



Climate Change A People Centered Call to Action

American Solar Energy Society

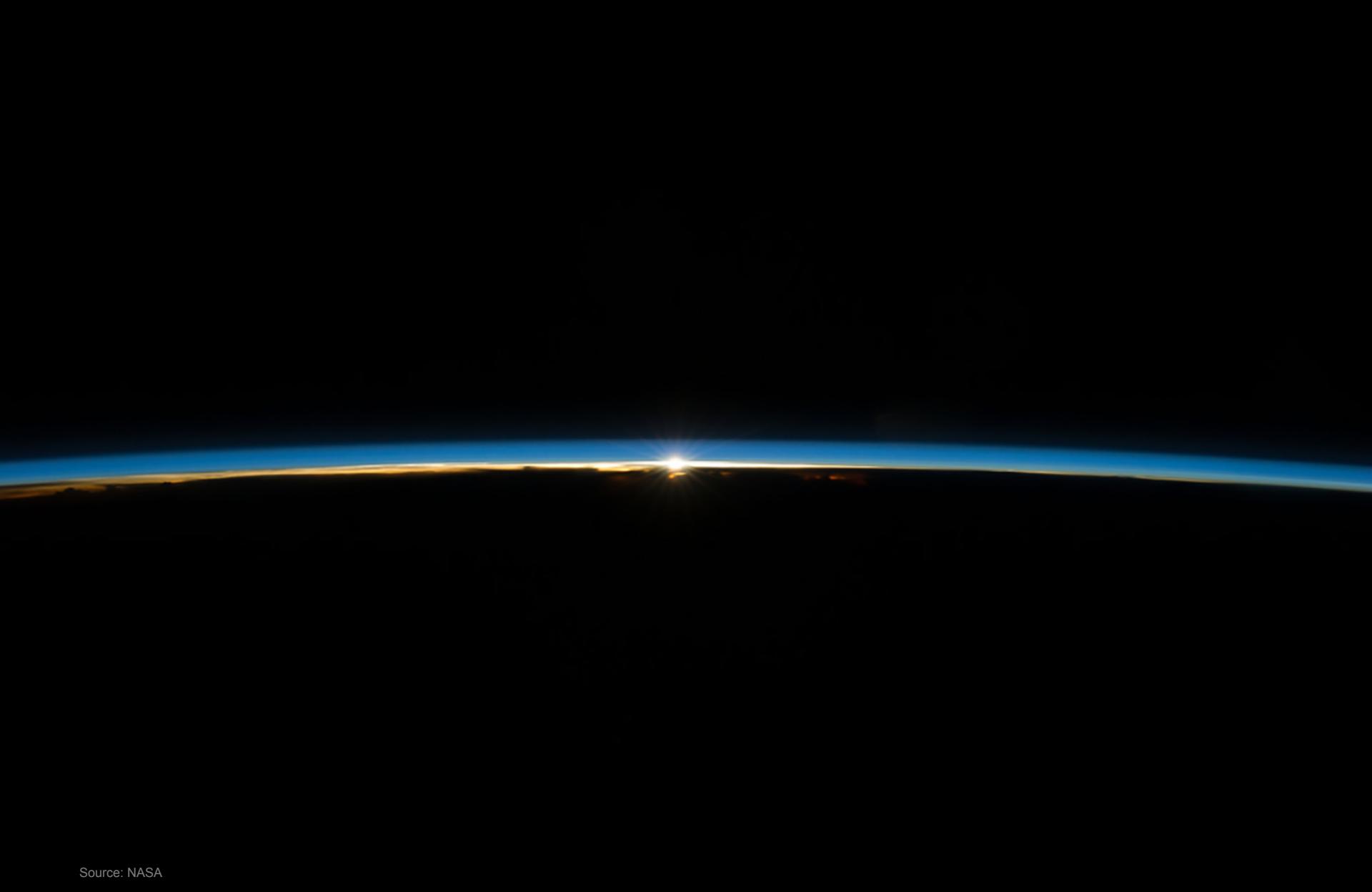
August 6, 2019

Kim Havey, Director of Sustainability





Source: NASA

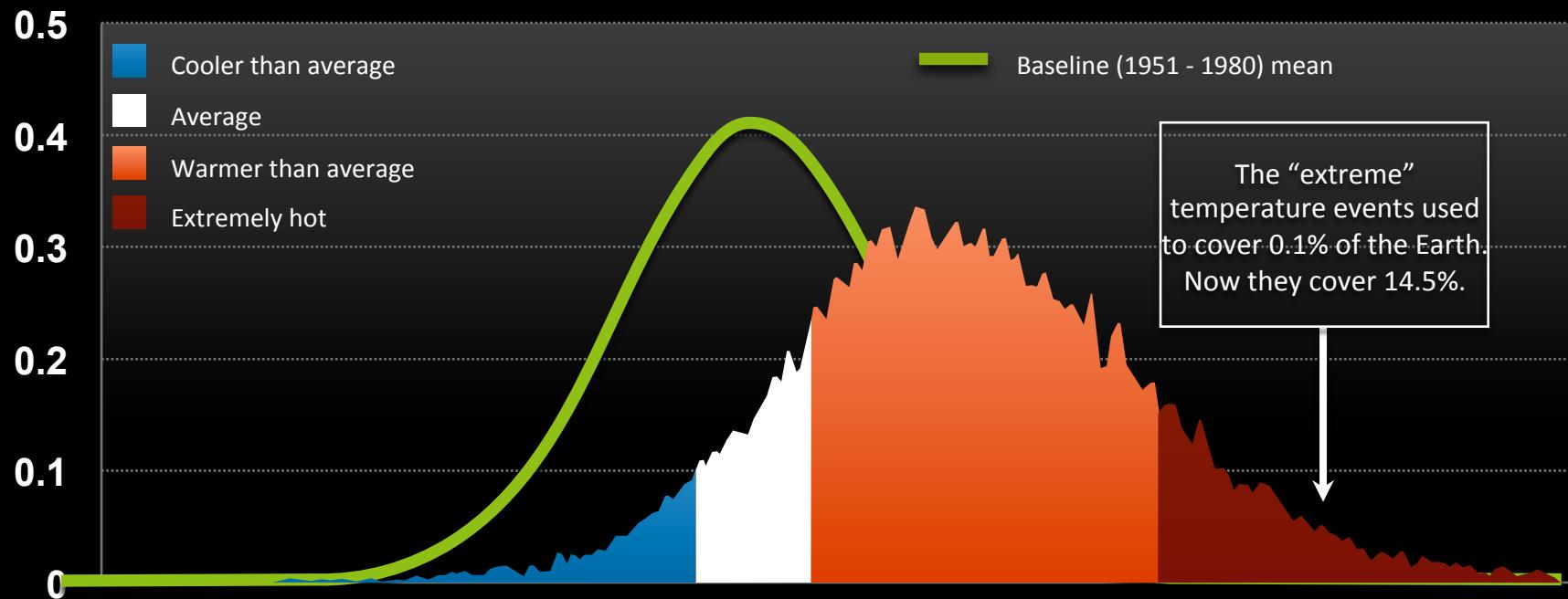


Source: NASA



We are now spewing 110 million tons of manmade global warming pollution into the thin shell of our atmosphere every 24 hours, as if it were an open sewer.

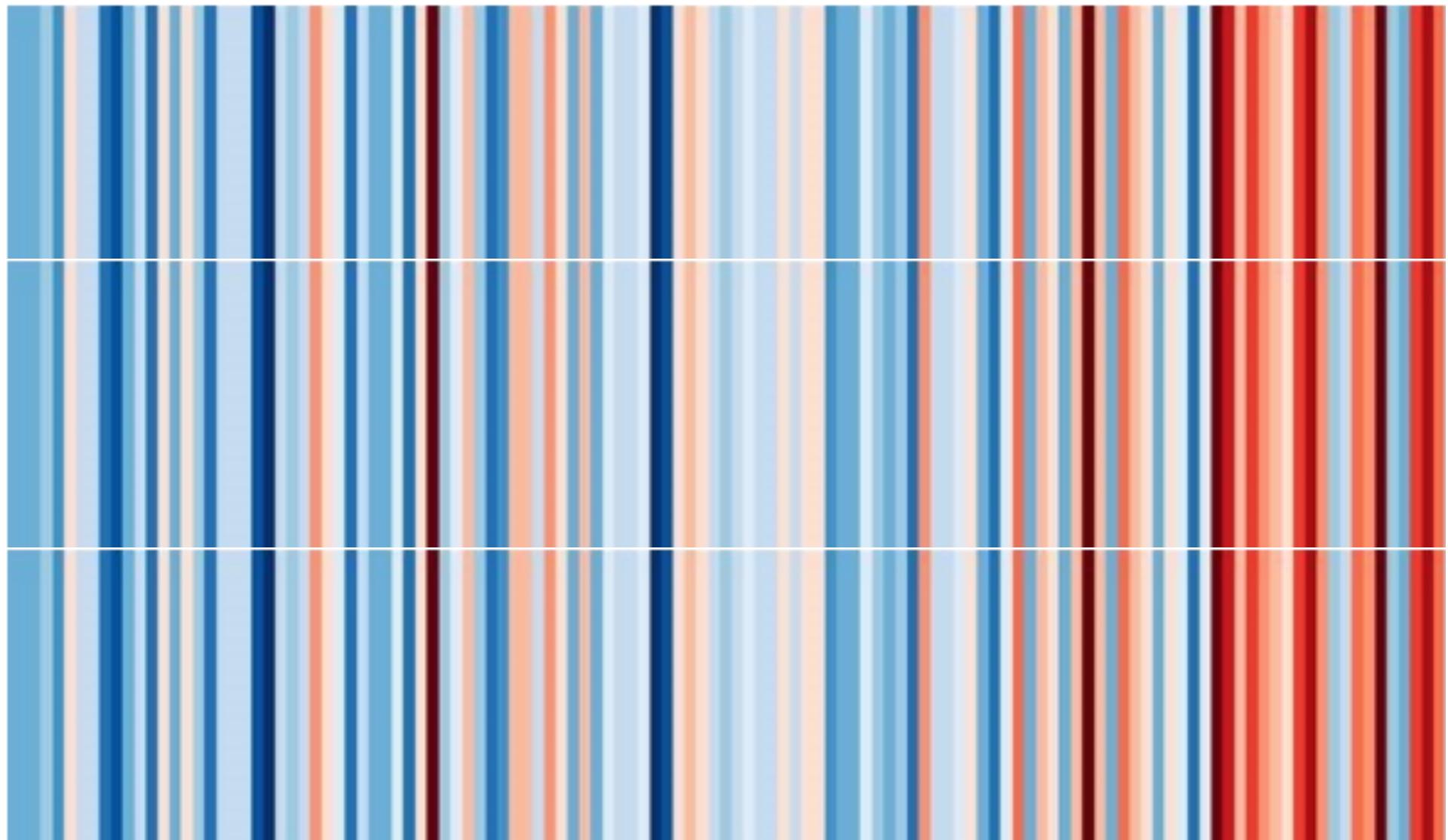




Source: NASA/GISS; Hansen, et al., "Perceptions of Climate Change," Proc. Natl. Acad. Sci. USA 10.1073, August 2012 – Updated 2016

In the next 50 years, Minnesota is projected to experience 30 more days with temperatures above 90° F, and 30 fewer days with temperatures below freezing, on average.

United States Climate Stripes 1895-2018



“For every incremental change we look at in the global record... it translates into a very highly amplified change in our Minnesota backyard.”

Mark Seeley

University of Minnesota Meteorologist (Ret.)



© 2010 Sean R. Heavey

Lakeville, Minnesota

June 4, 2019



Photo © 2019 Jeff Wheeler/Star Tribune via AP

Noah's Ark Replica

Williamstown, Kentucky

The Insurers were sued
in May 2019 for recovery of
\$1,000,000 in damages
from historic rainfall event.



North Bonneville, Washington

September 4, 2017



The oil and gas industry loves pipelines.

- Deaths
- Injuries
- Hazardous liquids (mostly oil)
- Natural gas

Dots scaled by incident size

Enbridge Pipeline Protest, Duluth,

June 29, 2018



Photo © 2018 Dan Kraker/Minnesota Public Radio via AP



Tunis, Tunisia

January 14, 2011

BREAKING POINT

The EU has failed us all

We must break free of the EU and take back control of our borders.

Leave the European Union
ON 23RD JUNE



votetoleavetheeu.co.uk

The Cost of Carbon

- \$ ***Political Instability***
- \$ ***Floods & Mudslides***
- \$ ***Wildfires***
- \$ ***Drought***
- \$ ***Storm Damage***
- \$ ***Ocean Acidification***
- \$ ***Infrastructure Loss***
- \$ ***Climate Refugees***



- \$ ***Species Extinction***
- \$ ***Melting Glaciers***
- \$ ***Famine***
- \$ ***Water Scarcity***
- \$ ***Ecosystem Loss***
- \$ ***Our Way of Life***
- \$ ***Infectious Diseases***
- \$ ***Sea Level Rise***

“The #1 Threat to the Global Economy”

“...the gravest effects of
all attacks on the
environment

are suffered by the
poorest.”

Encyclical Letter of
His Holiness, Pope Francis
On Care for our Common Home

We have
the solutions
at hand...



Since 2006, Minneapolis' emissions have declined 20% while GDP has increased 30%.

2019 ACEEE Ranked 4th Most Energy Efficient City in North America

City of Minneapolis Sustainability



Economic opportunity



Social equality



Environmental Sustainability

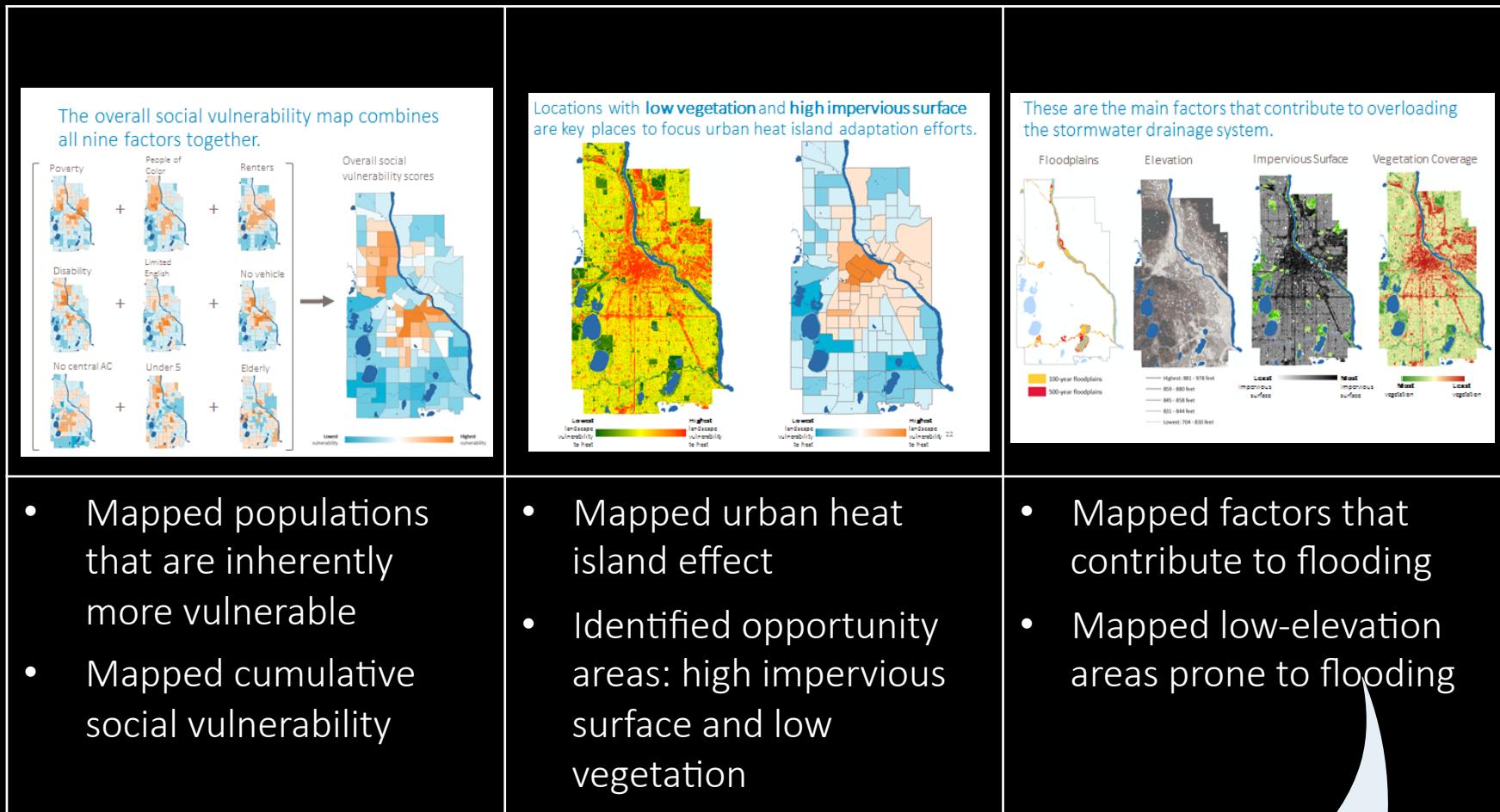


Environmental Justice and Climate Resilience

1. Green Zones Resident Advisory Councils
2. Climate Change Vulnerability Assessment
3. Climate Preparedness events with community partners
4. Resilient Communities
5. Staff Support
6. Funding



Climate Change Vulnerability



Climate Preparedness events

2016

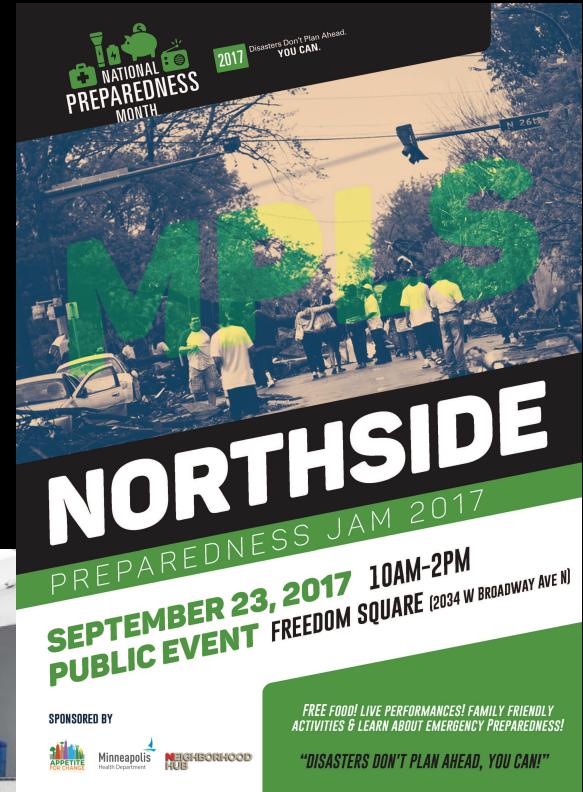
- Phillips
- Longfellow

2017

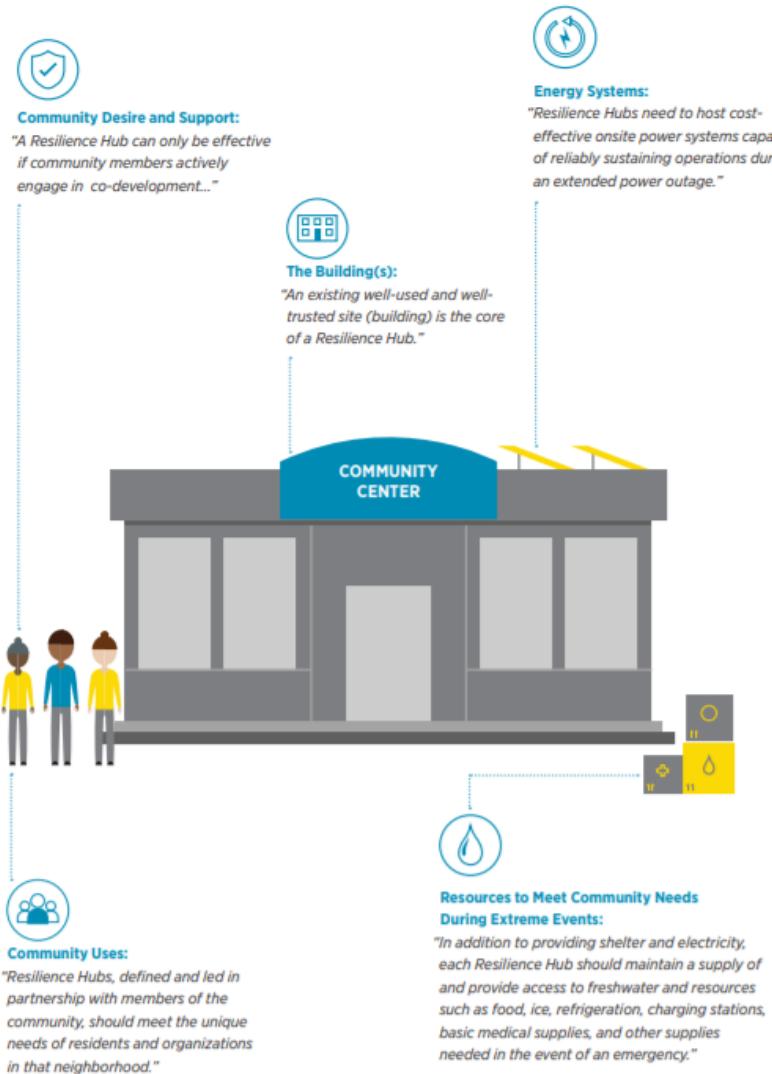
- Northside
- Northeast

2018

- Longfellow: Parents group
- North & Northeast: Art & Storytelling with Mom's



Little Earth of United Tribes Resiliency Hub



Lower Costs (NZE Energy Retrofits)

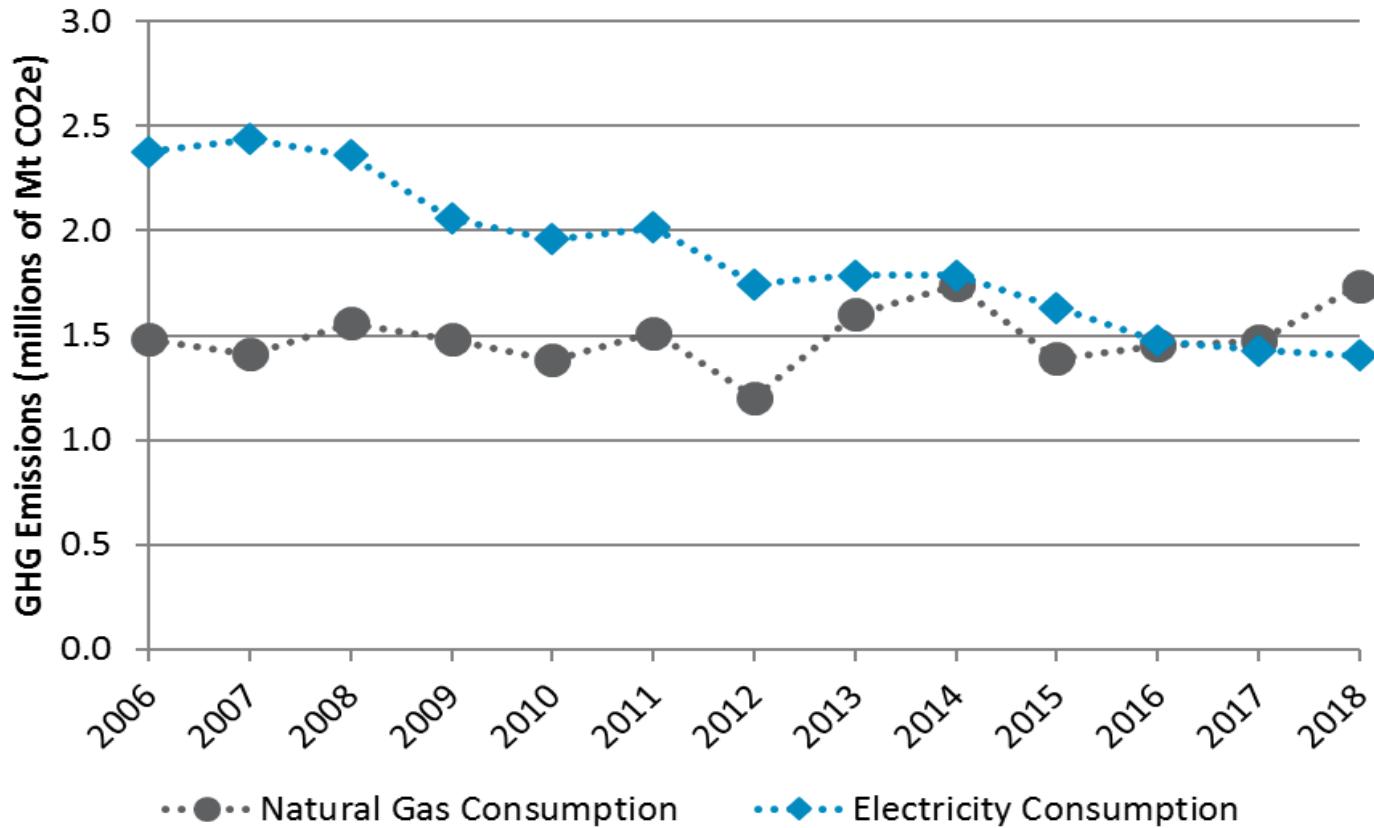
Support Cultural Values (kWs of Solar and storage)

Increased knowledge (classes and hands on training)

Enhance Resiliency (Harden Buildings)

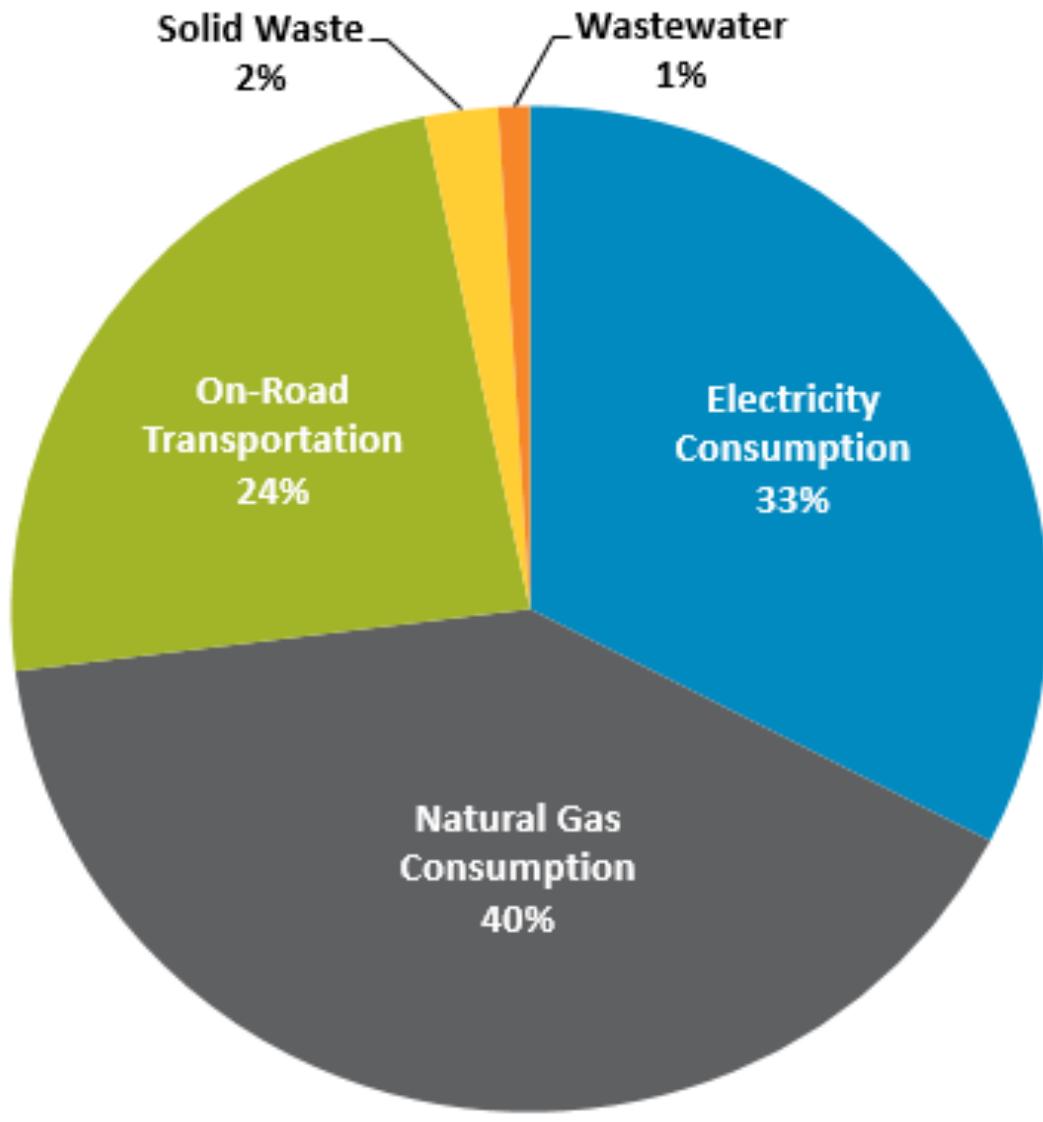
Community Center (Ongoing Social Use)

Emissions from Electricity and Natural Gas



Data: City of Minneapolis Sustainability

Minneapolis Greenhouse Gas Emissions by Citywide Activities (2018)



Data: City of Minneapolis Sustainability

Clean Energy Partnership

Franchise Agreements

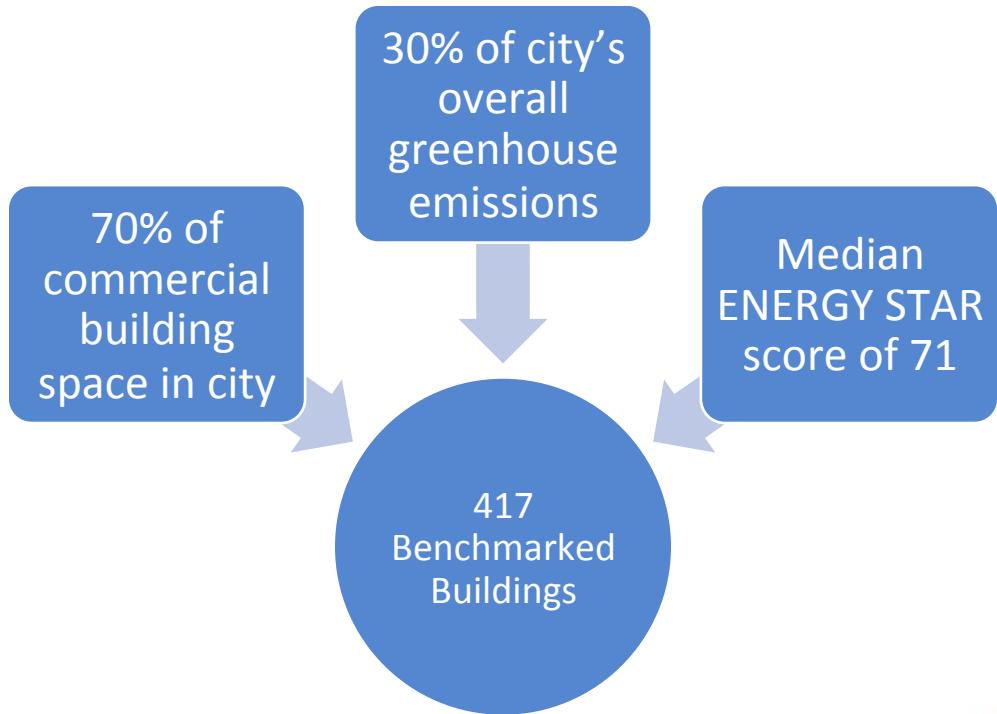
- Focused on use of public rights of way
- Shorter term, with possible renewal
- Broadened to include targeted related issues such as reliability reporting, infrastructure investment

Clean Energy Agreements

- City agrees not to municipalize during term of the agreement, in exchange for utility commitments in meeting City energy goals
- Use agreement to form City-utility **Clean Energy Coordinating Partnership** to jointly plan and prioritize clean energy activities in the City

- 20 collaborative activities have been adopted in the 2019-2021 Work Plan including on-bill loan repayment and Inclusive Financing.

Transparency in energy use = Benchmarking, TISH and TOL

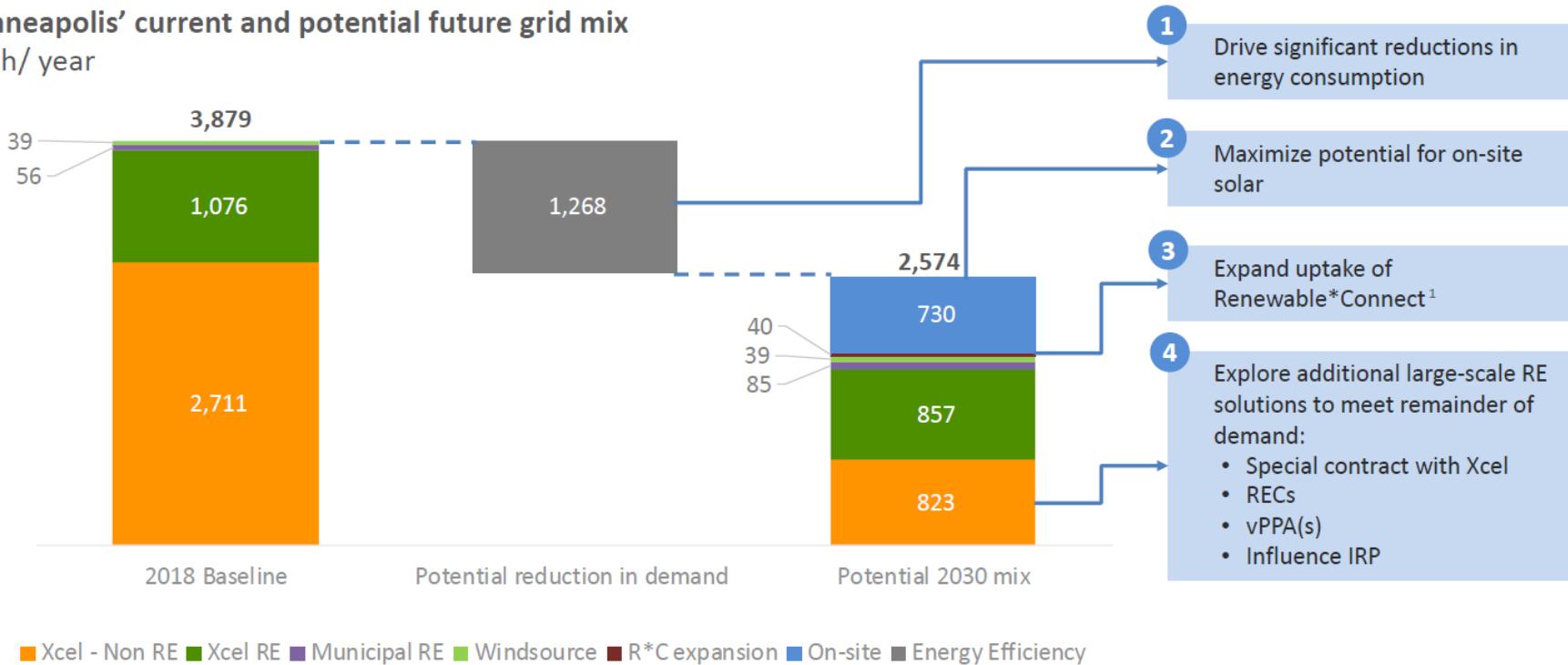




Minneapolis has committed to 80% carbon reduction by 2050, 100% renewable electricity for municipal facilities and operations by 2022 and citywide by 2030 with a goal of 10% local solar generation

Path to 100% Renewable

Minneapolis' current and potential future grid mix
GWh/ year



¹ 40GWh estimated by taking Minneapolis' % of Minnesota load and applying it to total potential R*C expansion

Increasing Solar Penetration

Installed solar capacity per capita (W)		Financial incentives		Regulation and code			
		Financing options	Local rebates	RE commitments	Solar easements	Streamlined permitting	Solar-/ solar-ready mandates
Honolulu, HI	606	Financing options	Local rebates	RE commitments	Solar easements	Streamlined permitting	Solar-/ solar-ready mandates
		0% loan program	35% of Capex (comm & res)	State 100% RE by 2045		X	X
Fresno, CA	330	PACE (comm & res)		State 100% CE by 2045	X		
Denver, CO	330	PACE (comm)		City 100% RE by 2030	X		X
Minneapolis, MN	24	PACE (comm)	\$0.25-0.35/kWh-yr1	City 100% RE by 2030		X	X



Connecting programs for More Affordable and Resilient Housing

- NOAH
- Energy Efficiency
- Lead and healthy housing
- 4d property tax
- Solar
- Passive homes





The Minneapolis 2040 plan will encourage greater housing density, plant thousands of trees and electrify transportation through mobility hubs.

Photo © Education Images/Universal Images Group via Getty Images

Community Solar Garden



Minneapolis is partnering with local developers and utilizing city rooftops to create community solar gardens for GZ residents.

Photo : Institute for local self reliance

Regulatory process & public input

Legislation and Regulation impacts things like:

SOLAR Installation

INTERCONNECTION Rules

ENERGY EFFICIENCY Programs

ELECTRIC VEHICLE Charging Costs

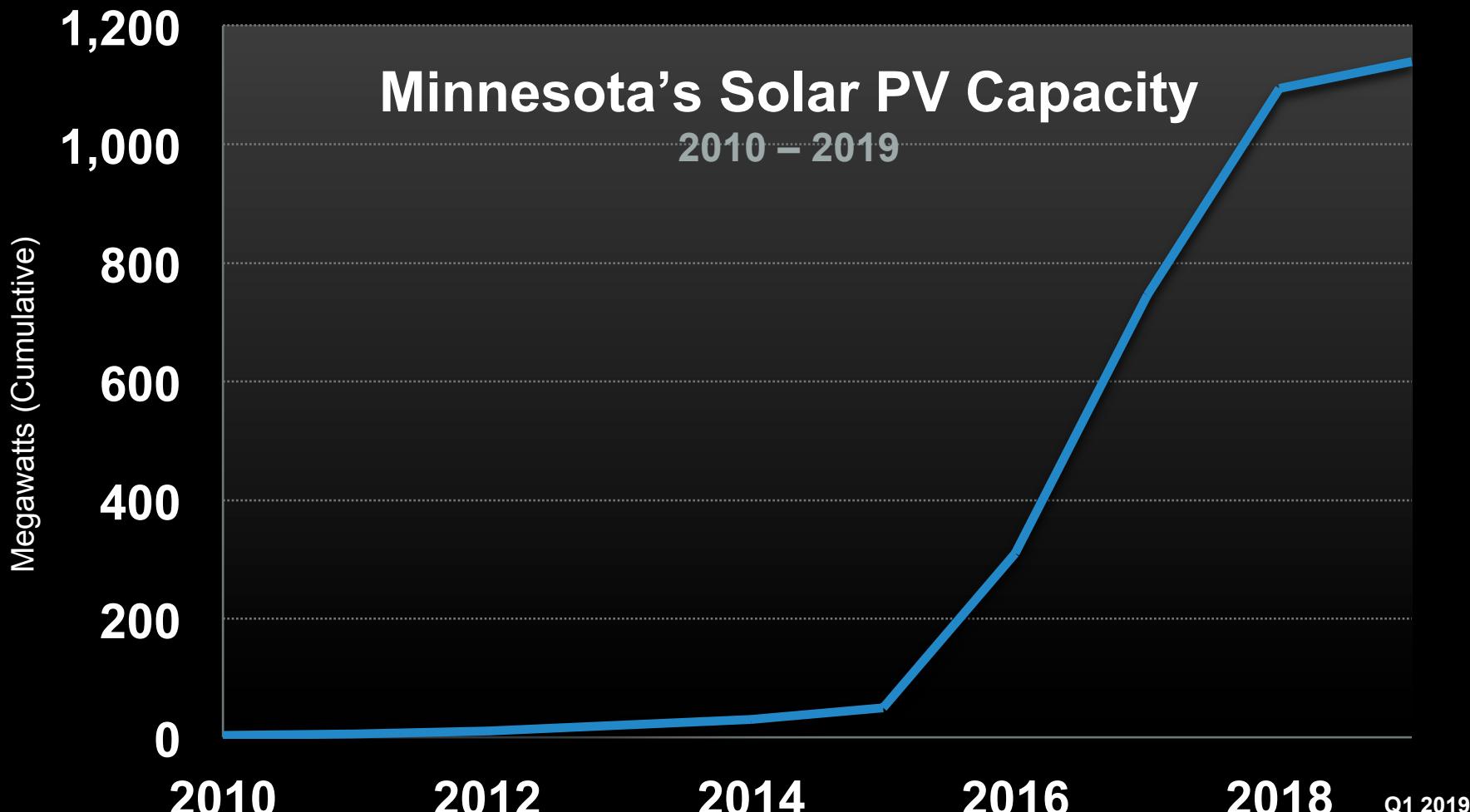
Integrated Resource Plans

Building Energy Codes



Some organizations, including City of Minneapolis, elect to participate in the regulatory process.





Data: Solar Energy Industries Association

**Over the last five years, U.S.
solar energy jobs have grown**

6x

faster than the overall economy.

St. Cloud, Minnesota

July 25, 2018



New Flyer Industries
makes electric buses
at its St. Cloud facility.

Photo © 2018 Ari Lindquist/Bloomberg via Getty Images

27 cities have committed to buying only zero-emissions buses starting in 2025:

Auckland Barcelona Birmingham Cape Town Copenhagen
Heidelberg Honolulu London Los Angeles Manchester
Medellin Oslo Oxford Mexico City Milan Paris
Quito Rotterdam Rome Santa Monica Santiago Seattle
Seoul Tokyo Vancouver Warsaw West Hollywood

Shanghai and Shenzhen, China are already buying only electric buses.



**In the 2015 Paris Agreement,
every nation in the world agreed
to work together to achieve net zero
greenhouse gas emissions by mid-century.**

**The U.S. cannot legally
withdraw until the day after
the 2020 Presidential election.**

U.S. Coal Plants

2005 – 2017

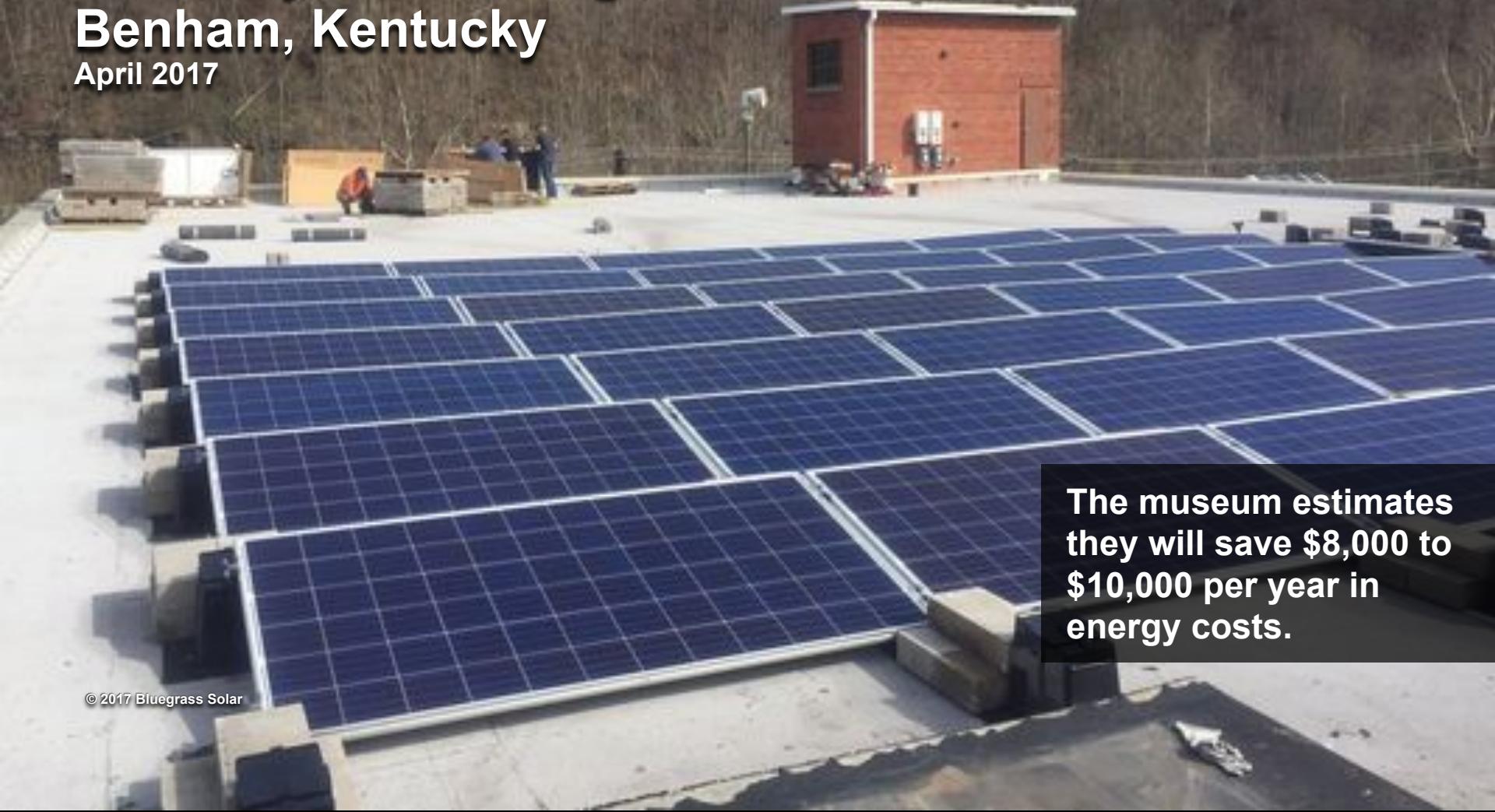


- New Plants**
 - Proposed and Defeated
-
- Existing Plants**
 - Retired
 - Retirement announced

Data: The Sierra Club

Kentucky Coal Mining Museum Benham, Kentucky

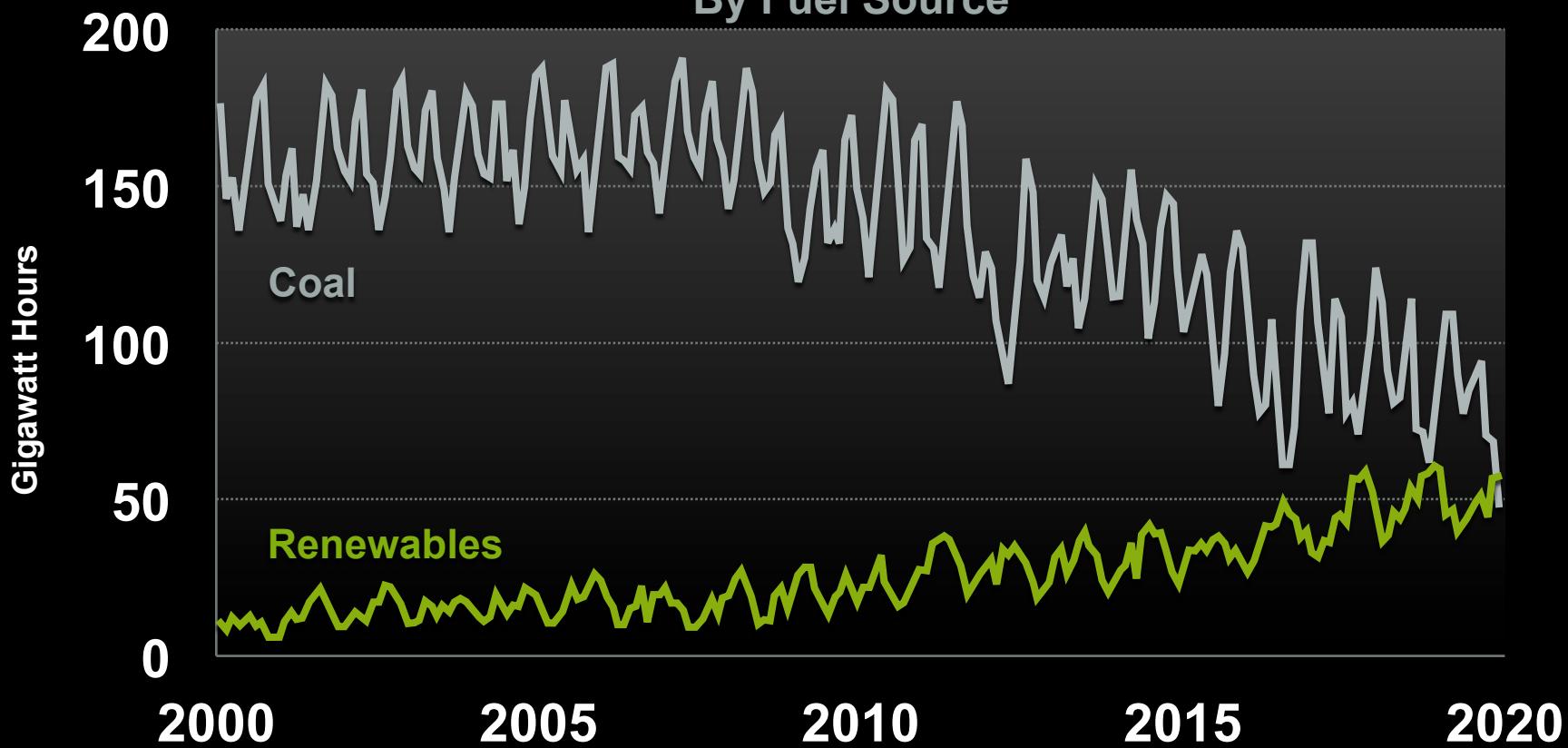
April 2017



The museum estimates they will save \$8,000 to \$10,000 per year in energy costs.

U.S. Monthly Net Electricity Generation

By Fuel Source



Data: United States Energy Information Administration via Bloomberg

Xcel Energy plans to produce 30% of its electricity from carbon-free sources by 2020 and 100% by 2050.

It also aims to reduce emissions 80% by 2030.

**Major Minnesota companies have
begun procuring renewable energy
for their operations.**



“After the final
no,
there comes a
yes,
and on that yes
the future world depends.”

Wallace Stevens



Source: NASA

Kim W. Havey, AICP, LEED AP

Director

Minneapolis Division of Sustainability

Thank you!