Metropolitan Council: Climate, Emissions, & Energy

March 2, 2016

METROPOLITAN COUNCIL

Agenda

Climate Change in our Own Backyard	Mark Seeley, U of M Climatologist
Climate Change in MN: Understanding our Role	Will Seuffert, Director of EQB
Framing the Work We Do	Jason Willett, Director of Council Sustainability
Emissions Mitigation & Climate Adaptation	Sara Smith, MCES Sustainable Operations Manager Jeff Freeman, Metro Transit Senior Project Coordinator
Helping Others	Lisa Barajas, Council Manager of Local Planning Assistance

METROPOLITAN COUNCIL

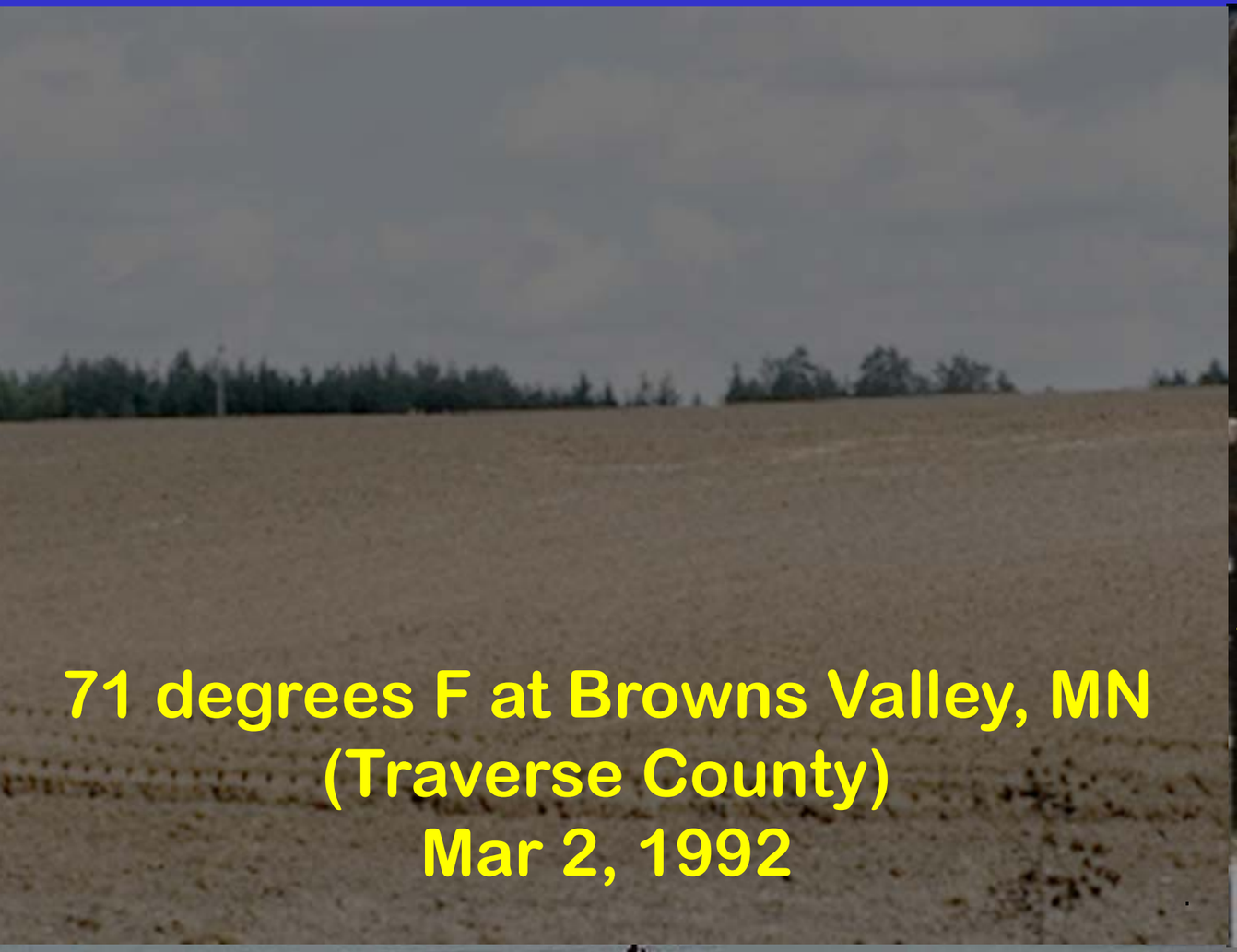
Evidence for Climate Change in Our Own Backyard

Dr. Mark Seeley
Department of Soil, Water, and Climate
University of Minnesota
St Paul, MN 55108

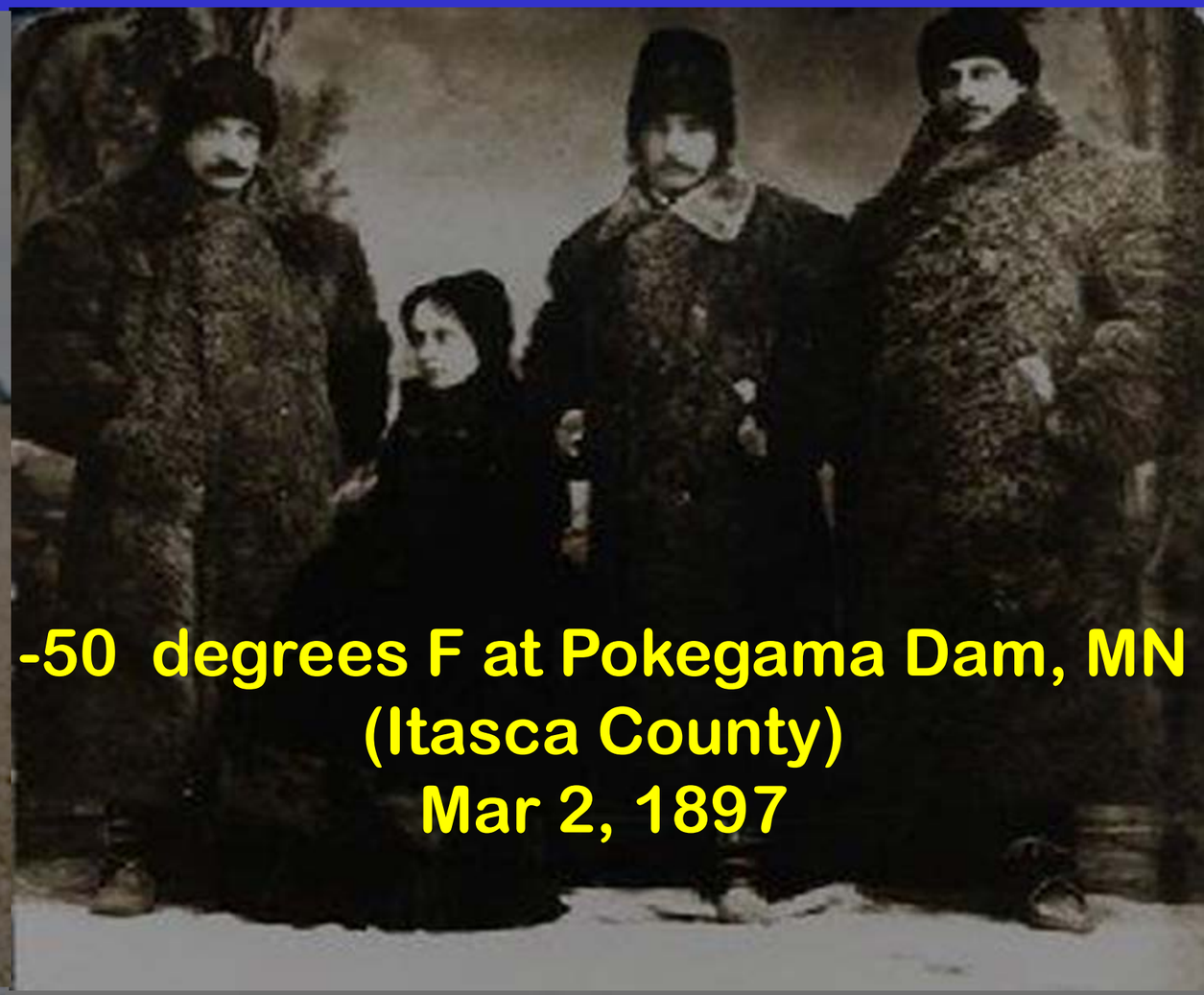
For Metropolitan Council

March 2, 2016

UNIVERSITY OF MINNESOTA
EXTENSION



71 degrees F at Browns Valley, MN
(Traverse County)
Mar 2, 1992



-50 degrees F at Pokegama Dam, MN
(Itasca County)
Mar 2, 1897

Lake Superior 97% ice covered
Mar 2, 1979

25.0” of snowfall at Wolf Ridge
Environmental Learning Center
(Lake County)
Mar 2, 2007

Segments

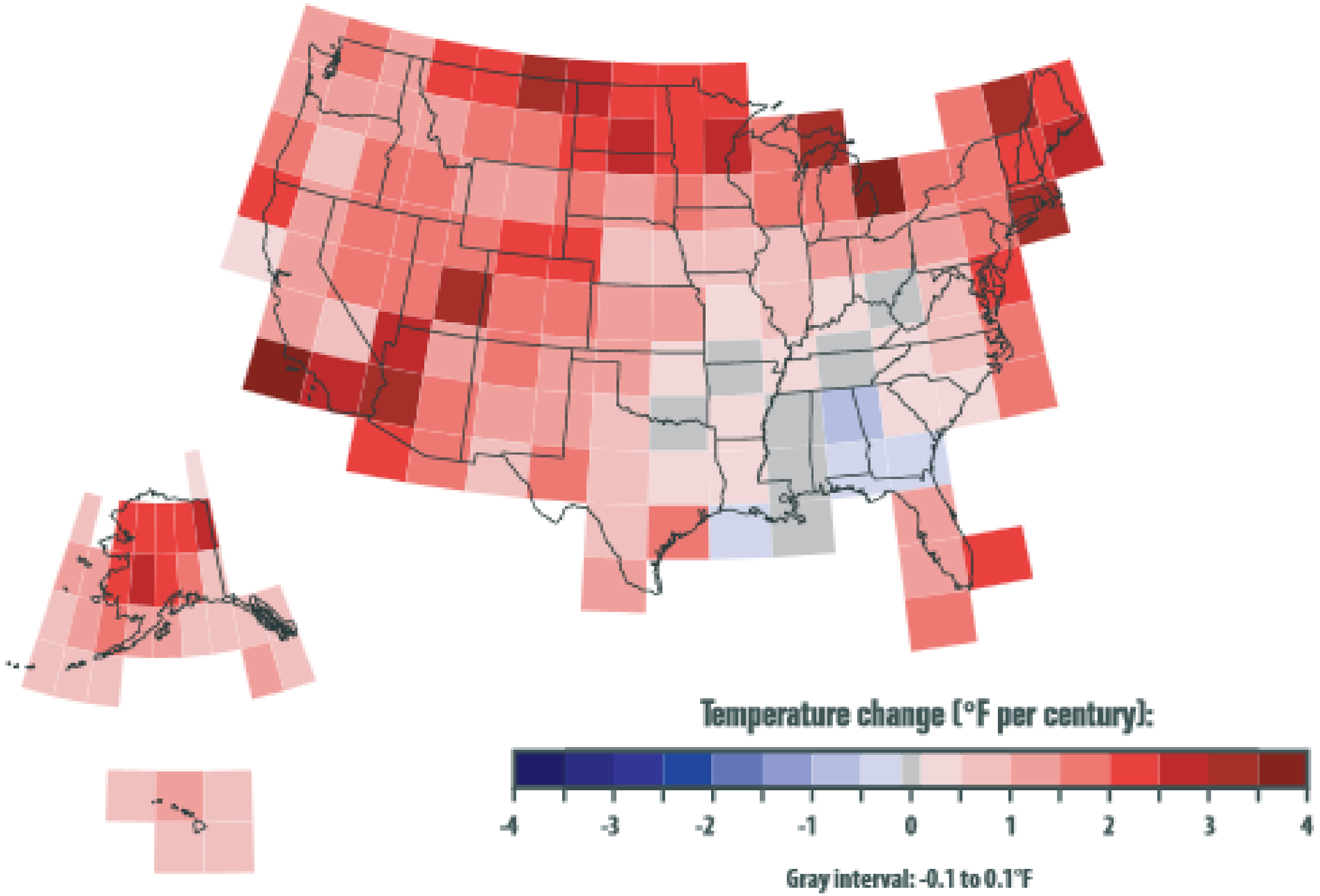
Disparities in the pace of change

Changes in three climate attributes

Associated impacts

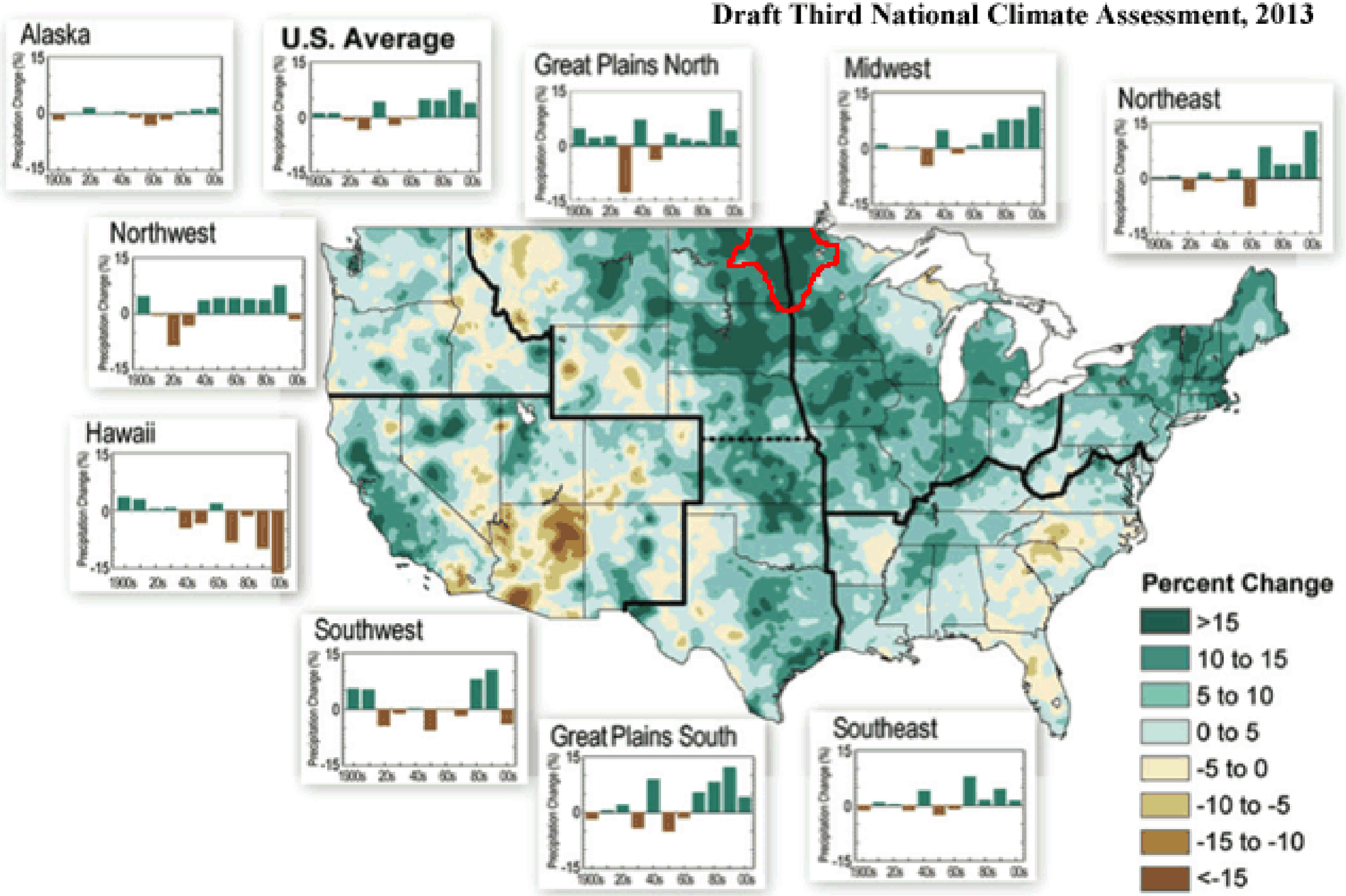
Figure 3. Rate of Temperature Change in the United States, 1901–2008

This figure shows how average air temperatures have changed in different parts of the United States since the early 20th century (since 1901 for the lower 48 states, 1905 for Hawaii, and 1918 for Alaska).



Data source: NOAA, 2009*

Disparity in the pace of climate change and the response to it



Geographic Disparity in Precipitation Change-IPCC 2013

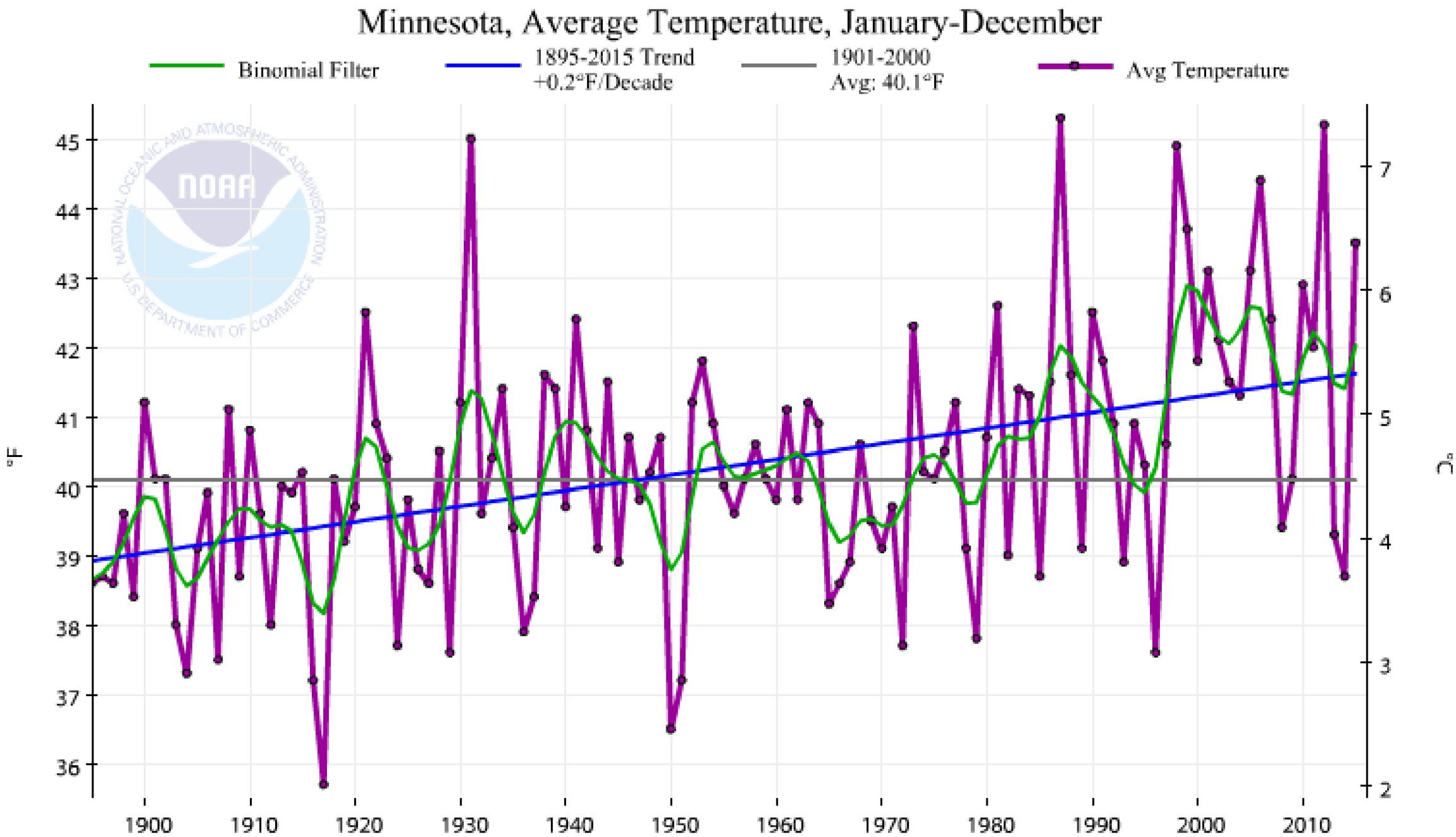
RECENT SIGNIFICANT CLIMATE TRENDS IN MINNESOTA AND THE WESTERN GREAT LAKES

- *TEMPERATURE*: WARM WINTERS AND HIGHER MINIMUM TEMPERATURES

MOISTURE: GREATER PRECIPITATION; HIGHER VARIABILITY; AND GREATER CONTRIBUTION FROM THUNDERSTORMS

- *DEWPOINTS*: GREATER FREQUENCY OF TROPICAL-LIKE ATMOSPHERIC WATER VAPOR

Minnesota Mean Annual Temperature Trends

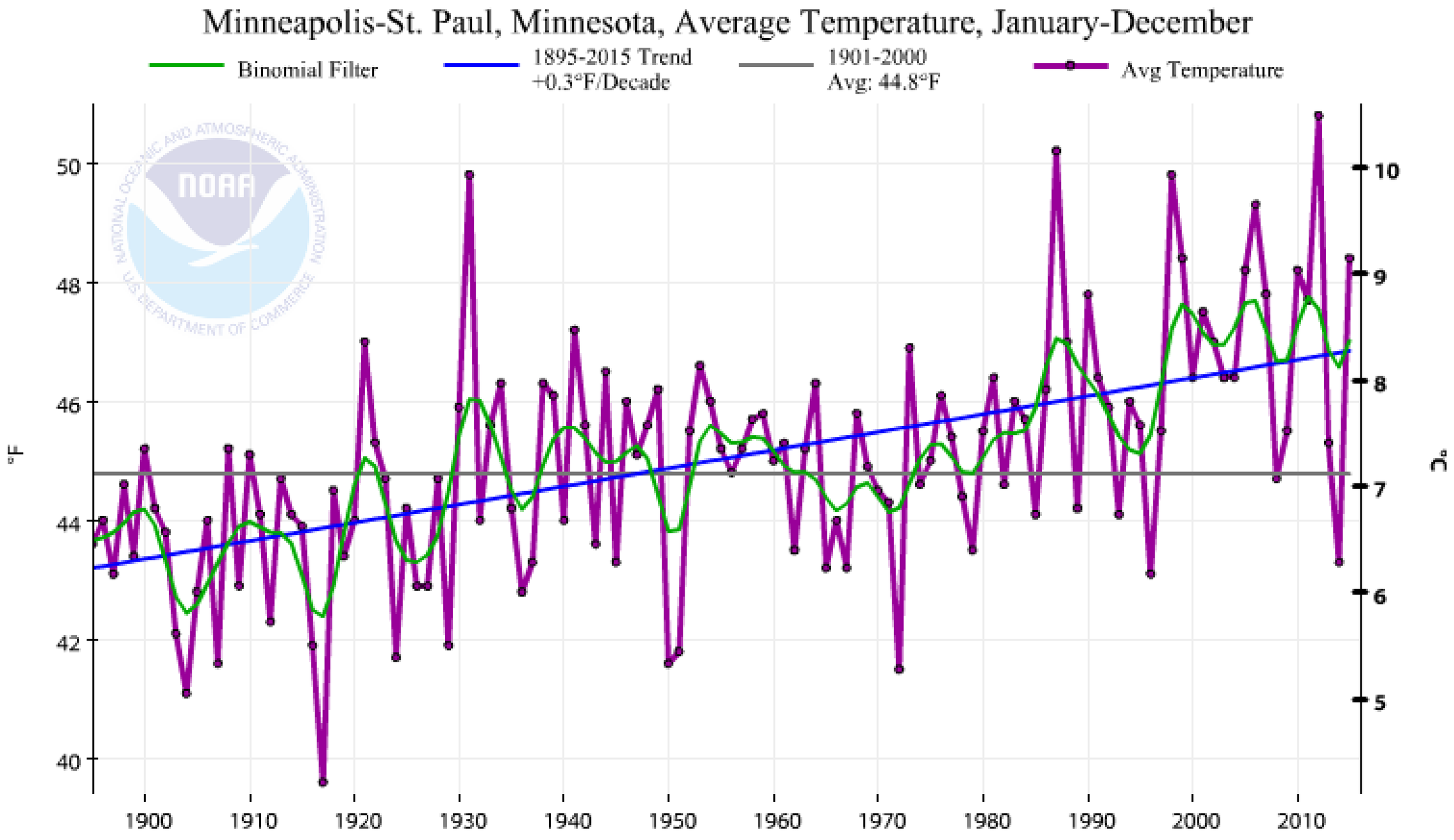


Temp trend is upward and more frequently above the 90th percentile, pace is 2°F per century.

Trends in mean monthly temperatures at Austin, MN 1971-2000 normals vs 1981-2010 normals (F)

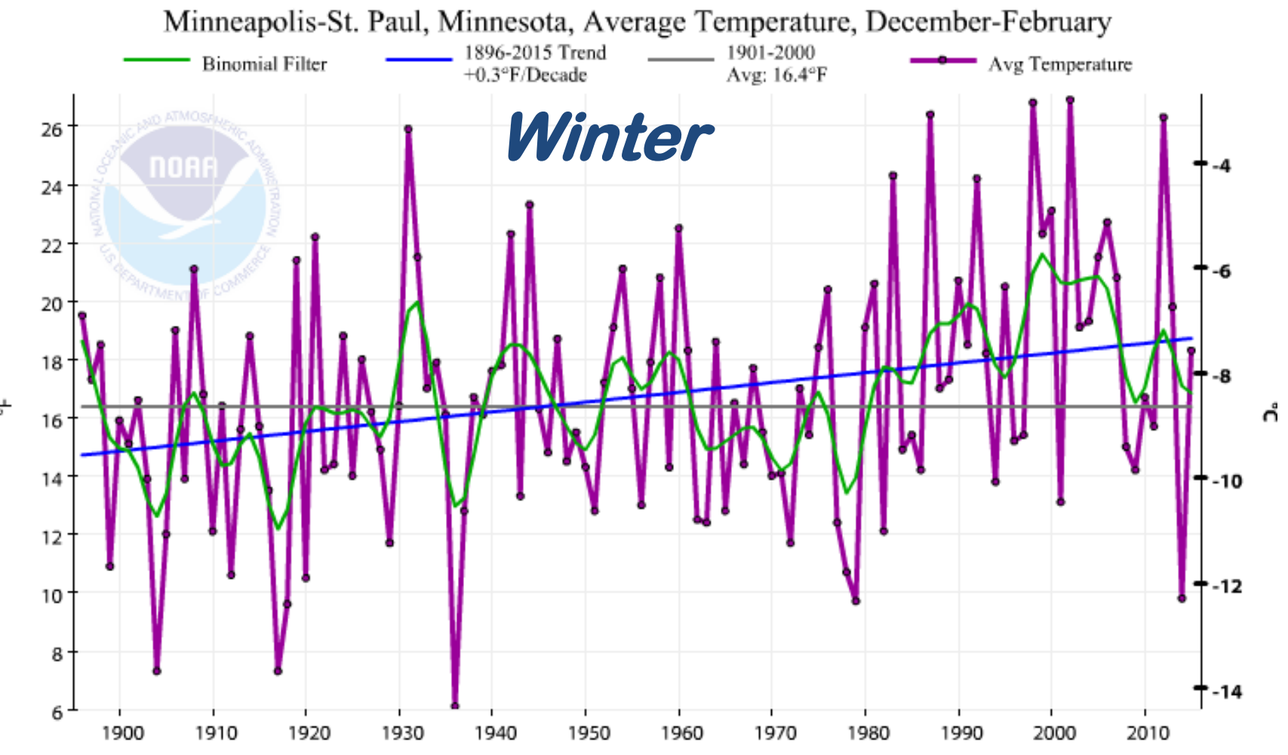
Month	Min Change	Max Change	Mean Change
January	+3.0	+2.1	+2.5
February	+0.1	+0.2	+0.1
March	-0.1	-0.1	-0.2
April	+1.3	+0.2	+0.7
May	+0.9	-0.8	+0.1
June	+1.6	-0.4	+0.5
July	+1.1	+0.2	+0.7
August	+1.6	+0.4	+1.0
September	+1.3	+0.6	+1.0
October	+1.7	-0.3	+0.7
November	+2.1	+1.7	+1.9
December	+2.2	+1.4	+1.8

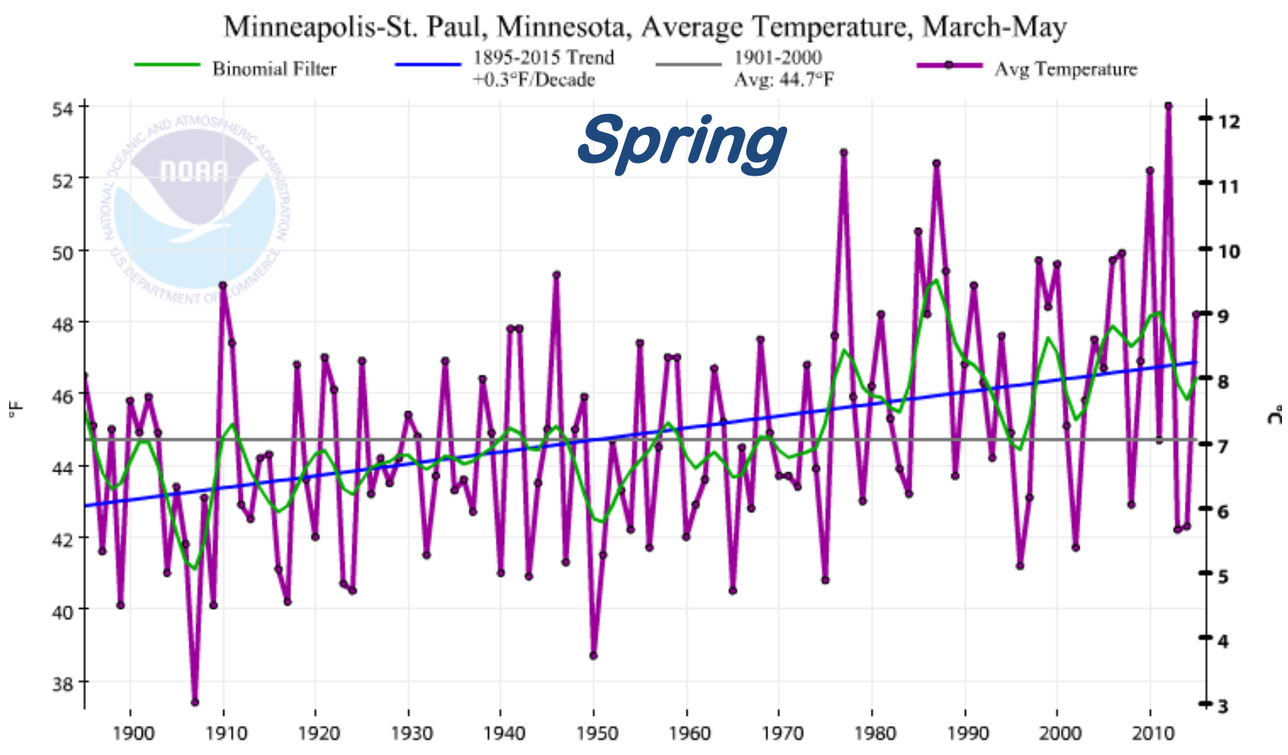
Twin Cities Mean Annual Temperature Trends

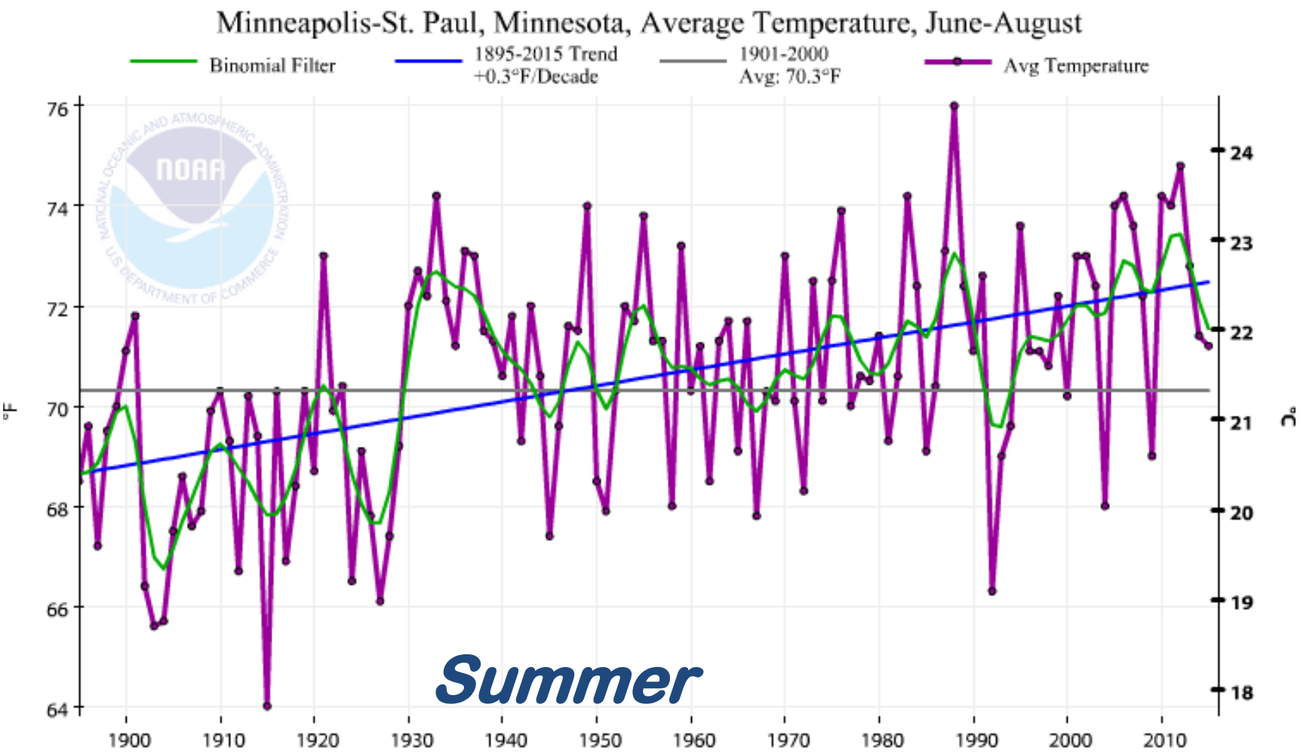


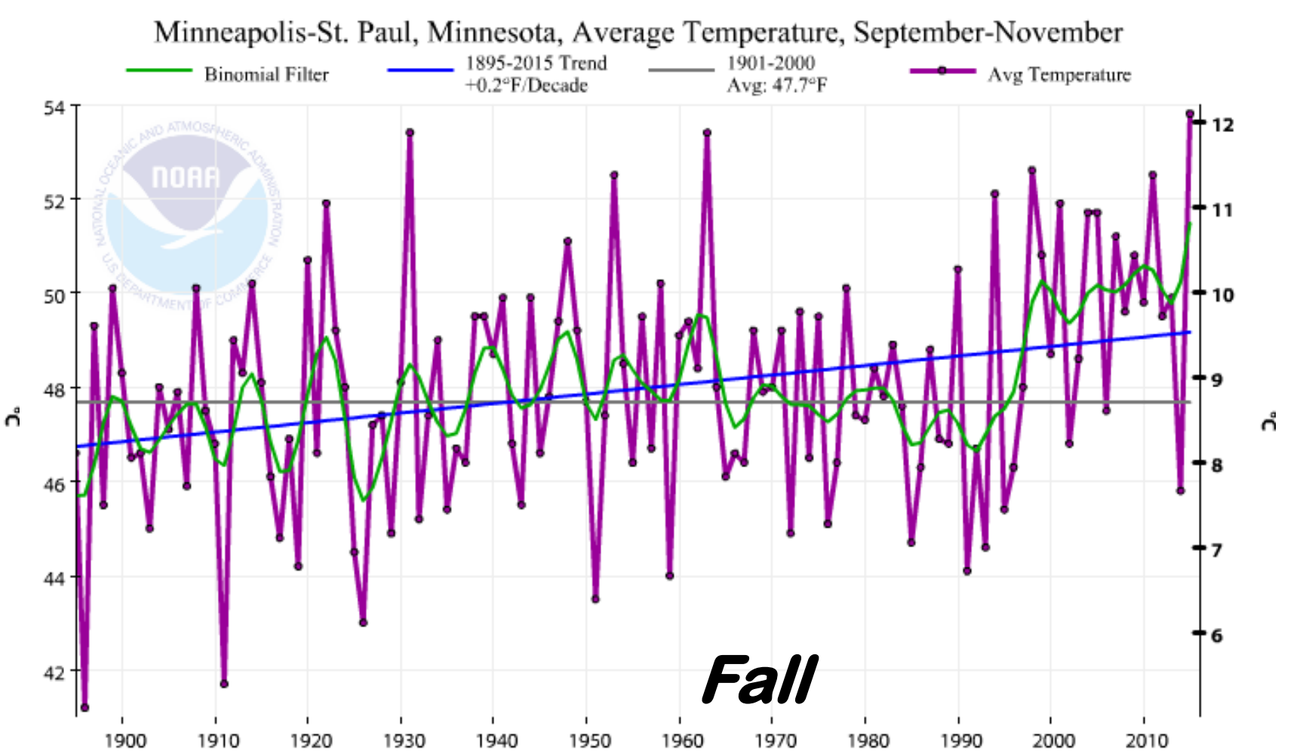
Temp trend is upward and more frequently above the 80th percentile, pace is 3°F per century.

Seasonal Twin Cities Temperature Trends



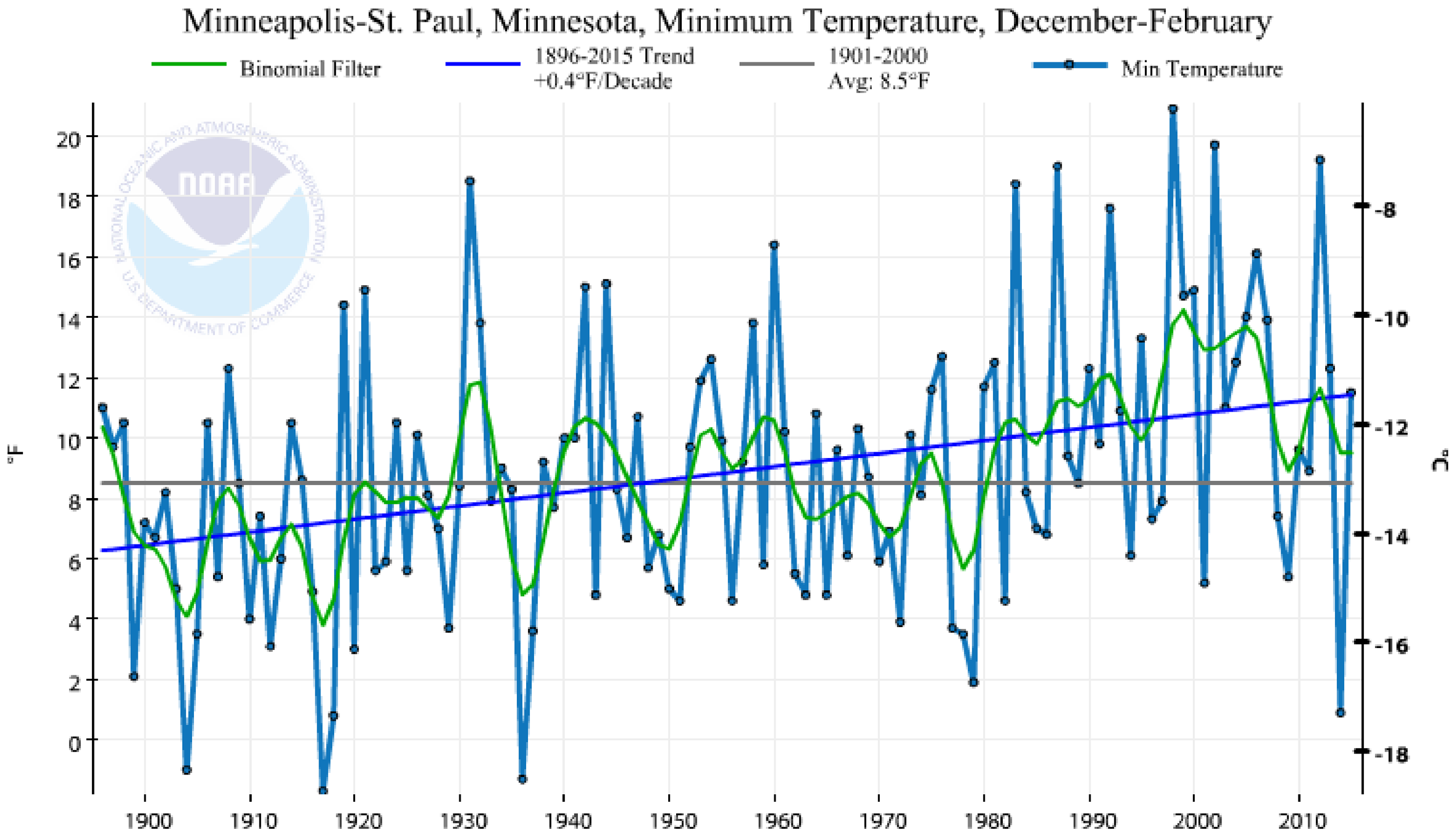






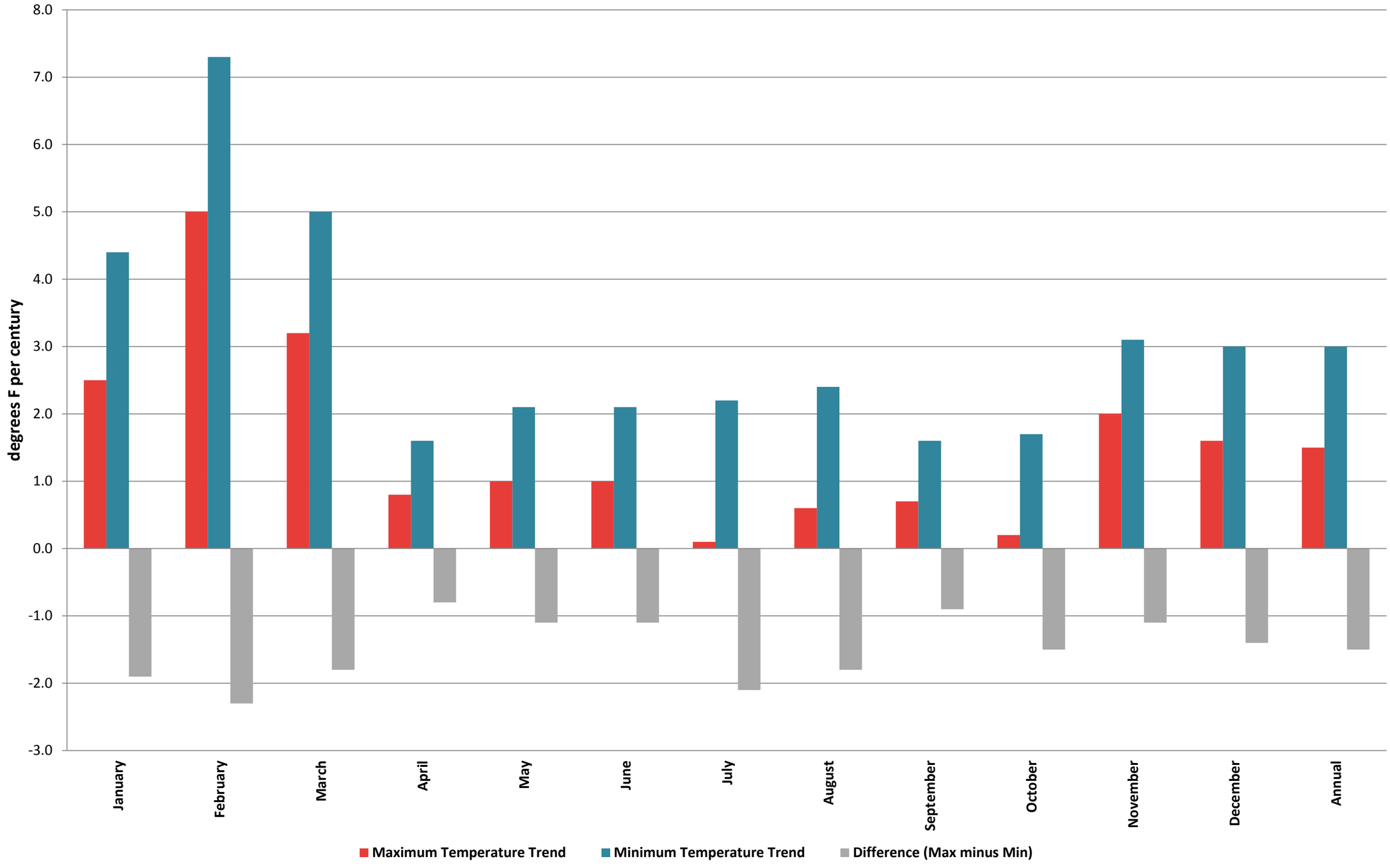
Trends in mean monthly temperatures in the Twin Cities 1971-2000 normals vs 1981-2010 normals (F)

Month	Min Change	Max Change	Mean Change
January	+3.2	+1.8	+2.5
February	+1.0	+0.5	+0.7
March	+0.8	+0.7	+0.7
April	+1.0	+0.8	+0.9
May	+0.4	-0.7	-0.2
June	+1.0	+0.2	+0.2
July	+1.1	+0.1	+0.6
August	+0.3	+1.0	+0.6
September	+1.6	+0.6	+1.0
October	+0.8	-0.4	+0.2
November	+1.4	+1.1	+1.2
December	+1.4	+0.7	+1.0



Change in average winter minimum temperature is 4°F per century in the Twin Cities climate record

Minnesota State-Averaged Temperature Trends
1895-2013



Consequences of Warmer Temperatures

Change in depth and duration of soil freezing

More rapid breakdown of crop residues

Earlier planting opportunities based on soil temperature

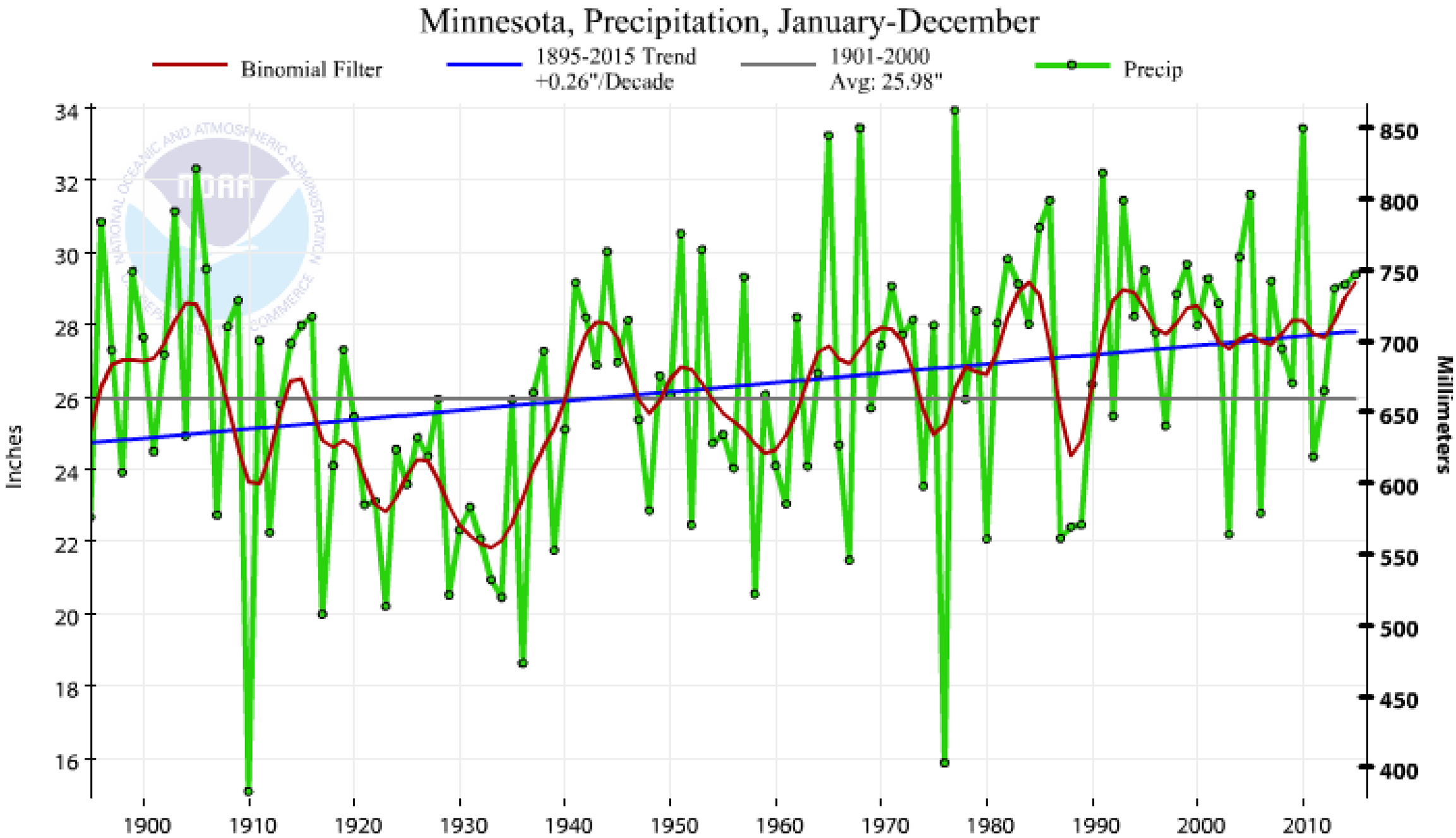
Extension of the mold and allergy season

Change in survival rates of insect pests, parasites, plant pathogens, and soil microbes

Increased number of freeze/thaw cycles/ more intermittent snow cover during winter

Longer growing seasons

Generally less Heating Degree Days (HDD)



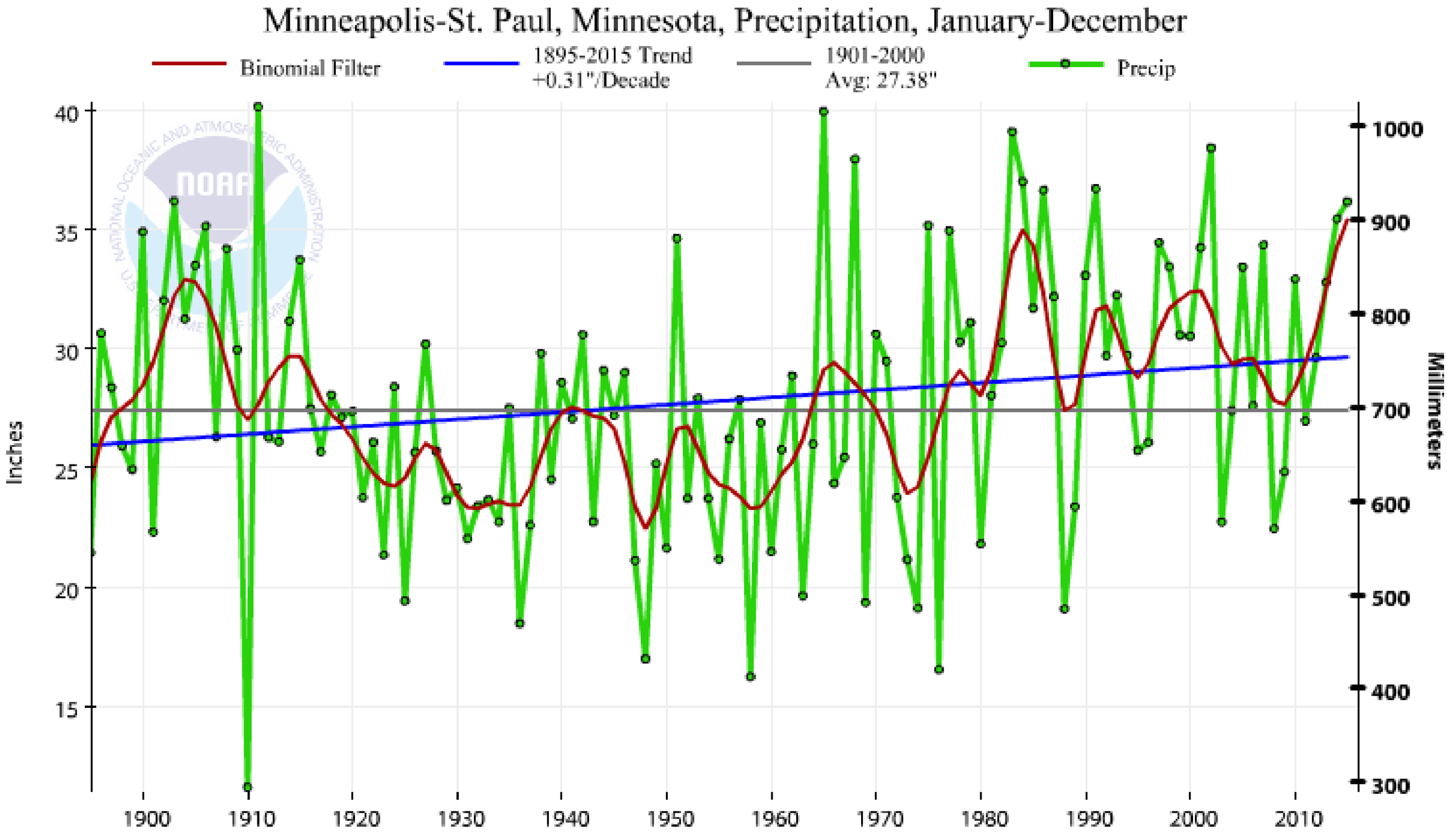
Trend in annual precipitation for MN

Change in Annual Precipitation
“Normals” at Faribault, MN

PERIOD	AMOUNT (IN.)
1921-1950	24.80”
1931-1960	27.06”
1941-1970	29.49”
1951-1980	30.30”
1961-1990	31.00”
1971-2000	31.67”
1981-2010	32.63”

31 percent increase since 1921-1950 period

Extremes: 10.81” in 1910, 42.20” in 1951



Trend in annual precipitation for Twin Cities

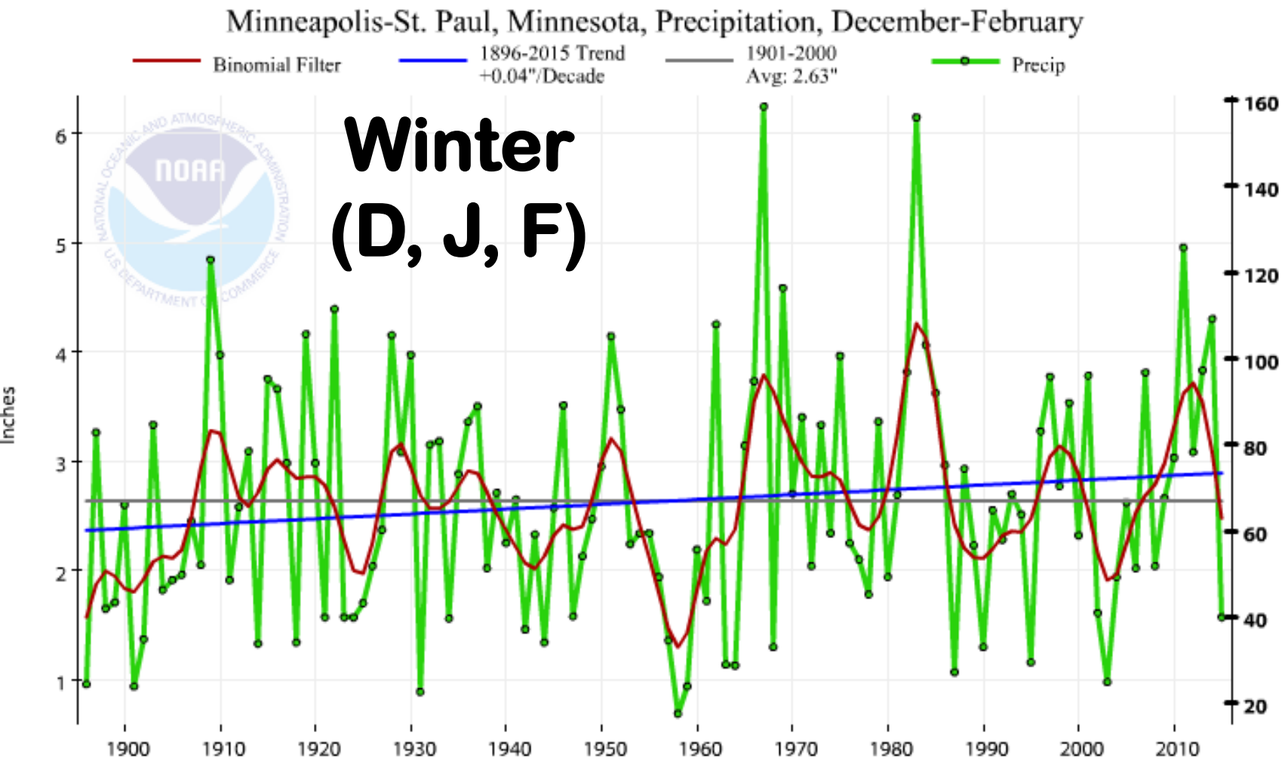
Change in Annual Precipitation
“Normals” for Minneapolis/St Paul, MN

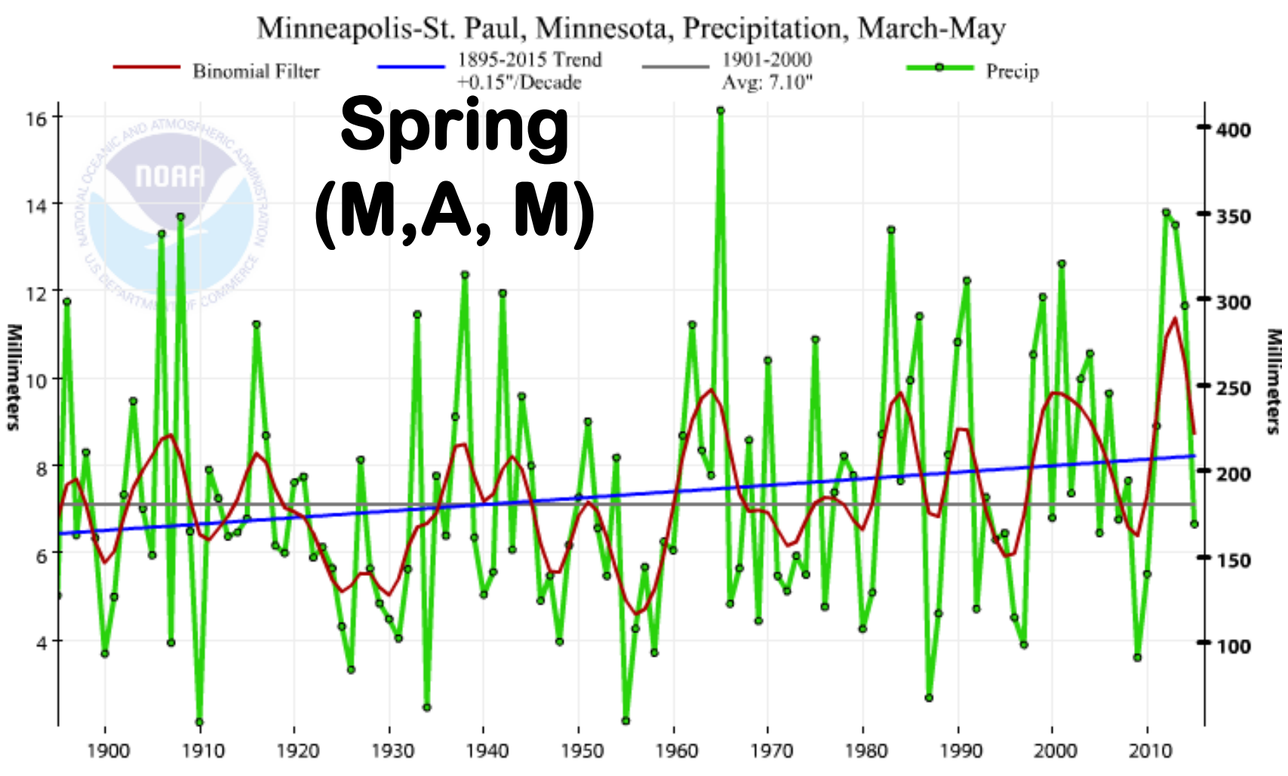
PERIOD	AMOUNT (IN.)
1941-1970	25.93”
1951-1980	26.36”
1961-1990	28.36”
1971-2000	29.40”
1981-2010	31.16”

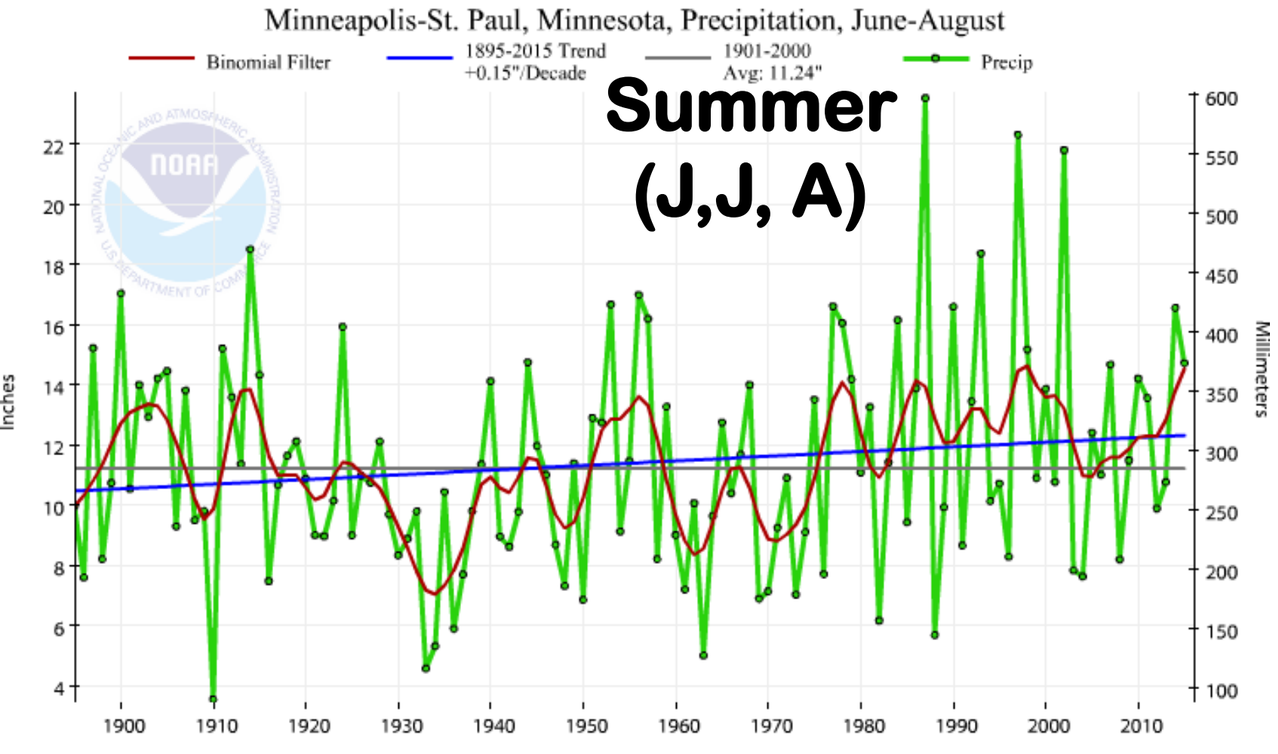
20 percent increase since 1941-1970 period

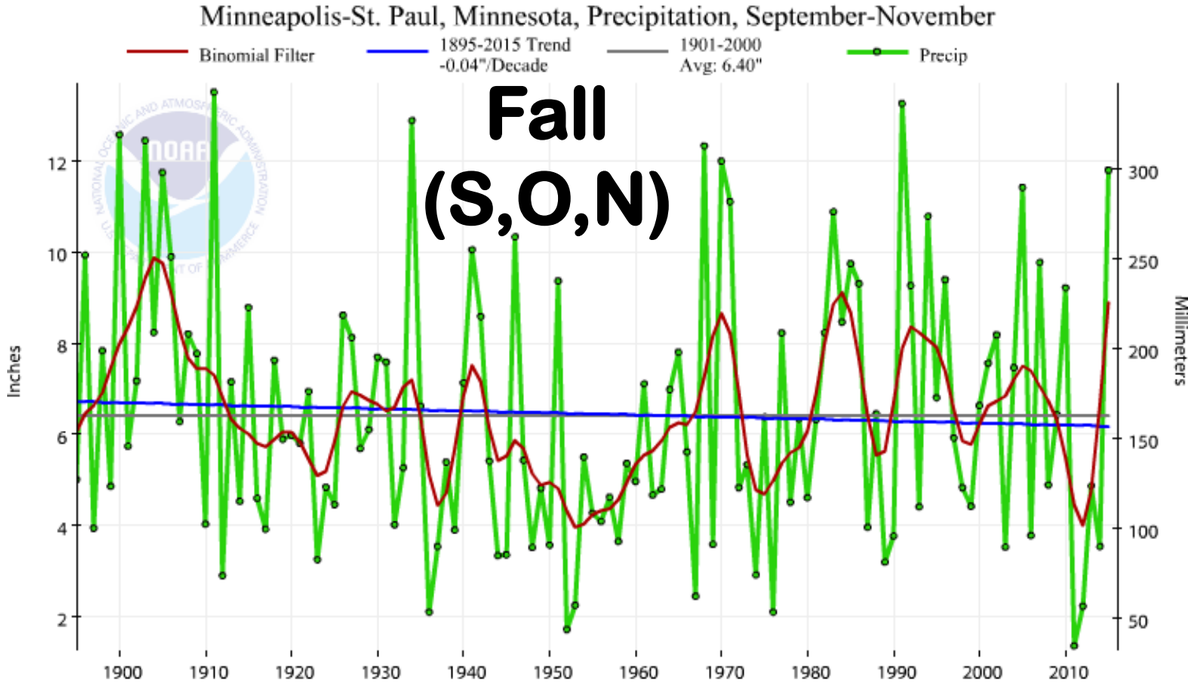
Extremes: 11.54” in 1910, 40.15” in 1911

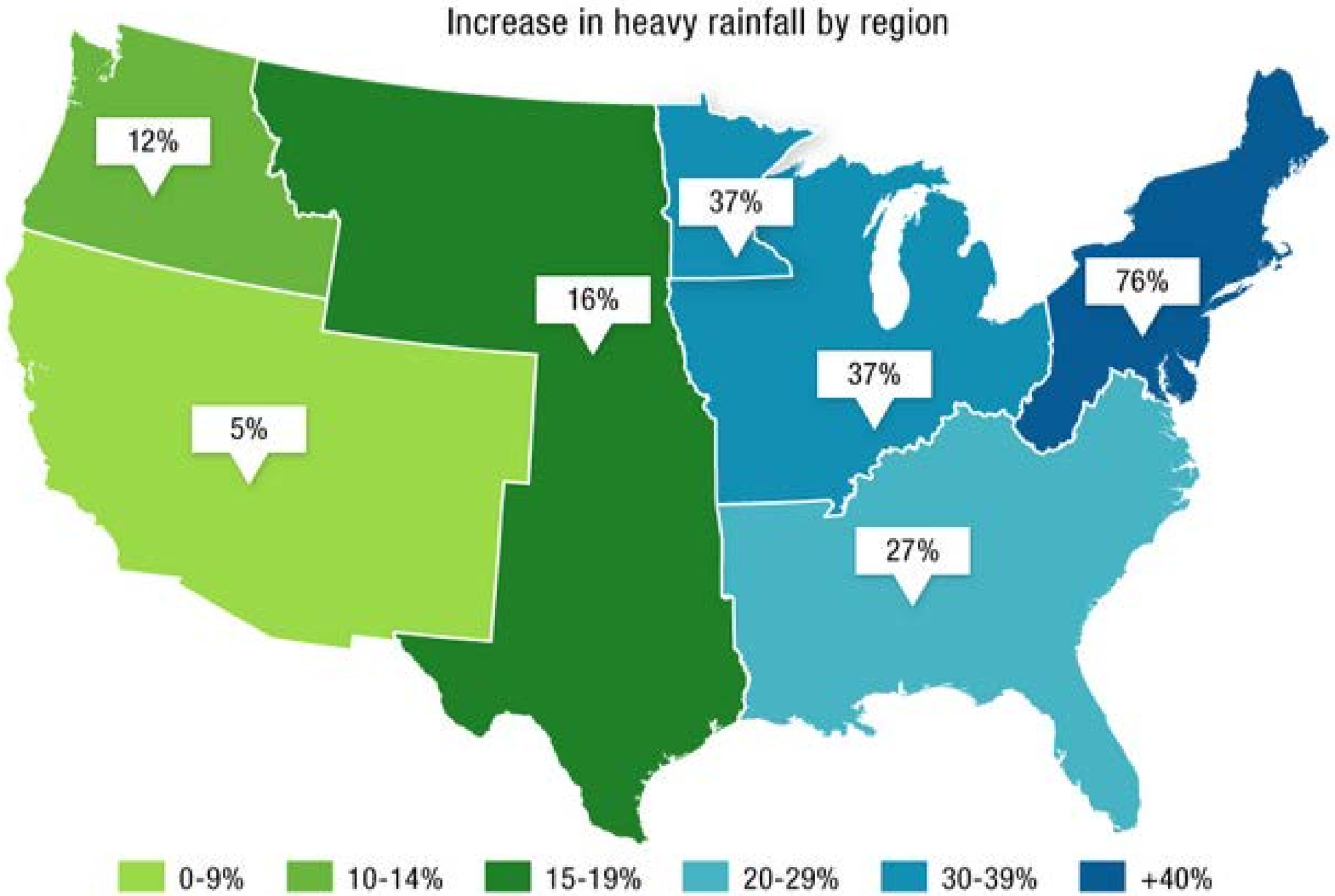
Statewide Seasonal Trends in Twin Cities Precipitation



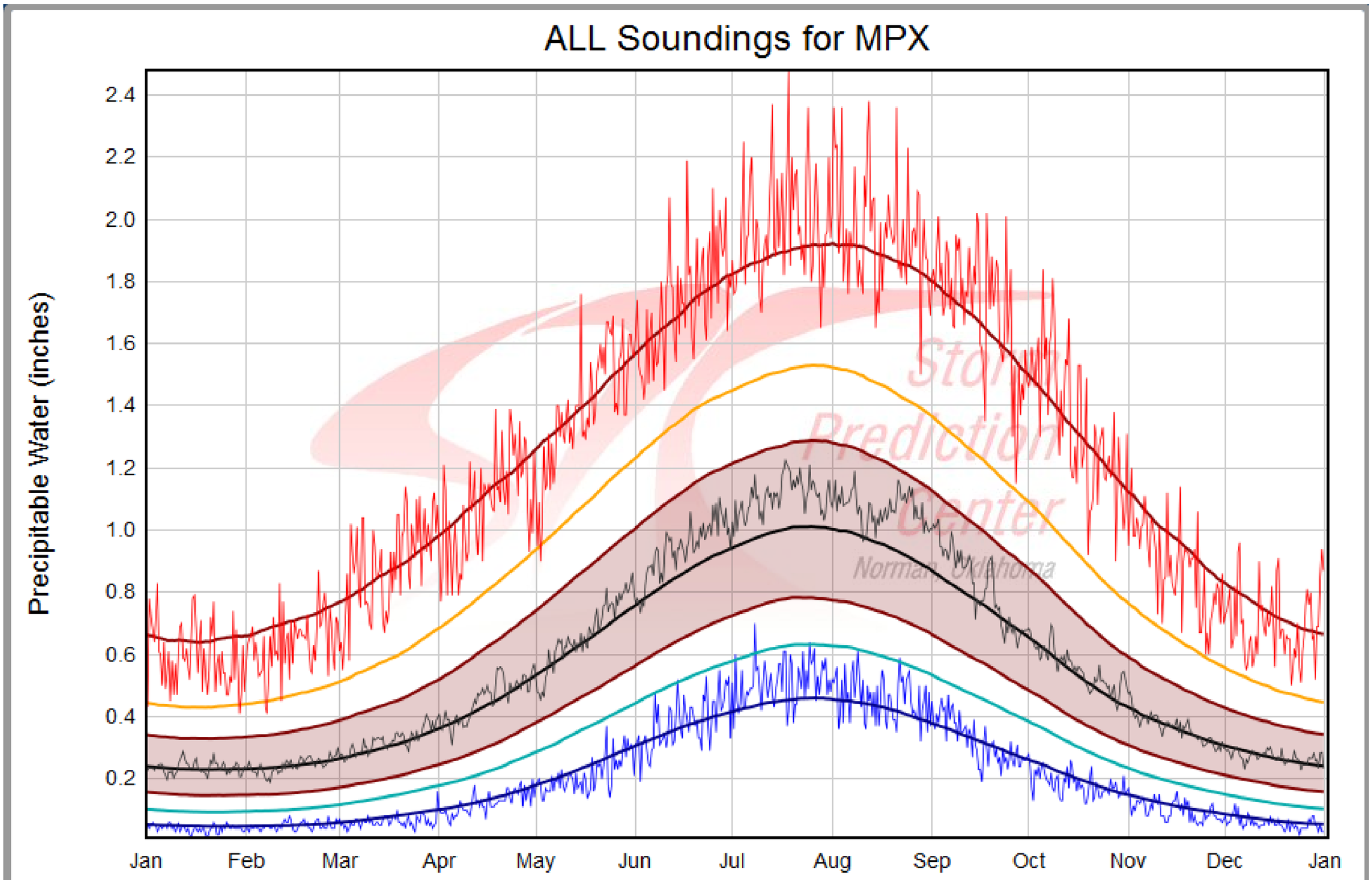








Source: National Climate Assessment, National Climatic Data Center



Radiosonde history of PW at MSP since 1948

(Most record high values have occurred since 1990)

Observations – Minnesota Trends

Minnesota Mega-rain Events

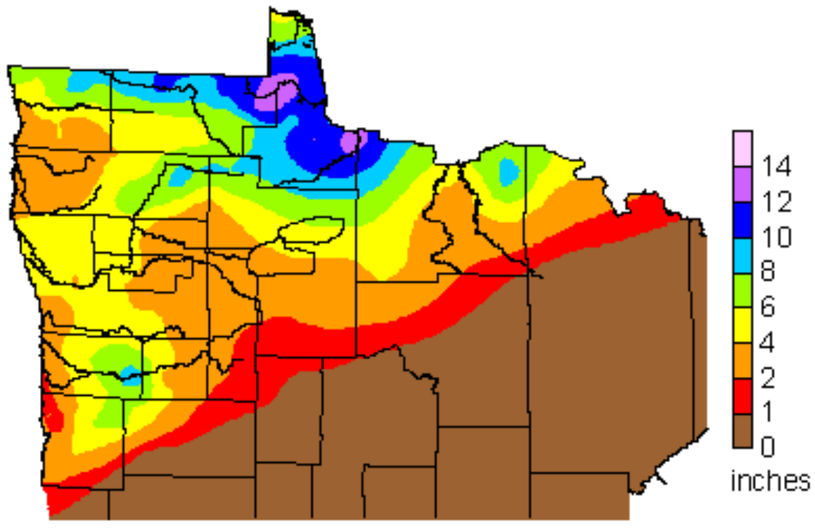
August 6, 1866, Southern Minnesota
July 17-19 1867, Central Minnesota
July 20-22, 1909, Northern Minnesota
September 9-10, 1947 Iron Range
July 21-22, 1972, Grand Daddy Flash Flood
June 28-29, 1975, Northwest Minnesota
July 23-24, 1987, Twin Cities Superstorm
June 9-10, 2002, Northern Minnesota
September 14-15, 2004 Southern Minnesota
August 18-20, 2007, Southern Minnesota
September 22-23, 2010 Southern Minnesota
June 19-20, 2012, Northeast Minnesota

Defined as 6" or greater rains cover at least 1000 square miles and a peak amount of 8" or greater

Shift in Precipitation Recurrence Intervals

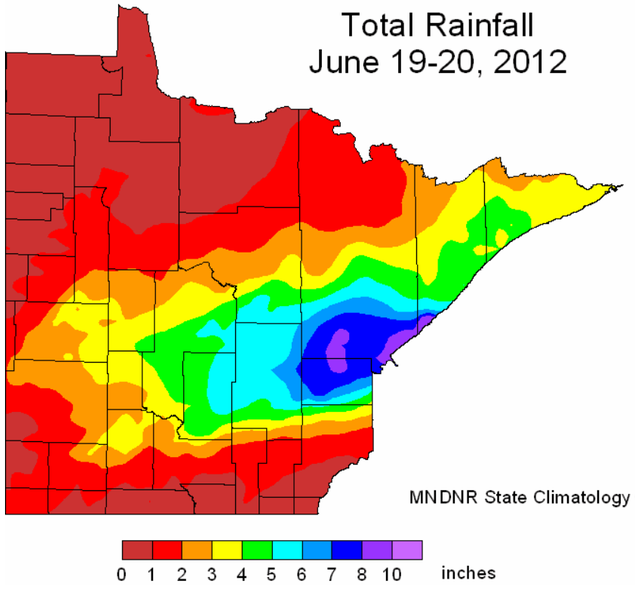
Mega Rains since 2002

Rainfall Totals - June 9 and 10, 2002



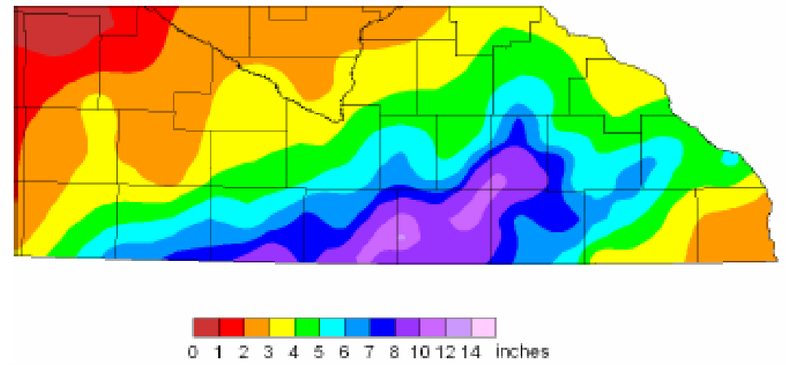
State Climatology Office - DNR Waters

Total Rainfall
June 19-20, 2012

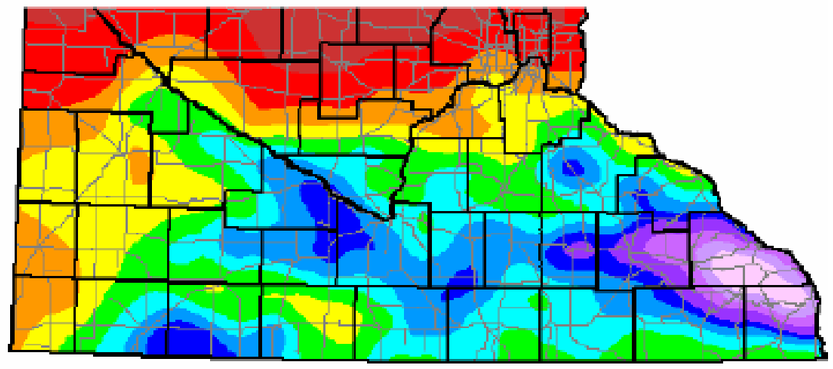


'1000-yr (approx.) events' in Southern Minnesota in the last decade.

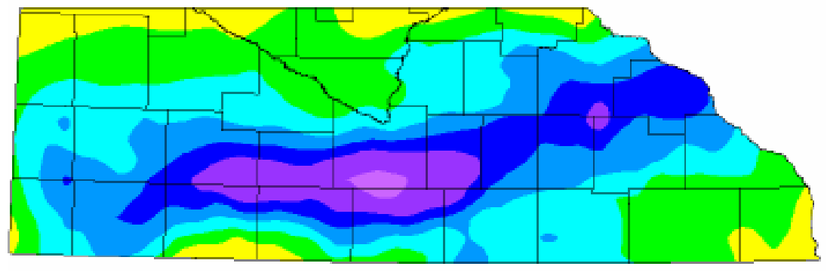
September 14-15, 2004



August 18 through August 20 (8:00 AM CDT), 2007



September 22-23, 2010



A 'by-eye' estimate of the total area covered by 10" of rain over the 7 years of 2004-2010 appears to be near 1400 sq. mi. or about 200 sq. mi per year. Given that the area of the southern 3 layers of counties looks to be approximately 20000 sq. mi. the areal fraction of the southern three counties covered by 10" per year appears to be approximately 1/100; i.e. at the rate of coverage for the last 7 years an area equal to the whole southern three county area could be covered in about 100 years.

Consequences of Changes in Precipitation Quantity and Character

Altered irrigation, tile drainage, runoff, sediment, and shoreline management

Change in storm sewer runoff and culvert designs

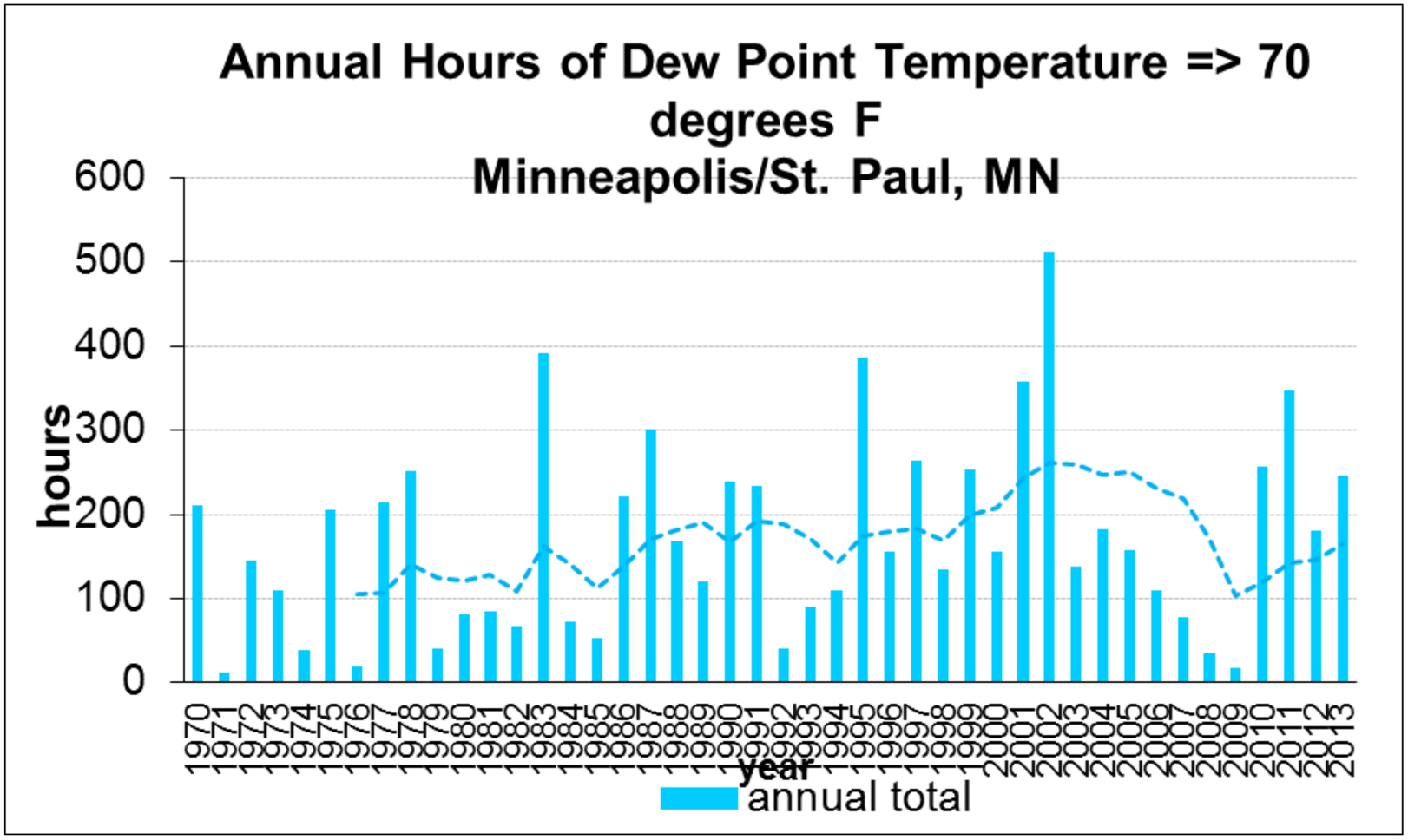
Mitigation of soil erosion via buffers, contours, and cover crops

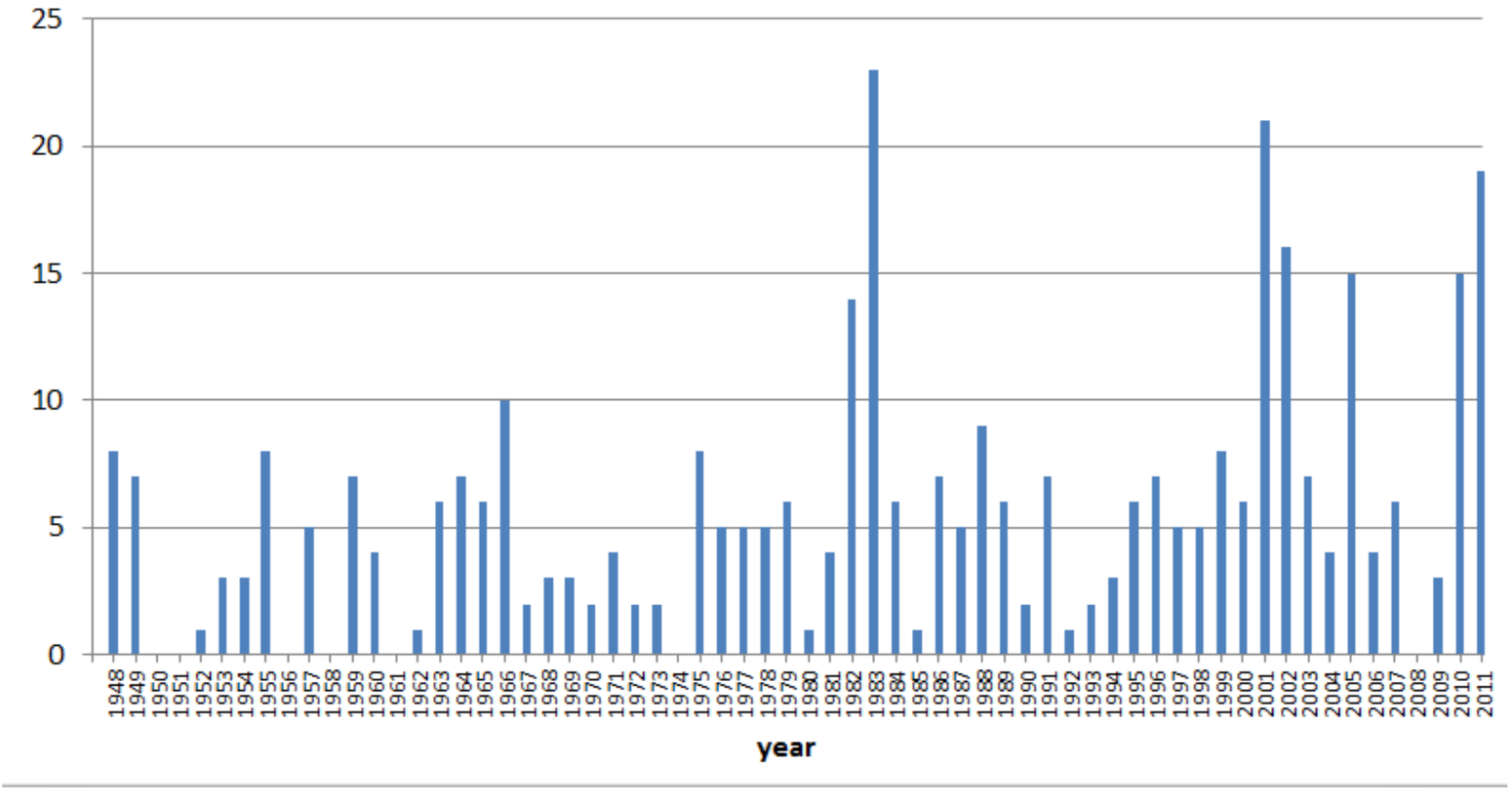
Mitigation of flooding potential

Impact on insurance risk and claims

Trend in episodes of dewpoints of 70 F or higher

Latitude 45 degrees



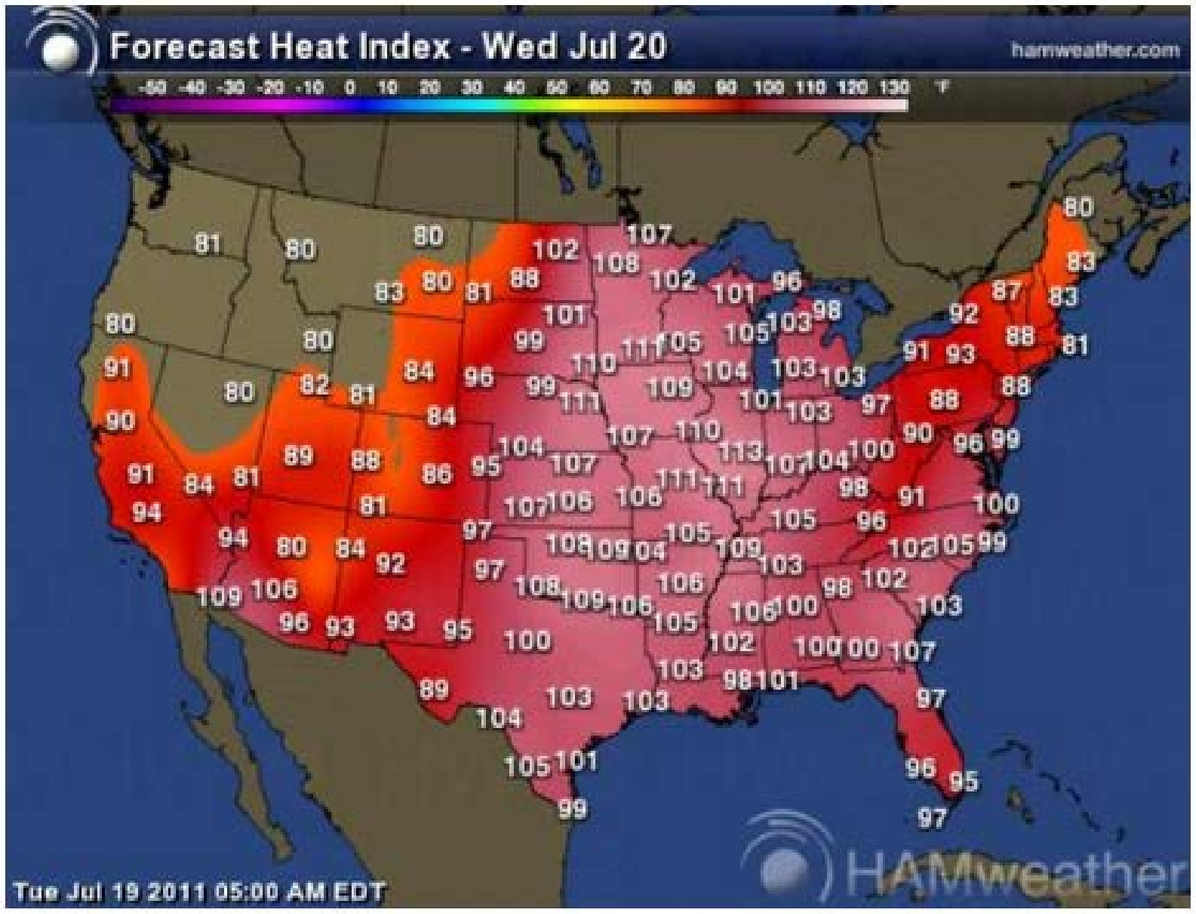


Hours with dewpoints of 70 degrees F or higher at Voyageurs National Park

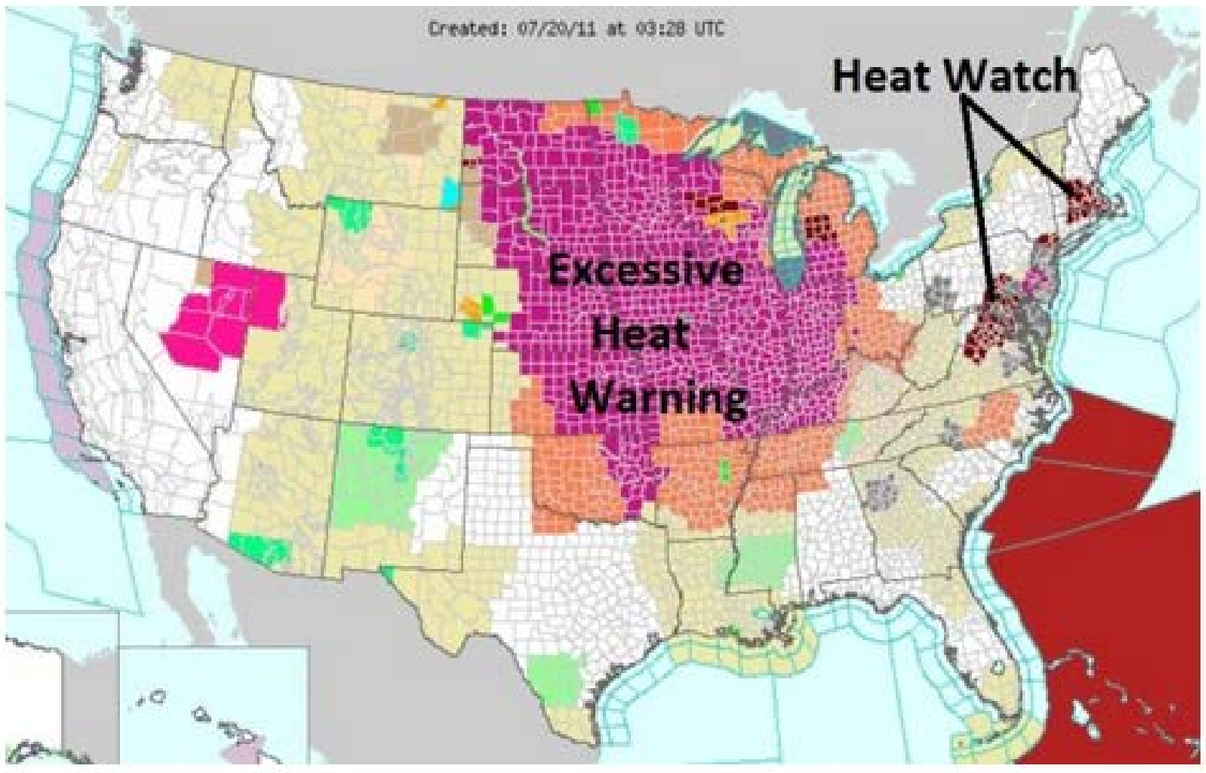
Latitude 48.5 degrees

Frequencies of tropical-like dew points (70 F or higher) and associated Heat Index values for the Twin Cities since 1945

Year	Hours with DP of 70 F or greater	Range of Heat Index Values (F)
1947	256	99 - 112
1949	303	98 - 112
1955	345	98 - 113
1957	243	98 - 112
1959	317	99 - 113
1960	259	98 - 112
1978	252	99 - 114
1983	392	102 - 110
1987	302	98 - 104
1995	387	98 - 116
1997	264	98 - 113
1999	254	98 – 116
2001	357	98 - 110
2002	512	98 – 109
2010	256	98 - 111
2011	347	98 – 118 (*134)
2013	248	99 - 105



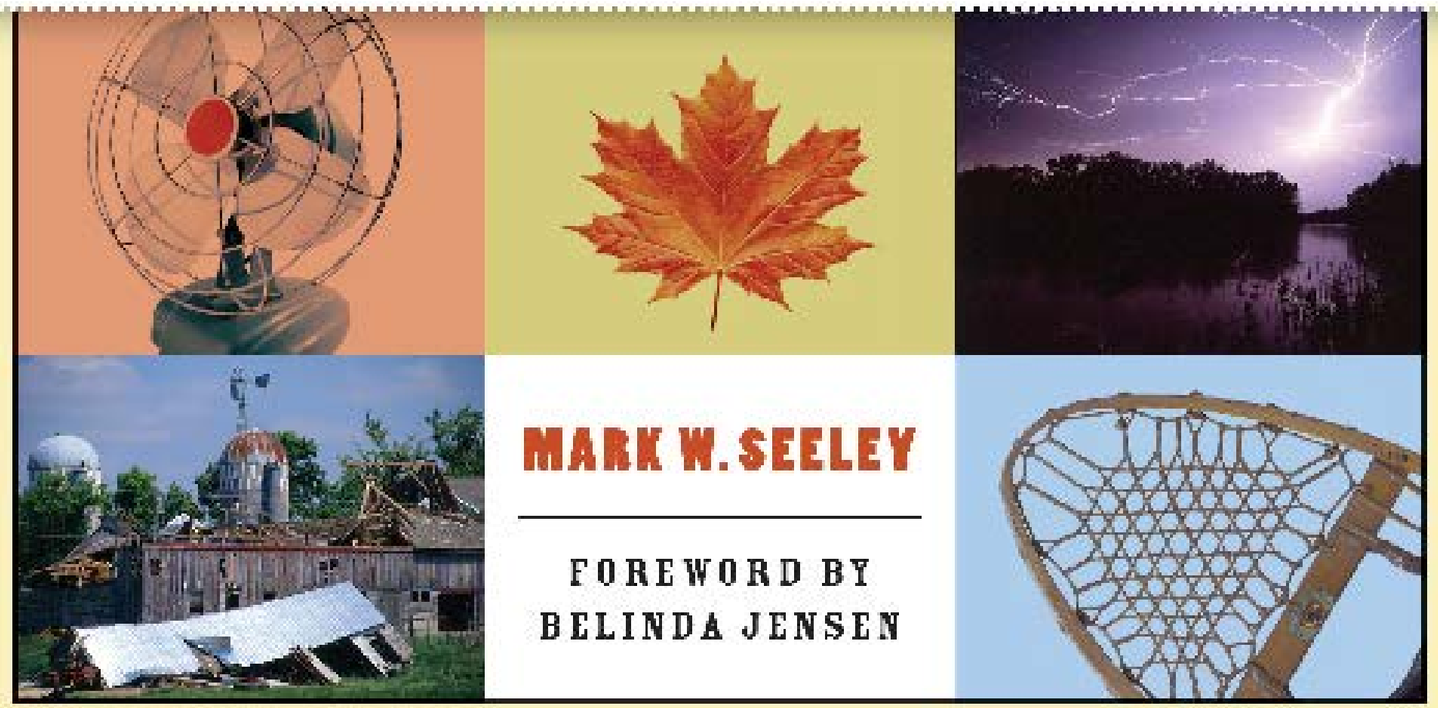
The Great Heatwave of '11. Heat indices will top 100 again today from the Great Plains eastward to the Great Lakes, Ohio Valley and southeastern USA, gripping the eastern 2/3rds of America.



July 19-20, 2011
Heat Wave

Heat Index:
112°F Faribault
114°F Mankato
114°F New Ulm
114°F Waseca
117°F Owatonna
118°F Red Wing
119°F Twin Cities
110°F Albert Lea
114°F St James
114°F Fairmount
121°F Austin
134°F Moorhead

MINNESOTA
WEATHER ALMANAC



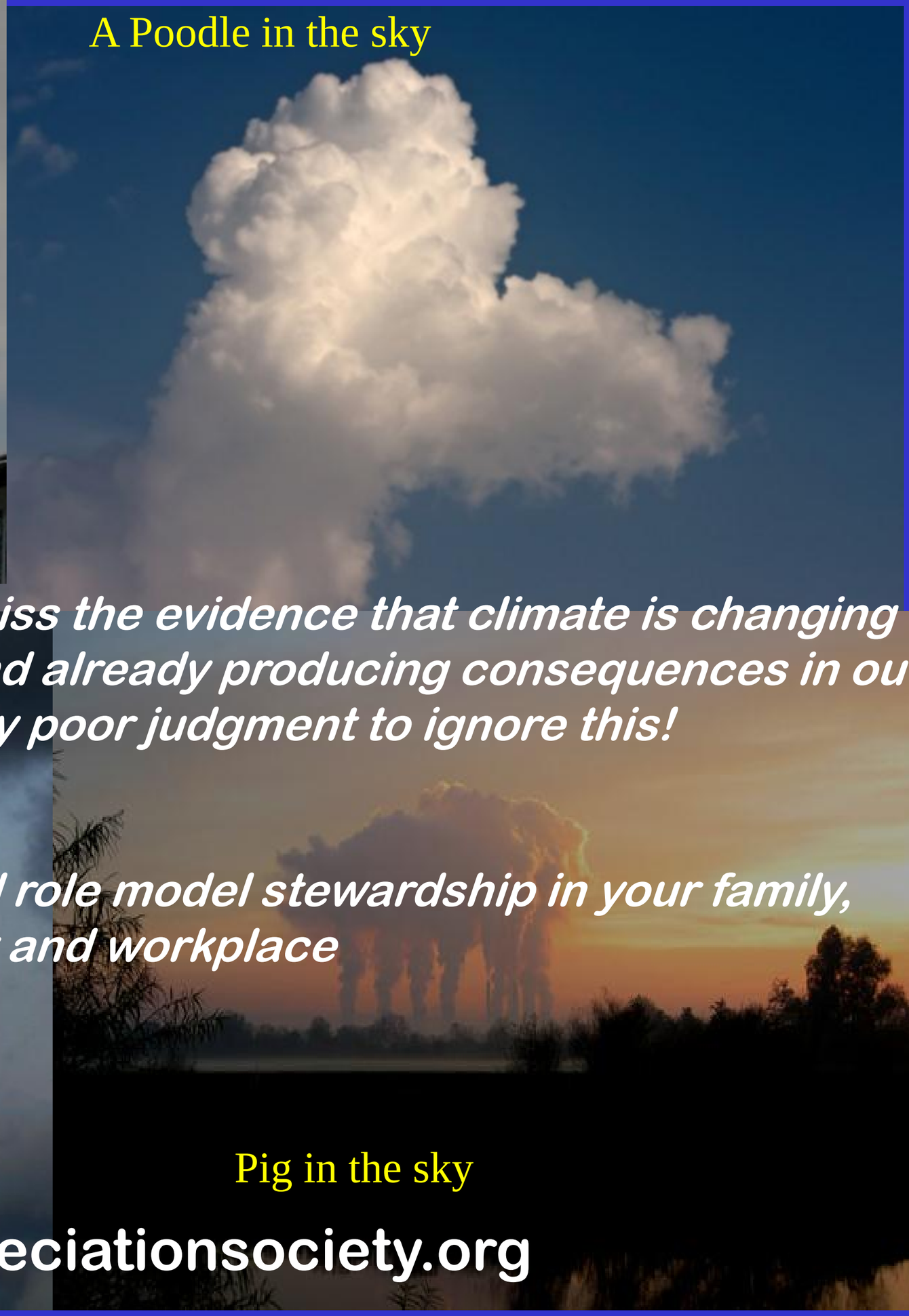
Historical Minnesota Heat Waves:

Red denotes dewpoint driven

1883, 1894, 1901, 1910, 1917, 1921, 1931, 1933, 1934, 1936, 1937, 1947, 1948, 1949, 1955, 1957, 1959, 1964, 1976, 1977, 1983, 1988, 1995,1999, 2001, 2005, 2006, 2007, 2010, 2011, 2012, 2013

(pattern is episodic but increasing in frequency)

Rabbits in the sky



A Poodle in the sky

For those who doubt or wish to dismiss the evidence that climate is changing ….the data indicate it is happening and already producing consequences in our own backyards. It is clearly poor judgment to ignore this!

Share your views on this issue and role model stewardship in your family, community and workplace

Snail in the sky

Pig in the sky

www.cloudappreciationsociety.org

Climate Change in MN: Understanding our Role

Will Seuffert, Executive Director

The Environmental Quality Board

Outline

- ~~Why we care about climate in MN~~
- International action
- Federal action
- State policy
- MN Clean Energy Economy
- Emissions trends and forecast
- What do we do next? State strategies for climate action

The Environmental Quality Board (EQB)

- Governor’s office
- Five citizen members
- Board of Soil and Water Resources
- Department of Administration
- Department of Agriculture
- Department of Commerce
- Department of Employment and Economic Development
- Department of Health
- Department of Natural Resources
- Department of Transportation
- **Metropolitan Council**
- Pollution Control Agency

UNITED FOR CLIMATE ACTION

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UN CLIMATE CHANGE CONFERENCE

COP21·CMP11

LABEL

PARIS2015

COP21·CMP11

UNDER 2° MOU

MINNESOTA ENVIRONMENTAL QUALITY BOARD EQB

111D: Proposed Clean Power Plan Rule

Goal: Reduce carbon intensity of existing fossil fuel power plants in the U.S. by 32% by 2030 (below 2005 baseline)

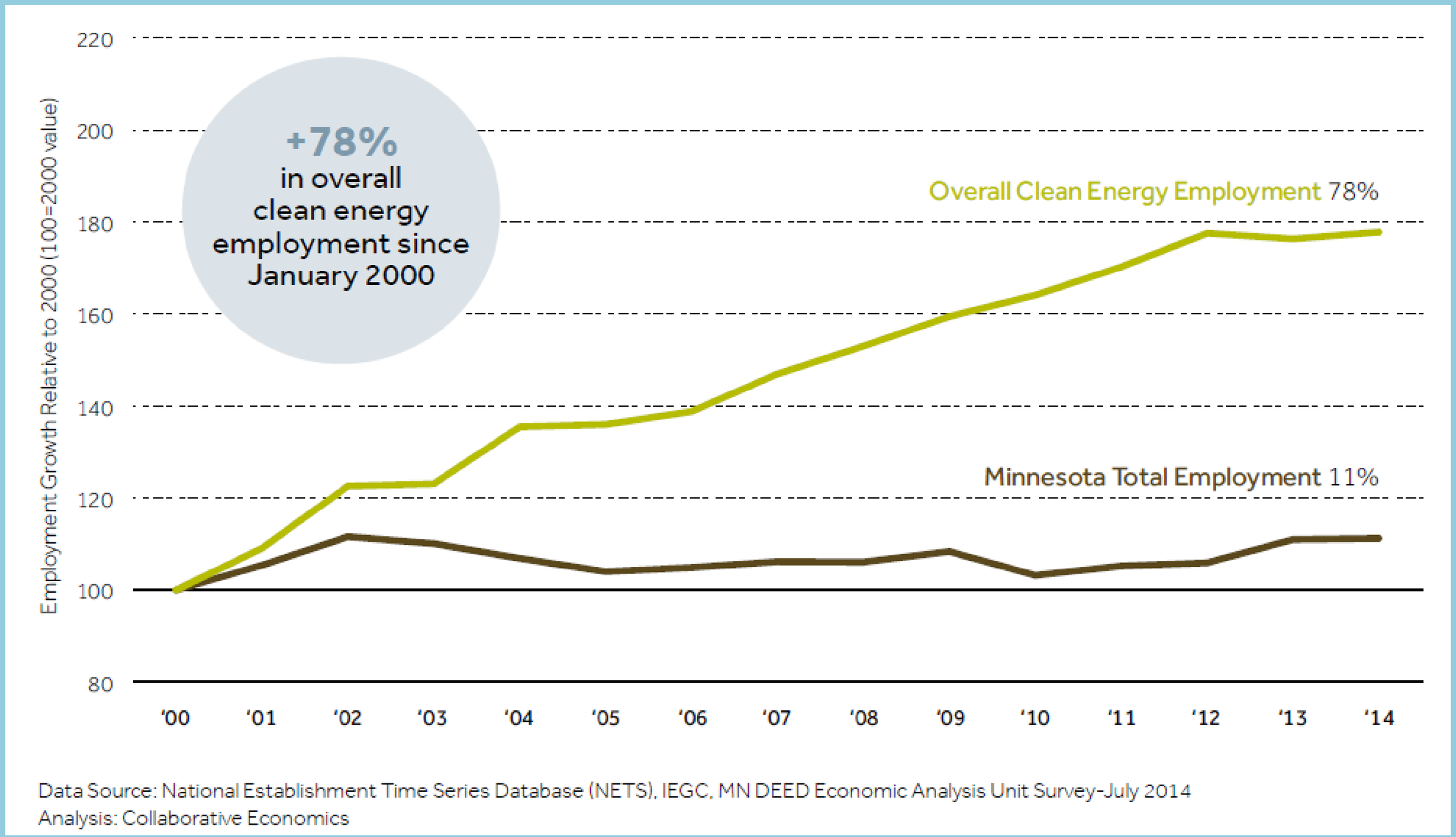
- Trading encouraged across states
- Allows flexibility for compliance within the limits of **permanent**, **verifiable**, **enforceable**

Minnesota state policy

- Reduce energy use 1.5% a year through cost-effective efficiency measures
- 25% of states energy be derived from renewable energy resources by the year 2025
  - 1% solar mandate/ 10% goal

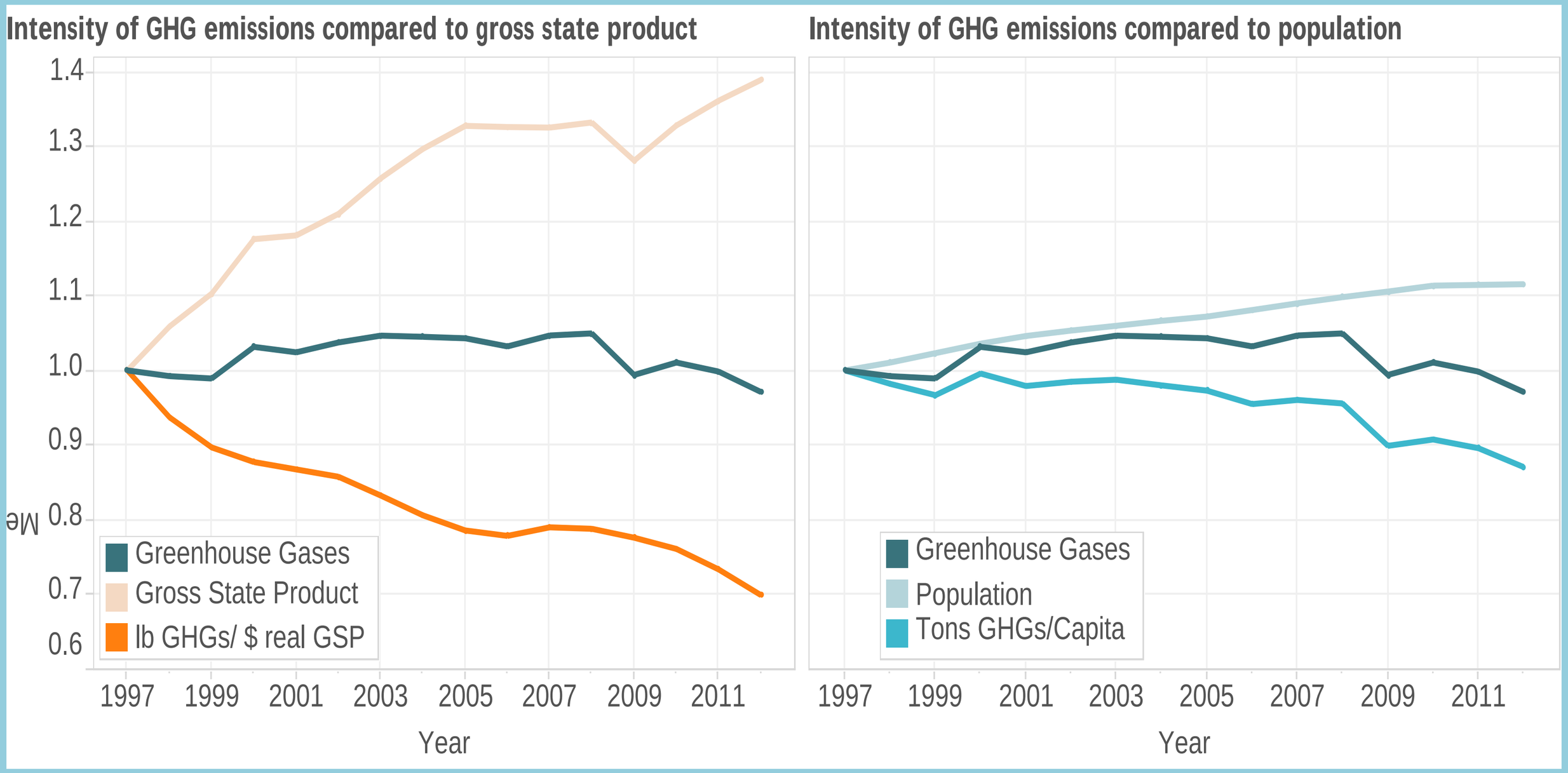
- Reduce statewide greenhouse gas emissions:
  - ✓ 15 percent by 2015
  - ✓ 30 percent by 2025
  - ✓ 80 percent by 2050

Clean energy jobs have grown much faster than the overall state employment



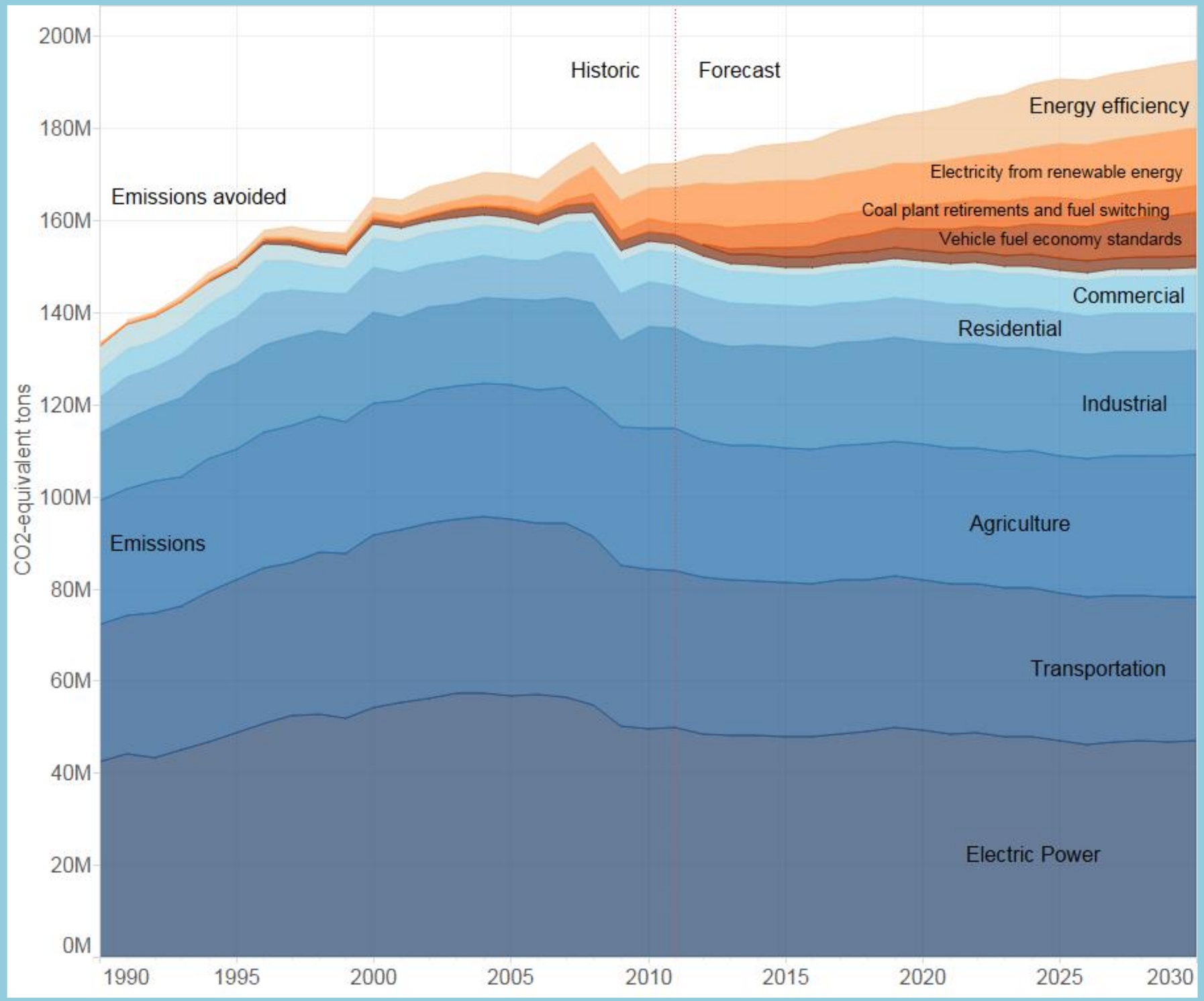
Data Source: National Establishment Time Series Database (NETS), IEGC, MN DEED Economic Analysis Unit Survey-July 2014
Analysis: Collaborative Economics

Economic growth has diverged from energy use (and emissions)

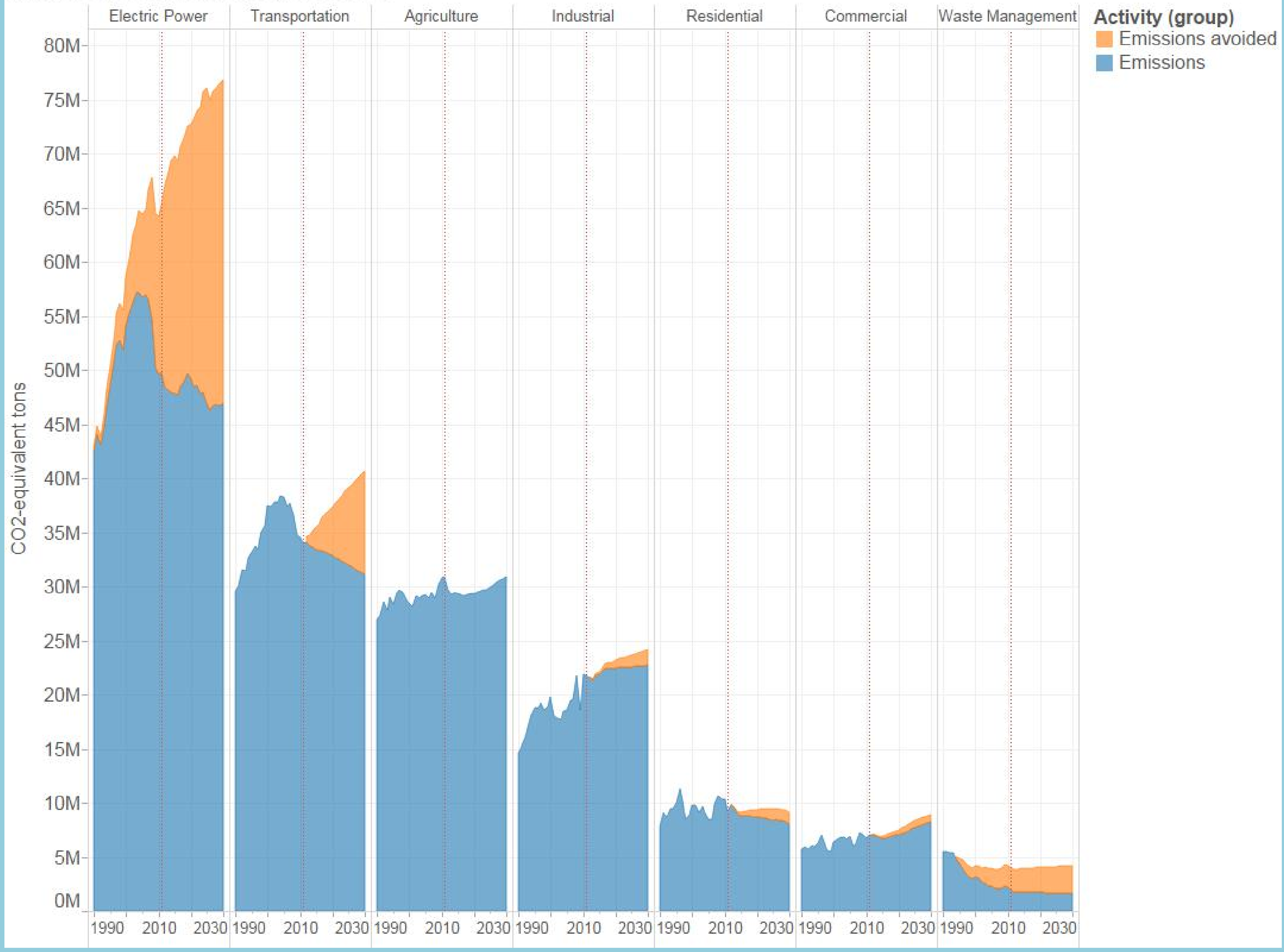


Source: PCA

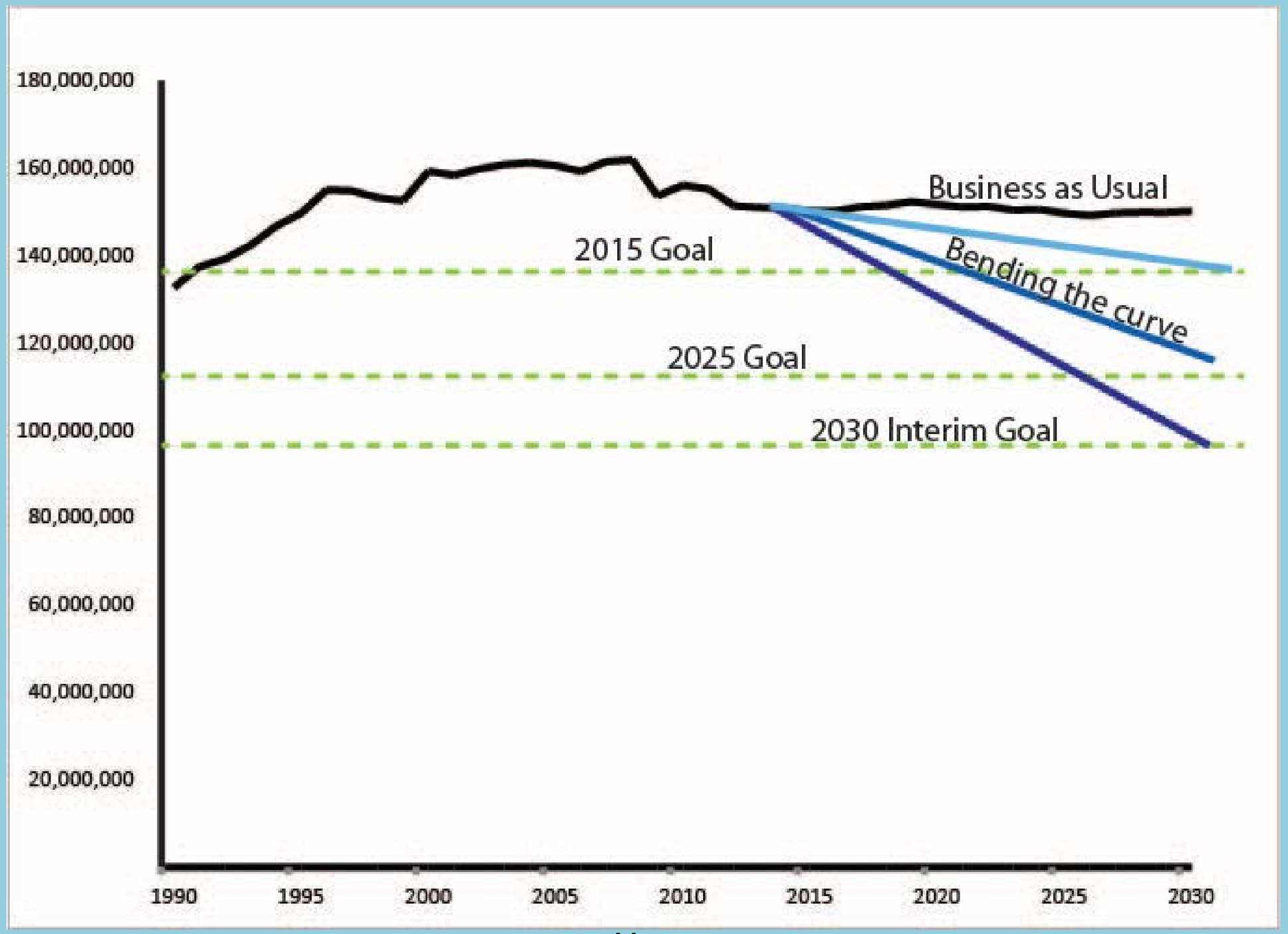
What progress have we made on emissions?



Emissions by sector, historic and forecasted



What is next: Identify strategies to bend the curve

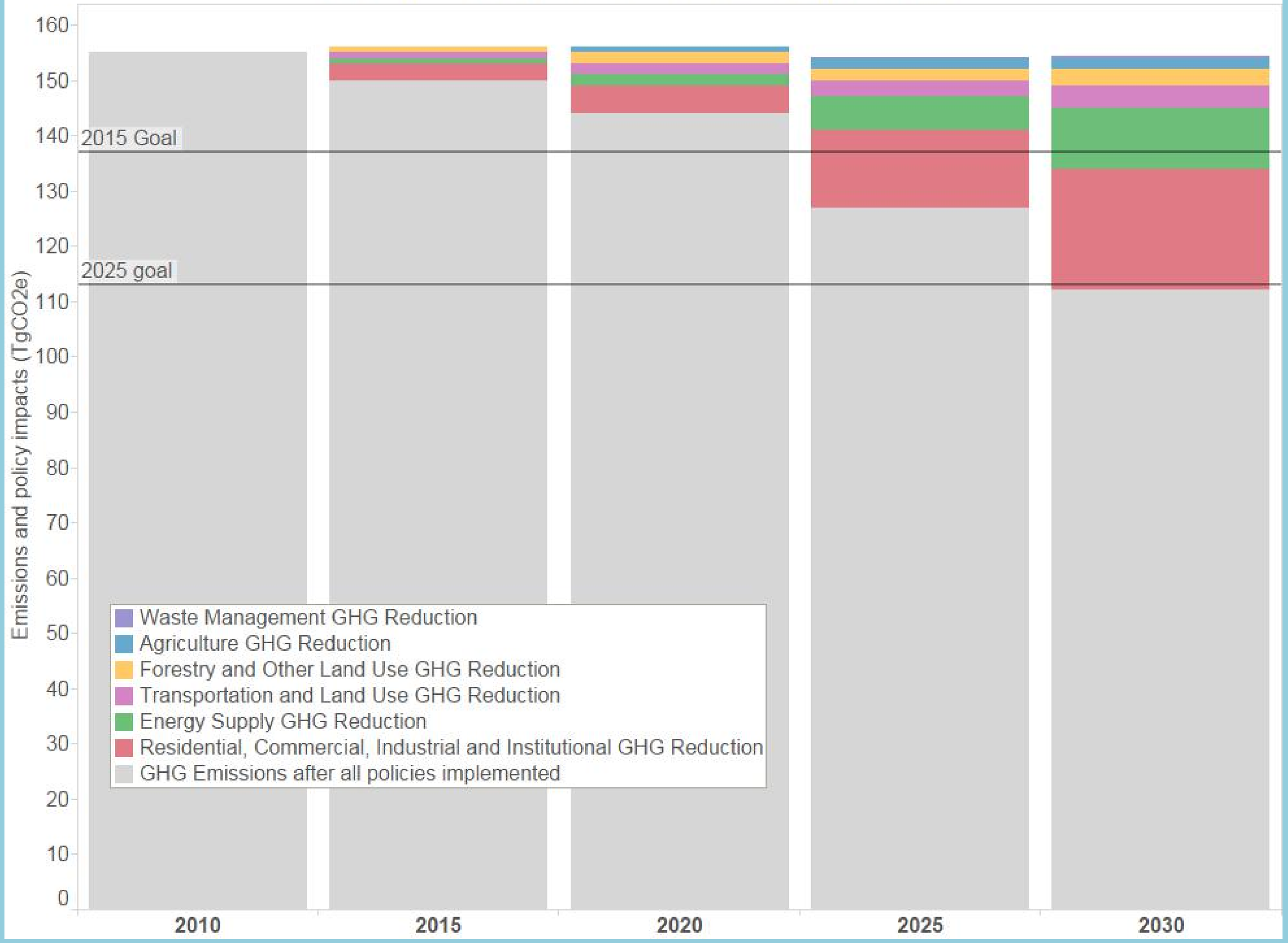


~50 million metric tons

What do emission reduction strategies look like in Minnesota?

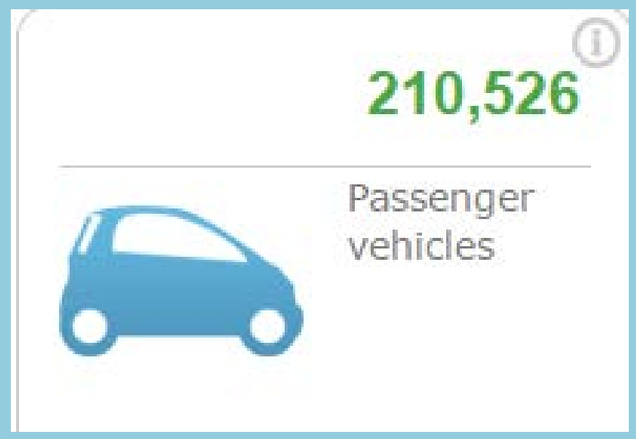
Energy Supply	Energy Demand-Side Management	Transportation and Land Use	Agriculture	Forests, grasslands, and wetlands	Waste Management
40% Renewable Energy Standard	*Combined Heat and Power*	*Transportation Pricing*	*Fertilizer Reduction*	*Protect Peat lands*	*Waste Water Treatment Efficiency*
50% Renewable Energy Standard	*SB2030 Building Guidelines*	PAYD Insurance	*Cover Crops*	*Best Management Practices*	*Waste Reduction*
Repower Sherco 1&2 to natural gas	*2.5%/yr Energy Efficiency*	Carbon Tax	*Increase Perennials*	*Community Forests**	*Increased Recycling and Composting*
Retire Sherco 1&2	*Thermal Renewable Energy*	Fuel Tax	*Advanced Biofuels*	*Disturbance Response*	
Repower one unit, retire the other		*Compact Metro Development*	*State Biofuel Goal*	*Conservation of natural land**	
111(d) Scenarios		*Metro Mass Transit*			
		Electric Vehicles			
		TLU-2&3 (combined)			

Total forecasted business as usual greenhouse gas emissions and potential emission reductions from sectors

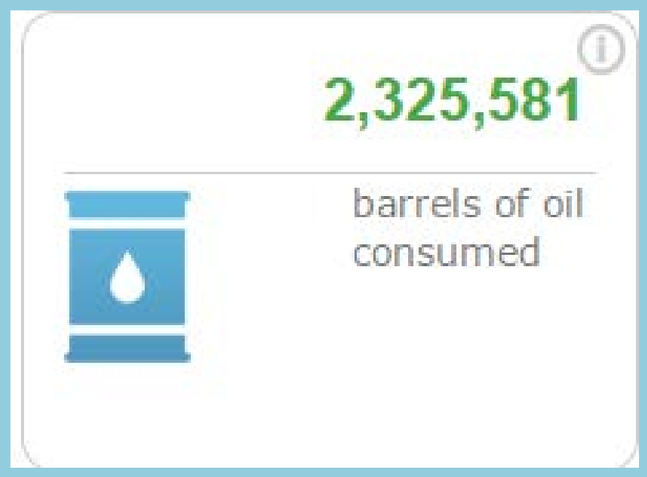


How much is a million metric tons of CO2 equivalent?

or



or



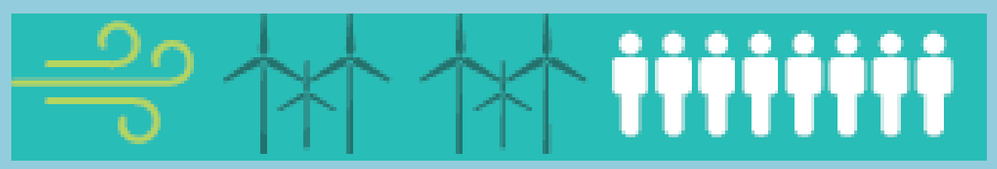
Energy Supply Sector

Minnesota exports $18 billion a year for fossil fuels

What can we do?

- Instead of investing capital into updating old coal plants, retire them and replace with natural gas or wind.

- Increase state renewable energy requirements.



Renewable Energy Standard

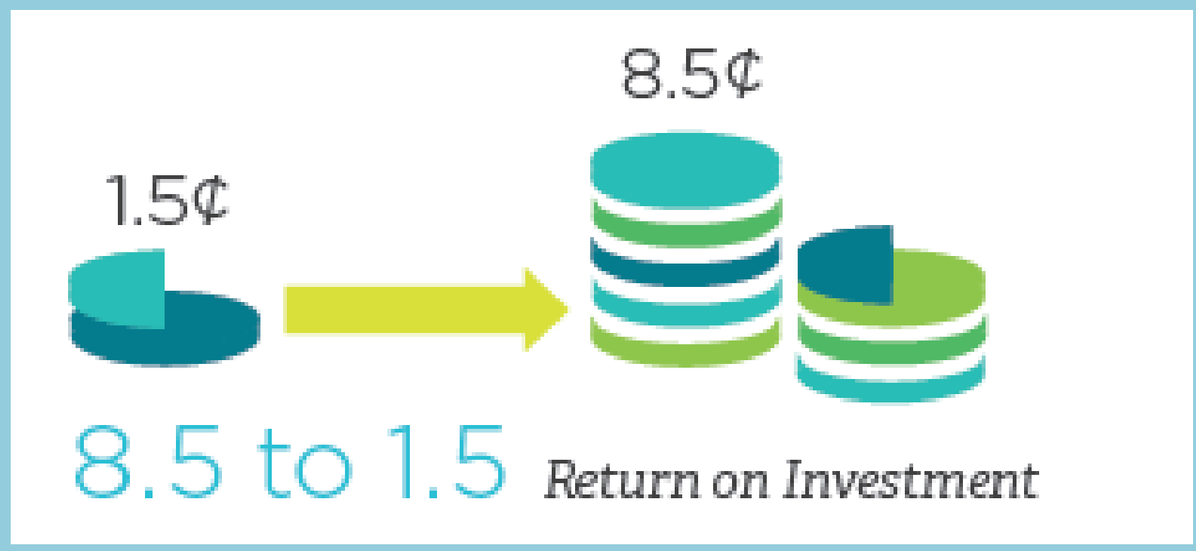
	2030 GHG reductions ($Tg CO_2e$)	2015 – 2030 reductions ($Tg CO_2e$)	NPV of societal costs, 2015 – 2030 (million $2014)	Cost effectiveness ($2014/tonne CO_2e)	2016-2030 (avg) Gross State Product/ 2030 Jobs
40% Scenario	7.5	67	**($620)**	**($8.20)**	**+ $177/ + 1,510**
50% Scenario	13	98	**($404)**	**($3.66)**	**+ $228/ + 1,820**

*****Next Generation Goal is to reduce annual emissions by ~50 million metric tons of CO2e by 2030*2030****

Demand-Side Energy Management Sector

What can we do?

- Remove barriers for local governments to implement building codes with stronger efficiency requirements than state code.
- Harness renewable thermal energy that we currently waste (CHP)
- Increase efficiency requirements for utilities to support efficiency in our homes and businesses.



Energy Efficiency: Residential, Commercial, Industrial

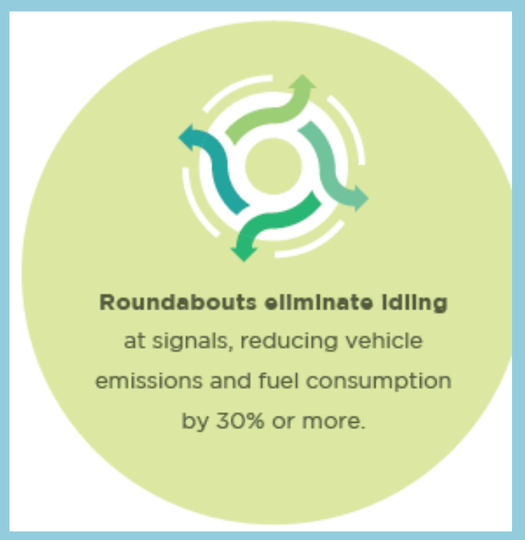
Residential, Commercial, Industrial and Institutional (RCII)					
	2030 GHG reductions (Tg CO_2e)	2015 – 2030 cumulative reductions (Tg CO_2e)	NPV of societal costs, 2015 – 2030 (million $2014)	Cost effectiveness ($2014/ tonne CO_2e)	2030 Gross State Product/ 2030 Jobs
SB 2030, Zero-Energy Transition Codes	9.3	54	**($2,050)**	**($34)**	**-$6 / +2,750**

*****Next Generation Goal is to reduce annual emissions by ~50 million metric tons of CO2e by 2030****

Transportation and Land Use Sector

What can we do?

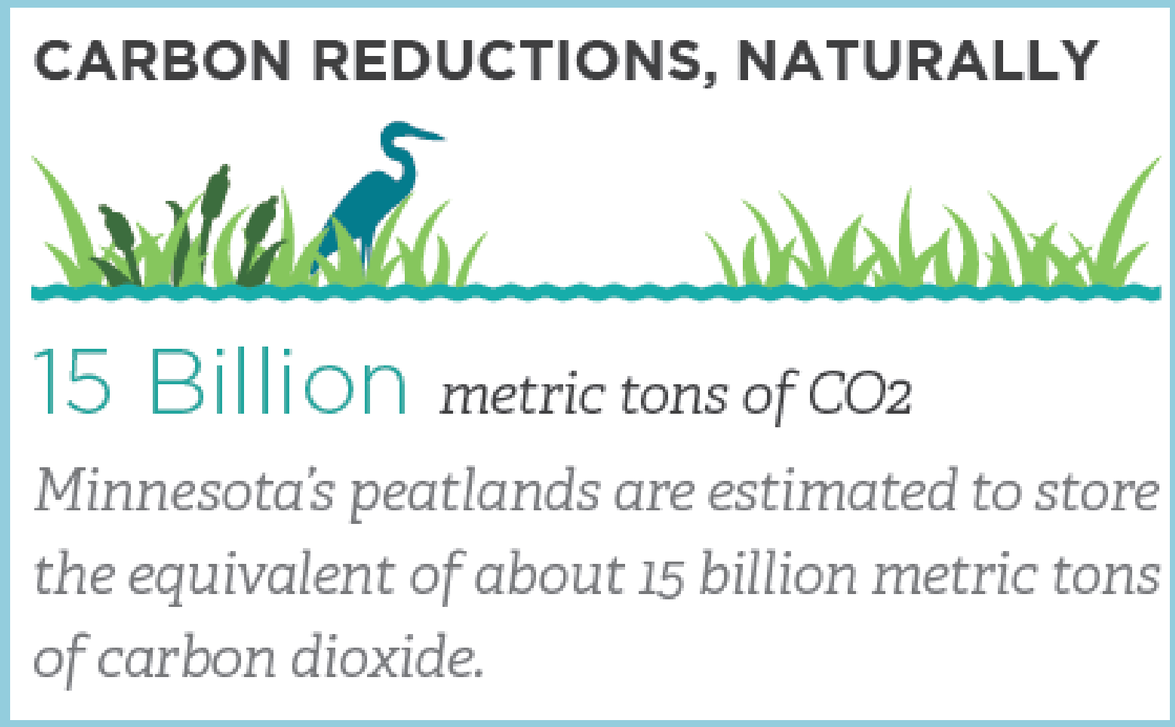
- Reduce driving through pricing mechanisms, densification of urban areas, and expanding public transportation
- Zero emissions vehicles, like electric vehicles.

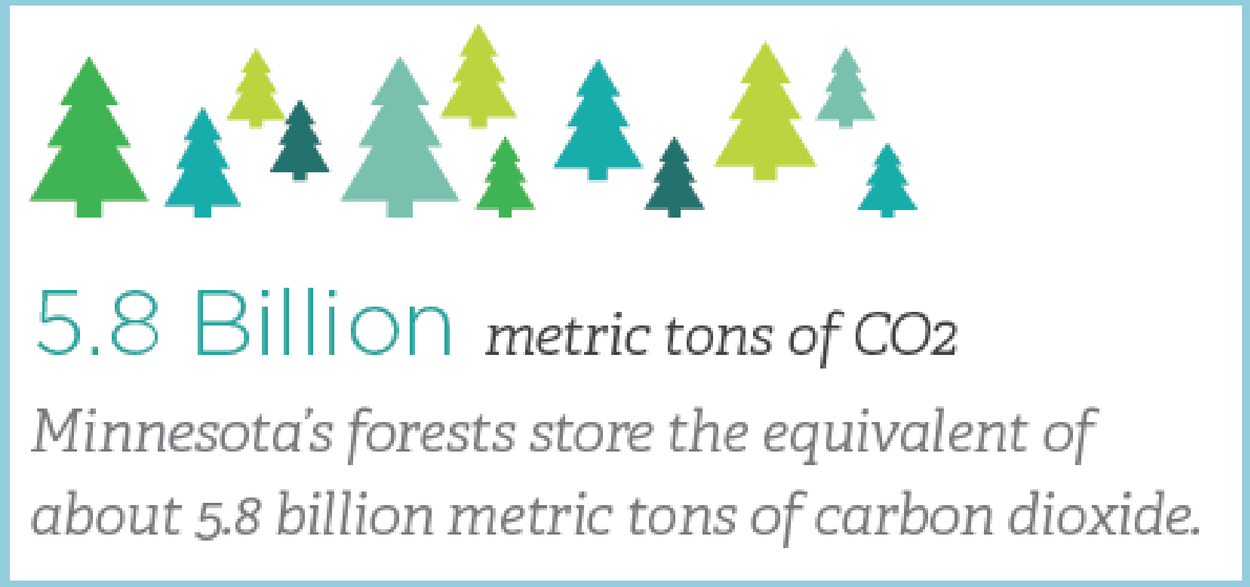


Zero Emissions Vehicles

	2030 GHG reductions (Tg CO_2e)	2015 – 2030 cumulative reductions (Tg CO_2e)	2030 Gross State Product/ 2030 Jobs
ZEV Standard (100% RE)	1.25	5.5	-$65/ -1,220
ZEV Standard (0% RE)	(0.02)	(0.42)	
Next Generation Goal is to reduce annual emissions by ~50 million metric tons of CO2e by 2030			

Forestry Sector

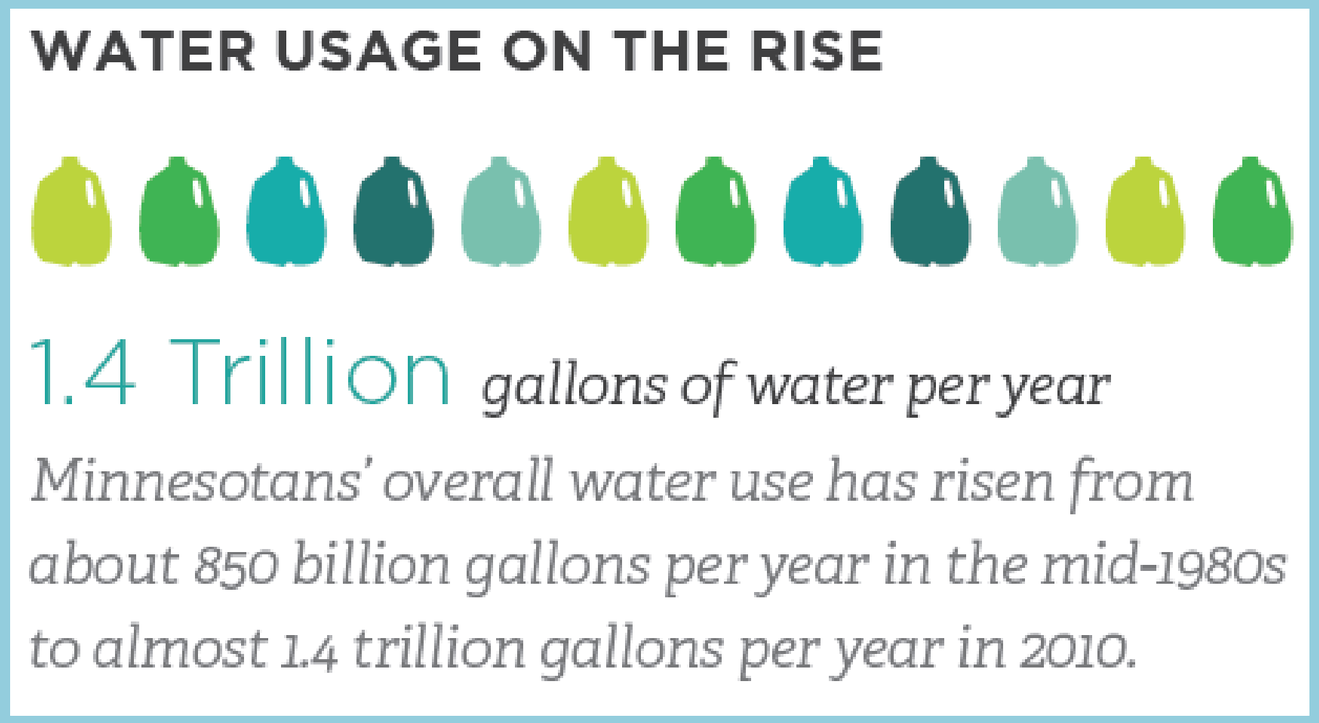


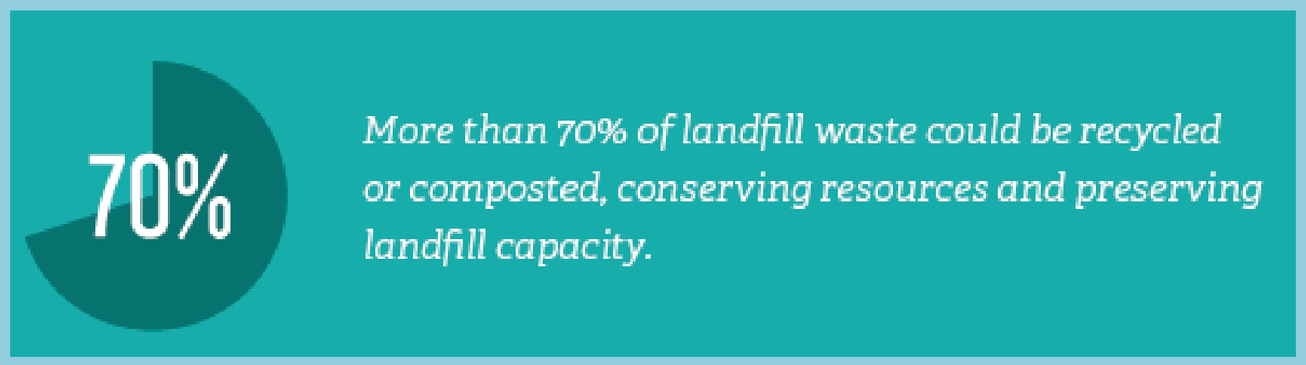


What can we do?

- Maintain or increase carbon storage in forests
- Protect wetlands and peatlands
- Protect forests
- Promote urban forestry

Waste and Water Sectors

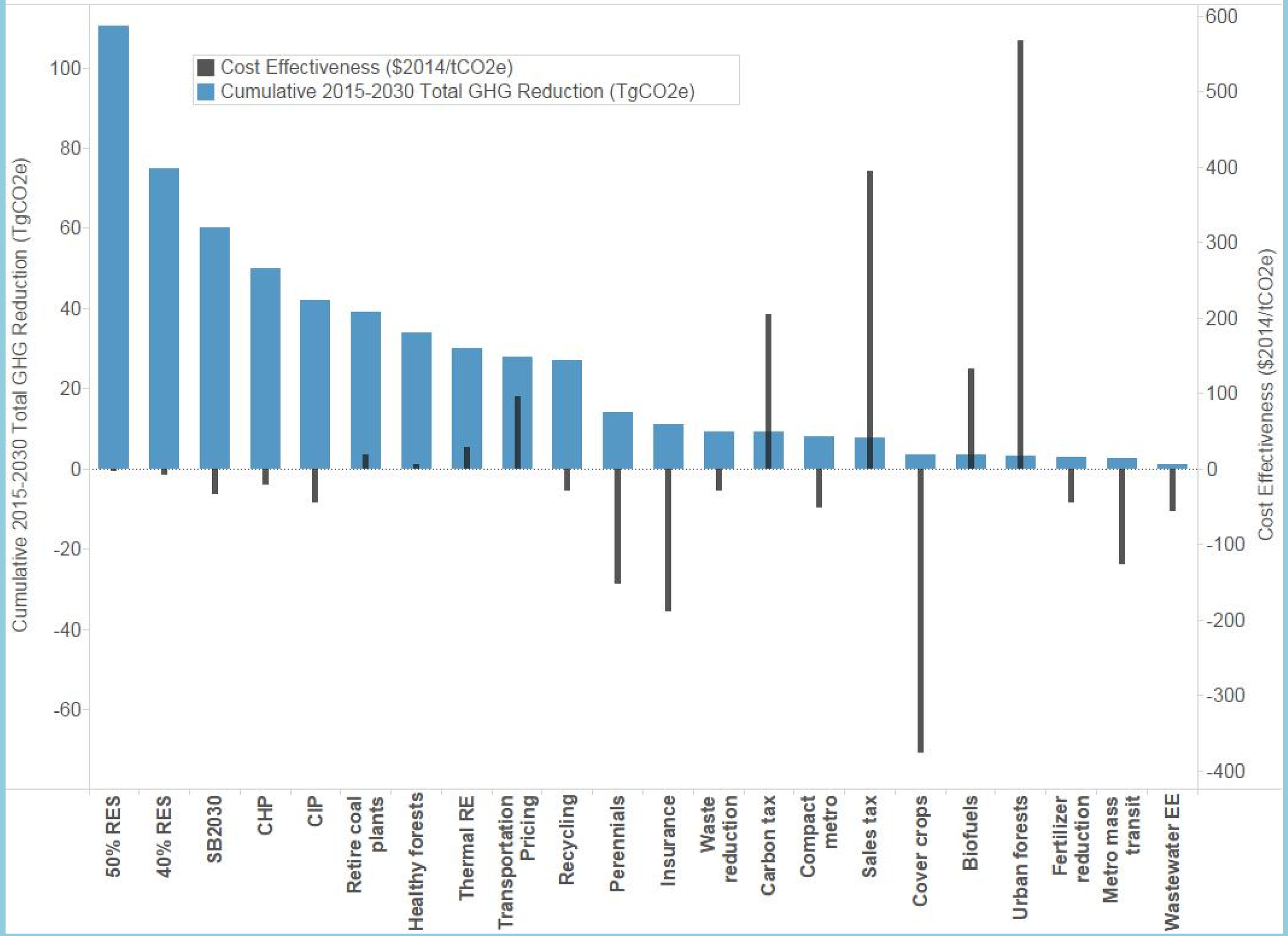




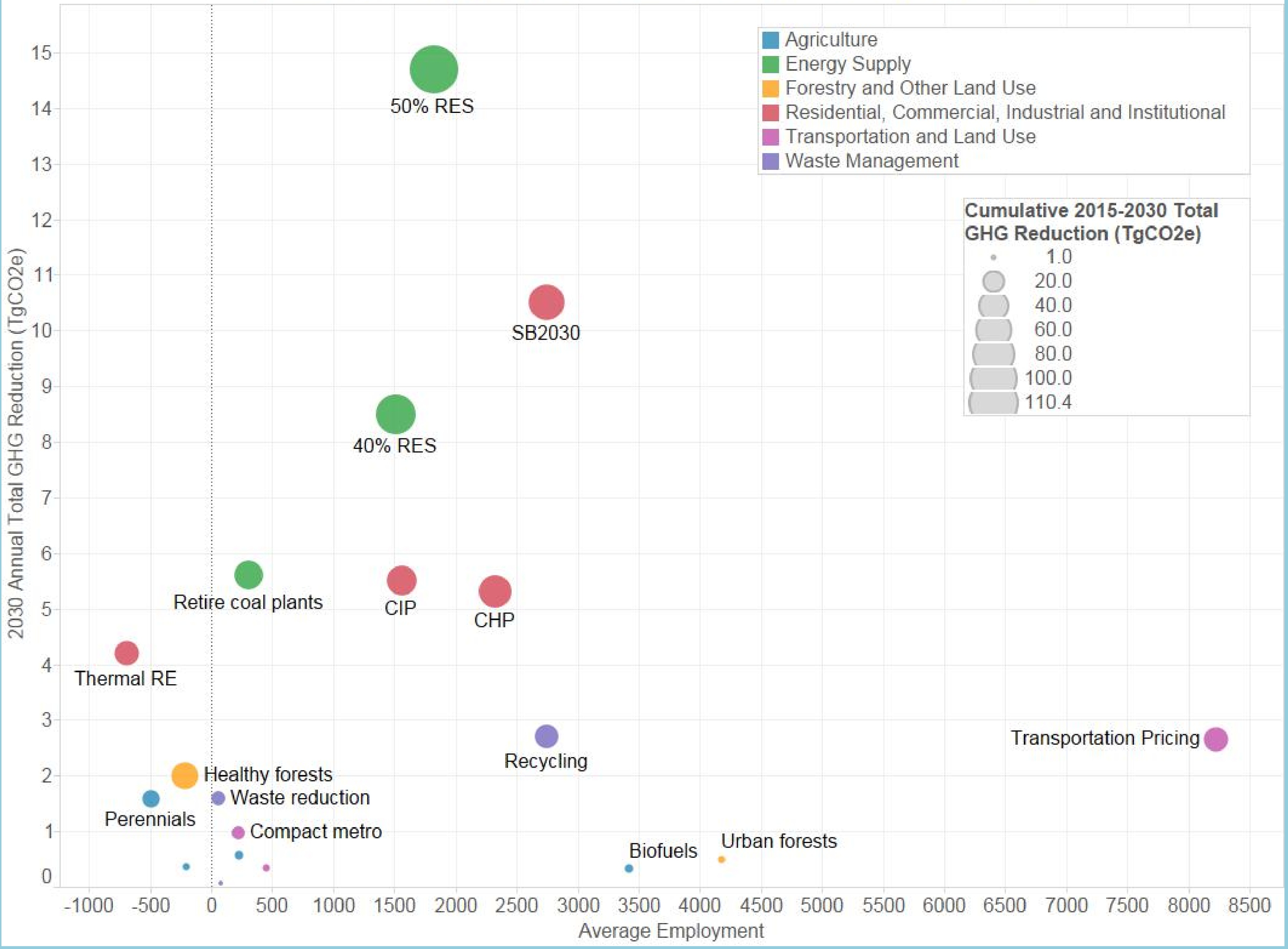
What can we do?

- Water conservation
- Decreasing the amount of material going to landfills
- Turning into energy

Cumulative greenhouse gas emission reductions and cost per ton of emission reductions from policies as stand-alone options



Greenhouse gas reductions (total in-state and out-of-state) and average employment from policies as stand-alone options



Going Forward…

- How do we value and account for co-benefits and cross-sector outcomes?
- How do we partner with local governments to maximize the reach of our policies and tailor them to communities?
- How do we partner with the private sector to support partnerships that can maximize mitigation benefits?
- How do we best align strategies?
- How can we hold ourselves accountable?

Questions?

Framing the Work We Do

Jason Willett, Director of Council Sustainability

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Vulnerabilities

Accountability

MISSION, VISION, VALUES

Thrive MSP 2040

OUTCOME

Environmentally Sustainable Region

STRATEGIES

1. Leading by example in operations
2. Helping others

SUCCESS MEASURES

Indicators (operational and regional)

ACTIONS

Work plans (operations and CCEST)

Vision...

"...a resilient region that minimizes its adverse contributions to climate change and air quality and is prepared for the challenges and opportunities of climate change."

Climate Mitigation

- Energy efficiency
- Renewable energy
- Combined heat & power
- Methane capture/use
- Industrial process improvements

Climate Adaptation

- Infrastructure planning
- Flood mitigation
- Emergency response
- Drought planning

Other Air Emissions Mitigation

- "Clean Air Minnesota"
- Health impacts
- Non-attainment

Council Strategies

Lead by example

Help others

LOCAL PLANNING HANDBOOK

- PLANNING OVERVIEW
- PLAN ELEMENTS
- COMMUNITY PAGES
- REVIEW PROCESS
- LOCAL PLANNING HIGHLIGHTS
- CONTACT US

LOCAL

Welcome to the Local
comprehensive plans.

- Provides clear
- Provides tools,
- Individualizes c
- Connects comm
- Helps commun
- Provides resou
- Highlights local

Some of the new tools

Community Pages –

Climate Change and Environmental Sustainability (CCEST)

- Coordinated communications
- Maintain Council Sustainability Plan
- Identify and track metrics
- Facilitate implementing demonstration projects at our facilities
- Support demonstration projects in the communities
- Collaborate with partners

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CCEST 2016 Work Plan

- Behavioral Campaign with ES and MT
- Council-wide lighting project
- Communicate the impact of mass transit on emissions
- Regional climate data
- Develop Urban Forestry Program
- Enhance Technical Assistance for Governments

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CCEST 2016 Work Plan

- Advance solar
- Investigate leveraging purchasing and contracting
- Improve and partner strategically with Xcel across Council
- Implement Council-wide building energy management systems
- Investigate Sewage Thermal Energy Recovery

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Strategy: Lead by Example

Operating our wastewater and transit systems to minimize emissions

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Emissions Mitigation & Climate Adaptation

Sara Smith, MCES Sustainable Operations Manager

Jeff Freeman, Metro Transit Senior Project Coordinator

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Types of Emissions

- ***Greenhouse Gases*** – atmospheric gases that contribute to climate change.
  - ***Biogenic emissions*** – occur as the result of combustion or decomposition of biological materials.
  - ***Anthropogenic emissions*** – caused or influenced by humans.
- ***Criteria Pollutants*** – air pollutants that affect ambient air quality.

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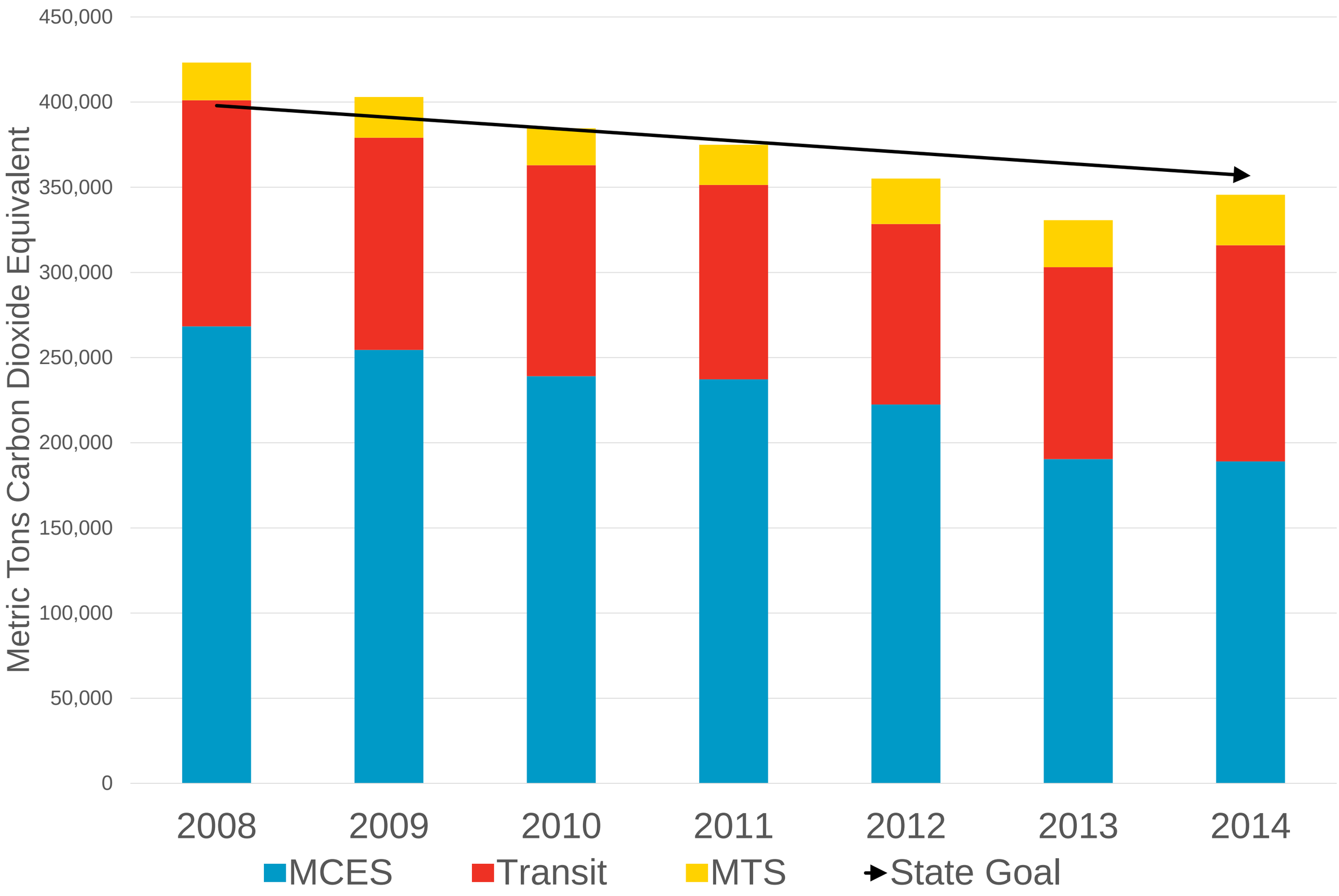
Council Greenhouse Gas Emissions



The 18% reduction in Council emissions is equivalent to....

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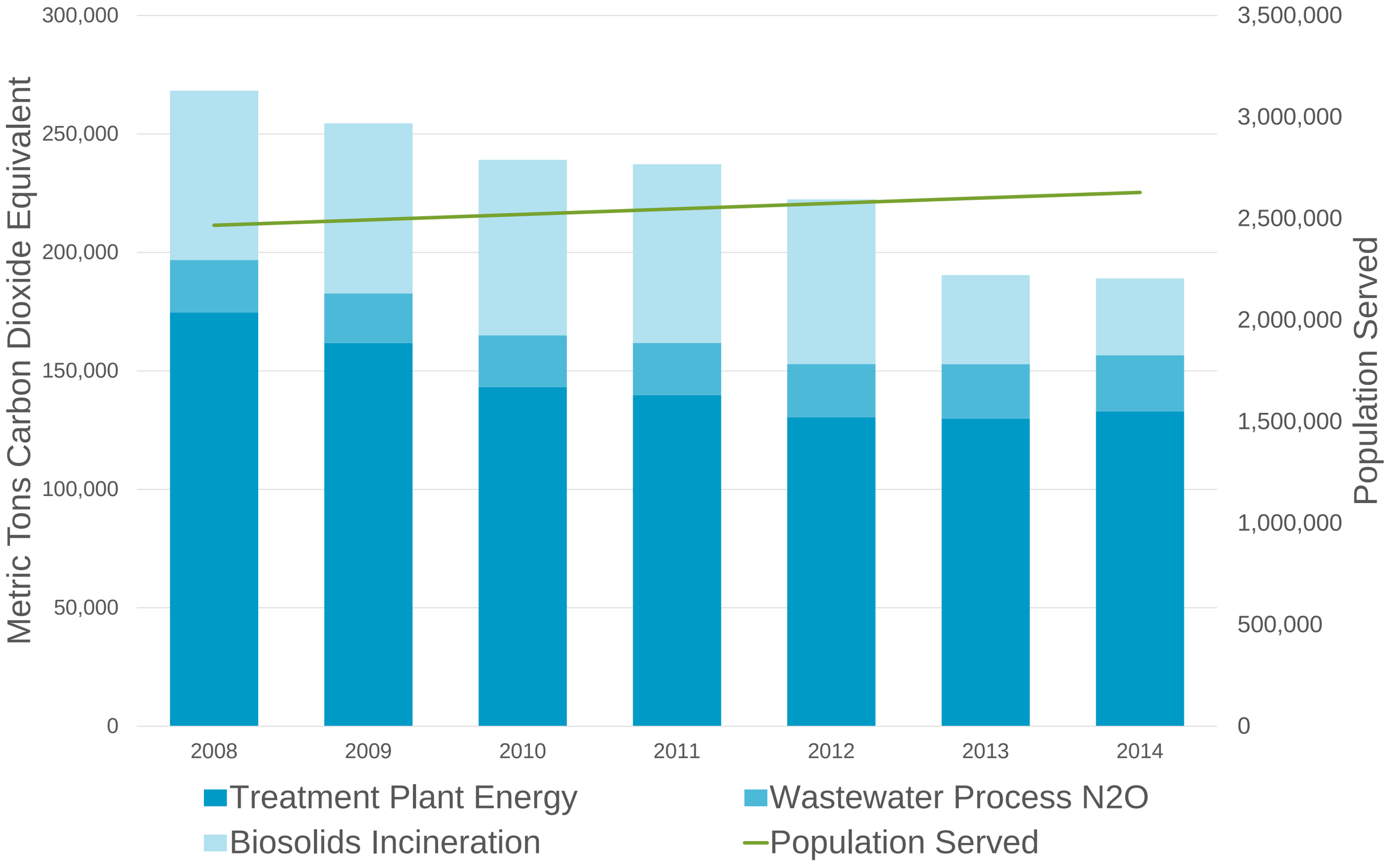
16,000 cars!

MCES Greenhouse Gas Emissions by Source



Emissions Reductions

- Reduced energy purchases by 23%
  - Lighting redesign
  - Facility recommissioning
  - Energy optimization of processes
- Reusing steam for heat and electricity
- Additional pollution controls on incinerators Solar development

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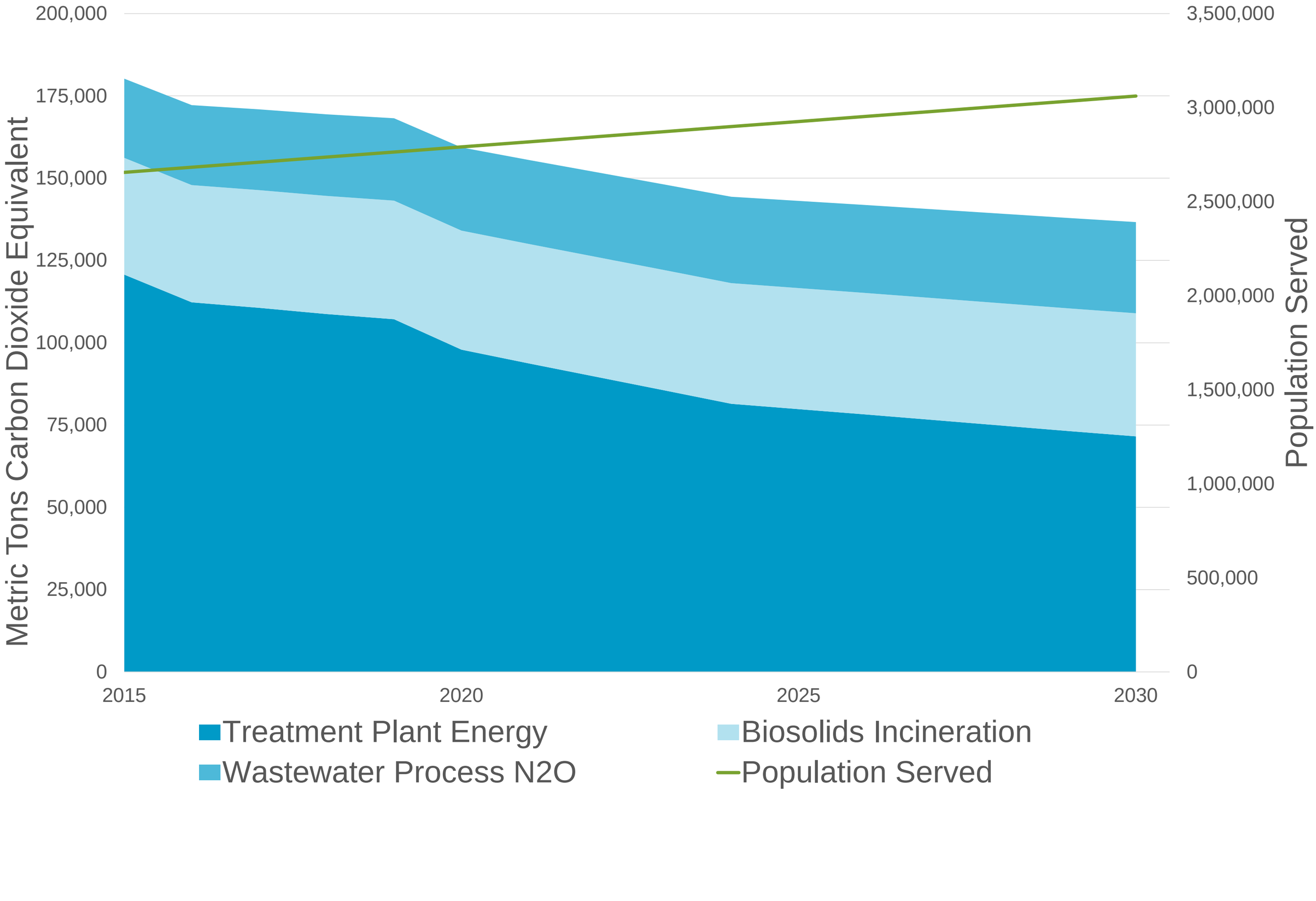
Forecasted Greenhouse Gas Emissions



MCES Future Plans

- Renewable Energy (solar, green tariff)
- Continue to consider our emissions in future plans
- Meet permitting requirements

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Climate Adaptation: MCES

- Stormwater demonstration projects
- Inflow and Infiltration program
- Build up flood walls at plants

Transit is Sustainable

- Displaces single occupancy vehicles
- Generates less than half of the emissions.
- In 2014,140,000 metric ton net savings.
- Moving our understanding forward:
  - Fine tuning the metrics
  - Developing individual modal (Rail, Bus, Commuter Rail) components
  - Creating site and mode specific scorecards

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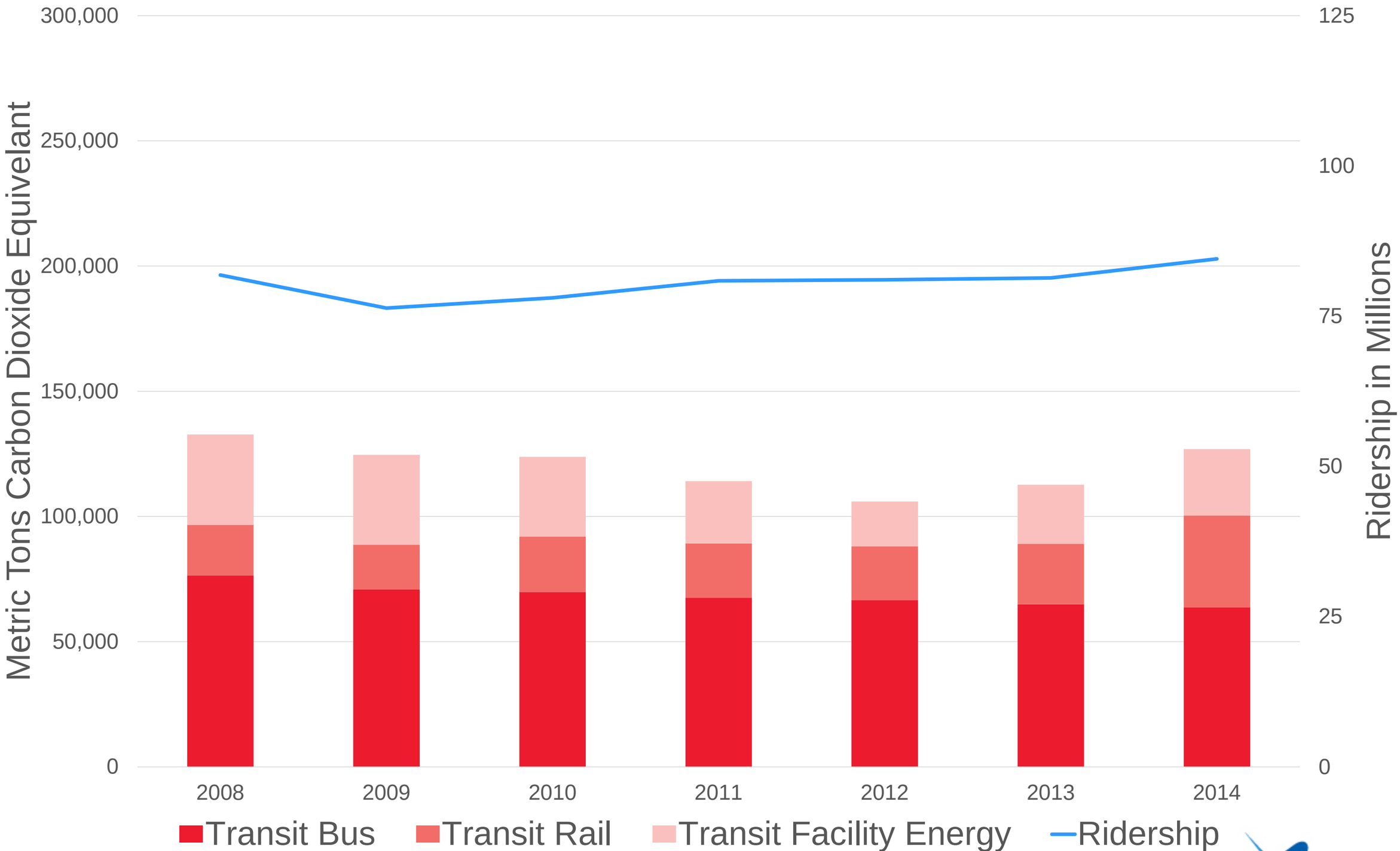
Metro Transit Greenhouse Gas Emissions



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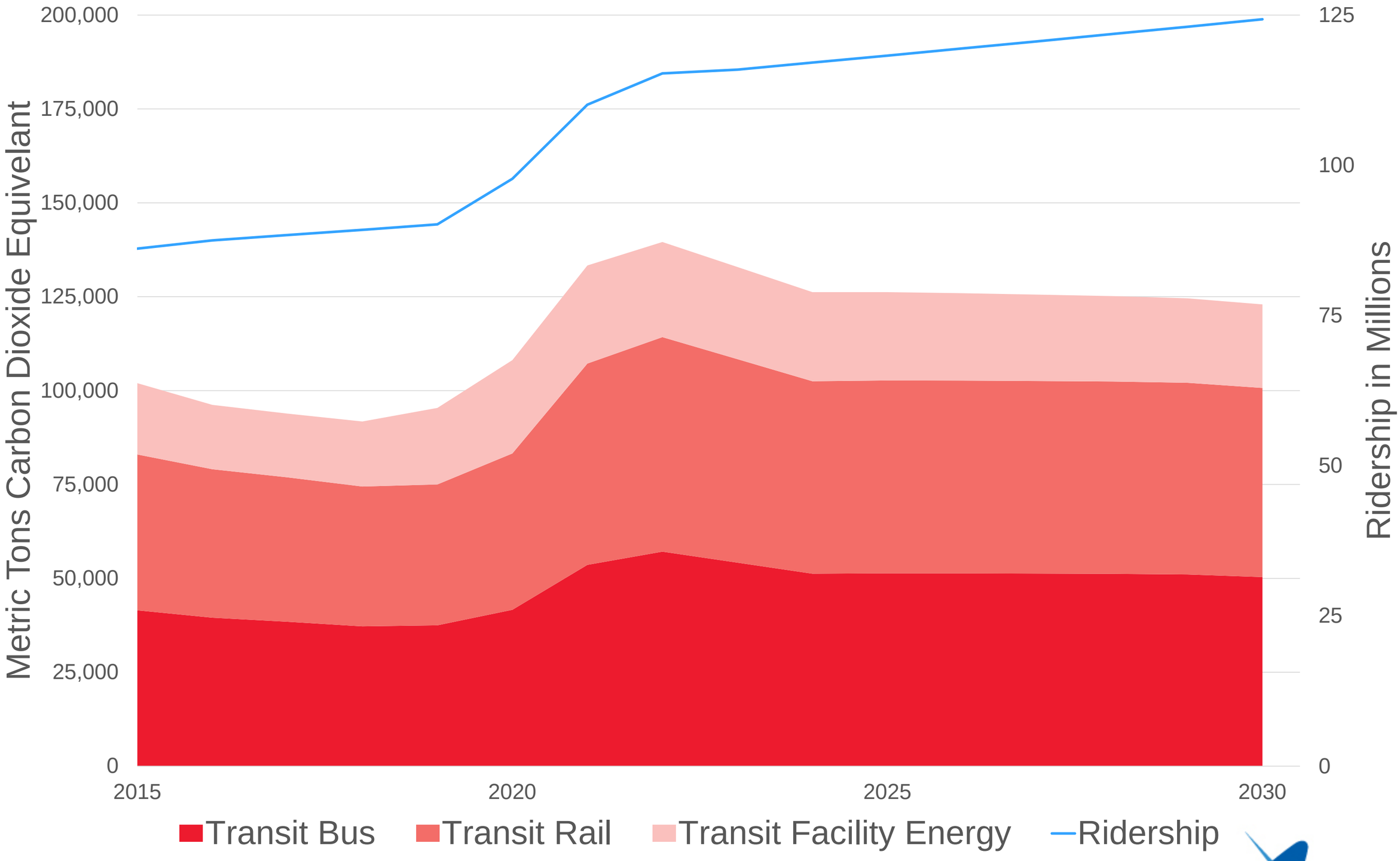
Forecasted Transit Greenhouse Gas Emissions



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Fleet Projects

- **Electric Bus**
  - 2015 Manufacturer and transit agency visits
  - 2015 Bus demonstrations
  - Operational modeling
  - Economic modeling

- **Electric staff pool vehicles**
  - Pilot project
  - Two 2016 Nissan Leafs
  - Positive economic analysis
  - 100+ MPG Equivalency

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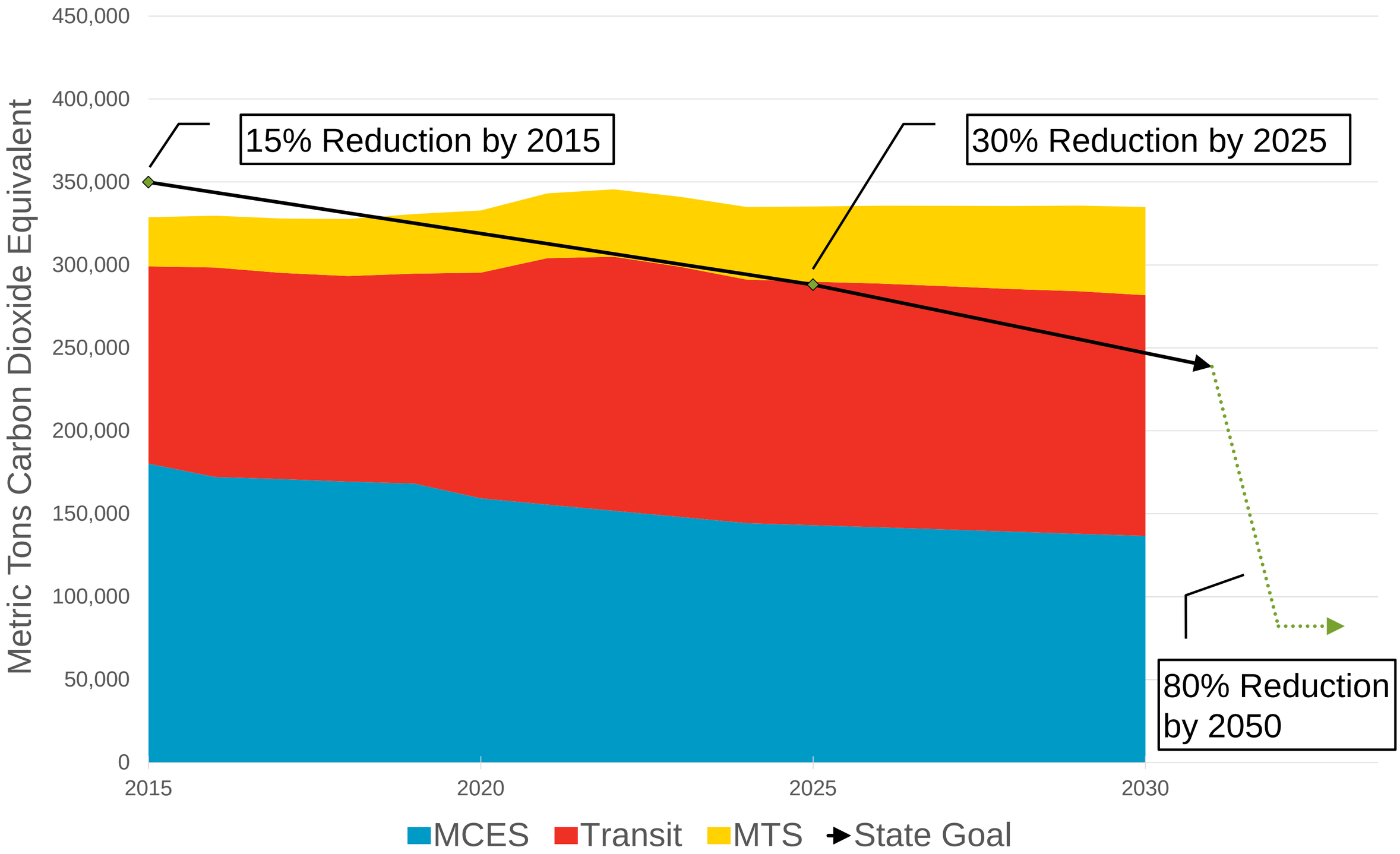
Council-wide: Forecasted Greenhouse Gas Emissions



Leading by Collaboration & Helping Local Governments

Lisa Barajas, Council Manager of Local Planning Assistance

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Collaborations

- To support region-wide and state-level efforts
- To support efforts of local units of government

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Regional & State Level Collaborations

- Environmental Quality Board
  - Climate Strategies and Economic Opportunities
- State (Interagency) Energy and Climate Team
- Interagency Climate Adaptation Team
- Metropolitan Energy Policy Coalition
- Clean Air Minnesota
- Community Solar Gardens
- Support state agencies in their emissions reporting
- ...and others!

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Supporting Local Units of Government

Climate Vulnerability Assessment

Technical Assistance to Local Gov’ts

Stormwater, Efficiency, & I/I Grants

Urban Forestry Program Development

Community-Level Data for the Region

Technical Assistance

Technical Assistance to Local Gov'ts

PlanIt

LOCAL PLANNING HANDBOOK

PLANNING OVERVIEW

PLAN ELEMENTS

RESILIENCE

This section provides resources for communities working to integrate strategies into local comprehensive plans to be more resilient in the face of a changing climate. As communities adjust to increasingly extreme weather events, stress on public facilities, and higher costs of services, there is growing need to not only plan for these events, but to also reduce the impacts th conscious climate adaptation iency also considers reducing hat the extent of climate o adapt and become resilient.

climate change as part of te **mitigation** strategies such as promoting land use and development patterns will s adopted greenhouse gas emissions goals. Climate **adaptation** strategies such as at require additional storm water management capacity acknowledge the new and ange.

are environmental; societal and economic challenges will need to be addressed to respond, adapt, and thrive under changing conditions. Consideration of ulnerabilities - will strengthen your community's ability to prepare for and cludes planning for more severe weather and prolonged heatwaves, for improved economic strength and diversity. As you may recognize from these examples, dy includes in its plan and in actions it has already undertaken, address some

MENT

D RESOURCES

Mapping

FAQs

Best Practices

Forms & Templates

MAPLEWOOD

LOCAL PLANNING HANDBOOK

LIVING STREETS POLICY AND SUSTAINABILITY EFFORTS

Maplewood has a history of remarkable sustainability projects! It was one of the first cities in Minnesota to begin installing rain gardens as part of street projects. The City now has more than 700 residential rain gardens, which manage stormwater runoff. Maplewood has been nationally recognized as a leader for its many sustainability efforts, which includes the City's **Living Streets Policy**, adopted in 2013.

Living Streets are complete green streets that provide for multiple modes of transportation and reduce environmental impacts by having less impervious surfaces, managing stormwater, and providing shade. Living Streets enhance walking or biking conditions, improve safety and security of streets, calm traffic, create livable neighborhoods, improve water quality, enhance urban forest, reduce road lifecycle costs, and improve neighborhood aesthetics.

WHAT MAY HELP OTHER COMMUNITIES?

Partnerships
The City indicates that their sustainability and Living Street policy successes are the result of support and contributions from all levels and departments within the City and through strong partnerships. Implementation of the successful Living Streets Policy: **Bartelmy/Meyer Living Streets Demonstration Project** was completed through partnership with **Ramsey-Washington Metro Watershed District** which provided funding, grants, technical assistance, and educational resources for the project. The project has been recognized for being groundbreaking for its efforts to incorporate livable communities' elements, public safety, traffic calming, and aesthetic improvements – as well as for partnerships between the City and Watershed District to accomplish mutual goals.

The City has other important partnerships that have advanced sustainability, including its partnership with University of Minnesota, and the capstone "**Sustainable Maplewood**" project, which studied efficient use of land through low-impact development, stormwater best management practices, and the protection of natural resources.

COMMUNITY HIGHLIGHT

COUNTY: Ramsey
POPULATION: 39,765

Maplewood is home to:
- Over 700 residential rain-gardens
- Nature Center that leads the community in environmental related issues and learning
- A culture of sustainability
- Environmental Neighborhood Groups
- Environmental Newsletter

CONTACT THE CITY:

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Environmental Planner
(651) 249-2304
shann.finwall@ci.maplewood.mn.us

Steve Love, PE, PLS
Assistant City Engineer
(651) 249-2404
steve.love@ci.maplewood.mn.us

OTHER RESOURCES:
- Green Corps
- GreenStep Cities
- Regional Indicators Initiative
- B3 Benchmarking

The City is a national leader in sustainability efforts. The Living Streets Policy is only one of the many ways that City encourages sustainable practices.

For street reconstruction projects, residents can select from a variety of garden designs, such as Easy Shrub, Sunny Garden, and Jazz Brights.

The Living Streets project in the Bartelmy-Meyer Neighborhood includes etched raindrops in the sidewalk adjacent to each raingarden.

Climate Vulnerability Assessment

Assessing the Vulnerability of the Built Environment

Climate impacts related to:

- **Water** Flooding and Inundation
- **Temperature**
  - Freeze-thaw cycles
  - Urban heat island

Two pronged approach:

1. Assess of our regional systems and assets
   - Strategies to address vulnerabilities
2. Develop suggested strategies applicable for local governments

Any Questions?

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