LOCAL CLIMATE ACTION

Focus on Waste Emissions & Strategies

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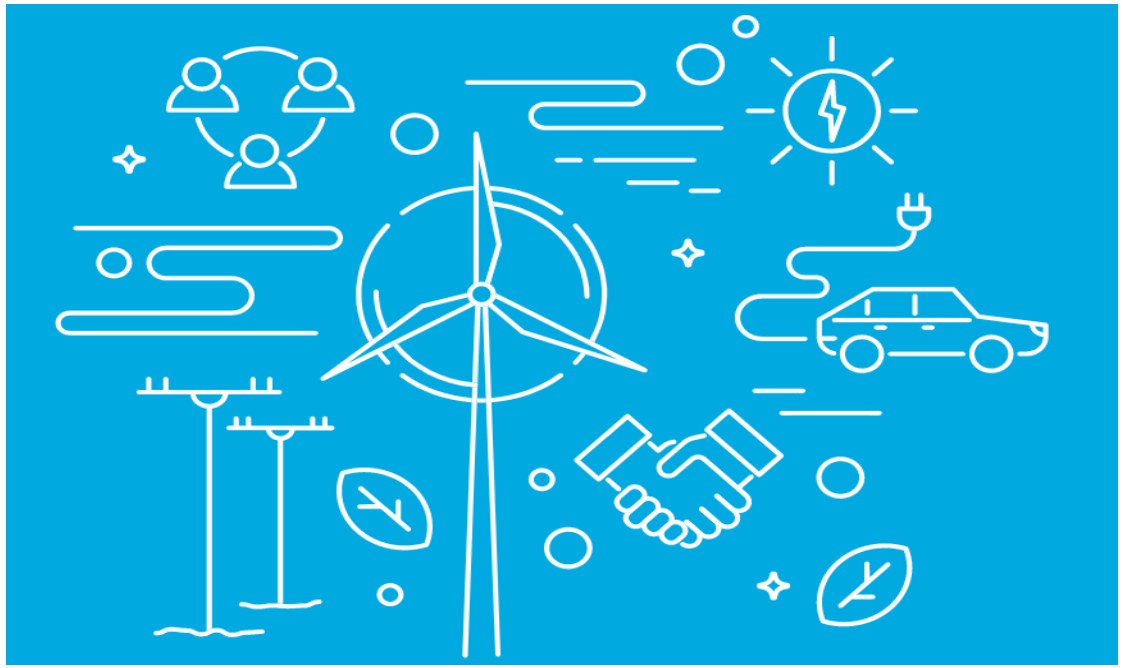
Transforming the energy system to benefit the economy and environment.



Communities Team

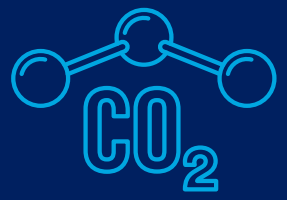
Cities and communities are critical to creating a better energy system because collectively they are big enough to matter and small enough to make changes quickly. GPI's programs are designed to assist communities in different ways with all the elements needed to drive change.

- Energy Planning Technical Assistance
- GreenStep Cities program partner
- Metro CERT
- SolSmart technical assistance
- Small business energy efficiency

Overview

1. Climate & Energy Planning Context
2. Examples from Minnesota
3. Community GHG Inventory
4. Using renewable resources
5. Climate hazards and resilience
6. Questions

CLIMATE AND ENERGY PLANNING



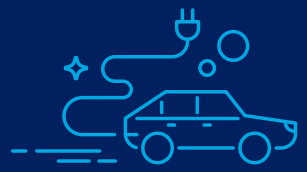
IPCC: 45% reduction by 2030; carbon neutral by 2050 to avoid 1.5° C temperature rise

People are increasingly engaged on climate & want leaders to act

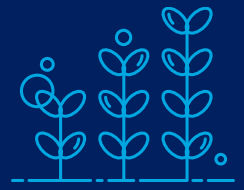
There are economic, health, and environmental benefits

Minnesota cities are leading:

- 5 Climate Action Plans
- 2 Climate Resilience Plans
- 1 County energy plan
- Over 20 PiE energy plans
- 30+ communities included climate in comp plans

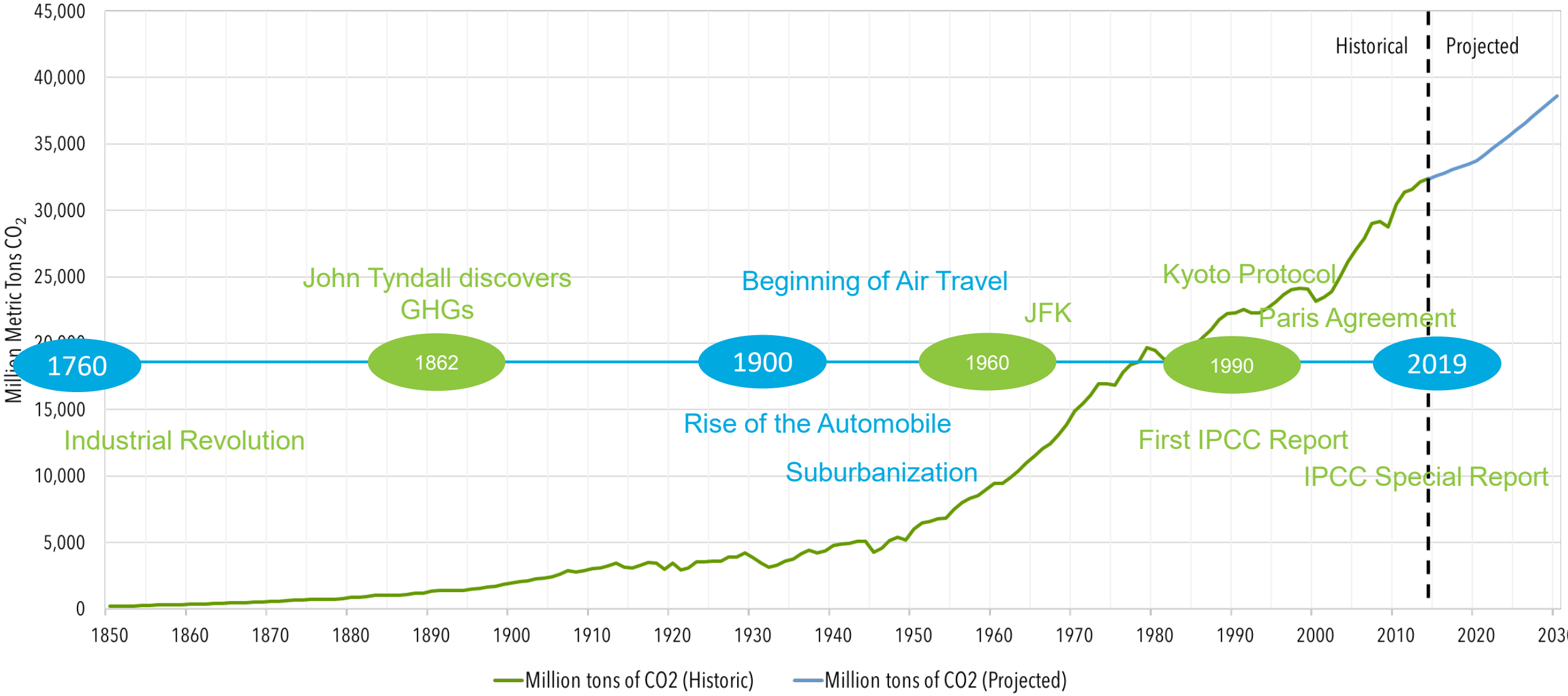


Technology is rapidly changing

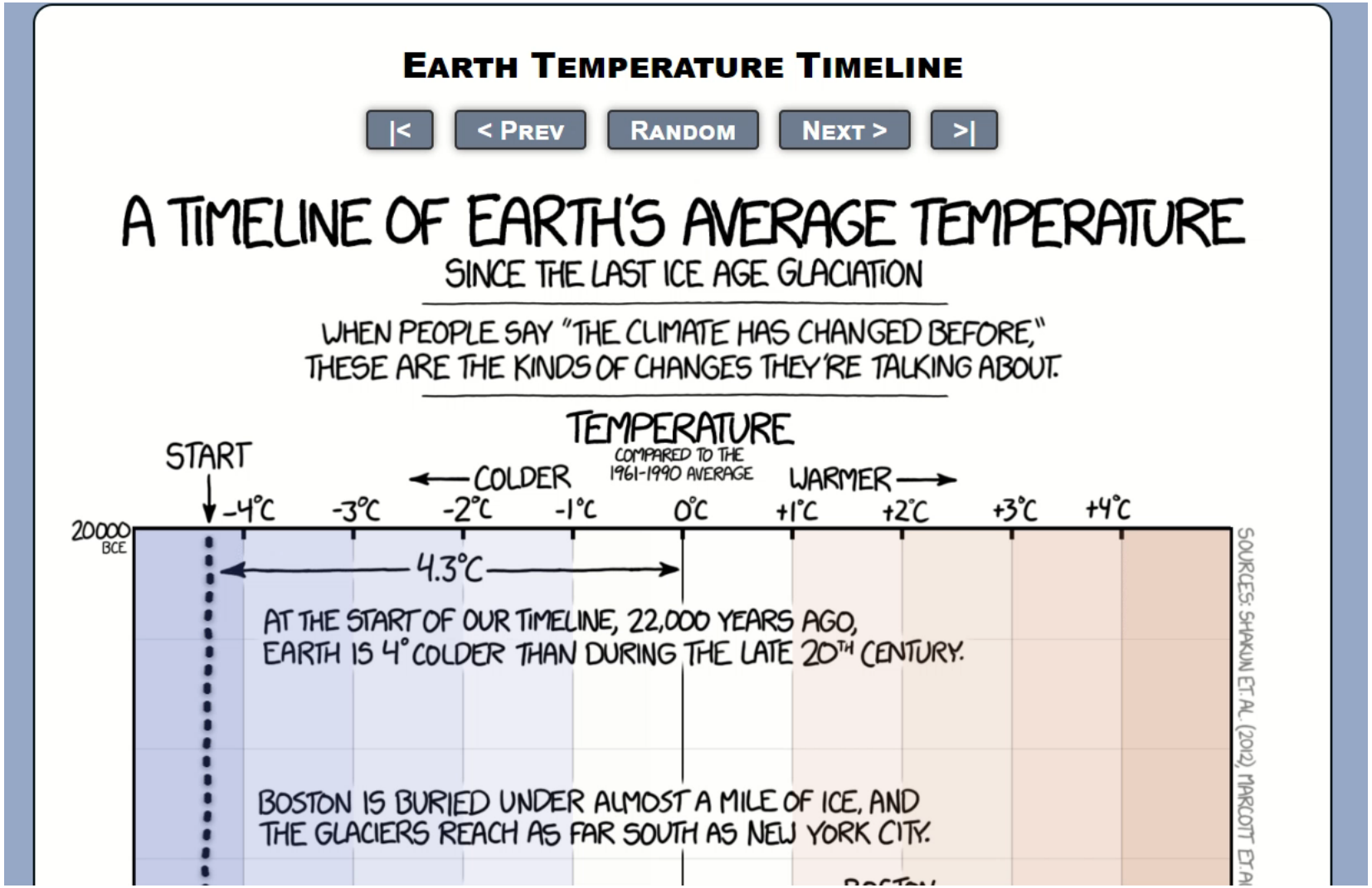


More cities are combining resilience and climate action plans

History of GHG Emissions



Source: Center for Energy and Climate Solutions



Source: XKCD.com

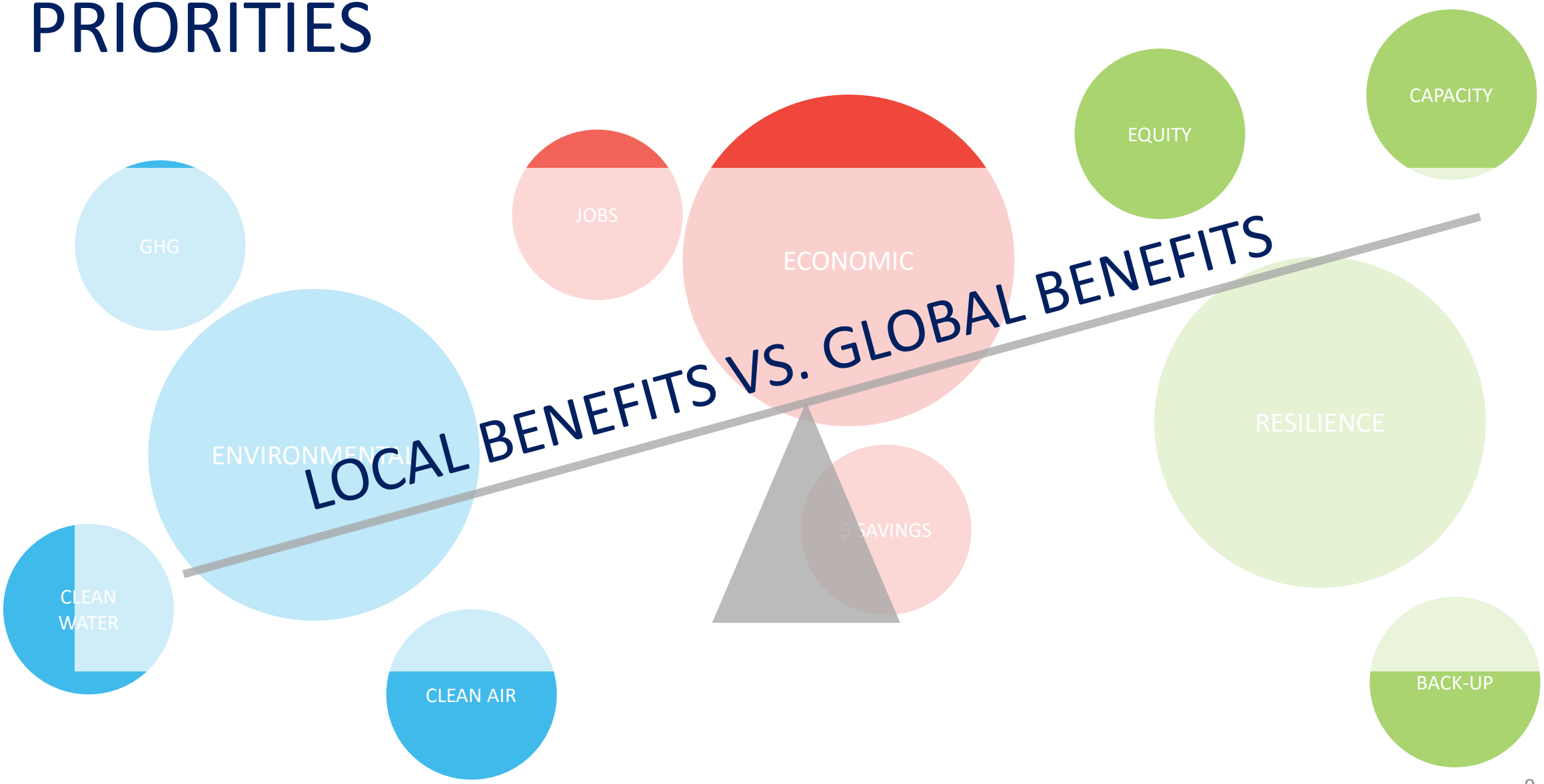
CLIMATE ACTION PLAN EXAMPLES

- Saint Paul
- Northfield
- Minneapolis
- Grand Marais
- St. Louis Park
- Washington County

EXAMPLE GOALS

Community	Carbon Goal	Renewable Goal
Grand Marais	Carbon neutral by 2040	100% renewable by 2030
Northfield	Carbon free energy by 2040	100% carbon free electricity by 2030
Minneapolis	80% emissions reduction by 2050	100% renewable by 2030
Saint Paul	Carbon neutral by 2050	
St. Louis Park	Carbon neutral by 2040	100% renewable electricity by 2030 (10% in-boundary)
Washington County	80% emissions reduction by 2050	None

PRIORITIES


LOCAL BENEFITS VS. GLOBAL BENEFITS
GHG
JOBS
ECONOMIC
EQUITY
CAPACITY
ENVIRONMENTAL
$ SAVINGS
RESILIENCE
CLEAN WATER
CLEAN AIR
BACK-UP

COMMUNITY-WIDE GHG EMISSIONS

Greenhouse gases are released through human activity

These are the most commons sources of emissions that are generated within or due to activity in cities:

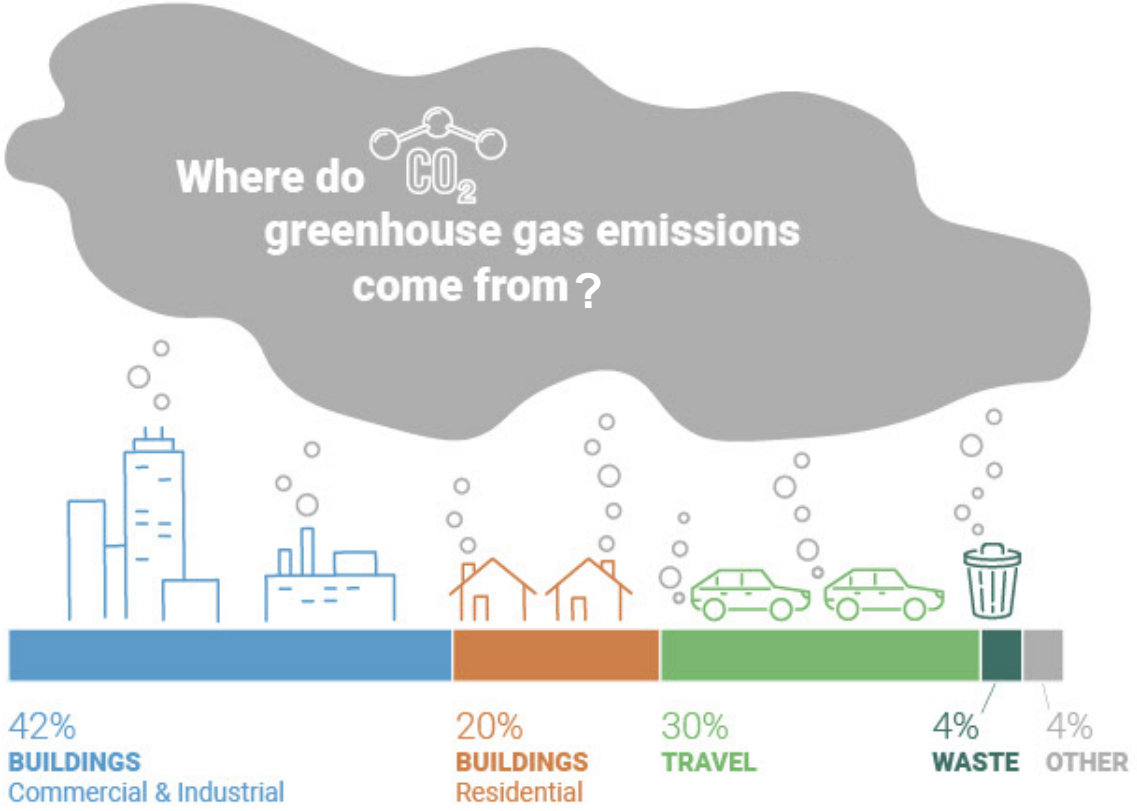
Generation of electricity (coal or gas-fired power plants), which is used in homes, businesses, industry, outdoor lighting, and increasingly for transportation.

Space and water heating that uses natural gas, propane, heating fuel, or electricity generated with fossil fuels.

Industrial and manufacturing processes that use natural gas or generate CO2 during production (e.g., the production of cement).

Modes of transportation that combust fuel (e.g., gasoline, diesel) to run. This includes most cars, trucks, freight, planes, boats, off-road vehicles, and more.

Generation and disposal of waste. GHGs are released during production of materials, methane released at landfills, and combustion at energy facilities.



Saint Paul, GHG Emissions

BUILDING ENERGY EMISSIONS

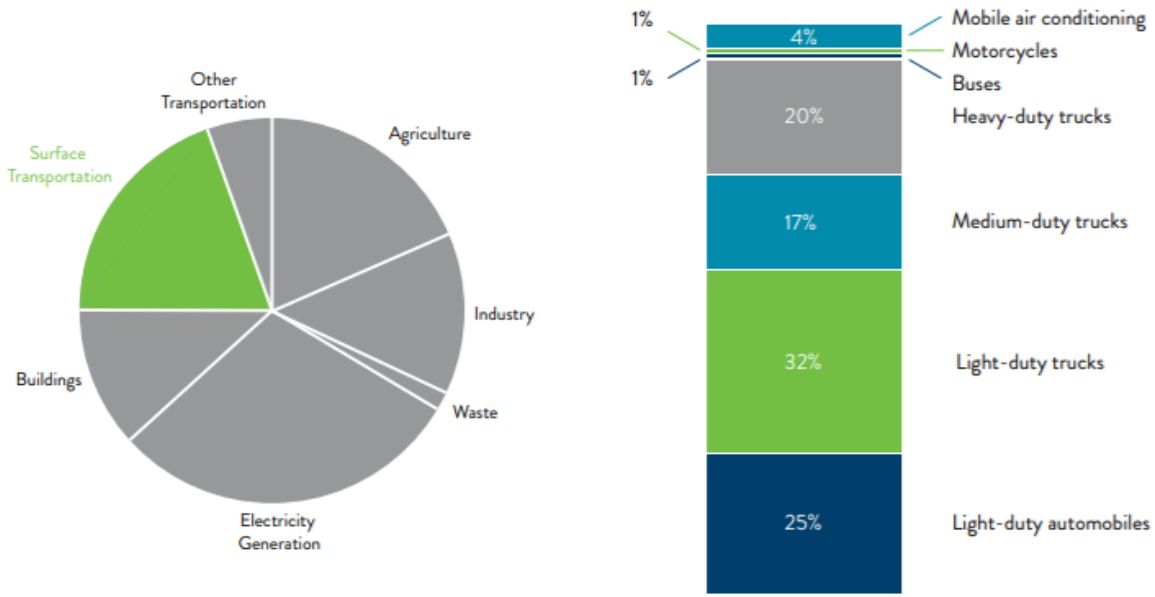
Residential/Commercial/Industrial **Natural Gas and Electricity** use

Sources of Emissions:

- Space heating
- Water heating
- Electricity consumption
  - Appliances
  - Lights
  - Gadgets
  - Hot tubs & saunas
- Industrial processes

TRAVEL EMISSIONS

Figure 4. Minnesota Emissions Profile



WASTE EMISSIONS

Material Waste and Food Emissions

Municipal solid waste data is collected by the Minnesota Pollution Control Agency at the county scale. Rice and Dakota Counties' per capita waste rates were used to estimate City-wide usage. Emissions from solid waste are based on the management method used by the local haulers and account for 2% of total community-wide emissions. In Northfield, the City contracts with Dick's Sanitation Services for single-hauler waste pick-up service for both garbage and recycling. Each year, more than 26,000 tons of solid waste are disposed of in Northfield (Table 1). Roughly half of the waste is recycled and most of the remainder is sent to a landfill, with a small percentage going to a resource recovery (waste to energy) facility. Emissions are calculated based on the volume and destination of the solid waste. Most emissions (95%) from Northfield solid waste come from waste that is landfilled. Organic materials, such as food waste, that are sent to a landfill break down and decompose over time, releasing methane, a powerful greenhouse gas. This methane could be captured and used either as compressed natural gas for heavy-duty vehicles or as renewable natural gas that is refined and added to an existing natural gas pipeline. In addition to capture, there is opportunity to reduce future methane by preventing organic material from entering the landfill.

Northfield currently offers organics composting opportunities for all food products, available at a single drop-off location near Sechler Park and through Northfield Curbside Compost. The drop-off compost site is operated through the City waste contractors and open seasonally (April through October). Community members may also sign up for Northfield Curbside Compost, a local Northfield business offering weekly curbside compost pick-up for a monthly or yearly fee. It is important to address food waste for many reasons. According to the Minnesota Pollution Control Agency, in 2013, 31% of all waste in Minnesota was organic material (Figure 6).

Breakdown of waste disposal in Northfield, 2015 to 2017			
Disposal Year	2015	2016	2017
Tons of solid waste	26,361	27,891	27,545
% Recycled	54%	52%	46%
% Landfilled	44%	46%	52%
% Resource recovery	1%	2%	2%
% Composted	<1%	<1%	<1%
Tonnes of GHG	3,437	3,374	3,737

Table 1. Total solid waste and waste processing proportions from 2015-2017. Source: Generated by Regional Indicators Initiative, from Rice and Dakota County data.

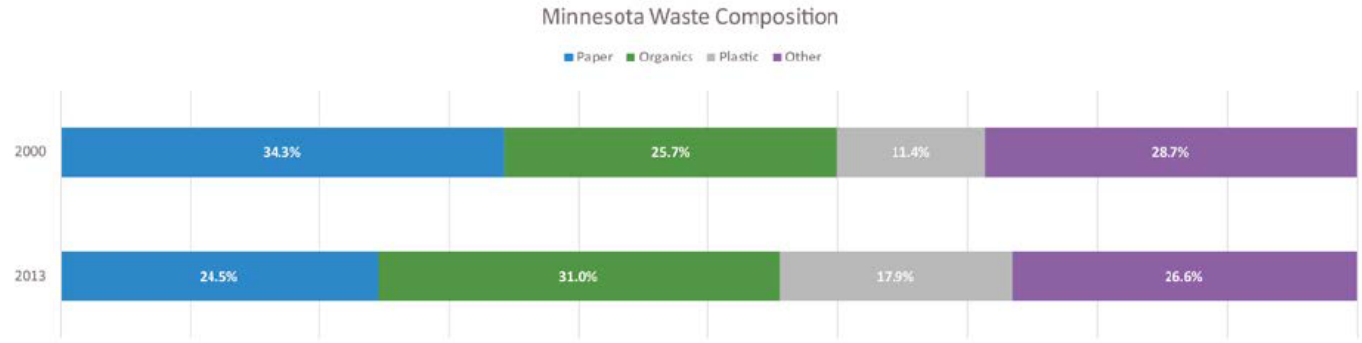


Figure 6. Composition of municipal solid waste in Minnesota in 2000 and 2013. Source: Minnesota Pollution Control Agency, "Minnesota MSW Composition Study," 2013.

Source: NBC News

OPPORTUNITIES: RENEWABLE ENERGY

SOLAR ENERGY CALCULATOR

October 2017

City Name: Hopkins

Date: October 16, 2017

User Input

Electricity Use	MMBtu/year	tCO2e/year
Total Electricity Use	680,613	72,809
Xcel, Connexus (need connexus data)		

Statewide Electricity Goals	MMBtu/year	MWh/year
State Solar Goal of 1.5% by 2020	10,209	2,992
State Solar Goal of 10% by 2030	68,061	19,948
25% Renewables by 2025 RES	170,153	49,869

Solar Generation Potential	MW	MWh/year
Total Generation Potential	4,156	5,402,574
Total Rooftop Generation Potential	86	111,590
Top 10 Buildings Generation Potential	23	30,195
Public Buildings Generation Potential	-	

Local Government Goals		
Renewable Electricity Share	20	%
Renewable Electricity Generation	**39,895**	**MWh/year**
Renewable Electricity Capacity (Solar)	**30.69**	**MW**
Greenhouse Gas Reduction	14,562	tonnes CO_2e

Results

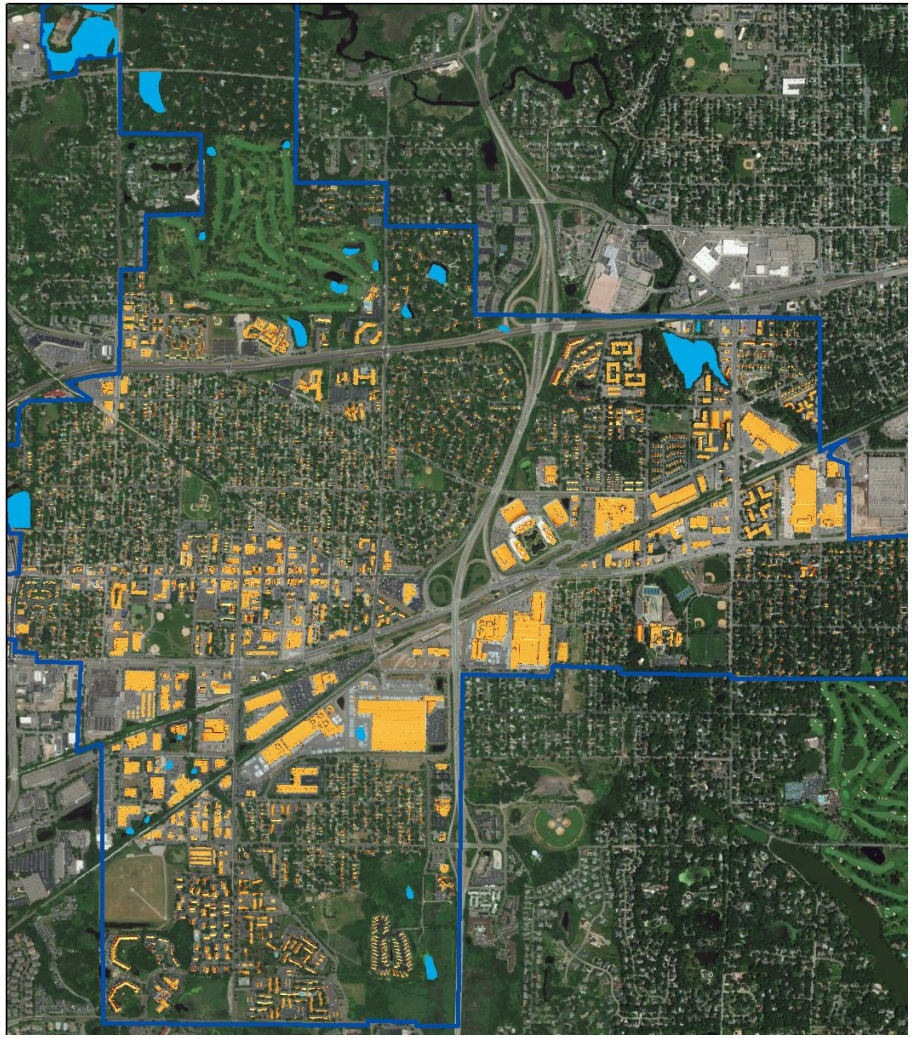
36% of the total rooftop solar resource is utilized, providing enough local renewable electricity to serve the equivalent of 5,253 households and resulting in a 20% reduction in greenhouse gas emissions from electricity use.

Instructions

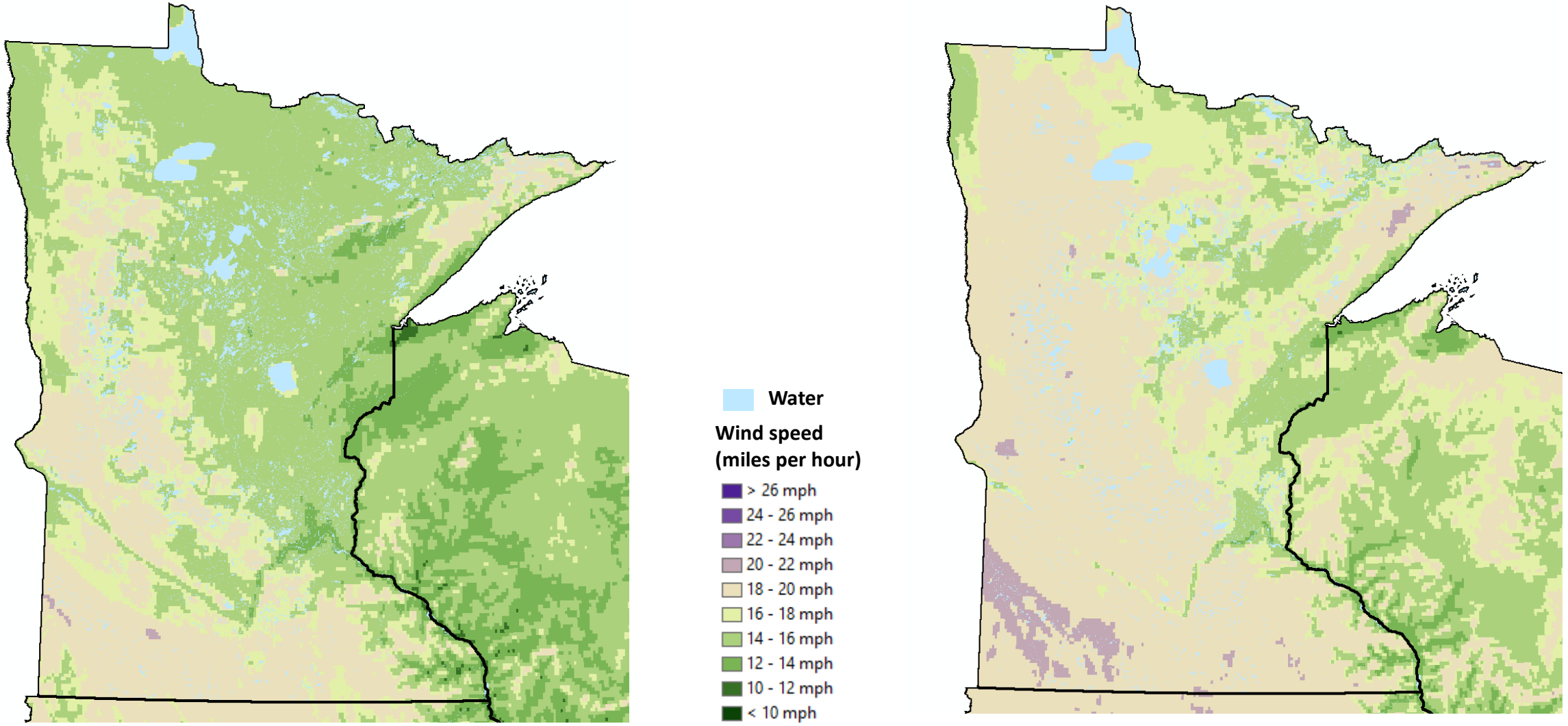
1. Use Regional Indicators Initative data to enter electricity consumption and greenhouse gas emissions data under "Electricity Use."
2. Use the Solar Resource Calculation provided by the Metropolitan Council on your Community Page, the Minnesota Solar Suitability App, or Google Project Sunroof to determine your solar resource and enter this into the "Solar Resources" section. Cities may need to conduct further GIS analysis to determine the solar resource of the top 10 buildings and public buildings.
3. Review Minnesota's clean electricity goals in the "Statewide Electricity Goals" section in comparison to your city's solar resource.
4. Set a citywide renewable electricity goal in the "Local Government Goals" section based on your city's solar resource and the statewide goals.
5. View the results.

Assumptions		
MWh / MMBtu Conversion	0.293	MWh / MMBtu
MMBtu / MWh Conversion	3.412	MMBtu / MWh
Solar MWh/MW Conversion	1,300	MWh / MW
Average Electricity Use per Household	26	MMBtu / year

Resources
Regional Indicators Initiative
Met Council Community Page
MN Solar Suitability App
Google Project Sunroof



OPPORTUNITIES: RENEWABLE ENERGY



OPPORTUNITIES: TRAVEL

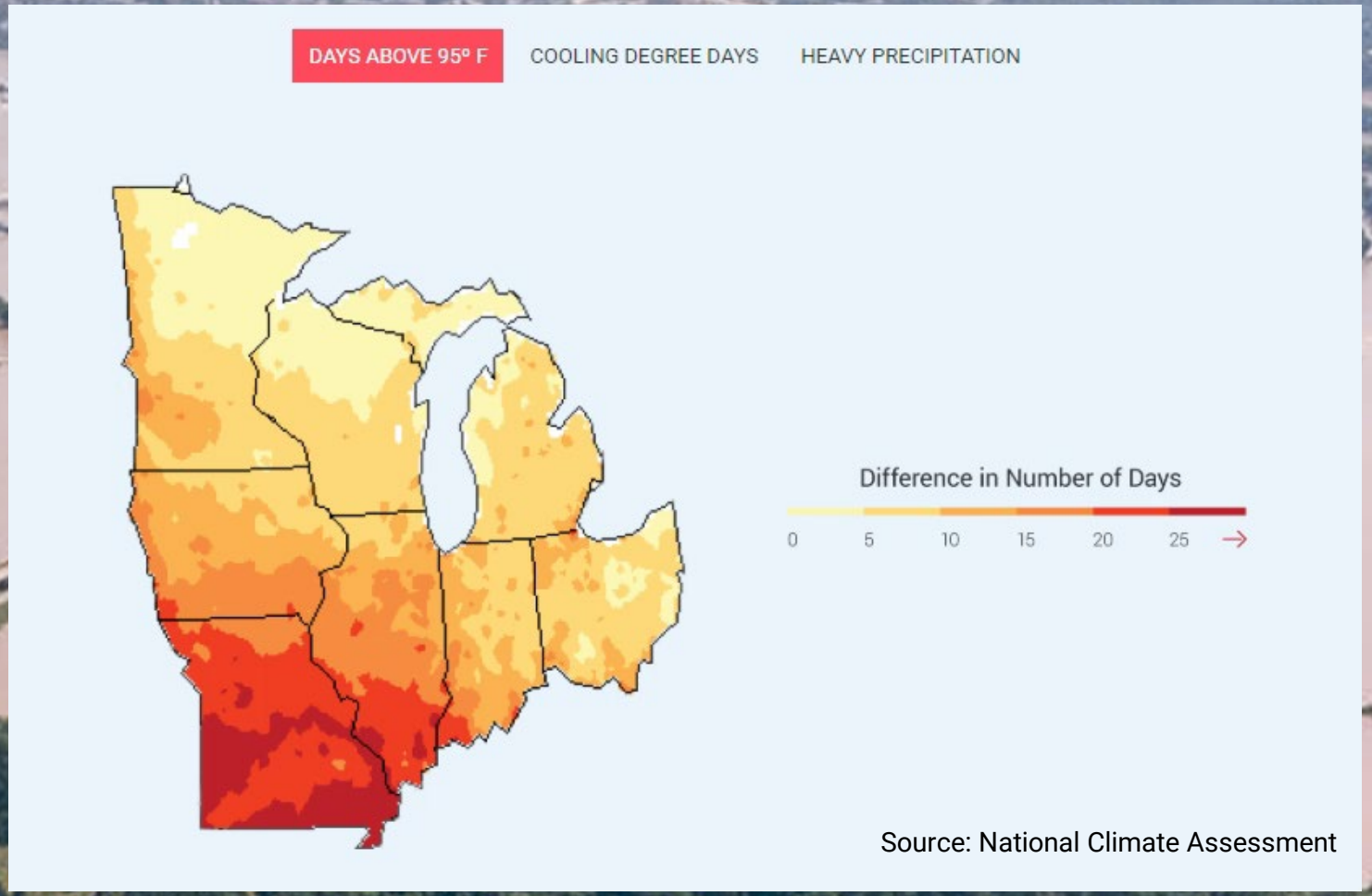
Travel Strategies:

- Allow for higher densities and mixed uses
- Remove parking minimums, create maximums
- Don’t raise fees on electric vehicles
- Road diet conversions
- Design streets for people, not cars
- Infrastructure for low- and no-carbon travel modes
- Increase transit options

OPPORTUNITIES – WASTE

ANTICIPATED CLIMATE HAZARDS

- Warmer winters
- Hotter summers
- Increased precipitation and flooding
- Drought
- Increase in extreme weather events
- Ecological destruction (invasive species)
- Vector-borne diseases (Lyme, West Nile)
- Freeze thaw cycles
- Winter recreation
- Impact to fisheries
- Agricultural impacts
- Poor air quality days (allergens, wild fires)
- Health impacts



RESILIENCE ASSESSMENT

Resilience Assessment

Population

Built Infrastructure

Natural Infrastructure

People are impacted differently by climate hazards. The ability to recover from an event may depend on a variety of factors, including demographic characteristics (age, income, race, language, health conditions) and situational factors (mobility, housing, transportation access).

Built infrastructure includes elements related to transportation infrastructure (roads and bridges, public transportation, and active mobility), water infrastructure (stormwater, drinking water, and wastewater), and critical infrastructure (back-up generation facilities and energy infrastructure).

Natural infrastructure like trees, native plants, water, and ecosystems are simultaneously susceptible to climate hazards and help improve the resiliency of the city.

STRATEGIES

Accelerate installation of solar energy systems

ENCOURAGEMENT

- Include information about solar energy on city website
- Host solar bulk-buy events
- Provide educational opportunities in public spaces
- Recognize businesses or groups that have installed solar systems or have set renewable electricity goals
- Promote participation in community solar gardens

REGULATION

- Remove regulatory barriers in zoning ordinance; allow rooftop solar as a permitted use in all zones
- Require solar within PUD ordinance or other optional path to basic zoning
- Provide clear and predictable permitting process
- Regulatory incentives from model ordinance

INCENTIVES

- Offer production incentive for solar on small commercial buildings (e.g. Green Business Cost Share)
- Solar or solar-ready is an option with the PUD (or other regulatory flexibility) ordinance
- Host CSG, and dictate terms to benefit residents, businesses, and low-income households

PUBLIC DEMONSTRATION, LEADERSHIP

- Add solar to publicly-owned facilities
- Participate in a community solar garden for city operations
- Purchase RECs to cover remaining usage
- Achieve SolSmart certification
- Install solar on brownfields

STRATEGIES: CO-BENEFITS

QUESTIONS

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