



WEBINAR:
**TOOLS FOR LOCAL GOVERNMENT
ENERGY CHAMPIONS**
OCTOBER 2017

MINNESOTA



The development of this presentation 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. The team includes LHB, Great Plains Institute, and the University of Minnesota's Energy Transition Lab and Center for Science, Technology, and Environmental Policy.

WEBINAR SPEAKERS



ALEX CECCHINI, Local Government Energy Programs Administrator | Minnesota Department of Commerce

BRIAN ROSS, AICP, LEED GA | Great Plains Institute

SHANNON PINC, Environment & Sustainability Coordinator | City of St. Louis Park

BECKY ALEXANDER, AIA, WELL AP | LHB, Inc.

ELLEN ANDERSON, Director, Energy Transition Lab | University of Minnesota

LoGoPEP TEAM & FUNDERS



Energy Transition Lab

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM



**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.



**CENTER FOR SCIENCE,
TECHNOLOGY, AND
ENVIRONMENTAL POLICY**

PARTNER CITIES:

1. Eden Prairie
2. Falcon Heights
3. Maplewood
4. Oakdale
5. St. Louis Park

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Additional funding has been provided by The McKnight Foundation.

THE MCKNIGHT FOUNDATION



LOCAL GOVERNMENT
ENERGY PLANNING WORKBOOK
MAY 2017



Developed by:
Great Plains Institute

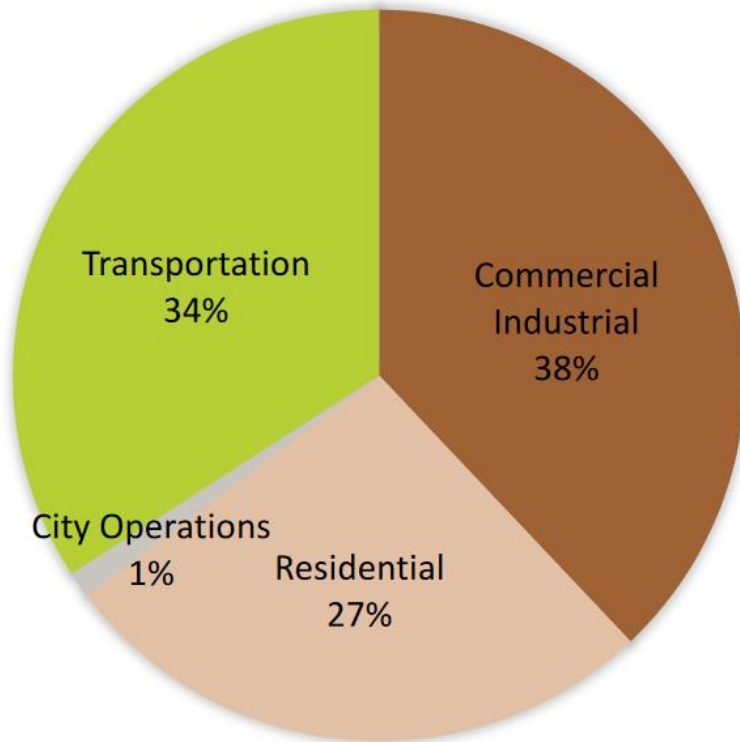
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LoGoPEP OVERVIEW

Brian Ross
GPI

Intro to LoGoPEP

GREENHOUSE GAS EMISSIONS BY SECTOR



Minnesota’s **Local Government Project for Energy Planning (LoGoPEP)** builds upon existing efforts to engage local governments in committing to actionable strategies for energy and greenhouse gas emission reductions.

LoGoPEP provides communities with planning tools and metrics to measure progress toward their goals. The tools were developed for metropolitan region communities, and are now being applied throughout the state.

What are Energy Resources?

Proved oil and gas reserves

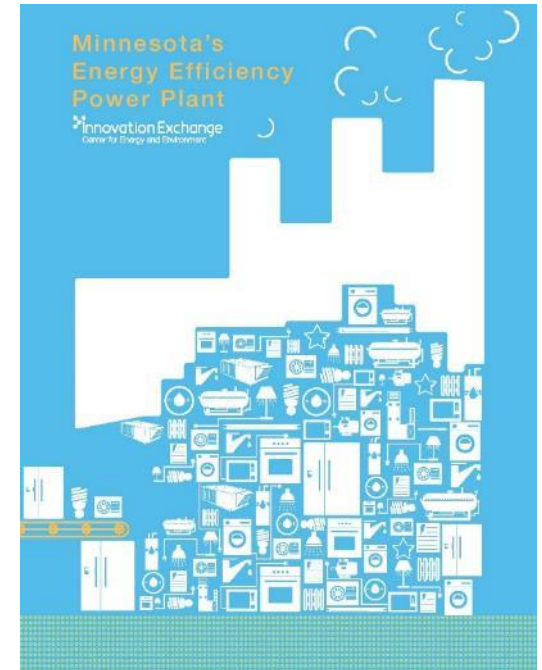
Those quantities of oil and gas, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be economically producible—from a given date forward, from known reservoirs, and under existing economic conditions, operating methods, and government regulations.

(SEC definition of proved reserves)



What are energy resources?

1. Demand-side energy resources
2. Solar energy resources
3. Biomass energy resources
4. Wind energy resources

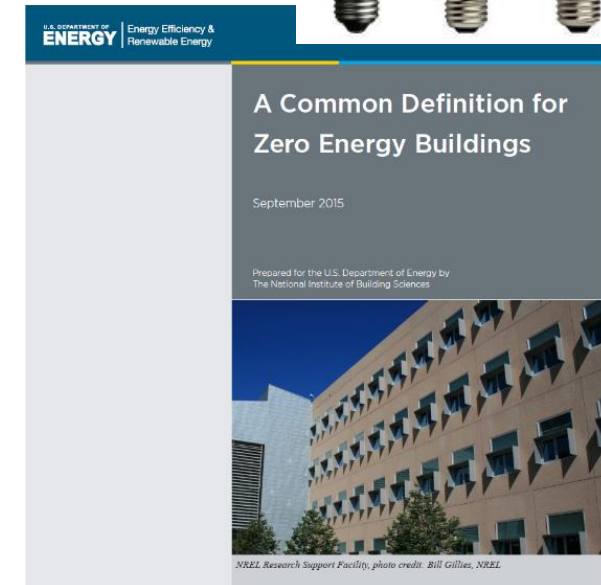


What are local energy resources?

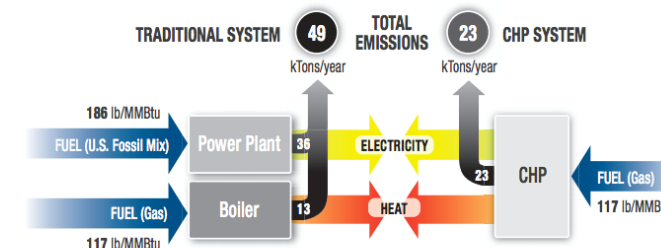


1. **Demand-side energy resources** include several distinct resources that are already used extensively by energy utilities:

- ✓ Energy efficiency
- ✓ Demand response
- ✓ Combined heat and power (CHP)



Increased Efficiency Results in Reduced Carbon Emissions



Example of the CO₂ savings potential of CHP based on a 5 MW gas turbine CHP system with 75% overall efficiency operating at 8,500 hours per year providing steam and power on-site compared to separate heat and power comprised of an 80% efficient on-site natural gas boiler and average fossil based electricity generation with 7% T&D losses.

Source: ICF International

What are local energy resources?

2. **Solar energy resources** are the most abundant local energy resource, but also the most distributed. Solar energy is used in several ways:
- ✓ Rooftop systems for homes and businesses
 - ✓ Solar farms and gardens



What are local energy resources?

3. **Biomass energy resources** include both traditional agricultural production and increasing utilization of non-traditional biomass. Biomass includes:

- ✓ **Corn, soybeans, and crop residues**
- ✓ **Wood scrap and residue**
- ✓ **Solid waste**



Photocredit: Ever-Green Energy



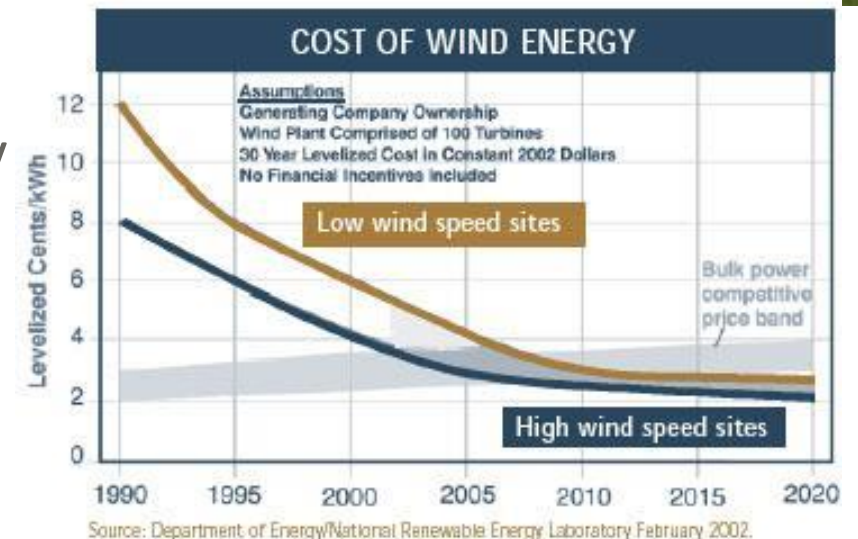
Photo credit: Covanta Energy

What are local energy resources?

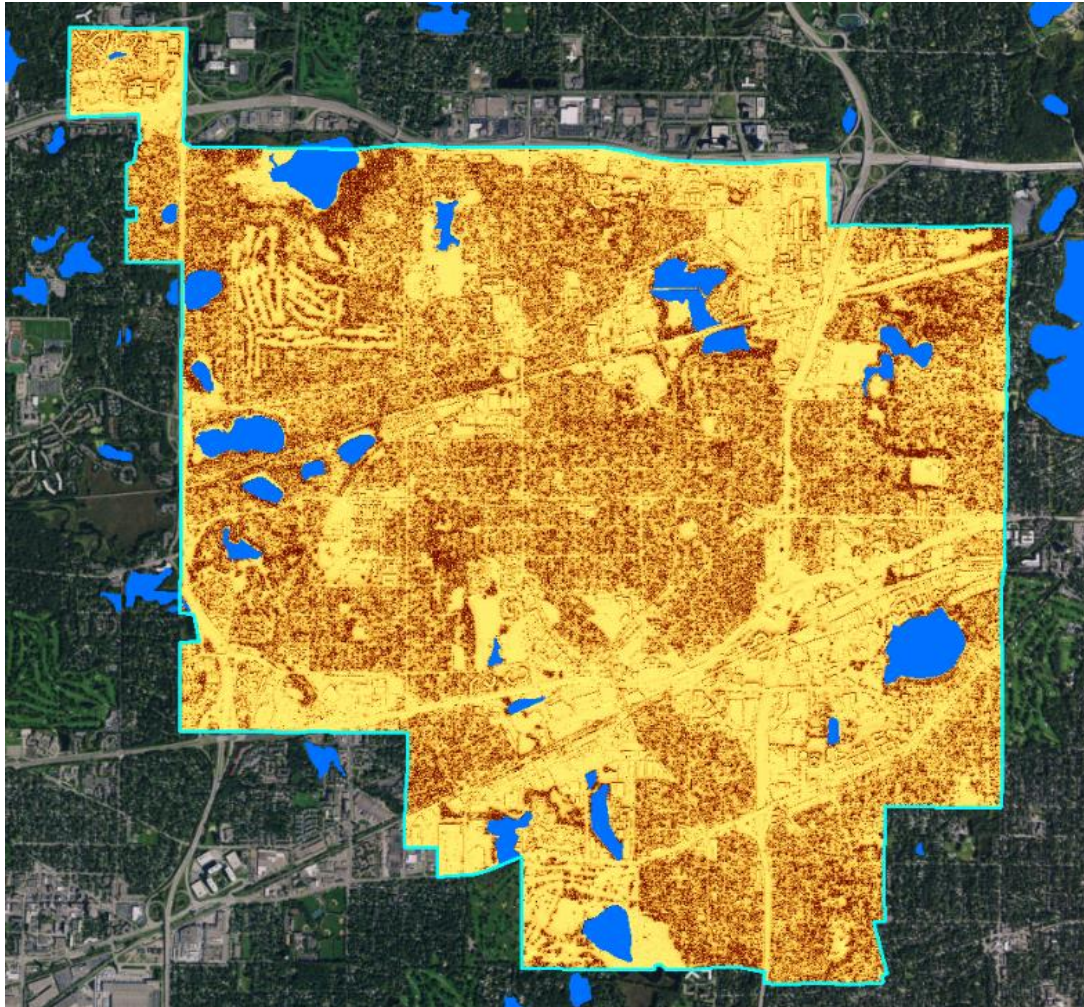
4. **Wind energy resources** are Minnesota's most extensively used and cost effective renewable energy resource. Wind is used to generate electricity as two primary types of land use:



- ✓ **Large “utility-scale”** turbines either individually or as a wind farm
- ✓ **Distributed wind** serving primarily on-site electric use as an accessory use



St. Louis Park



Annual electricity consumed – 498 GWh (Regional Indicators Initiative)

Gross reserves

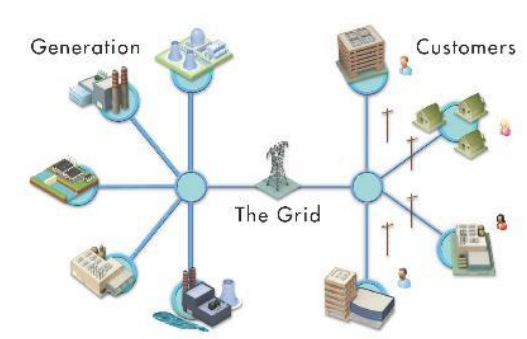
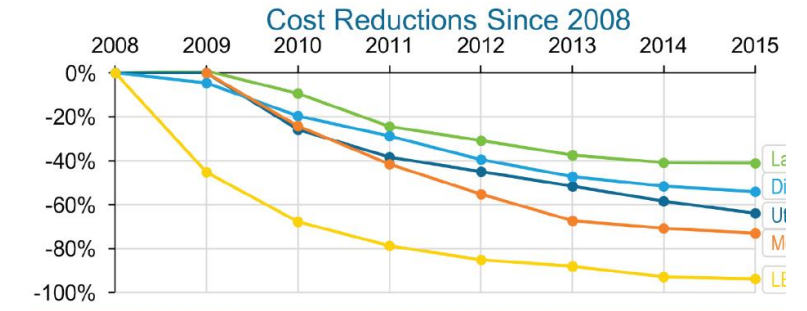
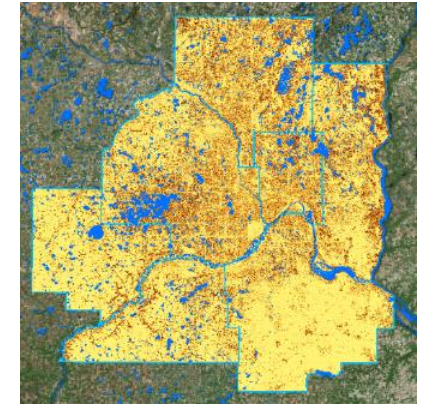
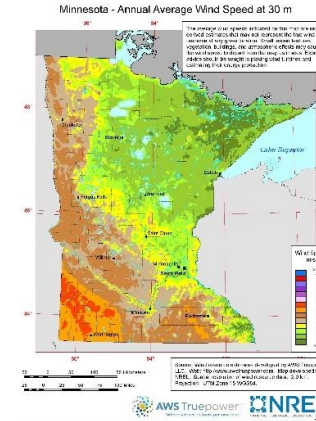
- ✓ 1,217 GWh of electricity,
- ✓ Approximately 940 MW of generating capacity.

Rooftop reserves

- ✓ 216 GWh of electricity (43% of electric use)
- ✓ approximately 170 MW of generating capacity.

Conclusions...

1. Local energy resources are abundant and readily available for economic capture.
2. Residents and businesses will want to develop their energy resources.
3. Local governments already have the tools to enable sustainable, local energy use and ensure that resource development benefits the community.



Energy Planning Tools, Resources

The cover of the "Local Government Energy Planning Workbook" features a photograph of a field of yellow wildflowers in the foreground, with a row of solar panels extending into the distance under a cloudy sky.

LOCAL GOVERNMENT
ENERGY PLANNING WORKBOOK
MAY 2017



Developed by:
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- A guide on how to incorporate energy and/or climate resilience in a city's **request for proposal**.
- An **energy planning guide and workbook** for use in the 2040 comprehensive planning process;

EXISTING CONDITIONS

ENERGY USE PROFILE

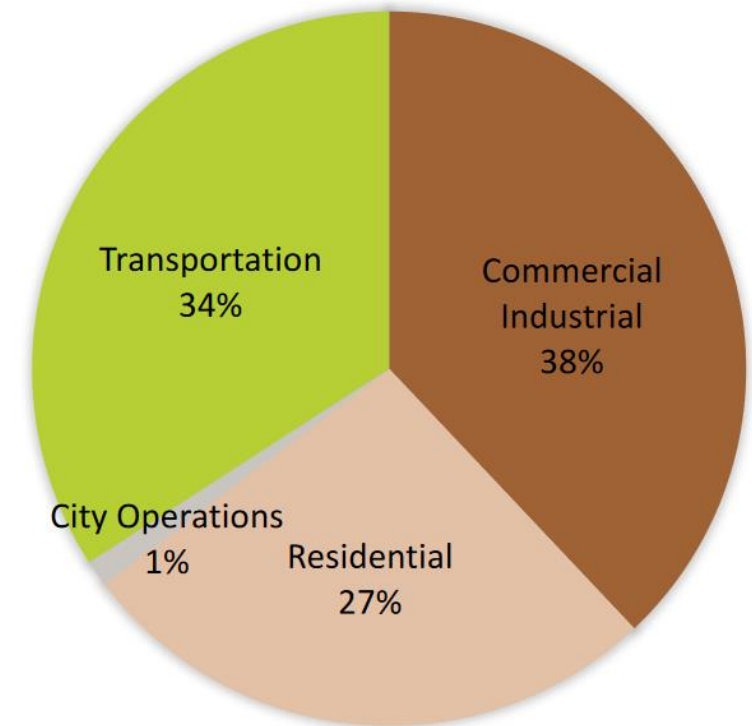
In order to establish a baseline to be able to set goals and measure progress, cities will need to assess their current energy consumption. This is done by gathering data for the commercial and industrial, residential, city operations, and transportation sectors. Much of these data can be collected from the Regional Indicators Initiative (note that city operations is not included in RII data and transportation is provided as vehicle miles traveled).



SECTOR	ENERGY (MMBtu)	EMISSIONS (tonnes CO ₂ e)	% OF TOTAL
Commercial/Industrial	2,250,824	236,436	38%
Residential	2,031,373	166,684	27%
City Operations	69,613	7,312	1%
Transportation	N/A	212,550	34%

* These numbers represent an average Twin Cities suburb. Actual data will vary.

GREENHOUSE GAS EMISSIONS BY SECTOR



DESIRED CONDITIONS

Desired conditions are forward-looking aspirations that are determined through a public engagement process to reflect the community's priorities. Using the existing conditions as a baseline, communities can develop goals and policies that are aspirational, yet achievable.

SETTING GOALS

- Set broad **energy** or **climate protection** goals
- Address specific **energy resources** that are available in your community
- Set **development** goals to improve energy efficiency of new buildings
- Consider specific **technologies**, such as goals for alternative fuel vehicles and public charging stations.
- Set goals that capture **co-benefits**: improving equity, creating local jobs, and improving habitat or water quality.

EXAMPLES OF COMMUNITY GOALS

Our community will:

- Reduce **greenhouse gas emissions** to match the State's reduction goals of 30% by 2025 and 80% by 2050.
- Secure 50% of the community's energy from **renewable energy sources** by 2030.
- Identify potential opportunities for **bioenergy** development.
- Install **electric vehicle charging stations** in every public and private parking lot and ramp by 2030.
- Increase participation in utility **energy efficiency** programs for residents so that 80% of homes have made improvements by 2040.

STRATEGIES

Strategies are the tools in the local toolbox that communities use to achieve desired outcomes: programs, regulations, operational procedures, and public investments. The following are examples of the types of strategies cities can include in their comprehensive plans.

ENCOURAGEMENT

- Promote Windsource[®] on city website
- Promote utility rebate programs through city communications
- Encourage net zero energy development
- Engage community in energy goal setting exercise

REGULATION

- Require energy efficiency and renewable energy within PUD ordinance
- Adopt an energy benchmarking ordinance
- Remove zoning barriers to renewable energy
- Adopt an energy stretch code (SB 2030)

INCENTIVES

- Enable PACE financing
- Offer regulatory incentives within zoning
- Expedite permitting for clean energy projects
- Offer technical assistance for private sector developments to incorporate net-zero and/or solar-ready designs

PUBLIC DEMONSTRATION, LEADERSHIP

- Participate in the Guaranteed Energy Savings Program
- Install solar on rooftops of public buildings
- Adopt net-zero energy standards for public facilities
- Sponsor a community solar garden for community residents and businesses

Energy Planning Tools, Resources

EXISTING ENERGY CONDITIONS: WHITE BEAR LAKE

The City of White Bear Lake is committed to understanding how energy is used in the community and exploring opportunities to reduce energy consumption and increase the use of clean energy resources. The City has completed an energy use profile to illustrate energy consumption and greenhouse gas emissions from buildings and transportation. The City has also inventoried existing energy and climate policies both adopted previously by White Bear Lake or implemented at the state level.

Energy Use Profile

The Regional Indicators Initiative (RII)¹ provides communities with data related to four indicators: electricity and natural gas use, transportation energy consumption, waste, and water. It also provides baseline greenhouse gas emissions associated with these indicators. Data from RII was used for the energy use profile for White Bear Lake; Xcel Energy is the service provider for both electricity and natural gas.

The types of energy used in White Bear Lake for buildings and industrial processes are primarily electricity and natural gas. While some fuels (e.g., heating fuel for residential use) are also used within the community, they were not captured in this assessment. The data in Figure 1 indicates that consumers use more natural gas than electricity, with nearly 2/3 of energy consumed being natural gas. This fuel is primarily used for water and space heating, cooking, and some industrial processes.

Electricity can be used for appliances, water and space heating, lighting, as well as other electronic devices. Figure 2 illustrates that residential consumers use approximately the same amount of energy as commercial and industrial consumers. However, it is important to note that there are more than 8,500 residential customers in White Bear Lake as compared to 800 commercial and industrial customers. RII indicates that utility energy consumption costs White Bear Lake residents and businesses \$27.4 million each year.

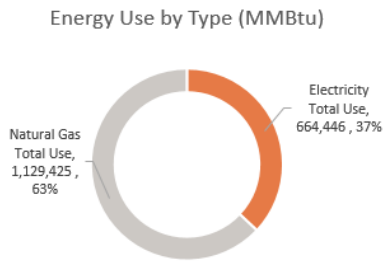


Figure 1 Data Source: Regional Indicators Initiative for White Bear Lake

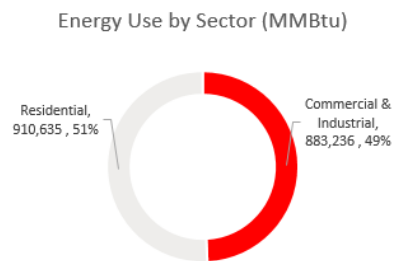


Figure 2 Data Source: Regional Indicators Initiative for White Bear Lake

- Example **energy existing conditions** summary with references for where to find data and information;

¹ <http://www.regionalindicatorsmn.com/>

Energy Planning Tools, Resources

Solar

1. Develop local solar reserves to generate the equivalent of 20% of community electric energy use by 2025.
2. Residents and business have the ability to purchase clean energy through the local utility produced by community solar/wind facilities by 2020.
3. By 2025, 20% of residents and businesses are purchasing solar or wind energy through the public utility.
4. Encourage rooftop and parking lot solar development to capture economically energy on developed land.
5. Facilitate solar development on lands that are poorly suited for other types of development, such as closed landfills, contaminated land, and industrial buffer areas.

Solar

Solar deployment comes in several forms that have distinct land use and development considerations. Different types of communities will need to address these forms (rooftop, commercial, community solar, and utility-scale solar) consistent with the development opportunities. For instance, communities with undeveloped land, particularly on the edge of the MUSA, should identify preferred locations for community solar development.

Biomass

1. Become a zero-waste community, with non-recyclable waste streams converted to energy production, by 2040.
2. Develop local biomass energy potential in the community's industrial and institutional facilities.
3. Expand biomass use for heating residential buildings, using certified low-emission wood stoves or boilers, to 10% of the city's housing units by 2025.
4. Propane and delivered fuel companies have low-carbon or carbon-free fuel options in place by 2025.
5. Increase use of biofuels (biodiesel, ethanol) and other low or no carbon fuels in private fleets.

Biomass

Biomass resources in the community will vary considerably by the type of community. Rural communities will have agricultural products and waste streams to consider, while urban communities may only have solid waste and tree waste. Also consider specific biomass opportunities associated with processing plants or other industry.

Wind

1. Enable development of small wind energy systems where both wind resources and surrounding land uses are appropriate.
2. Support development of appropriate utility scale wind farms in land use plans and regulation.
3. Support and promote residents' participation in 3rd-party certified wind energy programs.

Wind

Urban areas generally have poor wind resources; development goals should reflect a realistic assessment of the wind resource. Rural communities will have wind resources and will need to assess the opportunities for both small (distributed) wind and large-scale development, or even wind farms.

- Example **energy planning goal or policy language** addressing a variety of energy resources and community types;



Energy Planning Tools, Resources

- A **solar energy calculator** to help communities understand solar energy resources and set solar electricity goals, using the mapped solar information provided by the Met Council;

SOLAR ENERGY CALCULATOR

June 2017

City Name:

Date:

Electricity Use	MMBtu/year	tCO2e/year	Statewide Electricity Goals	MMBtu/year	MWh/year
Total Electricity Use	1,700,575	236,296	State Solar Goal of 1.5% by 2020	25,509	7,476
			State Solar Goal of 10% by 2030	170,058	49,841
			25% Renewables by 2025 RES	425,144	124,603
Solar Generation Potential	MW	MWh/year	Local Government Goals		
Total Generation Potential	1,530	1,988,351	Renewable Electricity Share	25	%
Total Rooftop Generation Potential	220	286,513	Renewable Electricity Generation	124,603	MWh/year
Top 10 Buildings Generation Potential	22	28,490	Renewable Electricity Capacity (Solar)	95.8	MW
Public Buildings Generation Potential	-		Greenhouse Gas Reduction	59,074	tonnes CO ₂ e

Results



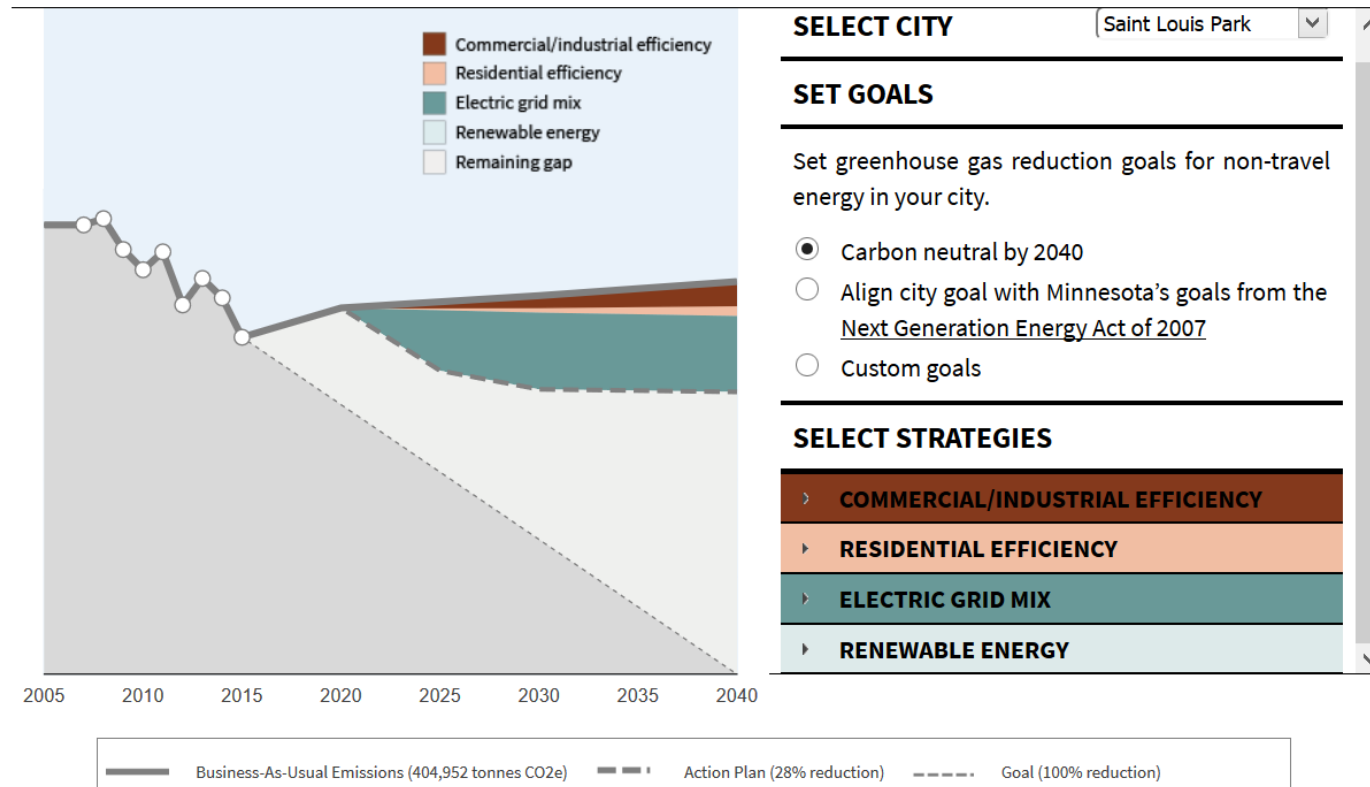
43% of the total rooftop solar resource is utilized, providing enough local renewable electricity to serve the equivalent of 16,405 households and resulting in a 25% reduction in greenhouse gas emissions from electricity use.

Energy Planning Tools, Resources

GREENHOUSE GAS EMISSIONS REDUCTION PLAN | NON-TRAVEL ENERGY Saint Louis Park



This tool allows users to explore a city's potential energy futures through an interactive diagram that shows forecasted city-wide greenhouse gas emissions from building energy consumption. Starting with historic baseline data and a business-as-usual forecast, users can set reduction goals and visualize the predicted impacts of reduction "wedges" that can be achieved through actions taken by residents, businesses, utilities, and local and state governments. Three reduction strategies that represent the impacts of existing policies are shown by default, including: Commercial/Industrial Energy Code Enforcement, Residential Energy Code Enforcement, and Planned Portfolio Mix Changes. To learn more, check out the [methodology document](#). The tool only evaluates non-travel energy, which comprises 55% of statewide emissions. To comprehensively address city-wide emissions, local governments should also consider vehicle travel, air travel, waste, wastewater, and agricultural emissions.



- A **wedge diagram tool** for energy and greenhouse gas reduction planning with an associated menu of feasible city actions.

Energy Planning Tools, Resources



Minnesota's Local Government Project for Energy Planning (LoGoPEP) builds upon existing efforts to engage local governments in committing to actionable strategies for energy and greenhouse gas emission reductions. LoGoPEP will provide communities with planning tools and actual results to measure progress toward their goals. This project is being developed at the Twin Cities metropolitan regional scale with the goal of future replicability and institutionalization throughout the state.

Key activities of this project include:

- Engaging a group of local government partners as key stakeholders in the development of a set of energy planning tools and resources that are differentiated by city type, including:
 - **Case studies** of energy strategies implemented by exemplar cities;
 - A brief guide on how to incorporate energy and/or climate resilience in a city's **request for proposals**;
 - An energy planning **guide** and **workbook** for use in the 2040 comprehensive planning process;
 - An **example analysis of energy existing conditions** documenting a city's energy use profile and available energy resources;
 - **Example local government energy goals**;
 - A **solar energy calculator** to assist in setting solar energy development goals;
 - A **wedge diagram tool** for energy and greenhouse gas reduction planning with an associated menu of feasible city actions.
- Providing online public access to the developed energy planning tools
- Convening collaborative workshops and webinars to train cities to use the energy planning tools
- Supporting ongoing energy and emissions tracking through the development and testing of an automated online database for Regional Indicators Initiative data
- Creating an Implementation Model to guide future work using lessons learned throughout the project

<http://www.regionalindicatorsmn.com/energy-planning>

REGIONAL INDICATORS INITIATIVE

Measuring City-Wide Performance

Tracking the performance of Minnesota cities through key indicators is essential to assessing progress and promoting efficiency. Use this website to learn about the Initiative, explore the data, understand the results, and get involved.



ENERGY

BRITISH THERMAL UNITS



WATER

GALLONS



TRAVEL

VEHICLE MILES



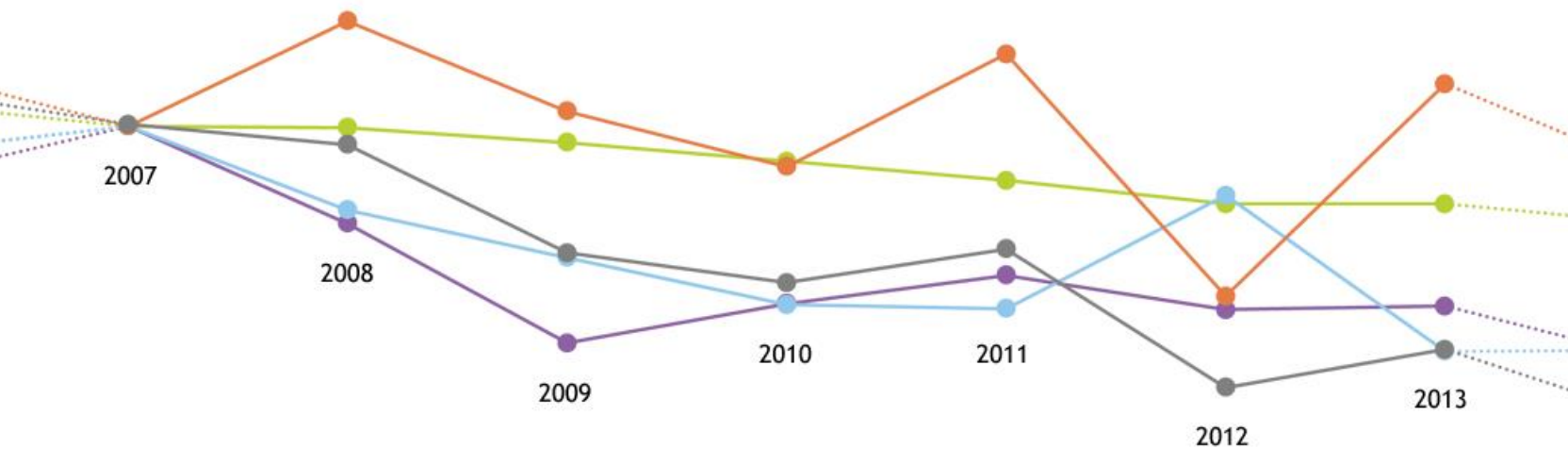
WASTE

POUNDS



GHG EMISSIONS

CARBON DIOXIDE
EQUIVALENTS

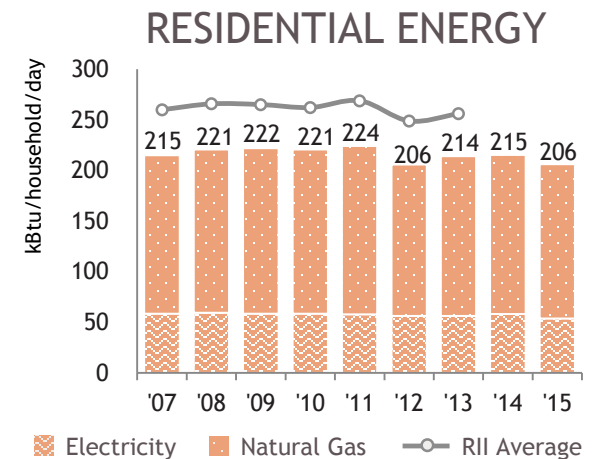
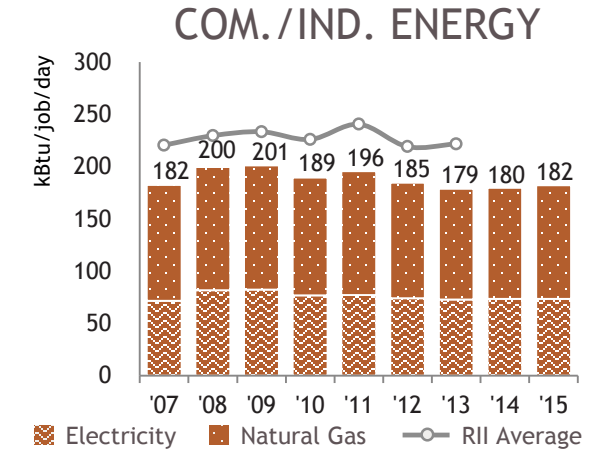
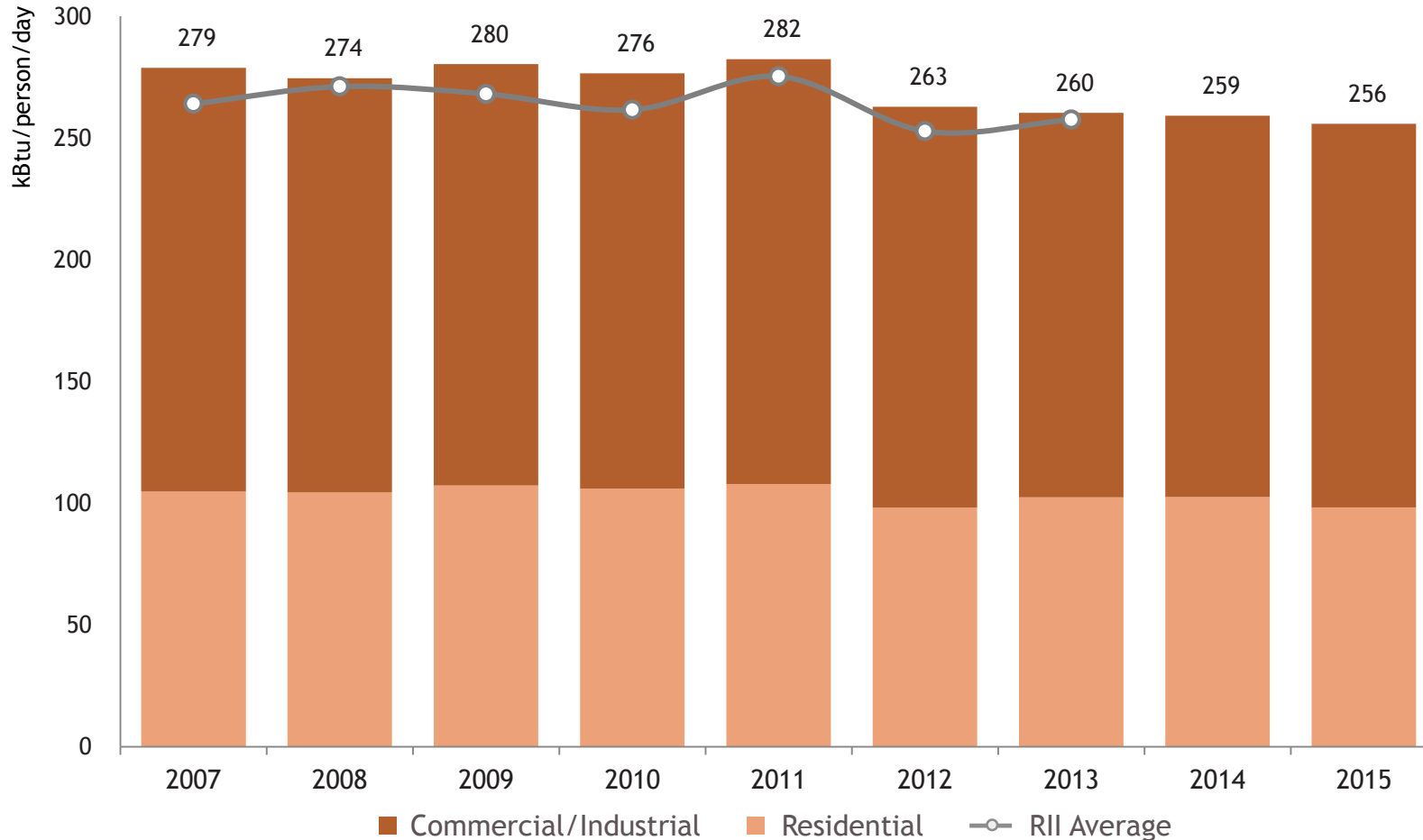


ST. LOUIS PARK PILOT CITY

Shannon Pinc

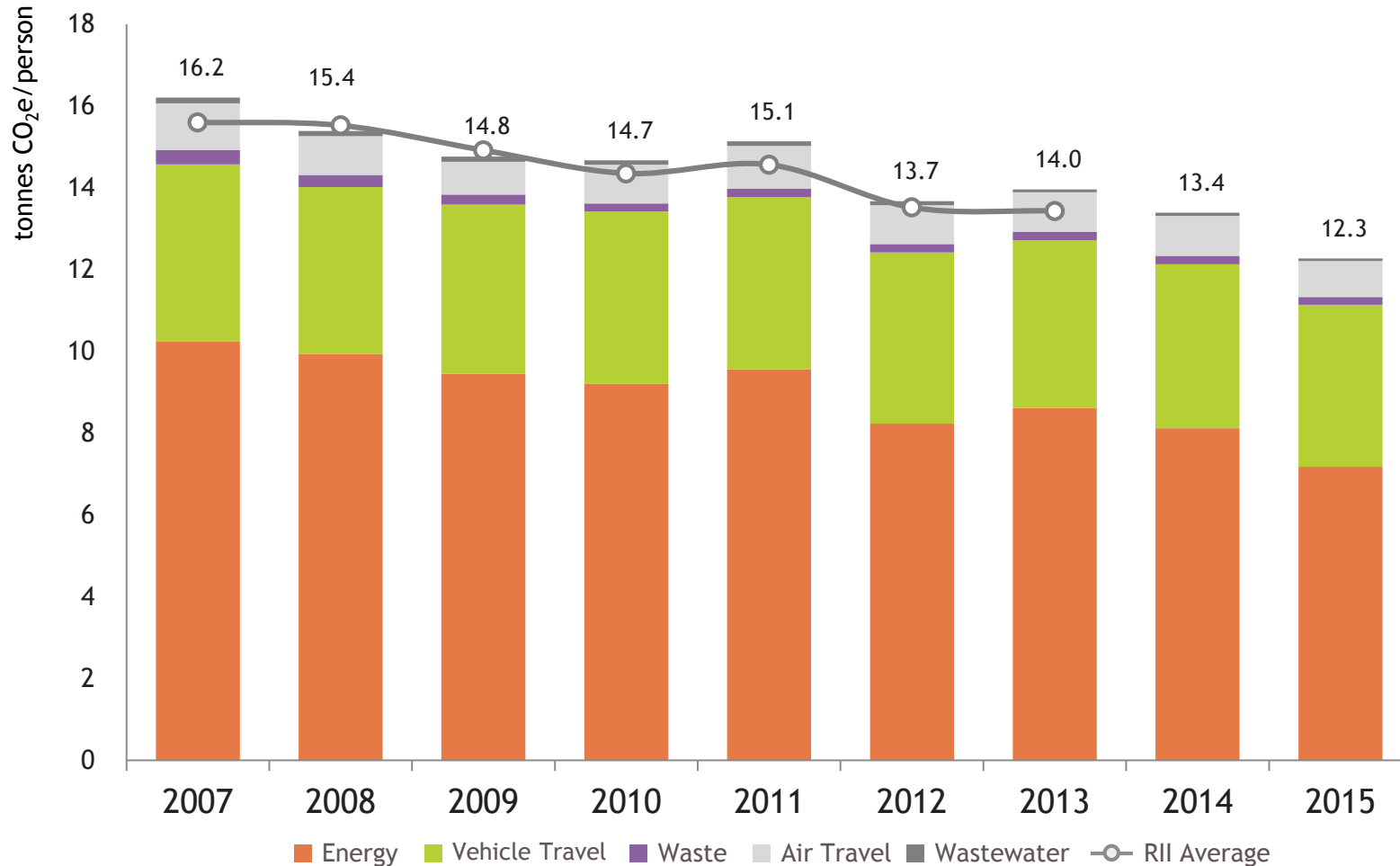
ST. LOUIS PARK

WEATHER-NORMALIZED ENERGY USE

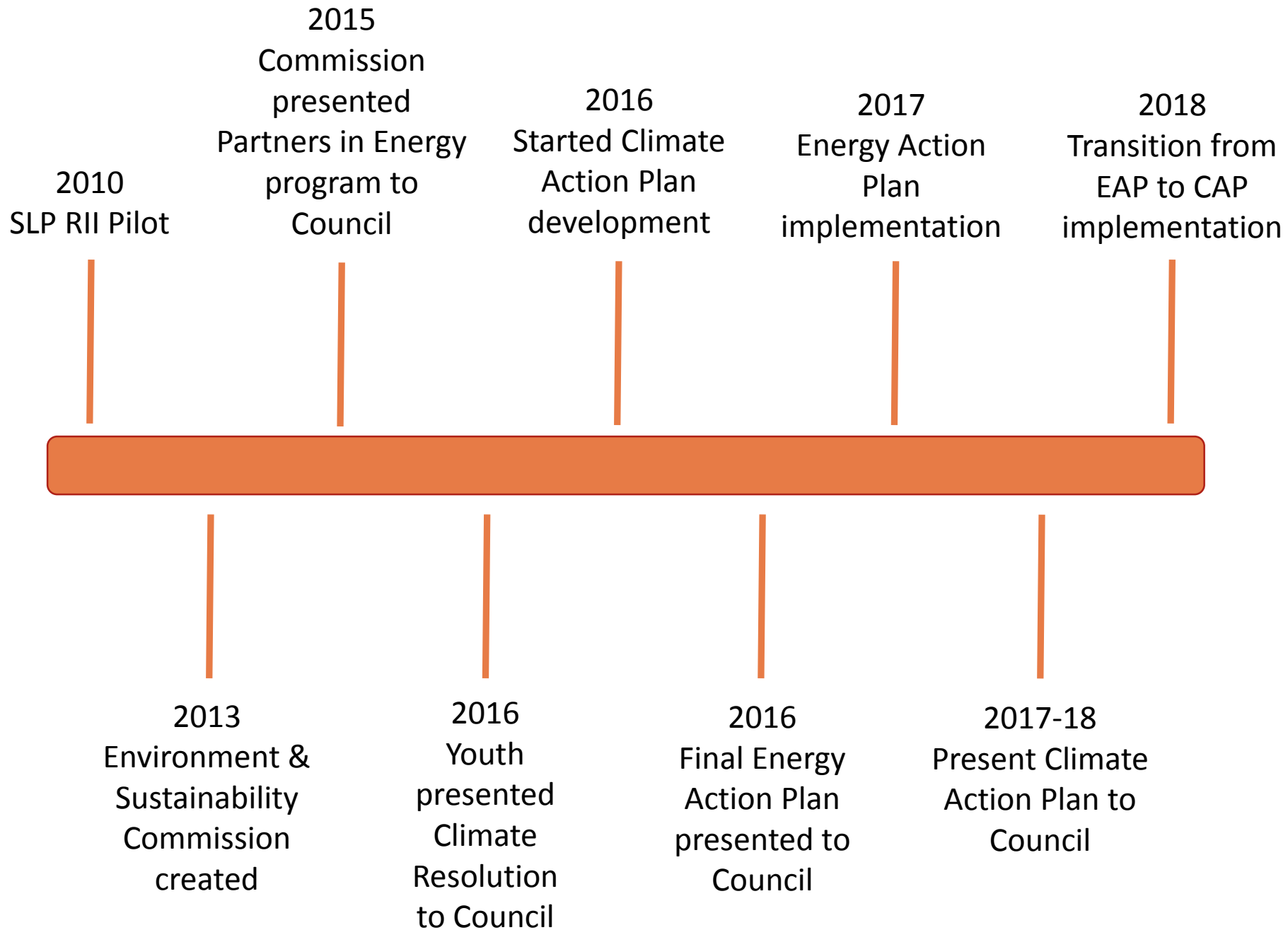


ST. LOUIS PARK

GREENHOUSE GAS EMISSIONS INVENTORY



- Non-travel energy is the largest contributor to the city's emissions (62%).
- Per capita emissions decreased in every category from 2007-2015, amounting to a 17% overall reduction.





An Energy Action Plan for



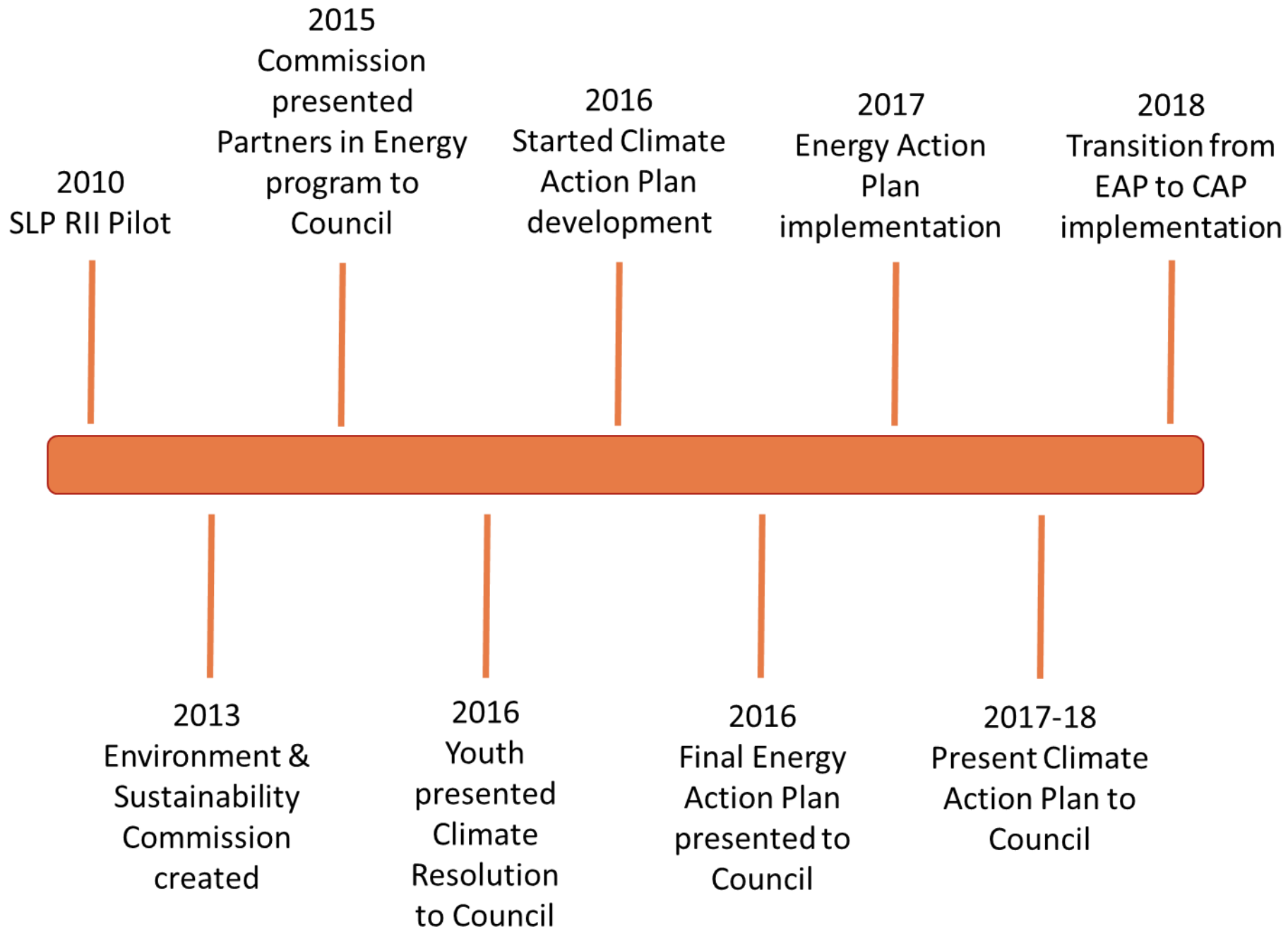
2016 ENERGY ACTION PLAN

CLIMATE ACTION PLAN
ENERGY EFFICIENCY IN BUSINESS
RENEWABLE ENERGY
PARTNERSHIP WITH YOUTH



“THE TIME TO ACT IS NOW. WE SHOULDN’T HAVE TO BE AFRAID OF OUR FUTURE”

--JAYNE STEVENSON, YOUTH MEMBER OF THE ENVIRONMENT AND SUSTAINABILITY COMMISSION

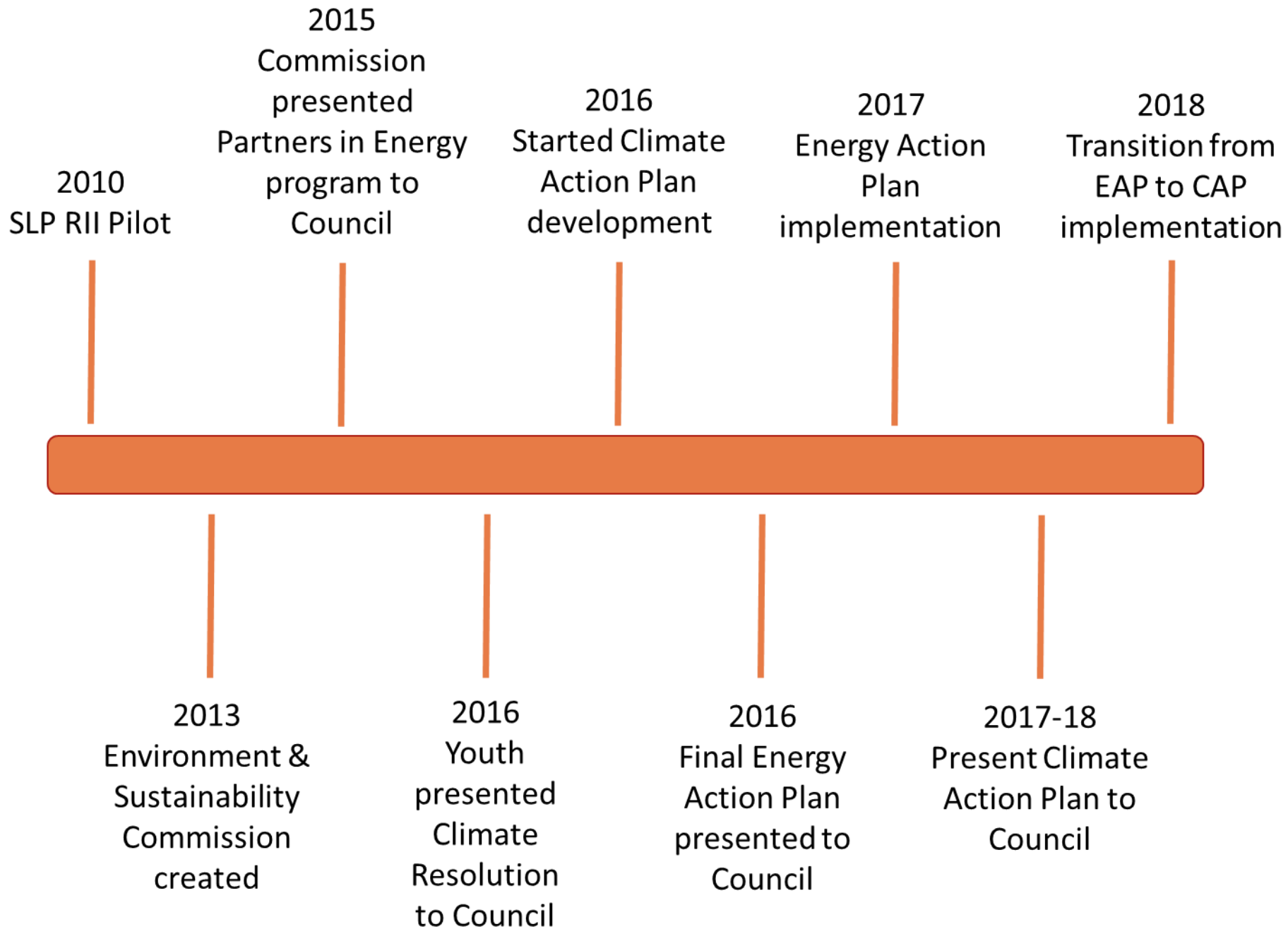


CLIMATE ACTION PLAN PROPOSED GOALS



Net zero greenhouse gas emissions by 2040

- Large Commercial Efficiency
- Small Commercial Efficiency
- Net Zero Construction
- Residential Efficiency
- 100% Renewable Electricity by 2025
- Transportation Emissions Reduction
- Zero Waste

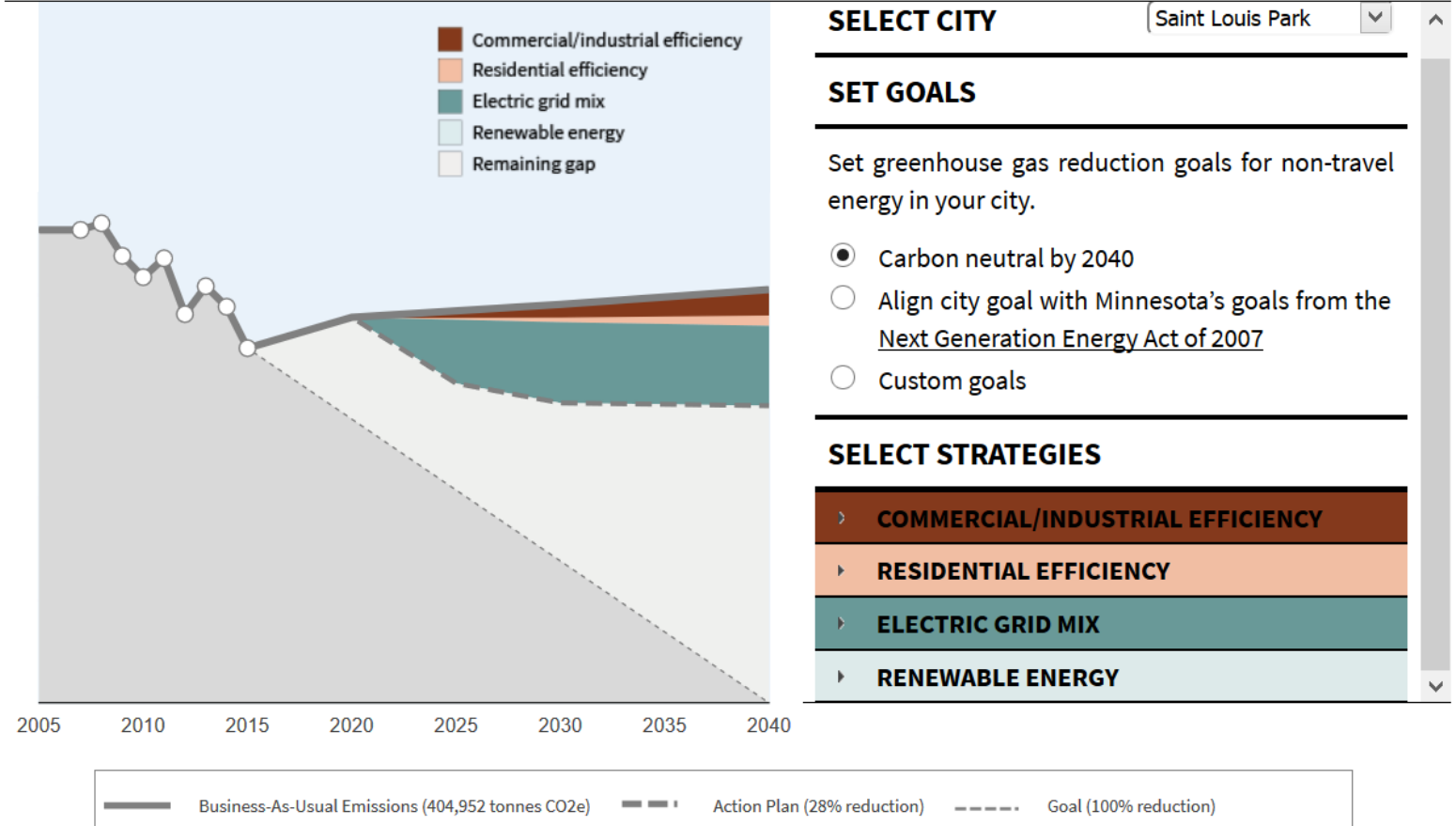


GREENHOUSE GAS EMISSIONS REDUCTION PLAN | NON-TRAVEL ENERGY

Saint Louis Park



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WEDGE TOOL DEMONSTRATION

Becky Alexander
LHB

RESOURCES

ENERGY USE PROFILE

Regional Indicators Initiative:

Measured energy and emissions data for Minnesota cities

<http://www.regionalindicatorsmn.com>

Xcel Community Energy Reports:

Measured energy, emissions, and program participation data for enrolled cities in Xcel's service territory

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

DOE City Energy Profiles:

Estimated city energy and emissions data for U.S. cities

<https://apps1.eere.energy.gov/sled/#/>

CLEAN ENERGY RESOURCES

Metropolitan Council Community Pages

Solar resource data for communities within the metro region

<https://lphonline.metc.state.mn.us/commportal>

Solar Suitability App:

Map of solar potential in Minnesota

<https://solarapp.gisdata.mn.gov/solarapp/>

Minnesota Wind Speed Maps:

Maps of Minnesota wind resource

<https://mn.gov/commerce/industries/energy/technical-assistance/maps.jsp>

ENERGY PLANNING AND ACTION

LoGoPEP Energy Planning Tools

<http://www.regionalindicatorsmn.com/energy-planning>

- A brief guide on how to incorporate energy and/or climate resilience in a city's [request for proposals](#)

- An energy planning [guide](#) and [workbook](#)

- An [example analysis of energy existing conditions](#)

- A [solar energy calculator](#) to assist in setting solar energy development goals

- A [wedge diagram tool](#) for energy and greenhouse gas reduction planning with an associated menu of feasible city actions

GreenStep Cities

Best practices to help cities achieve their sustainability and quality-of-life goals

<https://greenstep.pca.state.mn.us/>

IF YOU REMEMBER ONE THING . . .

Local governments are essential partners to meeting State and national energy/climate goals.

- ✓ Local energy resources are economically competitive
- ✓ Communities determine how local development occurs
- ✓ State and national goals will be implemented locally



Photo credit: U.S. DOE SunShot

CITIES LEADING THE WAY...



Cities in Minnesota that have committed to community-wide carbon reduction targets or Next Generation Energy Act targets...or better!

Burnsville	61,290
Eden Prairie	63,914
Edina	51,350
Falcon Heights	5,554
Duluth	86,238
Grand Marais	1,341
Maplewood	40,150
Mahtomedi	8,211
Minneapolis	407,207
Oakdale	28,073
Rochester	111,402
St. Louis Park	47,502
Saint Anthony Village	9,007
Saint Paul	302,398
Winona	27,139

Total Population 1,250,776

**Join the list
of
champions!**

RESOURCES

ENERGY USE PROFILE

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CLEAN ENERGY RESOURCES

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Solar Suitability App:

Map of solar potential in Minnesota

<https://solarapp.gisdata.mn.gov/solarapp/>

Minnesota Wind Speed Maps:

Maps of Minnesota wind resource

<https://mn.gov/commerce/industries/energy/technical-assistance/maps.jsp>

ENERGY PLANNING AND ACTION

LoGoPEP Energy Planning Tools

<http://www.regionalindicatorsmn.com/energy-planning>

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GreenStep Cities

Best practices to help cities achieve their sustainability and quality-of-life goals

<https://greenstep.pca.state.mn.us/>

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