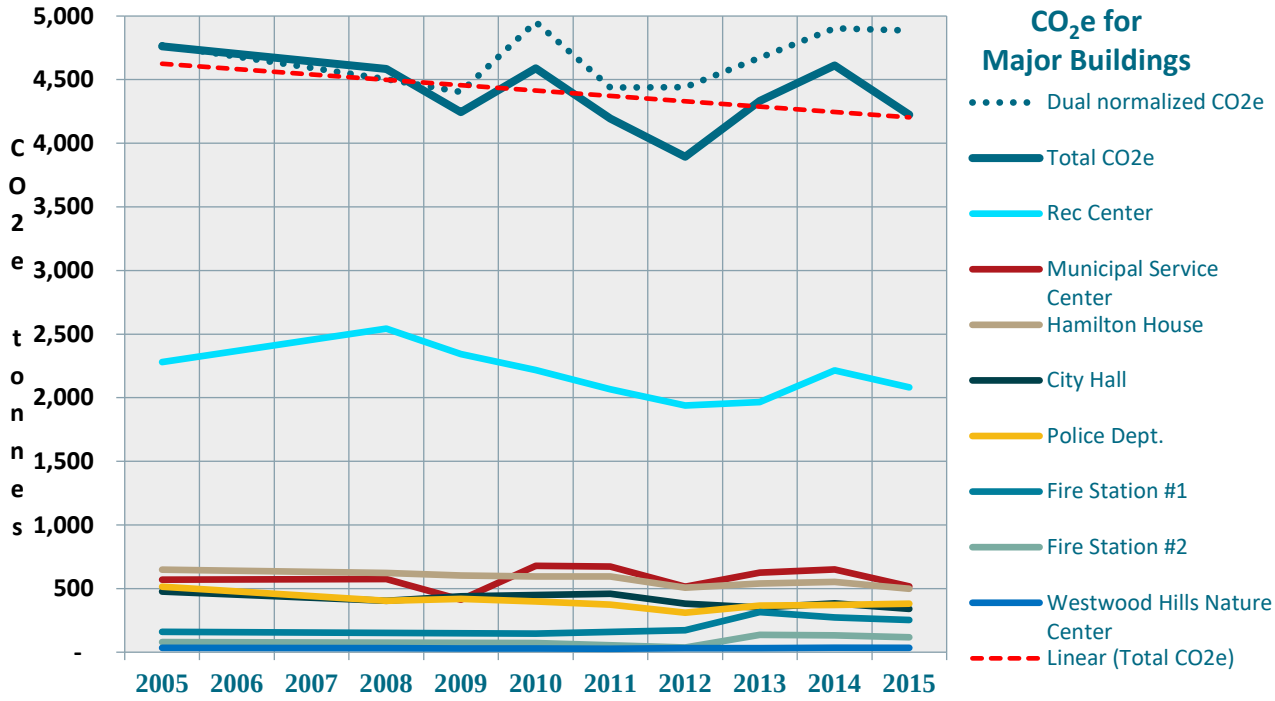


Figure 14 CO_2 Emissions for largest users in buildings and facilities sector.

Table 2, below, illustrates how the potential solar resource compares to the electricity consumed by each of the largest users. It also includes an estimate of the solar availability for each building as a percent of consumption. A GIS mapping tool was used to estimate the rooftop solar resource and does not account for mechanical equipment, structural integrity of rooftops, or other barriers that may reduce access to the solar resource and may overestimate potential. Site assessments should be completed to understand the true generation potential.

Building	Capacity (KW)	Potential Generation (KWh)	Electricity Consumption (KWh)	Solar as percent of consumption
Rec Center	629.42	818,234	3,006,300	27%
Municipal Service Center	816.51	1,061,466	619,999	171%
Hamilton House[1]	149.56	194,432	631,869	31%
City Hall	88.34	114,836	514,400	22%
Police Department	196.63	255,613	496,640	51%
Fire Station 1	146.34	190,243	302,990	63%
Fire Station 2	103.32	134,320	140,894	95%
Westwood Hills Nature Center	22.11	28,738	70,050	41%
Total	**2130.12**	**2,769,144**	**5,713,092**	**48%**

Table 2 Solar energy potential as percent of electricity consumption.

[1] The Hamilton House is a Public Housing building that is owned and operated by the Housing Authority, not the City of St. Louis Park. It is included in this list because the city tracks its energy and water use through the B3 benchmarking program.

St. Louis Park has several opportunities to use its public sector solar resources. The city's rooftop solar resources are substantial and may, in some cases, meet a significant portion of on-site electric energy use in the same building. Most sites have the potential to receive at least 25% of energy consumption from rooftop solar. The Municipal Service Center may be able to capture up to 171% from solar, which exceeds the benefits of net metering (net metering is limited to 120% of customer's on-site annual electric consumption). To capture the full benefit of solar on this roof space, the city should explore community solar.

City Action:
The city has a goal to achieve 100% of its electricity from renewable sources by 2030. This can be achieved at the city operations level through a combination of actions.

- Set an internal goal to receive at least 10% of the city's electricity from on-site solar
- Use the solar mapping to prioritize which buildings the city intends to install solar on
- Explore solar carport opportunities for parking areas (see Mill Valley Rec Center)
- Complete solar site assessments with a solar installer for priority buildings
- Complete a structural analysis and electrical service evaluation of rooftops
- Maximize rooftop solar on all public buildings with a good solar resource
- Ensure there is an element for storage plus solar, or storage-ready solar in any RFP issued by the city
- Use the city's sustainable purchasing policy to purchase on-site solar installations and/or renewable energy credits for the remaining electricity (the electricity that is not covered by on-site solar)
- Identify financing and incentive opportunities (rebates, production incentives, third-party financing)
- Explore opportunities for ground-mount systems to increase the amount of local generation
- Track progress and share success

The city can maximize building energy efficiency by implementing the following:

- Ensure all buildings and facilities are benchmarked and kept up-to-date in B3
    - Work to have all utility bills automatically uploaded to B3 database
    - Consider Portfolio Manager as an additional or alternative benchmarking tool (B3 and Xcel allow for automatic uploads to Portfolio Manager), buildings may be eligible to achieve ENERGY STAR certification
- Participate in State financing programs like the Guaranteed Energy Savings Program (GESP) or Local Energy Efficiency Program (LEEP)
- Prioritize improving the efficiency of the city's largest energy user (i.e. the Rec Center)
    - Consider solar thermal heating for the pool
    - Explore opportunities for ground-source heat-pumps for the ice arenas
    - Expand white roof to the entire rooftop
- Require green building or net-zero energy standards for all new public buildings, and for major renovations of existing buildings
- Encourage energy efficient behavior changes by all staff (e.g. turn computers off at night, eliminate any personal space heaters or refrigerators)

The following measures can be tracked using GreenStep Cities Step 4:

- Number of city-owned and private renewable energy generation sites
- Generation capacity at city and at private renewable energy generation sites
- Annual renewable energy purchases
- Percent of total energy use that is generated and purchased renewable energy
- Percent of total city energy use that is purchased from a community solar garden

POTABLE WATER AND SEWERS

The potable water production sector (wells, pumps, reservoirs, and the water treatment plant facilities) is second largest emitter of GHGs. Potable water accounts for about a quarter of the GHG emissions from city operations. Emissions from this sector have been declining over the past several years, in part due to Xcel Energy's cleaner grid mix, and to an increase in efficiency of variable drive motors.

Many of the water treatment plants and pumps have seen a decrease in energy use in the 10-year period of the analysis. However, there are a few plants and pumps that have increased energy consumption, including Water Treatment Plants 1 and 10, and Well 10 Pump House.

The major source of emissions from potable water production comes from electricity.

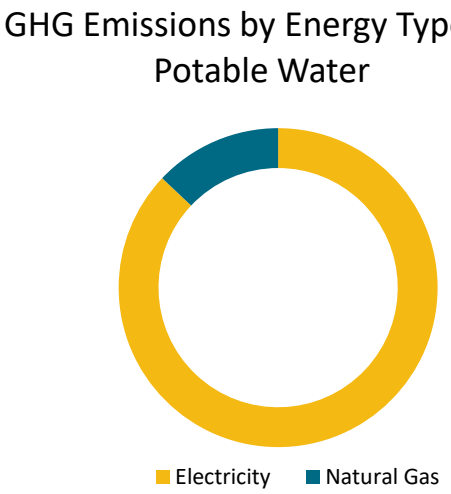


Figure 13 GHG emissions from electricity and natural gas consumption for potable water

City Action

Identify opportunities to improve efficiency and increase renewable energy production and consumption.

- Continue efforts to improve the efficiency of potable water delivery
- Enter energy use data into B3
- Identify possible sites for ground mount solar and storage
    - Ground mount solar and storage have the added benefit of increasing the resilience of the water supply system by providing electricity to the system in the event of a power disruption
- Purchase RECs for the remaining electricity usage
- Encourage residents and businesses to reduce water consumption through conservation
- Reduce water consumed by city operations
    - Increase native, drought resistant plant coverage
    - Collect and use rainwater as an alternative to pumped water for landscape irrigation

The following measures can be tracked using GreenStep Cities Step 4:

- Residential gallons used per person per day
- Business gallons used per job per day
- Annual city operations' gallons
- Annual energy used per million gallons of water

CITY FLEET

Liquid fuels consumption is controlled by the Public Works Department, which includes the Parks, Police, and Fire departments. The liquid fuels sector is the third largest source of GHG emissions for city operations. This sector includes fuel (gasoline, diesel, etc.) consumed by city vehicles. Both the emissions and consumption levels decreased between 2005 and 2015, in part due to an increase of in the use of alternative low carbon fuels (E-85).

City Actions

Actions the city can take to further reduce emissions include:

- Set annual targets to reduce GHG emissions through efficiency, conservation, and renewable energy
    - Record daily miles traveled by vehicle
    - Identify vehicles that travel fewer than 110 miles (range of a Nissan Leaf) or are idle long enough between use to be sufficiently charged for longer distances
    - As low mileage vehicles are replaced, replace with electric vehicles; EV range will increase as technology improves (Chevy Bolts have a range of 280 miles)
    - For vehicles driven longer distances, purchase fuel efficient, and/or Flex Fuel vehicles that use low carbon alternative fuels (E-85)
    - Identify vehicles that are over-sized for their purpose, replace with right-sized, more efficient vehicles
    - Identify opportunities to reduce VMT through more efficient routes
- Consider GHG emissions in the purchase of new vehicles
    - Purchase fuel efficient vehicles when EVs are not available or practical
- Study the feasibility of replacing combustion vehicles with electric vehicles
- Participate in a bulk purchase for fleet vehicles with the State of Minnesota Department of Administration, or other partnership (Drive Electric Minnesota)
- Install EV charging stations at public facilities for city fleets and personal employee vehicles
- Improve efficiency of routes to reduce vehicle miles traveled
- Convert heavy-duty vehicles to compressed natural gas or biodiesel
- Encourage or incentivize employees to take transit, bike or walk, or telecommute at least once a week

The following measures can be tracked using GreenStep Cities Step 4:

- Vehicle miles traveled (VMT) for gasoline and diesel fleets
- Average miles per gallon (MPG) for gasoline and diesel fleets
- Number of electric vehicles in city fleet
- City employee VMT per day

STREETLIGHTS AND SIGNAL

The Community Energy Report developed by Xcel Energy, suggests the city maintains approximately 1,800 of its own streetlights. Between 2010 and 2015, the city has replaced 40 to 60 lights each year. At this rate, if the city were to replace 60 lights each year, all lights would not be replaced for 25 years. To achieve 2040 goals, lights will need to be replaced at a rate of at least 75 lights each year.

City Action:

- Create a plan to accelerate the rate of replacing streetlights with LED fixtures
- Enter energy use data from streetlights into B3

- Consider different lighting options, such as lights combined with solar and storage, motion-sensor lights, moon-sensor lights, or removing lights in areas that are over lit to maximize energy savings

CRITICAL INFRASTRUCTURE

Critical infrastructure includes buildings like hospitals, schools, community centers, and emergency responder centers. These are places where it is necessary to maintain operations in the event of an emergency or a public health crisis like a prolonged heatwave. Disruption of power to these facilities limits the ability to effectively respond to the needs of residents. Many of these facilities have back-up generators, which are often fueled by diesel or natural gas. Advances in solar and storage technologies are increasing the feasibility of replacing fossil fuel generators with cleaner, more reliable alternatives.

City Action

The city can pair clean energy and storage to provide renewable energy and reliable back-up power to critical facilities.

- Use the table below to identify critical infrastructure and current back-up power types
- Research opportunities to install solar and storage for daily power supply as well back-up power
- Ensure any solar and storage installation can function safely as a microgrid in case of a power disruption
- Install solar storage systems above water lines from any potential flooding

Back-up Power for Critical Infrastructure / Facilities			
Facility 1	**Police Station**	**Facility 2**	**Fire Station 1**
Type	Emergency Response	Type	Emergency Response
Address		Address	
Generator	Yes/No	Generator	Yes/No
Generator Type		Back-up power type:	

Resources:

- National Renewable Energy Lab (NREL): Distributed Solar PV For Electricity System Resilience

INTERNAL TEAM

Execution of these actions will require staff to be strategic and intentional about reducing emissions through efficiency, conservation, and clean energy. The creation of an internal team that sets targets and develops a schedule of action will help drive operations toward achieving city-wide goals.

The team should include:

- Staff across departments
- A designated point-person to keep group on track
- Regular meetings to report progress and advance goals
- Regular updates to council, at least twice per year

There are different methods the city can utilize to achieve the goals of this plan and minimize the additional pressure it may have on staff and resources. The city is already completing actions that are directly or indirectly related to the actions outlined in the CAP. By identifying how the CAP can be integrated into the normal functions of the city, existing resources will be better able to absorb the change. For instance, how the city spends its money each year has a GHG impact. If the budget is designed to consider greenhouse gas emissions, additional spending can be avoided in several instances. Further, leveraging existing programs and working with partners can help externalize some of the burden and distribute the additional load. Additional dedicated funding will be necessary to achieve the goal of this plan. The city should consider funding mechanisms to support implementation of emissions reductions action. One option to consider is increasing utility franchise fee and dedicating any additional revenue to drive efficiency action in the residential, commercial, and industrial sectors.

Lead – Influence – Inspire

The city has enormous influence over how the community functions. The greatest impact the city has is in areas where it has decision-making authority. This includes existing policies and regulations that may enhance or restrict the implementation of carbon reduction strategies. Several of these polices have been identified throughout this CAP as tools that can be leveraged to support strategies and demonstrate the city's leadership.

In areas where the city has less control, it should use its influence to support the decision-making entities that have direct impact on the actions included in the CAP. One example from this plan is that the city is not able to set its own building code, so it should support legislation or rule-making at the state level that would enable cities to increase energy standards for all new buildings.

When the city does not have control or influence, but is interested in driving change, it can utilize its platform to provide information, inspiration, and incentives that support GHG reduction actions. The CAP Resource Hub is a good example of how the city can centralize much of this plan and create a go-to destination for action. There are many existing resources from Minnesota energy non-profits that can be adapted to fit the needs of the city.

Specific steps the Internal Team can take are to identify those areas where the city has existing tools that can be leveraged to achieve action; provide budget and capital improvement recommendations that consider the GHG impact; integrate support for climate action into regular city communications, where appropriate. Outside of city functions, the Internal Team can direct action by aligning interests, highlighting success, and inspiring its businesses and residents to be leaders.

Implementation of this Plan is no small task. It will require a shift in the way city functions to make climate action part of normal operations. The city has dedication, ingenuity, and community support to be successful.

Appendix A – Glossary of Terms

- **Advanced metering infrastructure (AMI)** – an integrated system of smart meters, communications networks, and data management systems that allows communication between customers and utilities
- **Anaerobic digestion** – a series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen; by-product is combustible biogas, which can be used to generate electricity or heat, or can be processed into renewable natural gas and transportation fuels
- **Building Benchmarking and Beyond (B3)** – benchmarking program for public buildings in Minnesota to measure and monitor energy consumption, costs, and carbon emission through month and annual reports
- **Carbon Offset** – a reduction in greenhouse gas emissions achieved in order to compensate for emissions somewhere else
- **Combined Heat and Power (CHP)** – cogeneration of useful thermal and electrical energy
- **E-85** – high-level ethanol-gasoline blends containing 51%-85% ethanol.
- **Electric Vehicles (EVs)** – vehicles that are powered by an electric powertrain
- **Fuel Switching** – replacement of non-renewable fossil fuels with clean, renewable fuels
- **Greenhouse Gases (GHGs)** – gases that contribute to the greenhouse effect by absorbing infrared radiation, including carbon dioxide, methane and chlorofluorocarbons
- **Leadership in Energy and Environmental Design (LEED)** – rating system designed by the United States Green Buildings Council (USGBC) to evaluate the performance of a building and encourage market transformation toward sustainable design.
- **Million British Thermal Units (MMBtu)** – a measure of the heat content of fuels or energy sources.
- **Net Zero Energy (NZE)** – an energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy
- **Property Assessed Clean Energy (PACE)** – energy saving measures receive project financing and are repaid as a separate item on the property tax assessment for a set time period
- **Renewable Energy Credits (RECs)** – a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation
- **Renewable*Connect** – clean energy pricing program available to Xcel Energy residential and commercial customers, includes both solar and wind
- **Stretch Energy Code** – an optional energy code that municipalities can adopt to meet a higher standard than the state's base energy code
- **Vehicle Miles Traveled (VMT)** – multiple of centerline mileage and number of motorized vehicles that travel past a certain location during a specific period of time
- **WindSource®** – a clean energy pricing program that allows Xcel Energy customers to pay a premium each month to get some or all electricity from wind energy

Appendix B – Climate Resolution

RESOLUTION NO. 16-067

RESOLUTION EXPRESSING THE COMMITMENT OF THE ST. LOUIS PARK CITY COUNCIL TO PROTECT THE CHILDREN AND GRANDCHILDREN OF THIS COMMUNITY FROM THE RISKS OF CLIMATE DESTRUCTION

WHEREAS, 195 countries, including the United States and every country that is a member of the United Nations, reached an agreement in Paris, France on December 12, 2015 that recognizes the risk to our children's and grandchildren's future from climate change;

WHEREAS, the greatest burden resulting from an inadequate response to the climate crisis will be carried by the youngest generation, and all who follow;

WHEREAS, the risks from an inadequate response are potentially devastating, and include economic and environmental disruptions, many of which are already being felt such as more severe storms, longer and hotter heat waves, worsening flood and drought cycles, growing invasive species and insect problems, accelerated species extinction rates, rising sea levels, increased wildfires, and a dramatic increase in refugees from climate impacted lands;

WHEREAS, leading climate scientists have indicated that further delay in significantly reducing greenhouse gas emissions will rapidly push humanity past the point where disastrous consequences can be avoided;

WHEREAS, numerous governmental and non-governmental bodies across the nation and the world have already adopted climate action plans to immediately and rapidly reduce greenhouse gas emissions while also stopping them entirely within 25 years;

WHEREAS, youth of St. Louis Park have brought to Council a Youth Climate Report Card highlighting the gap between what we are doing today and actions that would be necessary to protect their future;

WHEREAS, youth of St. Louis Park have indicated a willingness to work with City Council on such actions;

NOW THEREFORE BE IT RESOLVED that the St. Louis Park City Council commits to working constructively, using ingenuity, innovation, and courageous determination to create a St. Louis Park Climate Action Plan for consideration that significantly reduces St. Louis Park's greenhouse gas emissions to levels that would protect our community's children and grandchildren from the risk of climate destruction.

BE IT FURTHER RESOLVED that City Council commits to start the St. Louis Park Climate Action Plan creation process within 30 days, and to complete it as soon as possible.

BE IT FURTHER RESOLVED that a mechanism will be created for the ongoing inclusion of young people in the process of creating and executing climate related policies and actions.

Reviewed for Administration:

Thomas K. Harmening, City Manager

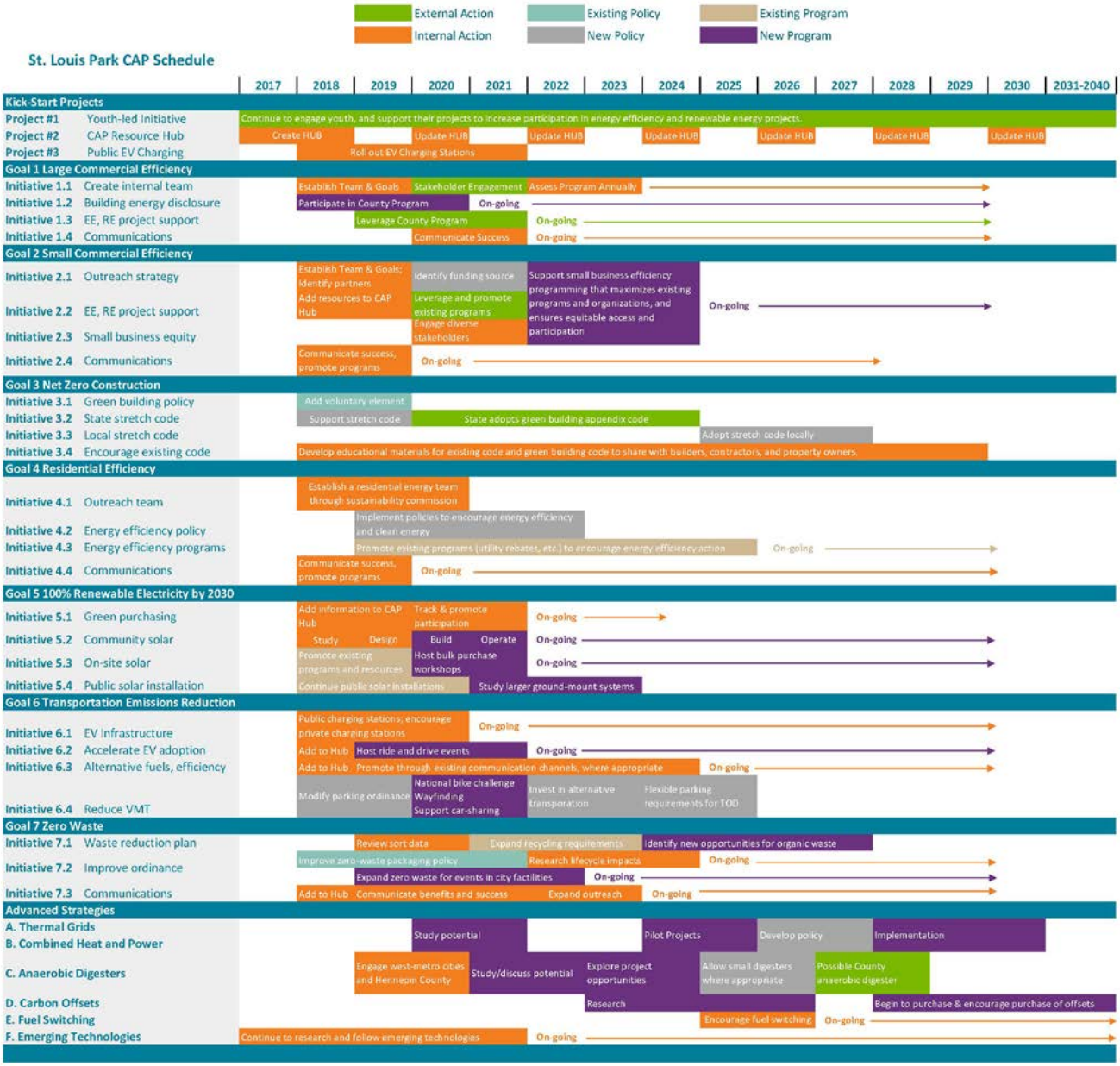
Adopted by the City Council

Jake Spano, Mayor

Attest:

Melissa Kennedy, City Clerk

Appendix C – Action Schedule Worksheet



Appendix D - Resources

- Property Assessed Clean Energy (PACE) – The Property Assessed Clean Energy (PACE) program allows home and business owners to finance efficiency projects through a voluntary assessment on their property
- Saint Paul Port Authority (Trillion BTU) – The Trillion BTU program, administered by Saint Paul Port Authority, provides rebates and loans to businesses to complete energy improvements
- MN Department of Commerce (Rev It Up) – Commerce annually solicits a request for proposals (RFP) from units of local government seeking low-cost, long-term capital to finance community energy efficiency and renewable energy system projects that are financed via energy savings and/or projected revenues created by the systems
- Xcel Energy – Offers a variety of rebates and efficiency programs to customers.
- CenterPoint – Offers a variety of rebates and efficiency programs to customers
- Institute for Market Transformation – Provides more rationale behind this type of policy, along with case study examples and a tool to compare policies across the country
- American Council for an Energy-Efficient Economy – The State and Local Policy database includes many cities' building energy disclosure policies and their requirements
- Minneapolis – The City of Minneapolis has passed a Building Rating & Disclosure Policy. This document lays out the rationale of the policy, how it is designed, its benefits, and how it will be enforced
- Lake Street Small Business Energy Coaching Pilot Program – Lake Street Council did extensive outreach to small businesses on energy efficiency and documented their strategies and lessons learned
- Minnesota Center for Energy and Environment – offers a range of programs targeted at commercial energy efficiency, including lighting HVAC, financing, and more
- Minnesota Clean Energy Resource Teams – provides resources, tools, and engagement efforts to implement local energy projects
- Minneapolis green business cost-share program – This is an example of an incentive program implemented by the City of Minneapolis
- Energy Star for Small Business – Energy Star provides resources and recognition for small and medium sized businesses
- Xcel Energy Rebates – Offers rebates for efficiency improvements
- CenterPoint Small Commercial Efficiency Program – Offers rebates for high-efficiency equipment
- ACEEE – Successful Practices of Small Commercial Energy Efficiency Programs
- Maplewood – The City of Maplewood has adopted a strong Green Building Program
- SB 2030 – Sustainable building energy standards that achieve net zero development by 2030
- St. Louis Park Green Building Policy - Requires building construction projects that receive or use city financial assistance to incorporate sustainable development practices
- Center for Energy and Environment – CEE provides a range of services including home energy audits, home energy squad visits, financing, and assistance implementing energy saving measures
- Energy Fit Homes – CEE has developed an Energy Fitness Score for residential buildings that allows home owners to see the relative efficiency of their homes
- Xcel Energy – Offers energy audits and a variety of rebates to customers
- CenterPoint Energy – Offers energy audits and a variety of rebates to customers
- Minnesota Weatherization Assistance Program – Provides free home energy upgrades to low-income homeowners and renters to help save energy and protect against harsh weather

- Hennepin County CAP – The Community Action Partnership provides free energy related repairs and heating bill assistance to low income residents
- Minnesota CUB – Minnesota Citizens Utility Board is a consumer advocacy organization that offers assistance to utility customers
- Fix-up Program – Financing program offered by Minnesota Housing Finance Agency
- Energy Efficient Mortgage Homeowner Guide: U.S. Department of Housing and Urban Development
- Minnesota Solar Suitability App – allows users to enter their address and see an estimate of their solar resource and production
- Google Project Sunroof – similarly allows users to see an estimate of solar resource and production.
- CERTs - The Clean Energy Resource Teams have a wide variety of resource on solar energy, particularly community solar gardens
- Clean Energy Project Builder - This site aims to bring together all the information you need to plan a clean energy project, including a search function for installers and funding sources.
- SolSmart Certification - SolSmart provides recognition and no-cost technical assistance to help local governments reduce barriers to solar energy growth
- Solarize - The Solarize approach allows groups of homeowners or businesses to work together to collectively negotiate rates, competitively select an installer, and increase demand through a creative limited-time offer to join the campaign
- Solar Power Hour – One-hour seminars on how solar PV systems work, financial benefits, and an explanation of the installation process
- Drive Electric Minnesota: Partnership to accelerate the adoption of electric vehicles in Minnesota.
- Metropolitan Area Planning Council, example of flexible parking standards and national examples
- Explore recommendations made in the Minnesota 2025 Energy Action Plan
- Pathways to Deep Decarbonization: A study completed to identify a path toward deep decarbonization through electrification of the energy system
- National Renewable Energy Lab (NREL): Distributed Solar PV For Electricity System Resilience

Appendix E – GHG Report Summary for City Operations

City of St. Louis Park

Greenhouse Gas Assessment

for

City Operations, 2005-2015

Findings Report

June 2017

Prepared for the City by

Acknowledgments

Mayor
Jake Spano

City Council

Steve Hallfin
Thom Miller
Susan Sanger
Anne Mavity
Gregg Lindberg
Tim Brausen

Sustainability Team

Rick Beane
Jay Hall
Brian Hoffman
John Laumann
Denny Millerbernd
Mark Oestreich
Shannon Pinc
Jeff Stevens
Rutager West

Utility Representatives
Jennifer Abbott, Xcel Energy
Thomas Dolan, CenterPoint Energy

Executive Summary

Introduction: In the fall of 2016, the City of St. Louis Park (City) hired a consultant team consisting of The Great Plains Institute, LHB Architects, and ORANGE Environmental, LLC, (Consultants) to prepare climate action plan for the City. An important component of the plan is the preparation of a greenhouse gas (GHG) assessment[1] for City-operations for the study years, 2005, 2010, and 2015 (Assessment). The Assessment, prepared by ORANGE Environmental, LLC, is comprised of 2 different reports—a Findings report (in Word) and an accompanying Excel spreadsheet file that consolidated the data and analyses necessary to generate the findings. This Findings report is designed as a stand-alone document to enable a full understanding of the Assessment without the need for reference to the underlying spreadsheets.

As described by Osborne and Gaebler in their book, *Reinventing Government* (1992), "If you don't measure results, you can't tell success from failure. If you cannot see success, you cannot reward it. If you can't see failure, you can't correct it." Every city prepares annual operating and capital improvement budgets. A city operations assessment is akin to the environmental budget for the City. Preparing and periodically updating the City operations Assessment allows the City to set reduction goals and measure success or failure in meeting those goals. The Assessment must be transparent and able to be replicated, updated, and compared with other similar baseline assessments.

The Assessment methodology is consistent with the *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, produced by ICLEI— Local Governments for Sustainability (ICLEI Protocol), and The Climate Registry.[2] Consistent with the ICLEI Protocol, greenhouse gases (GHG) are expressed in metric tons (tonnes), which equal 1,000 kilograms, or 2,204.6 pounds. It includes all pertinent and available data for the study years chosen by City staff: 2005, 2010, and 2015. GHG emissions serve as a common denominator for the comparison of kilowatts, therms, and gallons of vehicular fuels consumed; vehicle and air miles traveled; tons of municipal solid waste processed; gallons of sanitary sewage treated; and gallons of potable water produced.

---

[1] Greenhouse gas assessments are often called *carbon baseline* assessments or greenhouse gas *inventories*. The terms are generally interchangeable. For clarity and simplicity, the term *greenhouse gas assessment* will be used herein. In addition, this assessment includes the non-carbon-based greenhouse gas, nitrous oxide.

[2] The greenhouse gases of carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) are aggregated and reported as carbon dioxide equivalents, a commonly used unit that combines greenhouse gases of differing impact on the earth's climate into one weighted unit. The use of the term *greenhouse gasses* herein implies the carbon dioxide equivalents of these 3 key greenhouse gases. The source information for the tables and charts included in the body of the report can be found in the detailed tables that have been provided to the City as a technical supplement to this Assessment. City staff provided all data that pertains to City operations unless otherwise noted. Energy consumption data for City buildings and facilities are from the utilities and the Minnesota Buildings, Benchmarks, and Beyond (B3) Program when available. All of the sources of data for the Assessment are transparent, fully identified, verifiable, and reliable. They consist of City records and staff reports; utility records and reports to the Minnesota Public Utilities Commission; internationally recognized methodologies and published scientific papers regarding the calculation of GHG emissions; federal, state, and county agencies (USDOT, USEPA, MNDOT, MPCA, Metropolitan Council, Metropolitan Airports Commission, Hennepin County); and other published sources.

Assessment Scopes: The ICLEI Protocol categorizes GHG emission sources into 3 groups called *scopes* as follows:

- **Scope 1:** All direct GHG emissions from city operations (e.g. consumption of liquid fuels in city vehicles and natural gas consumption in city buildings).
- **Scope 2:** Indirect GHG emissions associated with the consumption of purchased electricity or other energy sources not located within the city.
- **Scope 3:** All other indirect emissions not covered in Scope 2; namely, management of the solid waste generated by City operations, employee commuting and business travel, contractor services, and emissions from the treatment of the city's wastewater.

Table 1: Indicators

Category	2005	2010	Percent Change	2015	Percent Change	Percent Change from 2005
Electricity and natural gas consumption:						
Buildings and facilities						
Electricity (MWh)	5,575	5,794	4%	6,116	6%	10%
Natural gas (therms)	323,797	337,812	4%	290,031	-14%	-10%
Streetlights and signals (MWh)	864	1,149	33%	1,126	-2.0%	30%
Potable water						
Total treated & pumped water (billions of gal.)	1.85	1.80	-3%	1.66	-7.8%	-10%
Electricity (MWh)	4,410	4,464	1%	3,740	-16%	-15%
Natural gas (therms)	62,184	60,769	-2%	55,437	-9%	-11%
Efficiency (gal. per kBtu)	87	85	-3%	91	7%	4%
Sewers						
Electricity (MWh)	770	684	-11%	629	-8%	-18%
Natural gas (therms)	8,340	5,266	-37%	5,511		-34%
Subtotal electricity (MWh)	11,619	12,091	4%	11,610	-4%	-0.1%
Subtotal natural gas (therms)	394,320	403,847	2%	350,979	-13%	-11%
Transportation:						
Public Works responsibilities:						
Liquid fuel consumption (gal.)	117,953	132,049	12%	116,015	-12%	-2%
Public Works contracted services (gal.)	9,069	9,707	7%	9,396	-3%	4%
Subtotal (gal.)	127,022	141,756	12%	125,411	-12%	-1%
Official travel (GHG tonnes)	10	14	45%	13	-9%	31%
Waste management:						
Solid waste (lbs. per FTE)	2,425	1,899	-22%	1,569	-17%	-35%
Per-capita sanitary sewer discharges (gallons per day)	102	104	1%	101	-2.9%	-1%
Other indicators:						
City employees (FTE)	319	318	-0.4%	361	14%	13%
City population	46,293	44,380	-4.1%	44,896	1.2%	-3%
City households	22,390	21,215	-5.2%	21,358	0.7%	-5%
Xcel Energy emission factor (GHG per MWh)	0.587	0.513	-13%	0.458	-11%	-22%
Seasonal cooling degree days	1,096	1,088	-1%	927	-15%	-15%
Seasonal heating degree days	7,159	7,170	0.2%	6,879	-4%	-4%

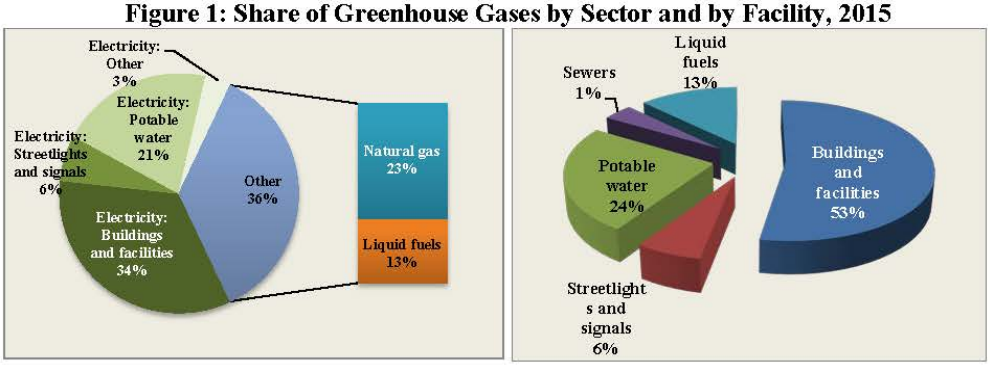
Table 2: Tonnes of Greenhouse Gas Emissions

Category	2005	2010	Percent Change	2015	Percent Change	Percent Change from 2005
Electricity and natural gas consumption:						
Buildings and facilities	5,051	4,831	-4%	4,397	-9%	-13%
Streetlights and signals	507	589	16%	516	-12%	2%
Potable water	2,929	2,624	-10%	2,018	-23%	-31%
Sewers	498	380	-24%	318	-16%	-36%
Subtotal	**8,985**	**8,425**	**-6%**	**7,249**	**-14%**	-19%
Transportation:						
Liquid fuels (Public Works and Parks)	**1,117**	**1,171**	**5%**	**1,046**	**-11%**	**-6%**
Scope 1 and 2 GHG emissions:						
Total GHG emissions	**10,102**	**9,596**	**-5%**	**8,295**	**-14%**	-18%
Per-FTE emissions	31.6	30.2	-5%	22.9	-24%	-27%
Normalized GHG emissions:						
Emissions compared to 2005, triple normalized for weather, utility emission factors, and changed accounts	10,236	10,231	-0.05%	9,771	-5%	-5%
Other GHG emissions (Scope 3):						
Solid waste management	130	72	-45%	68	-5%	-48%
Contracted services	85	91	7%	88	-3%	4%
Business travel	10	14	45%	13	-9%	31%
Wastewater treatment	6,374	4,995	-22%	3,214	-36%	-50%
Total Scope 3 GHG emissions	**6,598**	**5,171**	**-22%**	**3,382**	**-35%**	-49%

Indicators and sources of greenhouse gas emissions: Table 1 includes a list of key indicators that affect GHG emissions and other factors. It includes the sources of energy consumption for all 3 study years using a variety of measurement units and the percent change from the prior study year. Table 2 lists the associated GHG emissions and includes data that is triple normalized for weather, for utility emission rates, and for changed accounts.

The chart on the left in Figure 1 demonstrates the large role that electricity plays as regards the City operations' GHG footprint. Fully, 64% of the emissions in 2015 are attributable to its consumption with the remaining portions being natural gas (23%) and liquid fuels (13%). Buildings and facilities (34% of total) and potable water (21%) are the largest sources for electricity-related emissions. The second pie chart in Figure 2 breaks out the combined sources of GHG emissions into the various sectors in 2015. Buildings and facilities account for more than half (53%), potable water is the next largest (24%), followed by liquid fuels (13%), streetlights and signals (6%), and finally sewers at 1%.

Figure 1: Share of Greenhouse Gases by Sector and by Facility, 2015



Largest energy consumers and sources of emissions: Figure 2 illustrates the energy consumption from the 9 largest consumers of energy (in terms of millions of Btus, MMBtu). Consumption in general is declining. The 3 largest sources include the Rec Center, the facilities that produce potable water, and liquid fuels. Figure 3 looks at these 9 source categories in terms of GHG emissions. While potable water was, by far, the largest source of emissions in 2005, emissions in 2015 were 31% lower, primarily due to the facilities' reliance on electricity and Xcel's emission factor being 22% lower in 2015 than in 2005. As with consumption, in general, emissions are declining.

Figure 2: Largest Sources of Energy Consumption, 2005 to 2015

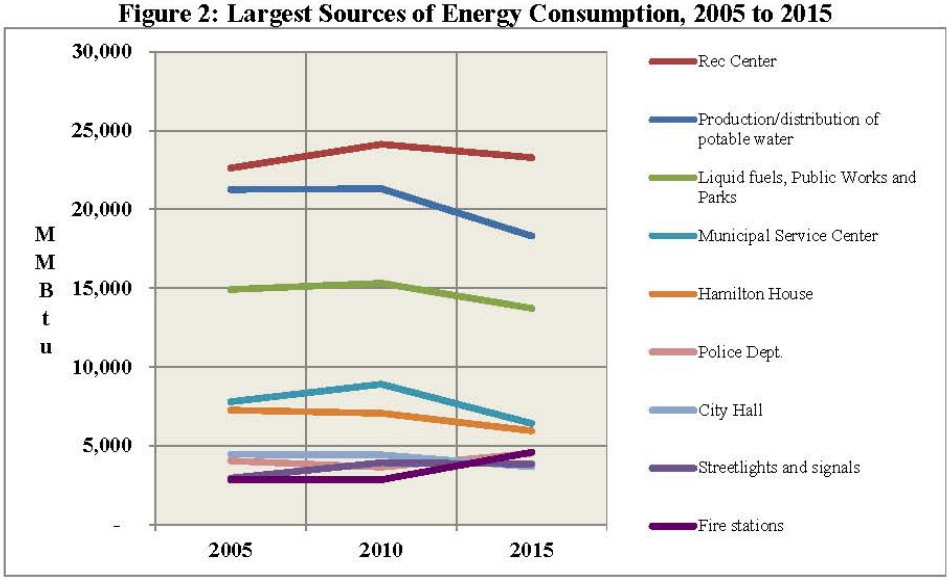
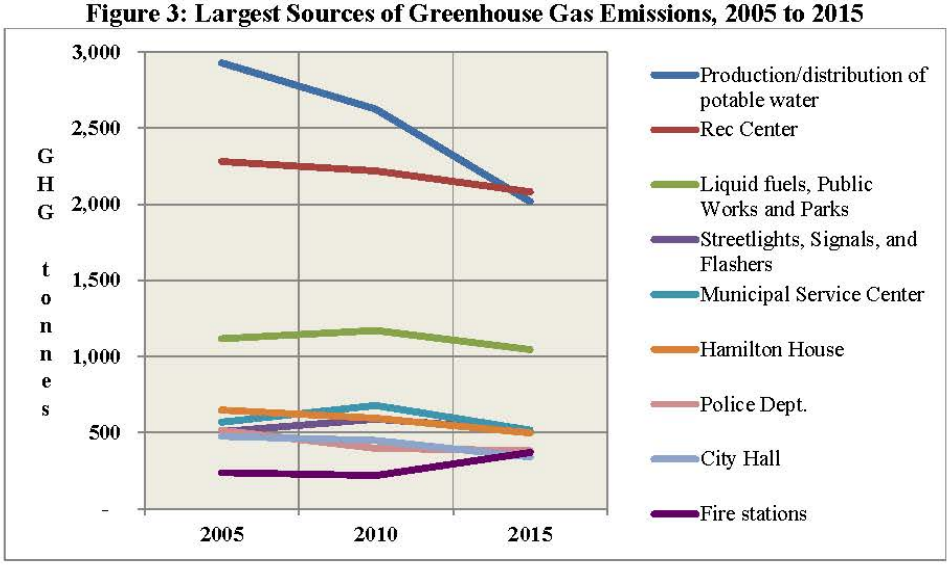


Figure 3: Largest Sources of Greenhouse Gas Emissions, 2005 to 2015



City buildings and facilities: Narrowing the focus to just the buildings and facilities sector and, even more specifically, to data in 2010 relative to 2005, Table 1 shows that electricity and natural gas consumption was 4% higher in 2010 than in 2005, and Table 2 shows that GHG emissions were 4% lower. The primary reasons for these changes are twofold:[3] The City increased the size of the Municipal Service Center by 45% between in 2010, which increased consumption. However, Xcel Energy's emission factor was 13% lower in 2010 than in 2005 (Table 1), which significantly reduced emissions in spite of the increased consumption.[4] Without the expansion, emissions from the Center would have been about 200 tonnes lower in 2010.

Turning to 2015, Table 1 shows that electricity consumption was 6% higher in 2015 than in 2010 and that natural gas consumption decreased significantly (-14%). Table 2 shows that GHG emissions were 9% lower than in 2010. The primary reasons for these changes are as follows: The decrease in GHG emissions was primarily due to Xcel Energy's emission factor being 11% lower in 2015 than in 2010. Facility changes also help explain the changes. The two fire stations doubled in size and equipment around 2011 and 2012. As a result, natural gas consumption increased significantly and also because the gas boilers are used to dehumidify the bays even in the summer. This increase in gas consumption was more than offset by reduced consumption by all the other major consumers (the Rec Center, City Hall, Hamilton House, the Municipal Service Center, and the Police Dept.). Facility changes that increased electricity consumption included the addition of an outside pond and waterfall in 2012 at the Nature Center plus outdoor

[3] Weather was not a significant factor because there is little difference in the heating and cooling degree days between 2010 and 2005.
[4] The GHG emissions associated with electricity generation vary over time according to a variety of factors, most importantly type of generating facility, fuel mix, and percent of renewable and nuclear generation. In addition, utilities purchase electricity from other generators, which can have very different GHG emission rates. As such, the calculation of annual GHG emissions depends on both the consumption data, which is in kilowatt-hours (kWh), and the emission factor that year. In contrast, the GHG emission rate for natural gas is very stable.

heating for birds. The Parks Dept. adding field lighting on two soccer fields and one softball field, which are used nightly from mid-May until the late fall. Changes that decreased electricity consumption include a lighting upgrade and a new air conditioning unit for the Police Dept. that was installed in 2008, and improvements to City Hall.

Looking at change from 2015 compared to 2005, Table 2 shows that emissions for buildings and facilities in 2015 were 13% lower, primarily due to the fact that Xcel's emission factor was 22% lower than in 2005.

Streetlights and signals: Table 1 shows that electricity consumption was 30% higher in 2015 than in 2005 for streetlights and signals. According to City staff, the increase in consumption is due to the addition of street lighting in new developments. Since 2010, the City has been replacing fixtures with LED bulbs. As for the signal systems, the City converted signal bulbs and pedestrian walk/do not walk lights to LED in 2006-2007. As such, all new signal systems installed after 2007 are completely LED. Consumption would have been much higher had the City not used LED technology.

Potable water and sanitary sewers: The wells, pumps, reservoirs, and the Water Treatment Plant facilities necessary to produce potable water comprise one of the largest single consumer category of energy (predominantly electricity) and source of GHG emissions. The category alone accounts for about a quarter of the total GHG emissions from City operations (Figure 1). Table 1 shows that production figures for potable water have declined since 2005 (3% lower in 2010 and 10% lower by 2015). When compared on a per-capita basis, the reductions are even more pronounced (5% by 2010 and 18% by 2015). The associated GHG emissions have been declining over the 3 study years at even greater rate, primarily due to Xcel's declining emission factor and electricity being the dominant energy source. Compared to 2005, emissions in 2010 were 10% lower and those in 2015 were 31% lower. When comparing energy efficiency for both electricity and natural gas consumption (gallons produced per thousand British thermal units, or kBtu), efficiency dropped slightly in 2010 compared to 2005 but then climbed such that energy efficiency was 4% higher in 2015 compared to 2005. The City's system of pumps and lift stations for the sanitary sewer system result in a very small amount of GHG emissions, only 2% of the City's total emissions.

Transportation: City transportation includes the 3 sub-categories described below. However, only the emissions from first subsection, Public Works, are classified as Scope 1 emissions and counted with the other Scope 1 and 2 emissions. The other 2 categories are Scope 3 emissions, which are reported separately on Table 2.

- **Liquid fuels consumption:** Table 1 lists the consumption of fuel controlled by the Public Works Department, which include consumption by the Parks, Police, and Fire departments. Consumption increased in 2010 compared to 2005 (12%) but then decreased such that consumption in 2015 was slightly below the 2005 level (-2%). Table 2 shows that the associated GHG emissions have increased in similar manner—5% larger in 2010 and 6% smaller than 2005 in 2015. The use of alternative fuels (E-85) since 2005 have helped to reduce emissions.

- **Contractor Services:** Table 1 shows the fuel consumption for private companies that Public Works hired to perform services that are a normal part of Public Works operational responsibility (e.g. snow plowing, street sweeping, seal coating, tree trimming, etc.).[5] Fuel consumption by contractor services constitute about 7% of the total consumption needed to perform the above operational responsibilities.

  Table 2 shows that the changes in GHG emissions tracked accordingly with the changes in fuel consumption figures. Since contractor services are a Scope 3 source of emissions, they are not counted along with the Scope 1 emissions from fuel consumption by Public Works. However, it is valuable to examine the combined fuel consumption data since it is associated with the same activities. Table 1 shows that fuel consumption was 12% higher in 2010 compared to 2005, and 1% lower in 2015 compared to 2005.

- **Business travel:** Table 2 also lists the estimated GHG emissions associate with official business travel, which is a very small Scope 3 emission source.

Waste management: The estimate of the municipal solid waste (MSW) generated by City operations is based on the assumption that a City job will generate MSW at a rate comparable to a job elsewhere in Hennepin County. This approach yielded an estimate of slightly less than 1 ton of waste per FTE job in the City. GHG emissions associated with waste management result in a small amount of emissions. Since they are in the Scope 3 category, they are reported but not counted with the Scope 1 & 2 emissions on Table 2.

Wastewater treatment: The Environmental Services division of the Metropolitan Council provided the City with the number of gallons of wastewater sent to the Metropolitan Waste Treatment Plant from the City's sanitary sewer system (which has been stable at about 102 gallons per day on a per-capita basis), and the City's share of the plant's GHG footprint. Table 2 shows the associated GHG emissions; however, they are not counted in the City's total because they are Scope 3 emissions. Emissions are declining significantly. The 2015 level was half that in 2005.

GHG reduction goal: One of the reasons the City chose 2005 as a base year for comparison purposes was that it matched the base year for the Minnesota Next Generation Energy Act of 2007. The Act established nationally aggressive statewide greenhouse gas reduction goals, using 2005 as a baseline, of 15% by 2015, 30% by 2025, and 80% by 2050. As Table 2 and Figures 4 and 5 show, the City met and even exceeded the state's 15% reduction goal because it's emissions were 18% lower in 2015 compared to 2005.

One way to put the value of these reductions into perspective is to consider them offsetting other emissions. The average St. Louis Park household's share of the citywide emissions equals about

[5] City staff estimated that 95% of normal street maintenance responsibilities are performed by City crews and 5% by private contractors. City staff have determined these estimations are reasonably accurate for all City contracts and that, since fuel consumption doesn't vary significantly from year-to-year, they are applicable for all of the study years. City staff estimated that the City normally pays private contractors about $290,000 per year for the maintenance of street trees and trees in parks. Of that amount, City staff estimated that no more than 3% of those costs are for fuels. It is assumed that 90% of the fuel is gasoline and 10% diesel.

34 tonnes of GHG per year.[6] Over the 10-year study period, the City's annual reductions below the 2005 base year's emissions totaled nearly 8,000 tonnes. On average over the 10-year period, the City's reductions would offset the equivalent annual emissions from about 28 households. Figure 7 illustrates this concept. For example, in 2010, the City's emissions were 506 tonnes lower than in 2005. That is the equivalent of the average emissions from 17 households in the City that year.

Figure 4: Greenhouse Gas Emissions by Fuel Sources, 2005 to 2015

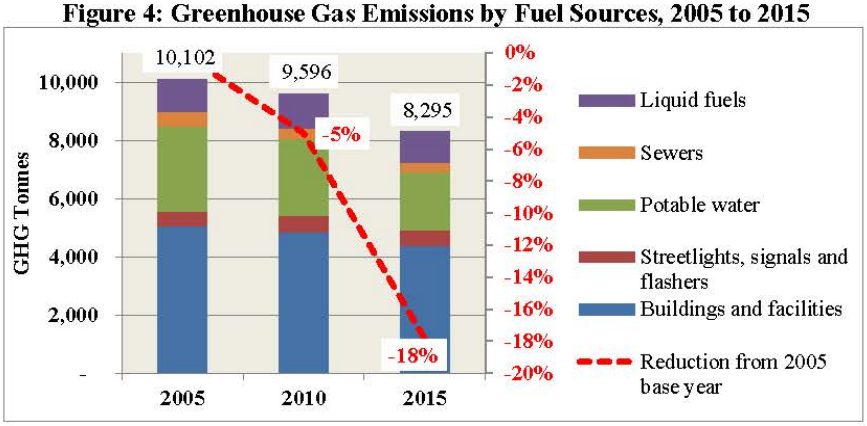
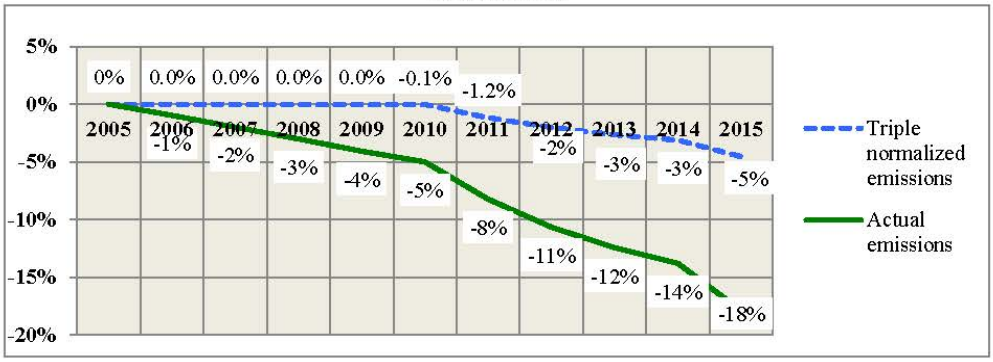


Figure 5: Greenhouse Gas Emissions Compared to 2005 Base Year, Totals and Normalized, 2005 to 2015



Normalizing emissions: In order to obtain a more accurate picture of the energy consumption and GHG emissions associated with energy consumption, it is valuable to screen out factors that affect consumption and emissions but are beyond the control of the City; namely, weather and the GHG emission factors for the electric utilities. Weather does not have a significant effect overall but utility emission factors are very important since electricity consumption is the dominant source of emissions for City operations (64% of total emissions in 2015).

[6] The data for the citywide greenhouse gas emissions attributable to the average household in St. Louis Park is from the Regional Indicators Initiative (years 2007 to 2013). Linear regression analysis provided estimates for 2005, 2006, 2014, and 2015. Source: http://www.regionalindicatorsmn.com.

Xcel Energy's emission factor was 22% lower in 2015 than in 2005. For a true apples-to-apples comparison, Table 2 includes triple normalized data that predicts emissions if a) the need for heating and cooling matched the 30-year temperature "normals" for the City, b) Xcel's emission factor remained at the 2005 base year level, and 3) there were no major expansions of the Municipal Service Center, fire stations, and streetlights. Figure 5 includes the triple normalized emissions over the 10-year study period. The major factor is Xcel's cleaner electricity, which Figure 6 shows accounts for 68% of the reduced emissions. The dotted line in Figure 5 reflects triple normalized emissions, including the use of Xcel's 2005 emission factor. Triple normalized emissions in 2015 were 5% lower than in 2005.

The first chart in Figure 6 illustrates the sources of the reduced emissions. After Xcel's reduced emission factor, reduced electricity consumption (-16%), natural gas consumption (-12%), and liquid fuel consumption (-4%) account for the rest of the reduced emissions. The second chart in Figure 6 breaks out the reductions by the source categories. The facilities that produce and distribute potable water account for nearly half of the reductions. The largest energy users naturally account for most of the rest of the reductions including the Rec Center (-12%); sewers (-10%); and Hamilton House, City Hall, and the Police Department are all at about -7% each.

Scope 3 emissions: Table 2 also lists the Scope 3 emissions. According to the ICLEI Protocol, these emissions are not to be counted with Scope 1 and 2 emissions but can be reported separately. Scope 3 emissions are declining significantly. The 2015 level was half that in 2005 essential because the emission rate for the Metropolitan Waste Treatment plant are half of what they were in 2005.

Figure 6: Sources of Reduced Greenhouse Gas Emissions, 2005 to 2015

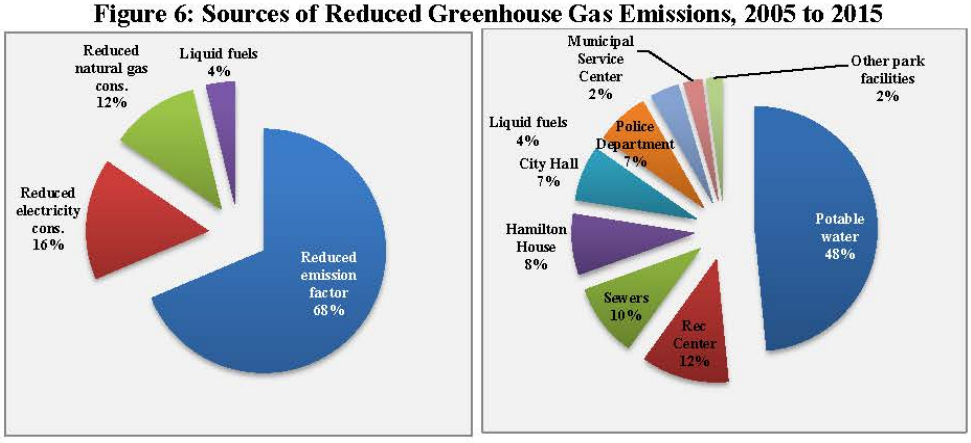
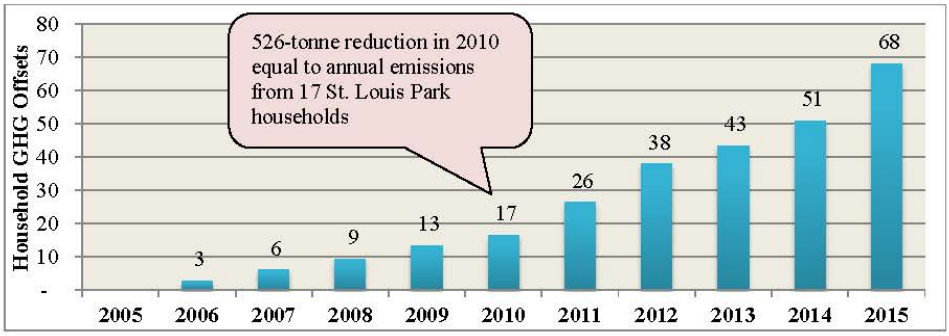


Figure 7: Equivalent St. Louis Park Household Offsets of Greenhouse Gasses from 2005



Takeaways: Table 3 summarizes the primary findings from the analysis (the "takeaways").

City of St. Louis Park Greenhouse Gas Assessment
City Operations, 2005 to 2015

Table 3: Takeaways

Description	X	Y	Z
Scope 1 and 2 Consumption and Emissions			
Compared to the 2005 Base Year, GHG lower in 2010 by X% and Y% in 2015.	-5%	-18%	
On average over 10-year study period, the City's emission reductions offset the average emissions of about X St. Louis Park households, a total of Z households by 2015.	28	275	
Primary factor that resulted in GHG reductions was due to Xcel Energy's reduced emission factor. It was X% lower in 2010 and Y% lower in 2015 compared to 2005.	-13%	-22%	
Compared to 2005, the reduced electricity emission factor resulted in the reduction of X tonnes in 2015, which equals Y% of the total reduction.	(1,291)	69%	
Had the electricity emission factor remained at the 2005 level, GHG emissions would have been X% higher in 2010 and Y% lower in 2015 compared to the 2005 base year.	5%	-2%	
Weather did not have a substantive effect on emissions. Although electricity is the dominant source of emissions and all but 2 years (2004 & 2009) during the 10-year study period had higher cooling-degree-days than the 30-year "norm," nationally, only 5% of electricity is used for summer cooling. Winters with higher heating-degree-days (2008, 2013, 2014) tended to balance out warmer winters (2006, 2012, 2015) over the study period.			
Changes to facilities were not a major change factor. The most significant change, the Municipal Service Facility, more than doubled in size but emissions increased from X tonnes in 2005 to Y in 2010, only a Y% increase.	504	679	35%
Triple normalized GHG emissions (weather, electric utility emission factors, and changed accounts) were virtually unchanged in 2010 and X% lower in 2015 compared to the 2005 Base Year.	-5%		
Compared to the 2005 Base Year, electricity consumption to produce potable water in 2015 decreased by X%. Production of potable water decreased by Z%. This yielded a Z% increase in electricity efficiency (gallons per kWh).	-15%	-10%	6%
The 9 largest consumers of energy include (largest to smallest): Potable water, Rec Center, liquid fuels, streetlights and signals, Municipal Service Center Hamilton House, the 2 fire stations, City Hall, and Police Dept.			
Compared to 2005, total energy consumption for the 9 largest energy consumers were X% higher in 2010 and Y% lower in 2015.	4%	-4%	
Compared to 2005, total GHG emissions for the 9 largest energy consumers were X% lower in 2010 and Y% lower in 2015. The reduced emissions were due primarily to the reduced electricity emission factor; Z% lower in 2015.	-5%	-18%	-22%
Eight categories were responsible for virtually all of the reduced emissions in 2015 compared to 2005 (largest to smallest): Potable Water, Rec Center, Sewers, Hamilton House, City Hall, Police Dept., Liquid Fuels, Municipal Service Center.			
Compared to 2005, these 8 categories were responsible for the reduction of X GHG tonnes.	(1,880)		
Xcel Energy's reduction in its emission factor was responsible for X of these tonnes; Y% of the total	(1,291)	69%	
Reduced electricity consumption among these largest energy consumers resulted in the reduction of X tonnes; Y% of the total.	(300)	16%	
Reduced natural gas consumption among these largest energy consumers resulted in the reduction of X tonnes; Y% of the total.	(219)	12%	
The emission reductions from the 8 of the major facilities were offset by the increased emissions (X tonnes) from the 2 fire stations and streetlights/signals.	146		
Scope 3 Consumption and Emissions			
Scope 3 emissions were significantly lower in 2015 compared to 2005 (X tonnes and Y%). This is primarily due to per-gallon emission reductions at the Metropolitan Treatment Plant.	(3,216)	-49%	
Treatment of the citywide sanitary sewer discharges at the Metropolitan Treatment Plant resulted in X GHG tonnes in 2015. This was Y tonnes less than in 2005, a Z% decrease.	3,382	(3,160)	-50%
Management of solid waste management waste generated by City operations was X tonnes lower in 2015 compared to 2005; a Y% decrease.	(62)	-48%	
The City relies on private contractors for normal Public Works operations. Fuel consumption from private contractors constitute about X% of total fuel consumed by Public Works. Associated GHG emissions increased by Y tonnes and Z% in 2015 compared to 2005.	7%	3	4%
Surface and air travel for City business by staff and elected officials results in a relatively small amount of emissions; only X tonnes in 2015.	13		

Appendix F – Wedge Diagram Methodology

METHODOLOGY

WEDGE DIAGRAM TOOL

SEPTEMBER 2017

MINNESOTA LoGo PEP

Prepared by:
LHB and the University of Minnesota, Center for Science, Technology, and Environmental Policy

This work is supported by the Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE), under Award Number DE-DE-EE0007229. This project was made possible by a grant from the U.S. Department of Energy and the Minnesota Department of Commerce.

CONTENTS

INTRODUCTION

Minnesota's Local Government Project for Energy Planning (LoGoPEP) aims to engage local governments in committing to actionable strategies for energy and greenhouse gas emission reductions by providing communities with planning tools that will help them prioritize impactful strategies, understand implementation pathways, outline a plan for action, and measure progress toward their goals.

The wedge diagram tool allows users to explore a city's potential energy futures through a web-based interactive diagram that shows forecasted city-wide greenhouse gas emissions from building energy consumption. The diagram includes historic baseline data, a business-as-usual forecast to 2040, reduction goals, and reduction "wedges" that can be achieved through actions such as implementing neighborhood outreach programs, developing new citywide regulations, and supporting statewide policies. By inputting levels of commitment to each building-energy reduction strategy, users can visualize the predicted impacts in real-time and prioritize high-impact strategies. The wedge diagram is intended to be a living tool that can be adapted each year as communities learn more about the impacts of their actions.

The wedge diagram tool is currently exclusive to non-travel energy, which comprises 55% of statewide emissions. To comprehensively address citywide emissions, local governments should also consider vehicle travel, air travel, waste, wastewater, and agricultural emissions.

BASELINE DATA

Baseline energy emissions data is reported through the Regional Indicators Initiative for 2007-2013 based on information provided by energy utilities and in compliance with the *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* produced by ICLEI.[1]

BUSINESS-AS-USUAL (BAU) FORECAST

The business-as-usual forecast for energy emissions is based upon the premise that the average person/building/job will use the same amount of energy in the future as they do today, and that the carbon-intensity of the energy used stays constant. This approach enables strategies such as efficiency improvements, updated building codes, and clean energy to be accounted for in the reduction wedges, whether these improvements are legislatively mandated, market-driven, or voluntary.

[1] For more information on the baseline emissions methodology, refer to the Regional Indicators Initiative website: www.regionalindicatorsmn.com.

Business-as-usual energy emissions in the year 2040 are estimated by:

1. Calculating the 5-year moving average residential energy consumption per person and commercial/industrial energy consumption per job from the baseline data for natural gas and electricity.
2. Multiplying the normalized energy consumption from Step 1 by population and jobs estimates for 2040, respectively, to get the total expected energy consumption.
3. Multiplying the total expected energy consumption by the most recent emissions factors for electricity and natural gas, respectively, to get the total expected energy emissions.

The baseline energy consumption, demographic data, and emissions factors are from the Regional Indicators Initiative data. Population and job forecasts are from the Metropolitan Council for communities within their jurisdiction.[2] Demographic forecasts for cities outside of the Twin Cities metropolitan region are from the Minnesota State Demographic Center.[3] Since projections are not available at the city scale, the Demographic Center recommended extrapolating city estimates by applying each city's 2015 share of its county's population to the county-level forecasts.

Since different portfolios of reduction strategies are available to new buildings versus existing buildings, the business-as-usual energy use needs to be divided between new and existing buildings to effectively calculate the reduction wedges. This is done by applying a new construction rate of 1.53% per year for commercial buildings and 1.35% per year for residential buildings, which reflects the average regional growth since 2000.[4] The remaining energy consumption is allocated to existing buildings.

Since this methodology does not account for city-specific building stock or growth projections, it likely results in an underestimate of new construction for rapidly growing communities.

---

[2] Metropolitan Council, "Population, Households and Employment Forecasts to 2040, Twin Cities Metropolitan Area (January 1, 2017)," 2017, https://metrocouncil.org/Data-and-Maps/Data/CouncilResearchProducts/Council-Forecasts.aspx.

[3] Minnesota State Demographic Center, "County Population Projections (March 2017)," 2017, "Minnesota County Labor Force Projections, 2015-2030," 2017. Since job projections are only available through 2030, a linear forecast is used to estimate later years.

[4] Survey results from the 2012 Commercial Building Energy Consumption Survey (CBECS) and the 2015 Residential Energy Consumption Survey (RECS) show the number of buildings and the year built for a statistical sample of buildings. This information can be used to estimate the historic new construction rate. The new construction rate of 1.53% per year for commercial buildings was calculated based on building area for the Midwest - West North Central region for the years 2000-2012. The new construction rate of 1.35% per year for residential buildings was calculated based on the number of housing units in the Midwest - West North Central region for the years 2000-2015. This time period was selected to moderate the effects of economic conditions. Since demolished buildings are not included in the survey data, the new construction rates may be slightly overestimated.

GOALS

While local governments are encouraged to develop their own emissions reduction goals, the wedge diagram tool also includes Minnesota's statewide goals from the Next Generation Energy Act of 2007: 30 percent below 2005 levels by 2025 and 80 percent below 2005 levels by 2050. Since the earliest available year of baseline data is 2007, this is used instead of 2005 to calculate the goal milestones.[5]

Note that the statewide goals are intended to address Minnesota's total emissions, not just those from building energy. Although here they have been applied directly to the building energy sector, it may be necessary to beat these goals to offset sectors that are more difficult to reduce, such as air travel.

STRATEGIC PLAN

The strategic plan shows the anticipated outcomes of committing to a set of emission reduction strategies selected by the user. The strategic plan is calculated by adjusting the business-as-usual forecast based on the sum of the reductions achieved through each of the selected strategies. The reduction strategies are categorized into five broad categories that reduce emissions through efficiency (using less energy) and decarbonization (using energy that results in fewer emissions). These categories include: Commercial/Industrial Efficiency, Residential Efficiency, Electric Grid Mix, Renewable Energy, and Fuel Switching.

Strategy Interactions

Energy planning should be approached through a combination of efficiency and decarbonization, targeting both the source of the energy and the end use. However, if the savings from efficiency and decarbonization are both calculated based on the business-as-usual energy use and emissions factors, the savings would be double-counted. To avoid this, savings are applied first to efficiency strategies, then to electric grid mix strategies, and finally to renewable energy and fuel switching strategies. In essence, efficiency savings are based on business-as-usual energy use and business-as-usual emissions factors. Electric grid mix strategies are based on planned energy use and business-as-usual emissions factors. Renewable energy and fuel switching strategies are based on planned energy use and planned emissions factors.

In addition to these big picture strategy interactions, there are also several overlaps between strategies within a single category. These interactions are described in the respective category sections.

[5] The assumption that 2005 emissions are comparable to 2007 emissions is supported at the statewide scale, where the two years were within 1% of each other. Anne Claflin, "Greenhouse Gas Emissions: 1990-2014," 2017, doi:10.1007/978-1-4419-7991-9.

Example

In 2030, Community A has a business-as-usual energy use of 1000 MMBtu and a business-as-usual emissions factor of 0.10 tCO2e/MMBtu. Community A commits to efficiency strategies that reduce energy use by 25% by 2030 and plans to install enough on-site photovoltaics to generate 100 MMBtu per year. The energy utility that serves Community A plans to reduce their emissions factor by 30% by 2030.

Energy Efficiency Reduction: 1000 MMBtu x 25% x 0.10 tCO2e/MMBtu = 25 tCO2e
Electric Grid Mix Reduction: 750 MMBtu x 0.10 tCO2e/MMBtu x 30% = 22.5 tCO2e
On-Site Photovoltaics Reduction: 100 MMBtu x 0.07 tCO2e/MMBtu = 7 tCO2e

Definitions

The following terms are used in the calculation of the savings potential associated with each strategy.

- **Emission reduction**
  For each strategy, the emission reduction represents the reduction in tonnes of carbon dioxide equivalents (tCO_2e) from the business-as-usual based on changes in energy intensity and emission intensity for each strategy.

- **Building energy use**
  Building energy use refers to the amount of energy used in buildings, in million British thermal units (MMBtu). This is the first data point needed for the energy efficiency strategies, and is typically separated into commercial and industrial buildings versus residential buildings, as well as existing versus new buildings. For strategies that have different savings rates based on fuel type, building energy use may also be separated between electricity and natural gas.

  While *BAU* building energy use is used as the starting point for all efficiency strategies, *planned* building energy use is the starting point for decarbonization strategies. Planned building energy use is defined as the amount of energy anticipated after all efficiency and fuel switching strategies are applied.

- **Implementation period**
  The implementation period is the time period during which each strategy is implemented. Some strategies result in savings that persist beyond their implementation period while others do not.

- **Participation rate**
  Participation rates are defined as the percentage of people or buildings adopting the given strategy, assuming all households operate at the same energy intensity, and all jobs have equivalent energy intensities. Since this is not true (especially for commercial/industrial buildings), the participation rate is more accurately described as the percentage of energy use that will be affected by the strategy. For example, if large commercial buildings comprise 25% of the

building stock, but use 50% of the energy, a strategy that targets all large commercial buildings would use a participation rate of 50%.

For one-time strategies such as equipment replacement or retrofits, participation rates are distributed equally across the implementation period selected for strategy adoption. For example, a participation rate of 15% for building retrofits from 2025-2040 would result in a 1% annual participation rate. For ongoing strategies such as behavior change or green power purchase, participation rates are assigned to each year of the designated implementation period. For example, a participation rate of 15% for behavior change from 2025-2040 would result in a 15% annual participation rate.

- **Energy savings rate**
  Energy savings rates are defined as the reduction in energy use from the BAU based upon the given strategy. Depending on the strategy, there may be separate energy savings rates for electricity versus natural gas.

- **Emissions factor**
  Emissions factors refer to the emissions intensity of each unit of energy consumed, in tonnes of carbon dioxide equivalent per million British thermal unit (tCO_2e/MMBtu). Since natural gas emission factors do not vary substantially over time, the emissions factor for natural gas remains constant at 0.05 tCO_2e/MMBtu.[6] The emission intensity of electricity changes based on the primary energy used to generate the electricity. In this analysis, electricity supplied through the grid is assigned an emissions factor that changes over time based on the anticipated portfolio mix of each utility serving the community. In communities served by multiple utilities, their emissions factor is a weighted average and may be different for the commercial/industrial sector than it is for the residential sector based on the percentage of the total load met by each utility. Electricity supplied through renewable energy – whether from green power purchase or on-site renewables – are assigned an emissions factor of zero.[7]

  While the *BAU* emissions factor is used to determine emissions savings for all efficiency strategies, the *planned* emissions factor is the starting point for decarbonization strategies. The planned emissions factor is the anticipated emissions factor of the grid, after applying the electric grid mix strategies.

[6] Table G.1 and G3, Local Government Operations Protocol, for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.1, May 2010.

[7] There is a risk of double-counting savings from renewable electricity if these savings are accounted for both within the utility's emissions factor and as a separate strategy. The emissions factors reported by Xcel Energy, for example, include the impact of Windsource customers on their grid average.

Persistence of Strategies

Persistence is defined as the effectiveness and longevity of reduction strategies after the initial implementation period. Savings from one-time strategies that are based on installed technology (e.g. Stretch Energy Code and Appliance, Equipment, and Fixture Efficiency) are typically assumed to persist throughout the planning horizon, reflecting the lifetime of the energy-saving building component or device. Savings from strategies that rely on the continued engagement of the building operator or occupants (e.g. Energy-Efficient Operations and Behavior Change) are assumed to be contingent on continued participation. Assumptions regarding persistence are described for each strategy in the documentation below.

To see the completed methodology, visit:
https://www.regionalindicatorsmn.com/customer_media/WedgeToolMethodology_September2017.pdf