CLIMATE ACTION KC

CREATING CLIMATE RESILIENCE IN KANSAS CITY

Partnership

Mike Kelly
Mayor
City of Roeland Park, Kansas

Lindsey Constance
Councilwoman
City of Shawnee, Kansas

CLIMATE ACTION KC

MARC
Mid-America Regional Council

IUC
INTERNATIONAL URBAN COOPERATION
European Union-North America

A European Union Programme

MindMixer

climateactionkc.mindmixer.com

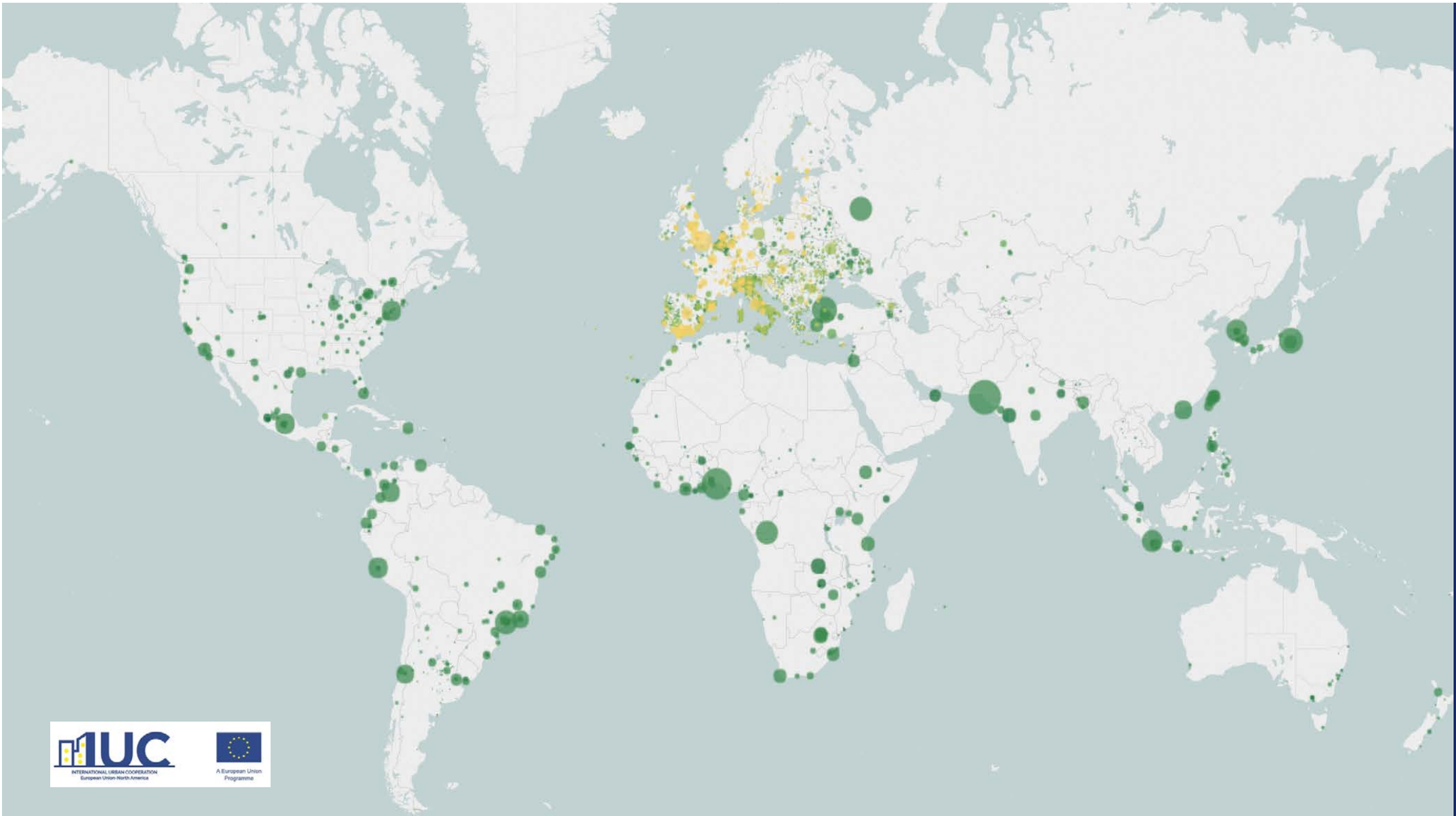
Setting the Context

Bob Berkebile, FAIA
Principal Emeritus
BNIM

Global Covenant of Mayors

Ryan Glancy
Technical Coordinator
International Urban Cooperation

Global Covenant of Mayors



10,000+ CITIES

130+ COUNTRIES

800+ MILLION PEOPLE

> 10% OF THE GLOBAL POPULATION

100+ GLOBAL PARTNERS

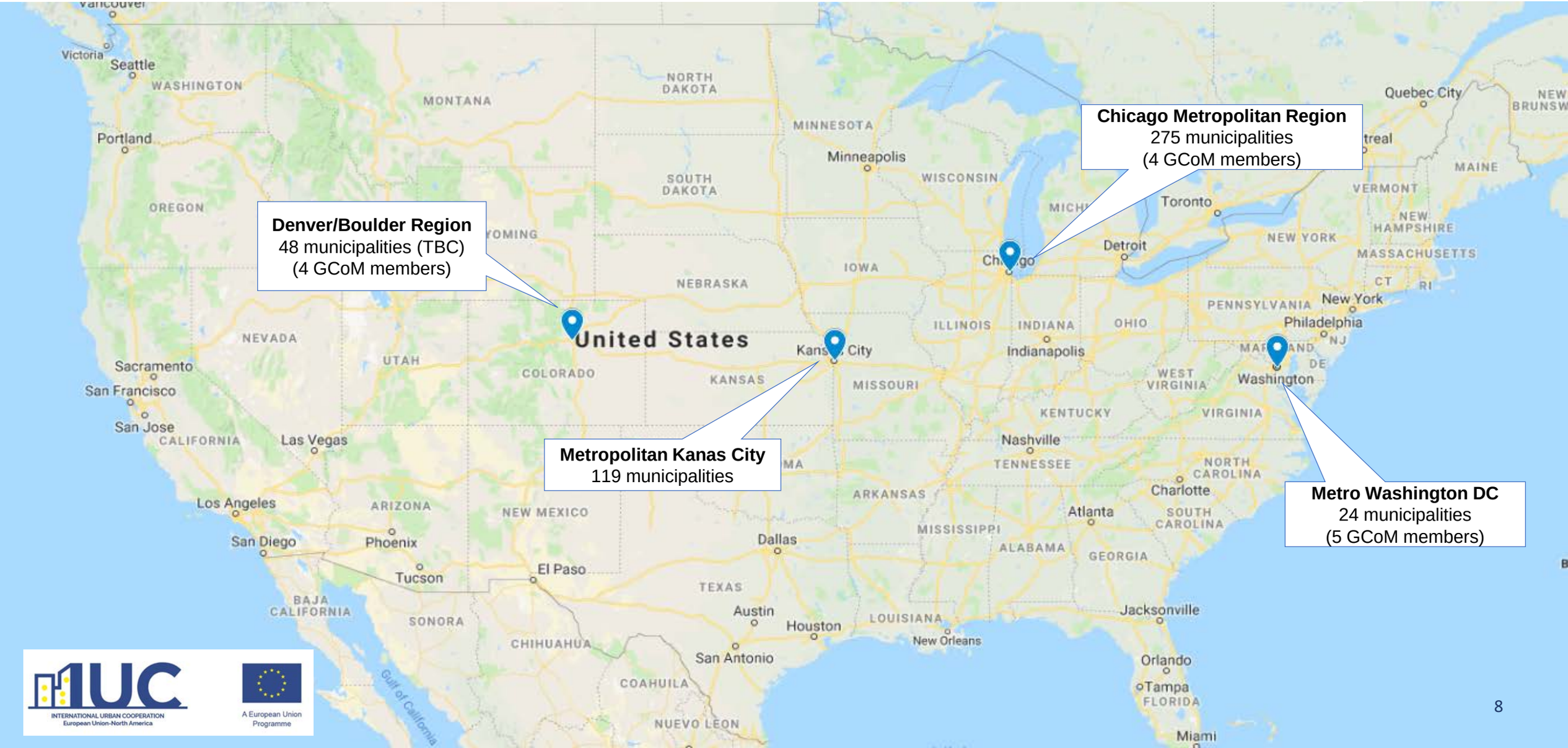
METRO-SCALE CLIMATE LEADERS

- **Support from the European Union** through the 'International Urban Cooperation' program
- **Technical support** in the form of workshops and online assistance to develop:
  - ✓ GHG inventory
  - ✓ Climate risk & vulnerability assessment
  - ✓ Target setting and scenario development
  - ✓ Mitigation and adaptation action identification and prioritization
  - ✓ Drafting Climate Action Plan document
- **Knowledge exchange** between US regions and other regions internationally (i.e. Europe)
- **Promotion** of regional case studies through GCoM

IUC
INTERNATIONAL URBAN COOPERATION
European Union-North America

A European Union Programme

Metro-Scale Climate Leaders



1. Greenhouse Gas Inventory
2. Climate Risk & Vulnerability Assessment
3. Climate Action Plan

Greenhouse Gas Emissions Inventory

Doug Norsby
Air Quality Planner
MARC

Greenhouse Gas Emissions Inventory

Purpose: A Greenhouse Gas (GHG) Inventory is created to assess a region's carbon footprint and identify the areas of largest impact. Creating a GHG inventory is the first step in identifying mitigation targets and actions.

GHG inventories include a set of regional emission factors, activity data across a variety of sectors, and total GHG emissions for the region.

GHG Inventory Sectors

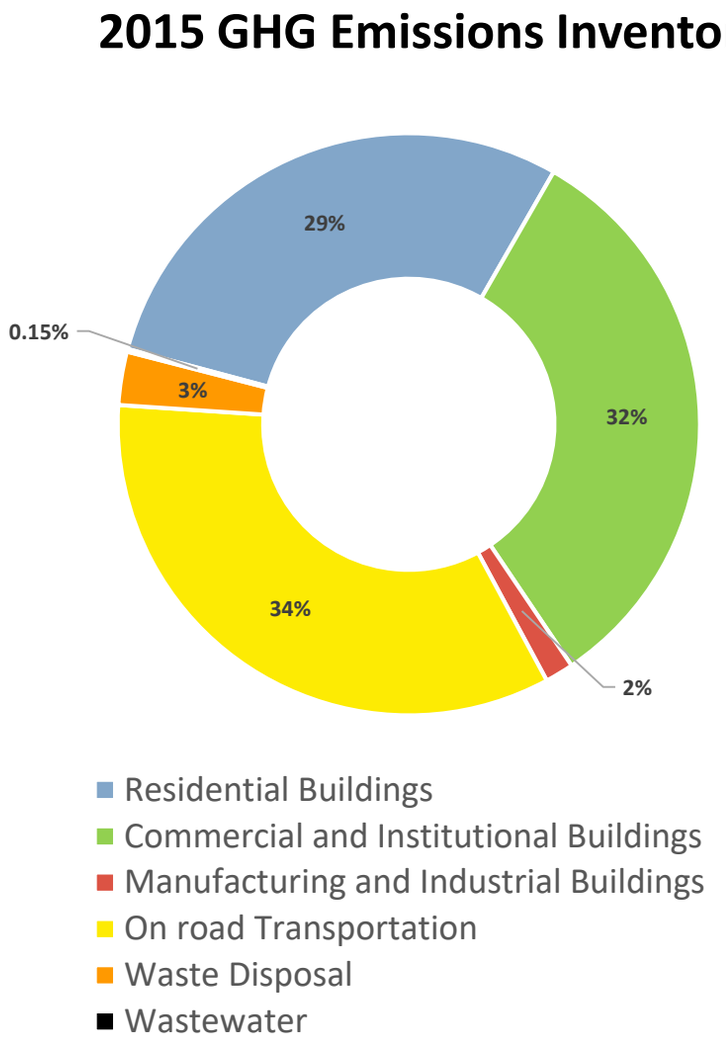
Includes:
Greenhouse gas emissions from energy, transportation, and waste in the Region

Stationary Energy	Transportation	Waste
Building and facility energy consumption: natural gas, steam, and grid electricity.	**On-road** travel, such as private automobiles, commercial trucks, and buses.	**Solid waste** generated within the regional boundary that is disposed within the regional boundary. **Wastewater** generated within the regional boundary.

GHG Inventory Partners and Sources

Stationary Energy	Transportation	Waste
Natural Gas and Steam - Spire Energy - Kansas Gas Service (ONE Gas) - Atmos Energy - Veolia **Electricity** - KCP&L - IP&L - Westar Energy - KCBPU - City of Gardner	**Passenger Vehicles**, **Freight Trucks,** and **Public Transit** modeled in the MARC Regional Transportation Model	**Waste disposal tons** sent to in- and out-of-region landfills

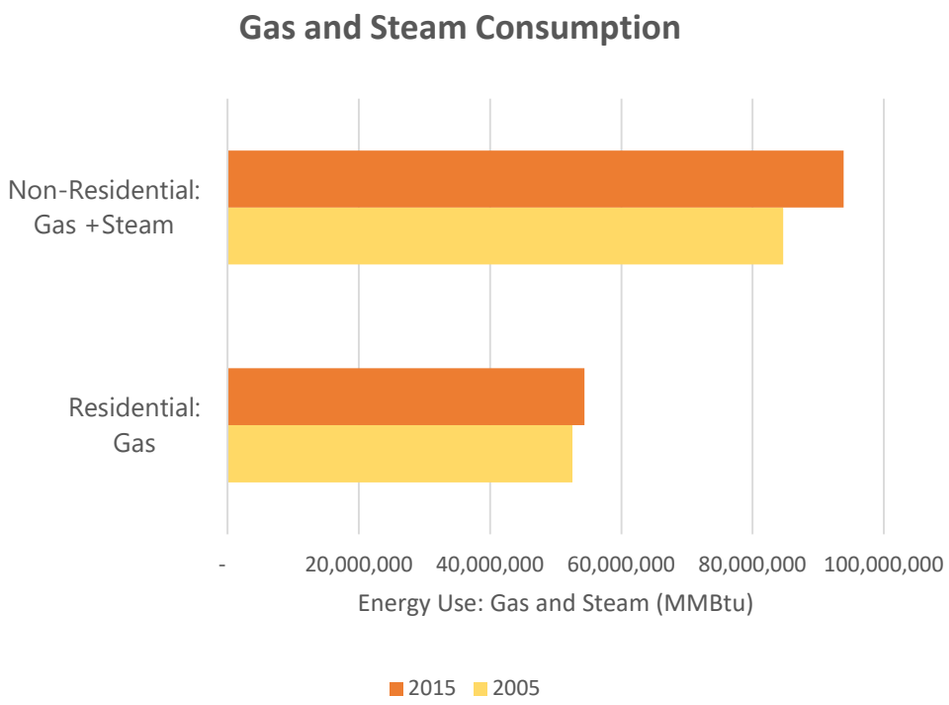
2015 GHG Emissions Inventory

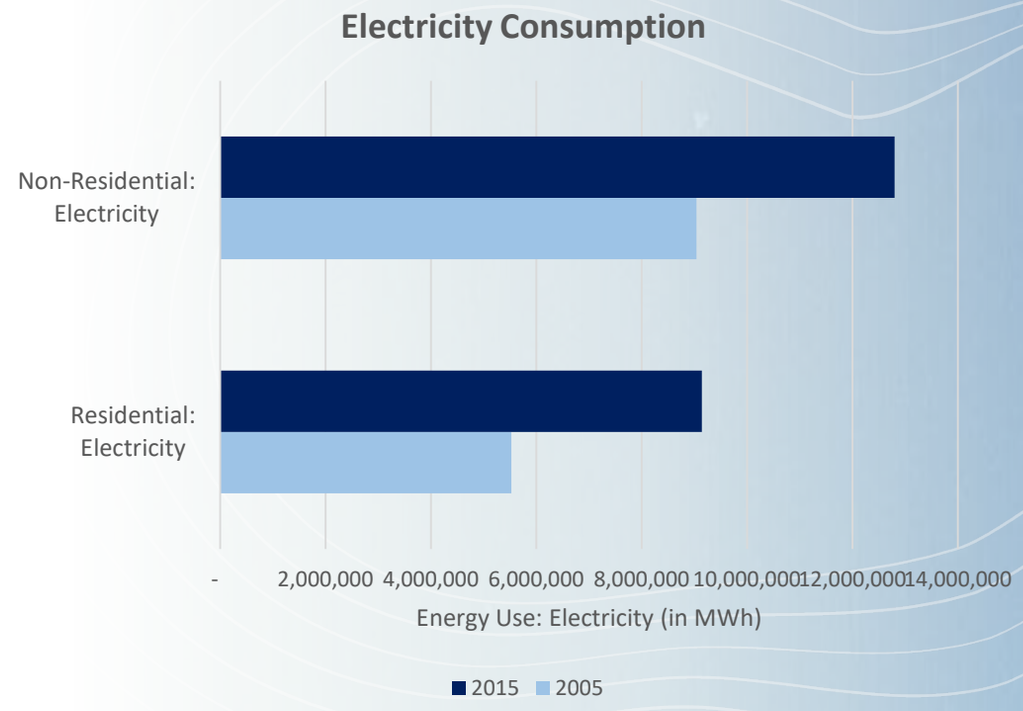


2015 GHG Emissions for the MARC Region are estimated for the following sectors:

- Stationary Energy
  - Residential Buildings
  - Commercial and Institutional Buildings
  - Manufacturing Buildings
- Transportation
  - On-road Transportation
- Solid Waste
  - Waste Disposal
  - Wastewater

Energy Consumption





Since 2005, energy (natural gas and steam) consumption in the MARC region has increased by 8% and electricity consumption has increased by 51%.

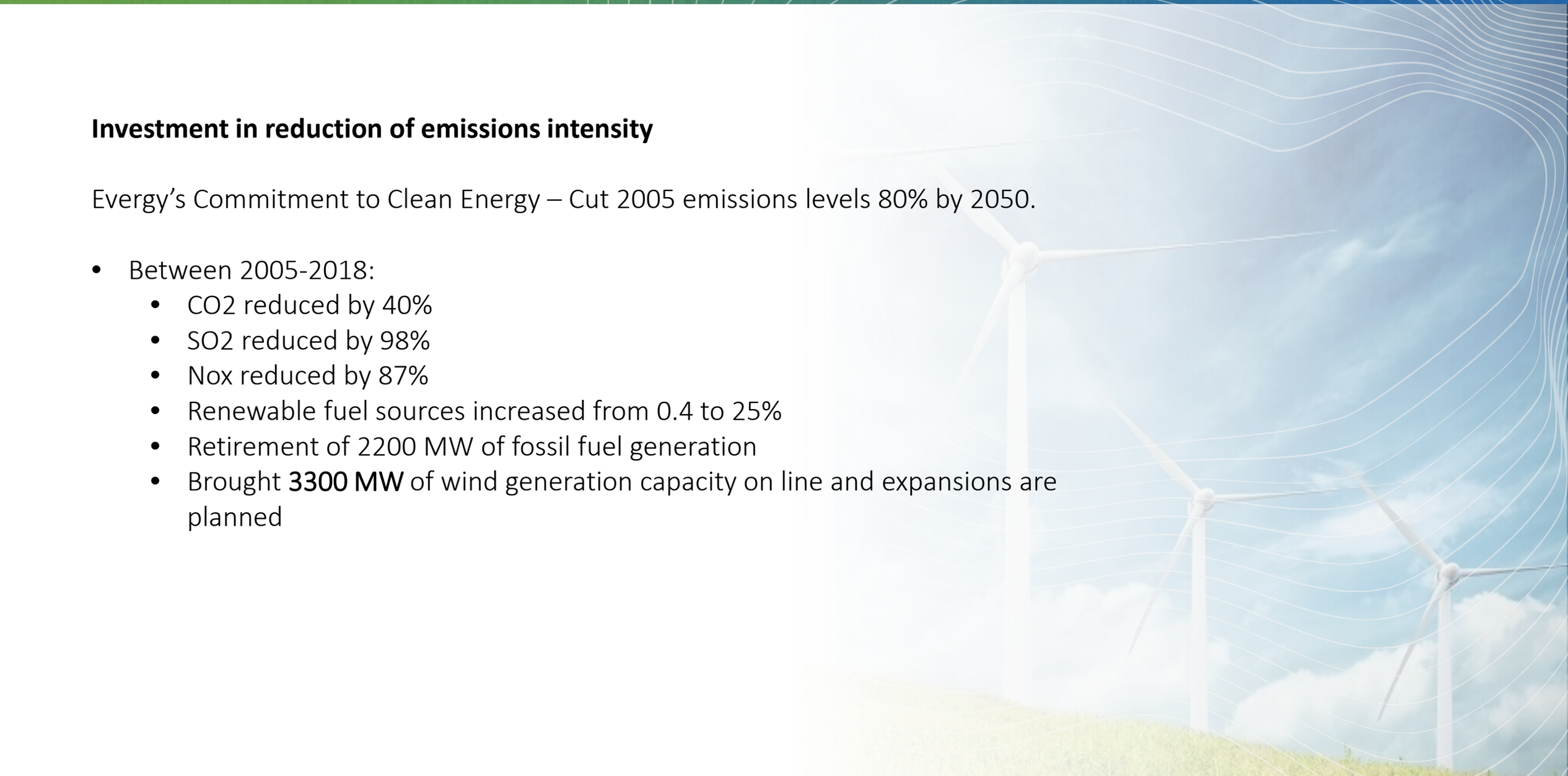
The emission intensity of the electricity grid in both Kansas and Missouri has reduced by roughly 17%.

Utility Investment

Investment in reduction of emissions intensity

Evergy's Commitment to Clean Energy – Cut 2005 emissions levels 80% by 2050.

- Between 2005-2018:
  - CO2 reduced by 40%
  - SO2 reduced by 98%
  - Nox reduced by 87%
  - Renewable fuel sources increased from 0.4 to 25%
  - Retirement of 2200 MW of fossil fuel generation
  - Brought 3300 MW of wind generation capacity on line and expansions are planned



Utility Investment

Commitment to expanding energy efficiency and conservation

Evergy

- Energy Efficiency programs: Annual energy savings of 1 million MW-hr between 2005 and 2018
- Subscriptions available to support wind and solar energy
- Credits available for solar installations returning power to the grid
- Established network of 1100 EV charging stations with support for over 10,000 vehicles

Spire

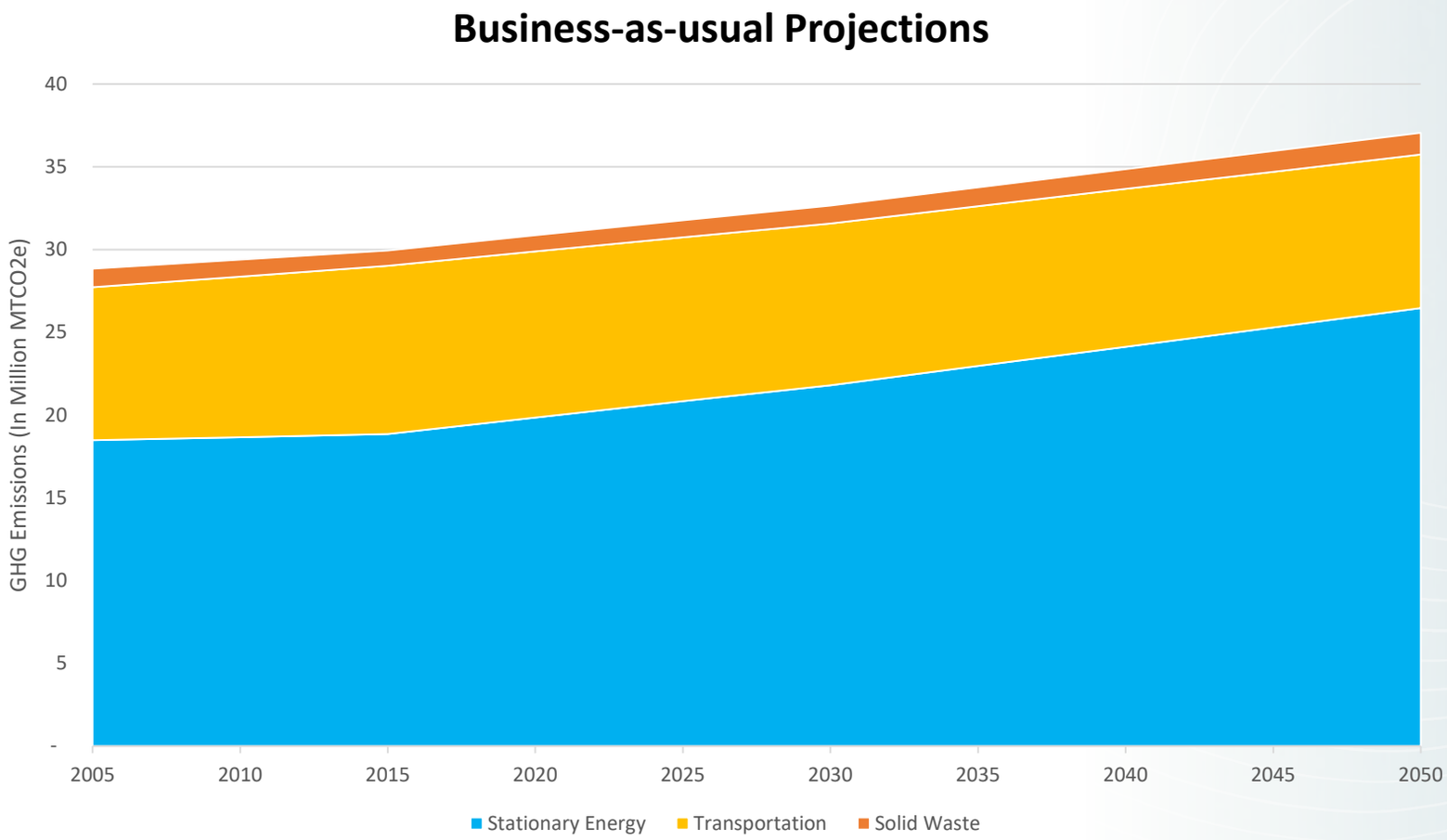
- Rebates available for high-efficiency appliance purchases
- Weatherization assistance programs for low-income families
- Collaborative energy efficiency program support with Evergy
- 2500 miles of aging pipeline replaced across Missouri between 2003 and 2018 at a cost of $1B

Business as Usual Approach

Purpose: A Business as Usual (BAU) projection uses locally specific parameters like population growth or GDP growth projections to model future emissions in the Region. A BAU projection allows us to see what will happen to GHG emissions in the region if we do not act.

Includes: The 2015 GHG emissions inventory is scaled to 2050 based on a combination of projected population growth and transportation emissions in the region.

Business as Usual Projections



GHG emissions are estimated to increase by 28% from 2005 base year to 37 Million MTCO2e by 2050, if no actions are taken.

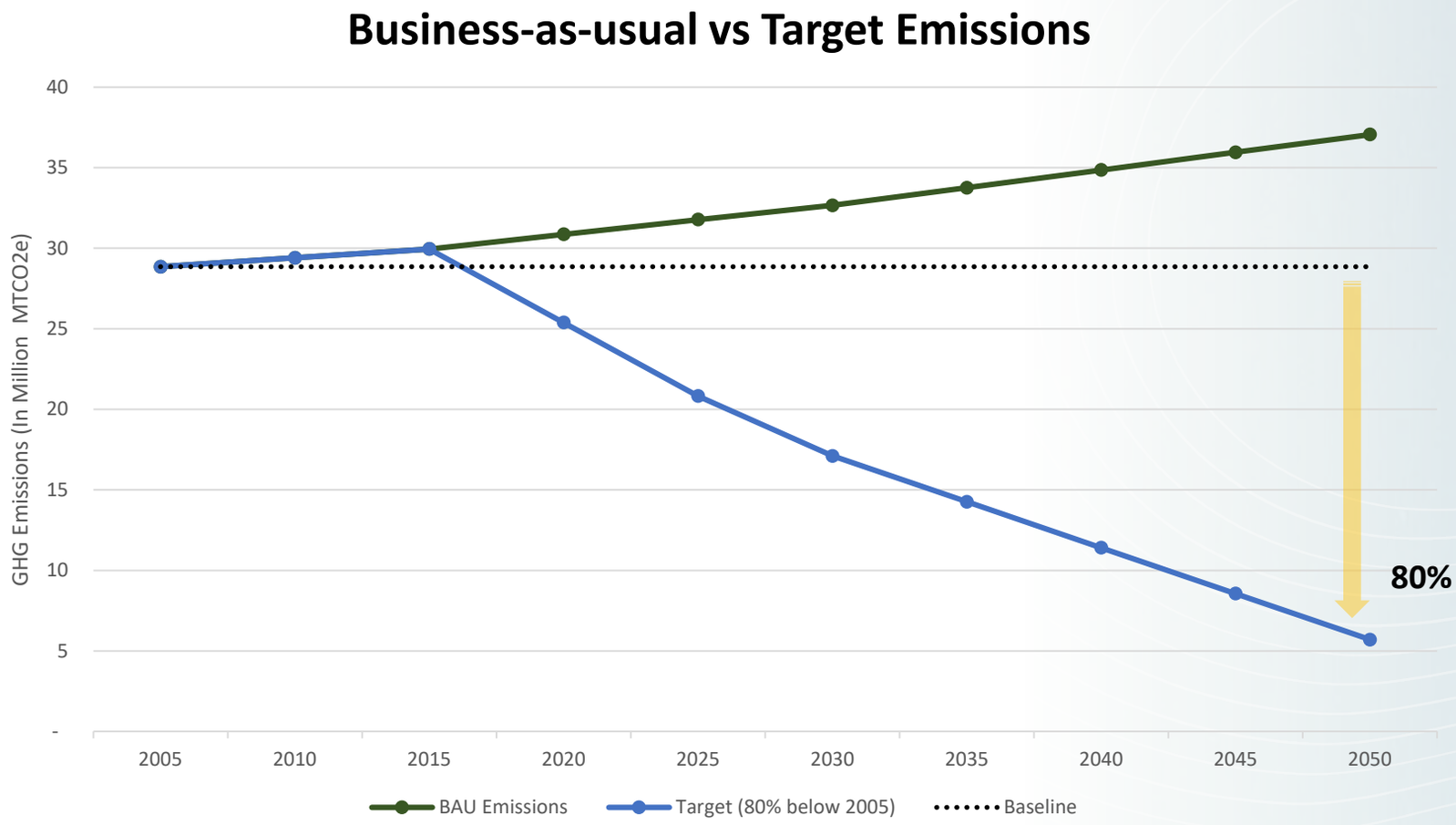
These projections are based on current population and transportation emissions forecasts for the MARC Region.

Potential Regional Targets

To comply with the Paris Climate Agreement, MARC hopes to set three mitigation targets with 2005 as the base year. These regional targets aim to achieve:

- 27% reduction by 2025
- 40% reduction by 2030
- 80% reduction by 2050

Business as Usual Projections



The region needs to reduce GHG emissions to 5.7 Million MTCO2e by 2050, to achieve 80% reduction below the 2005 baseline.

GHG Inventory Findings

Major emission sources:

- Energy:
  - Commercial buildings, residential buildings
  - Electricity use
- Transportation: passenger vehicles
- Waste: Organic Waste

Trends between 2005 and 2015:

- Emissions have increased 4% in the region, while the population has increased by 10%
- Per capita emissions have declined by 6%
- Solid waste disposal has reduced from 2.4 Million tons to 1.9 Million metric tons

Climate Risk & Vulnerability Assessment

Karen Clawson, AICP
Principal Planner
MARC

Climate Risk & Vulnerability Assessment

Purpose: A Climate Risk and Vulnerability Assessment is created to assess a region's climate risk, the risk level related to regional hazards of greatest concern, our vulnerabilities and our capacity to adapt and bounce forward.

The assessment will inform plans and decisions that aim to reduce these vulnerabilities, take advantage of opportunities, and improve our collective resilience.

Adaptation: Any adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects which moderates harm or exploits beneficial opportunities. (IPPC)

Community Profile

2,137,829
Total Population

909,782
Total Housing Units

7%
Under 5

20%
5-19 yrs

60%
20-64 yrs

14%
65+ yrs

4,893
Land area (sq. mi.)

2%
Water

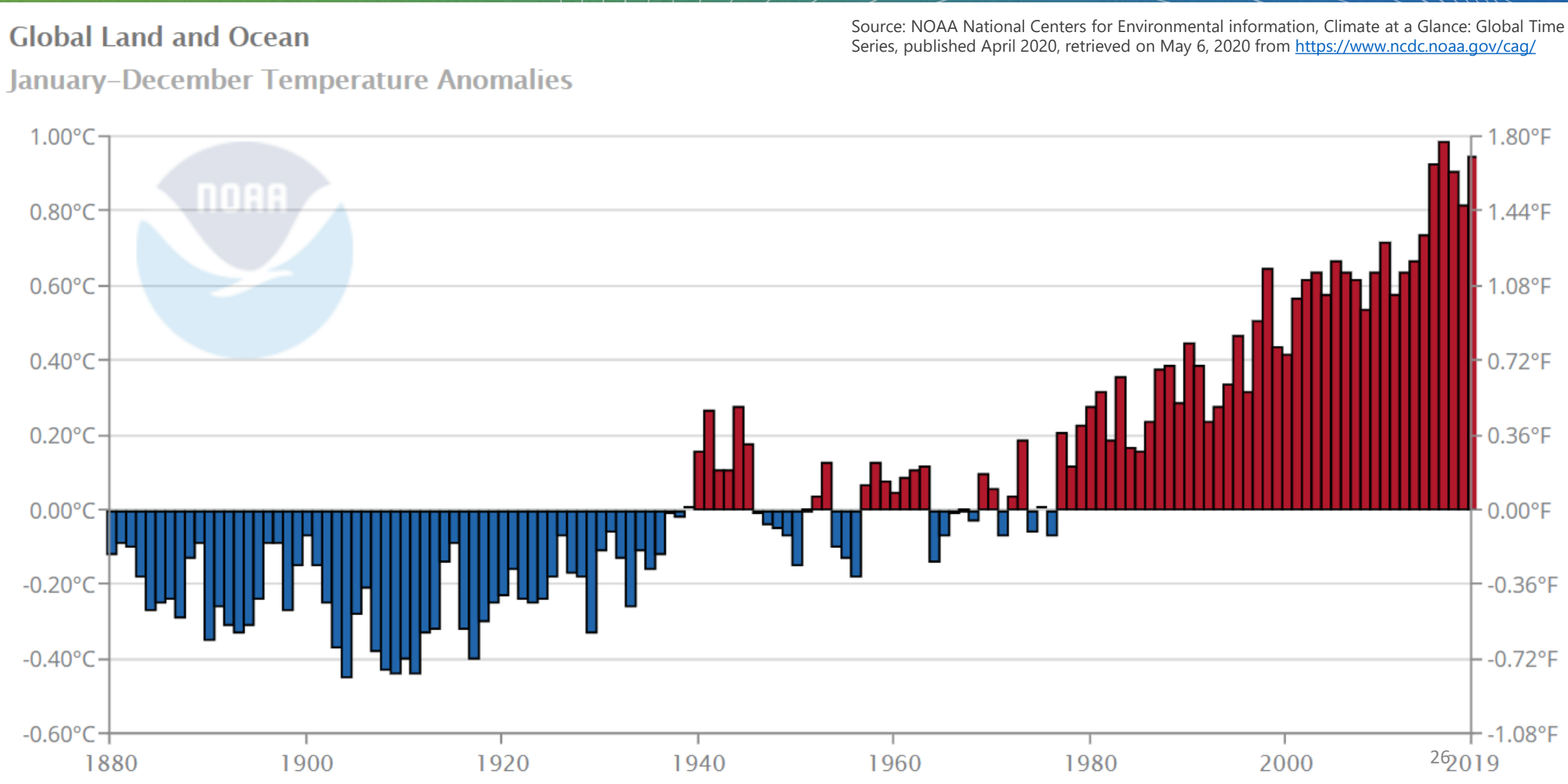
37
Median age

11%
Living in poverty

70%
White only

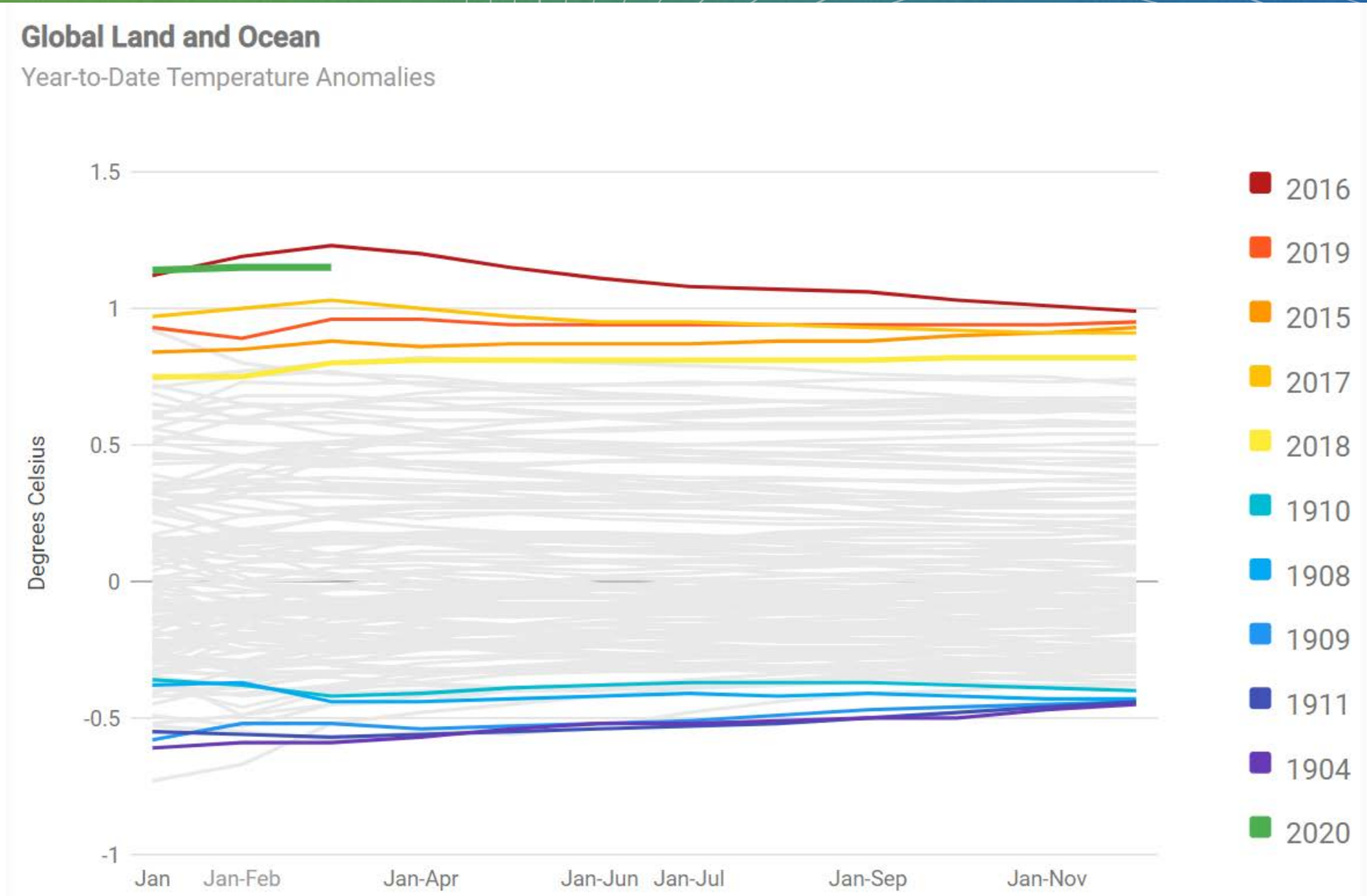
30%
Non-white

Climate Outlook



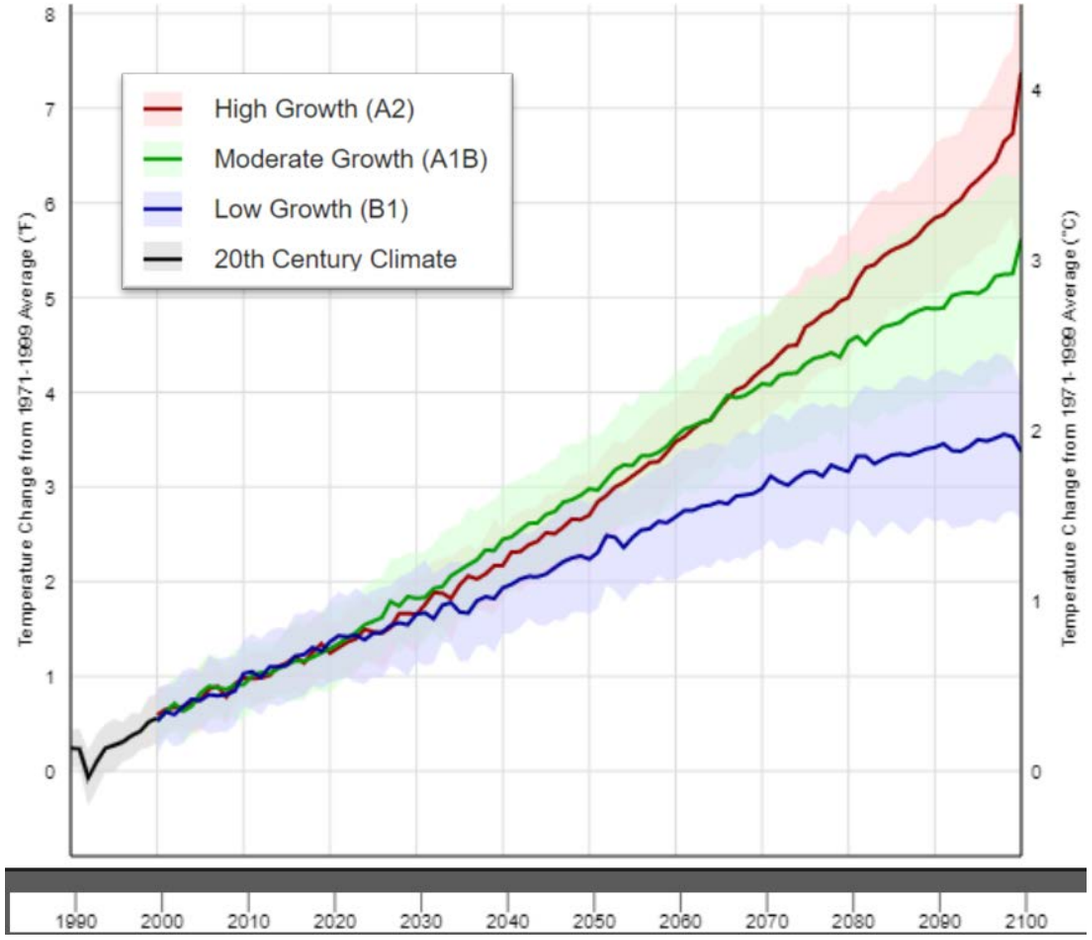
Source: NOAA National Centers for Environmental information, Climate at a Glance: Global Time Series, published April 2020, retrieved on May 6, 2020 from https://www.ncdc.noaa.gov/cag/

Climate Outlook



Climate Outlook

Projected temperature changes in the 21st century for three possible emissions scenarios

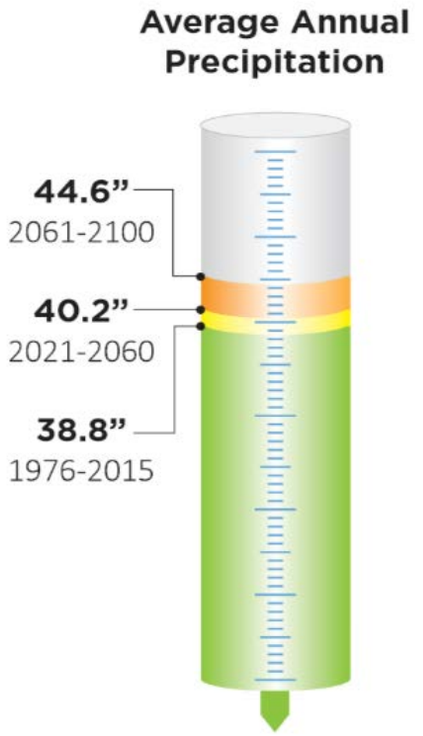


- Results from a wide range of climate model simulations suggest that our planet's average temperature could be between 2 and 9.7°F (1.1 to 5.4°C) warmer in 2100 than it is today.
- It is virtually certain our world will continue to warm over this century and beyond.
- The exact amount of warming that will occur in the coming century depends largely on the energy choices that we make now and in the next few decades.

Source: NOAA National Centers for Environmental information, Climate at a Glance: Global Time Series, published April 2020, retrieved on May 6, 2020 from https://www.ncdc.noaa.gov/cag/

Climate Outlook

Precipitation

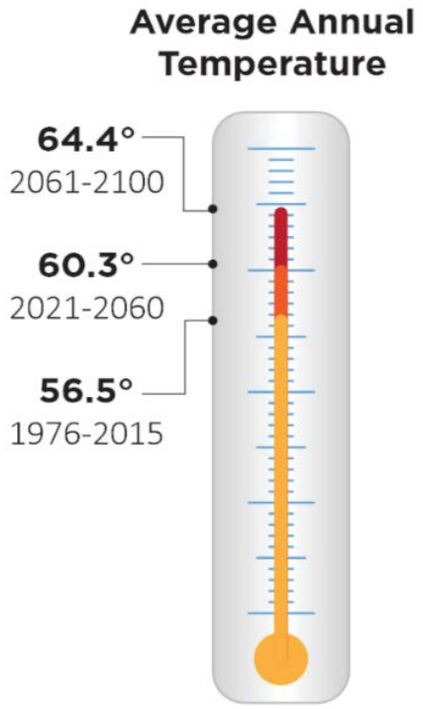


- Average annual precipitation will increase from 38.8" to 44.6" per year.
- Maximum 1-day precipitation will increase from 3.4 to 4.0 inches, while 5-day and 15-day precipitation will increase from 5.5 to 7.0 inches and 7.5 to 10.4 inches, respectively.
- The number of days with more than 1.5" of precipitation will increase from 5.0 to 9.3.
- The maximum number of consecutive dry days will increase from 30.9 to 39.5 days/year.

Climate LOOK
A Better Choice for Climate Analysis

Climate Outlook

Temperature

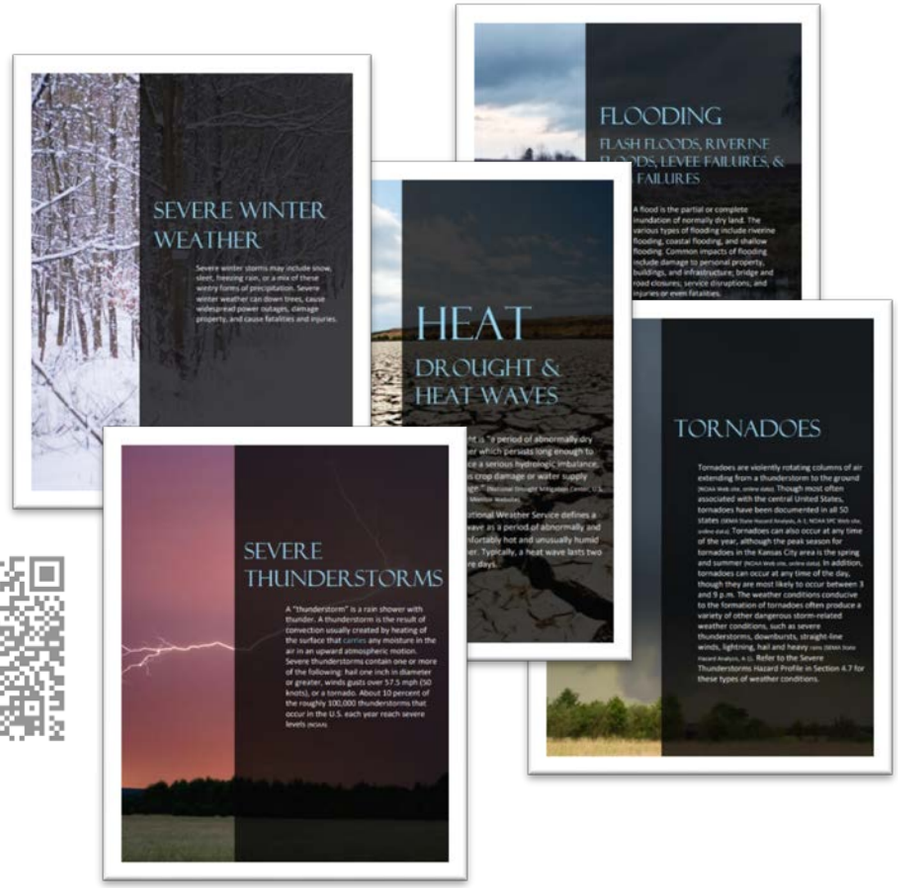


- The average annual temperature will increase from 56.5°F to 64.4°F.
- The number of days/year in which the temperature exceeds 105°F will increase from 0.7 to 21.9.
- The number of cooling degree days, a reflection of the demand for energy needed to cool a building, will nearly double. Conversely, energy demand for heating will decline by 27%.
- The last spring frost is projected to be more than two weeks earlier, whereas the first fall frost will occur about 11 days later.

Climate LOOK
A Better Choice for Climate Analysis

Natural Hazards & Risk Assessment

2020 Hazard Mitigation Plan (MARC)

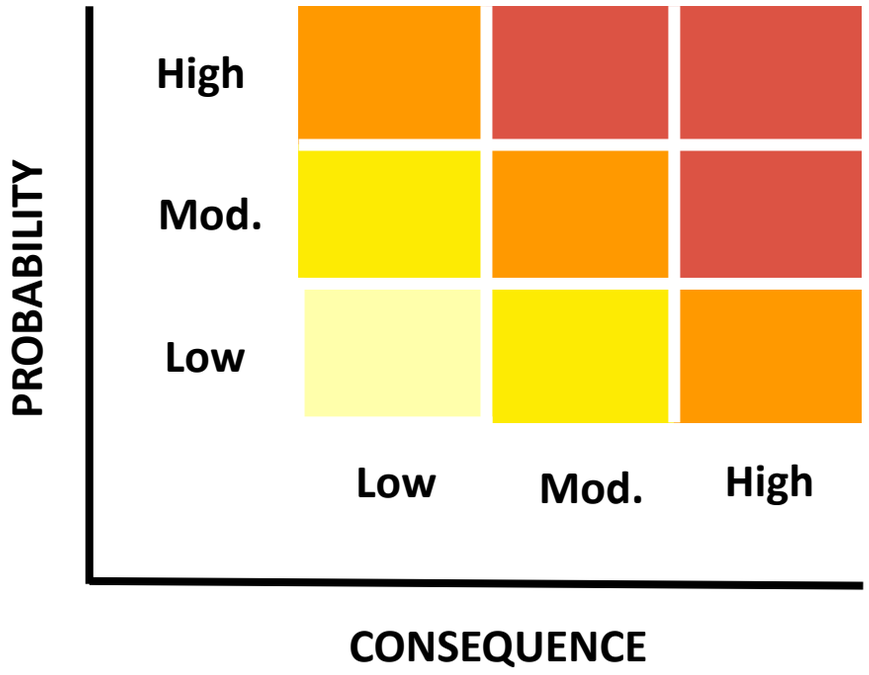


- Which hazards pose the greatest risk to our region?
- What are the past and expected future impacts to people and sectors, assets, and services?

- Flooding
- Heat
- Drought
- Tornados
- Severe Thunderstorms
- Severe Winter Weather

Natural Hazards & Risk Assessment

Risk Matrix

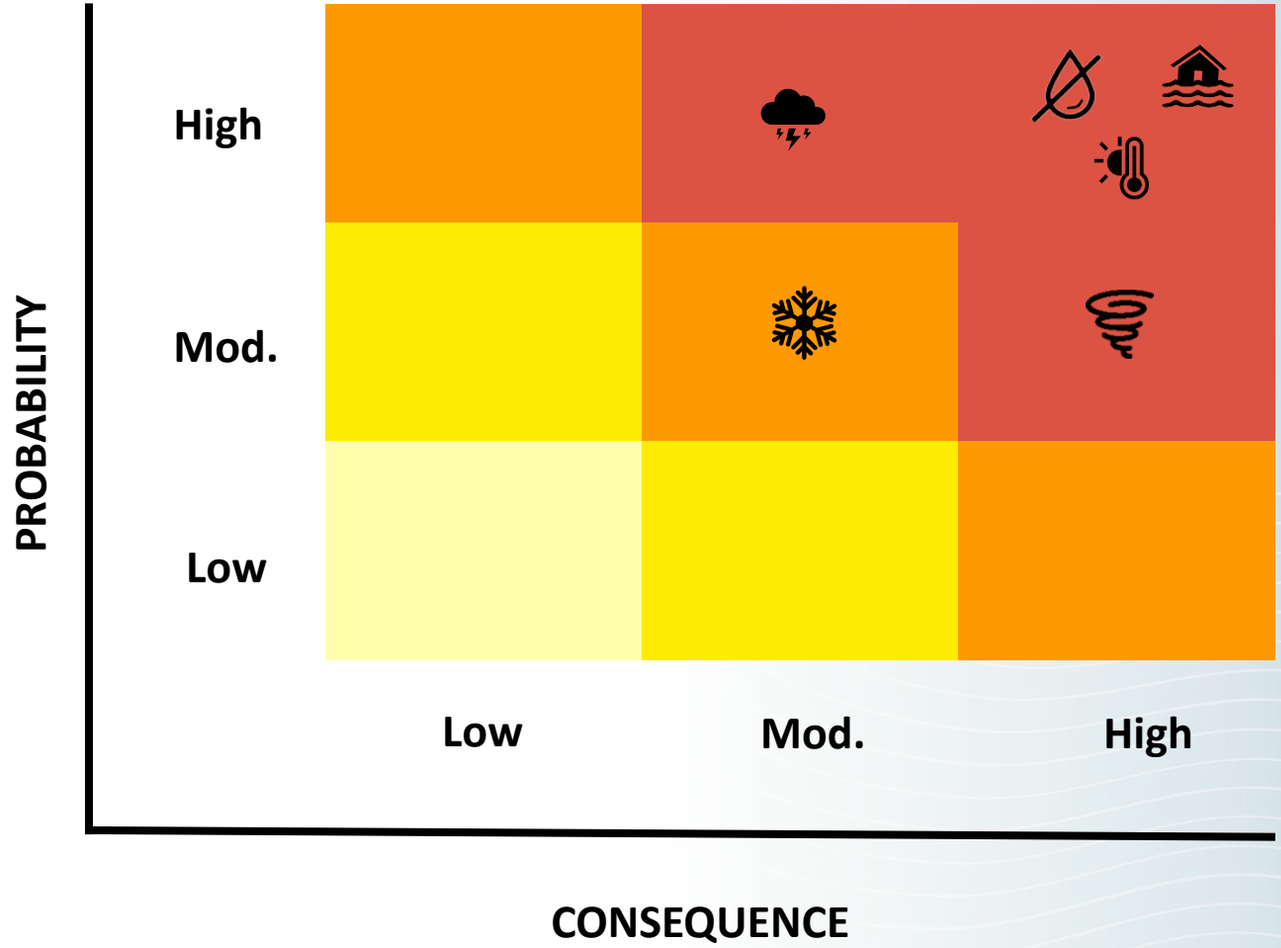


Probability		
3	**High**	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	**Moderate**	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	**Low**	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	**Do not know**	Region has not experienced or observed climate hazards in the past

Consequence		
3	**High**	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
2	**Moderate**	The hazard represents a moderate level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are moderately significant to day-to-day life.
1	**Low**	The hazard represents a lower (the lowest) level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are deemed less significant (or insignificant) to day-to-day life.
0	**Do not know**	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Natural Hazards & Risk Assessment

Risk Matrix



Flood

Risk Level: HIGH

IMPACTS

- Loss of life
- Residential displacement
- Decreased crop/produce yields from urban and rural farms
- Public health and environmental hazards
- Flooded roadways and increased road maintenance
- Limits emergency access

VULNERABLE GROUPS

- People with medical/physical conditions or disabilities.
- People who live in flood prone areas.
- People who are difficult to reach through normal communications.
- People who are elderly or young children.
- People with a lack of access to transportation.
- Home owners

Heat

Risk Level: HIGH

IMPACTS

- Heat-related illness/mortality
- Increased insect-borne illness
- Worsening air quality
- Urban areas will see higher near-surface air temperatures due to urban heat island effect

VULNERABLE GROUPS

- People with medical/physical conditions or disabilities.
- People who work or conduct leisure activities outside.
- Elderly.
- People with a lack of access to air-conditioning or other cooling mechanisms
- People who are difficult to reach through normal communications.

Drought

Risk Level: HIGH

IMPACTS

- Damage to crop quality and lower yields
- Increased irrigation costs
- Production losses for hydropower
- Increased fire risk
- Loss of biodiversity
- Migration and concentration of wildlife
- Loss of life
- Increased concentration of contaminants in water
- Increased disease
- Decreased air quality
- Urban tree canopy decline

VULNERABLE GROUPS

- Low-income population
- Small and/or rural communities
- Farmers or other agricultural workers

Severe Thunderstorms

Risk Level: MODERATE

IMPACTS

- Flooding
- Black outs

VULNERABLE GROUPS

- People with medical/physical conditions or disabilities.
- People who live in flood prone areas.
- People who are difficult to reach through normal communications.
- People who are elderly or young children.
- People with a lack of access to transportation.
- Home owners

Tornadoes

Risk Level: MODERATE

IMPACTS

- Loss of life
- Significant damage to buildings and infrastructure
- Blackouts
- Impaired transportation system, emergency response

VULNERABLE GROUPS

- People with medical/physical conditions or disabilities.
- People who live in low-income households.
- People who live in sub-standard housing.
- People who are elderly or young children.

Severe Winter Weather

Risk Level: MODERATE

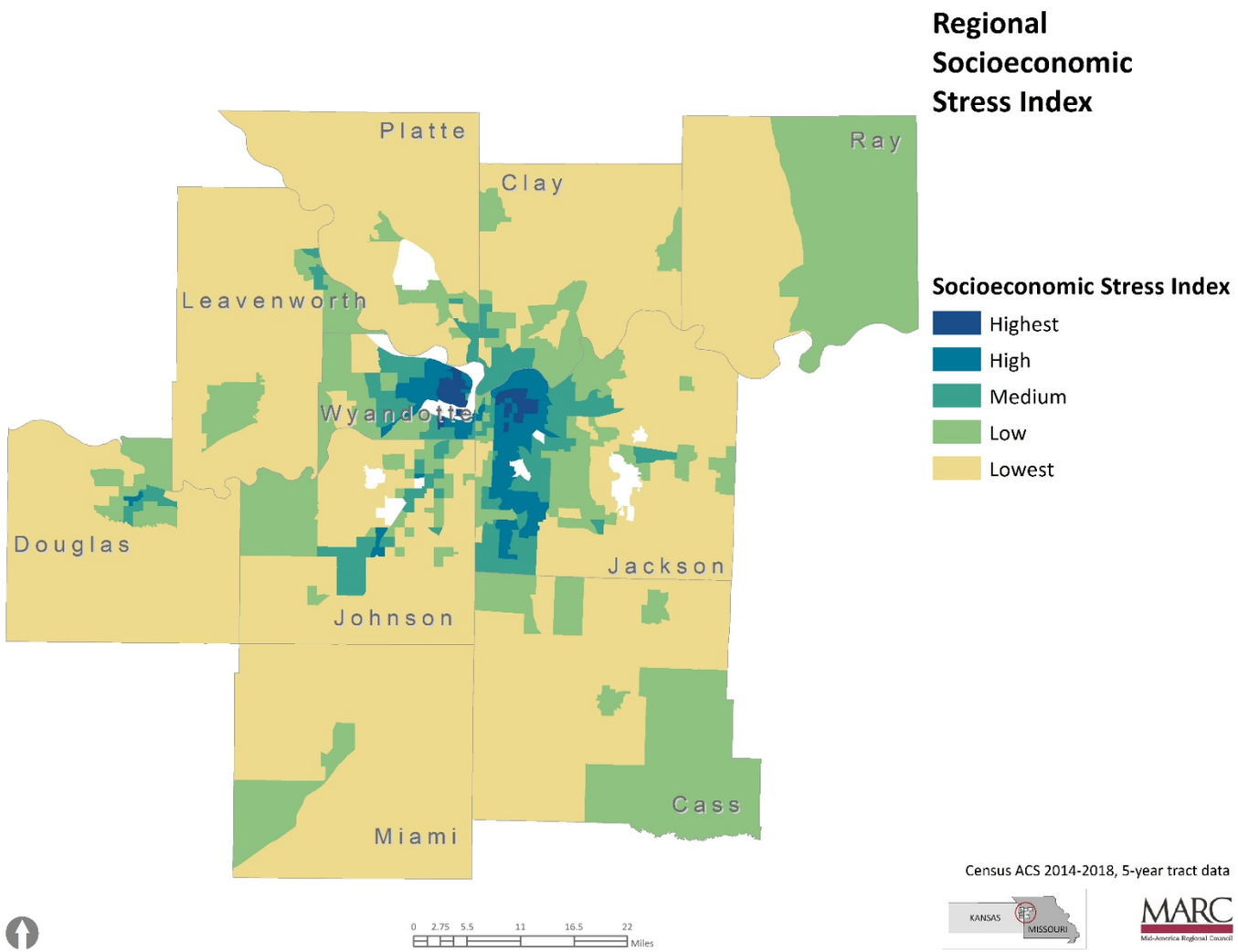
IMPACTS

- Injuries (frostbite and hypothermia) and loss of life
- Traffic crashes
- Property damage
- Power outages
- Telecommunications disruptions
- Impaired roadways and increased road maintenance
- Decreased emergency access

VULNERABLE GROUPS

- Older adults or young children
- People who live in low-income households
- Homeless populations
- People without adequate heating

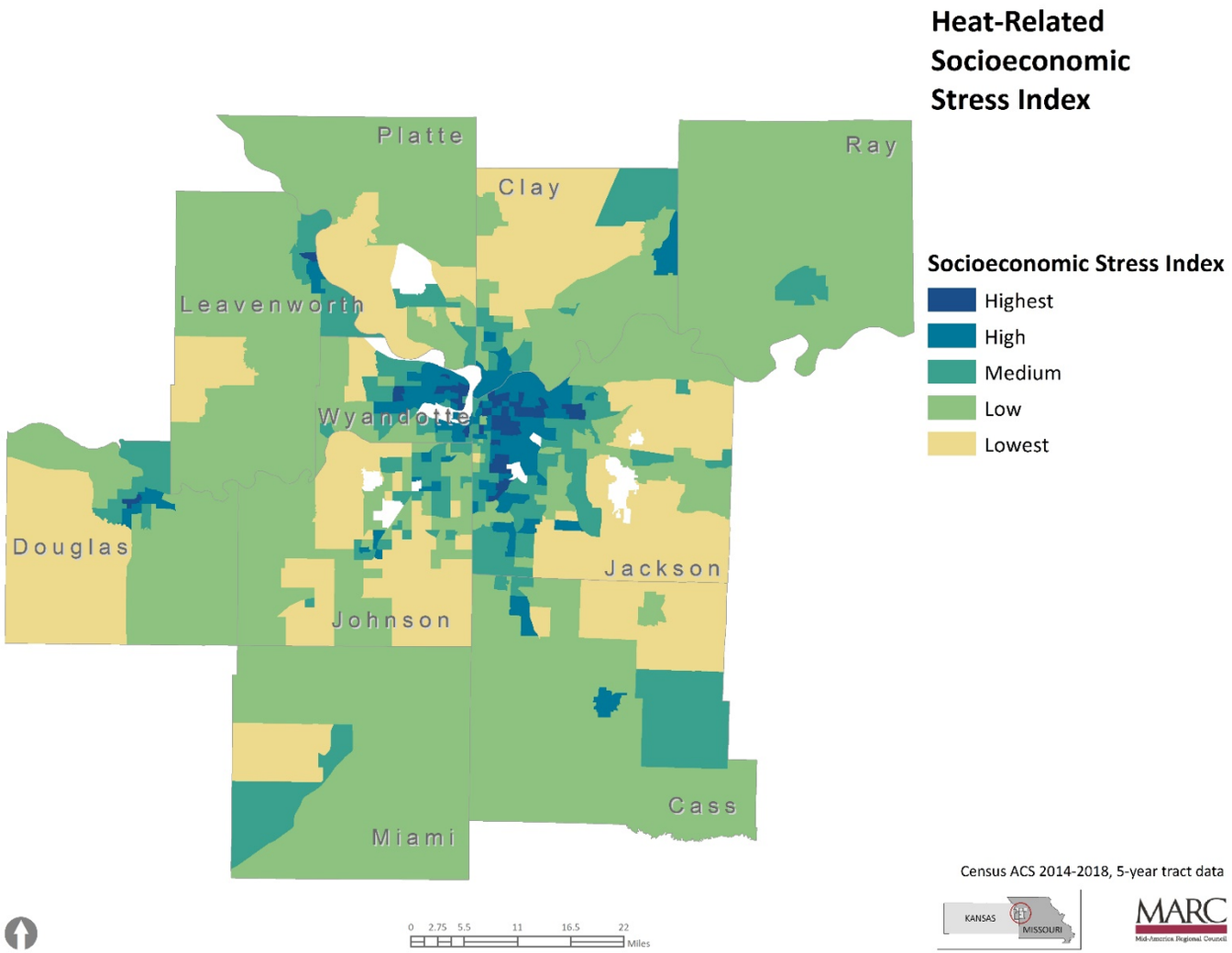
Social Vulnerability Index



Vulnerability indicators:

- Less than highschool graduation
- Non-white population
- Population below 200% of poverty
- Population over 65
- Population 65 and Over Living alone
- Single parent families
- Uninsured
- Unemployed

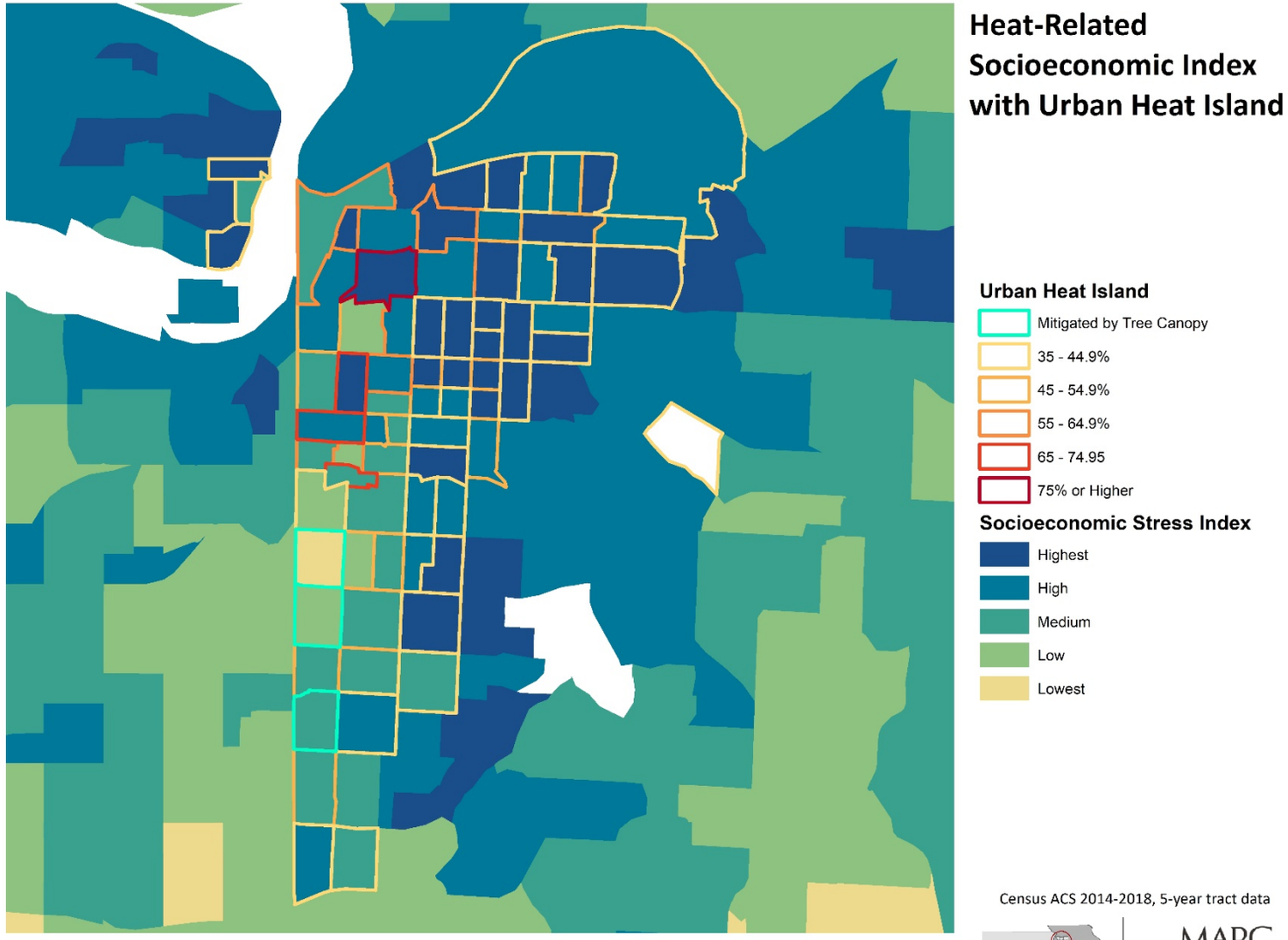
Heat Vulnerability Index



Socio-economic indicators:

- Disabled population
- Zero-vehicle households
- Population below 200% of poverty
- Population over 65
- Population over 65 and living alone
- Structures built before 1960

Heat Vulnerability Index



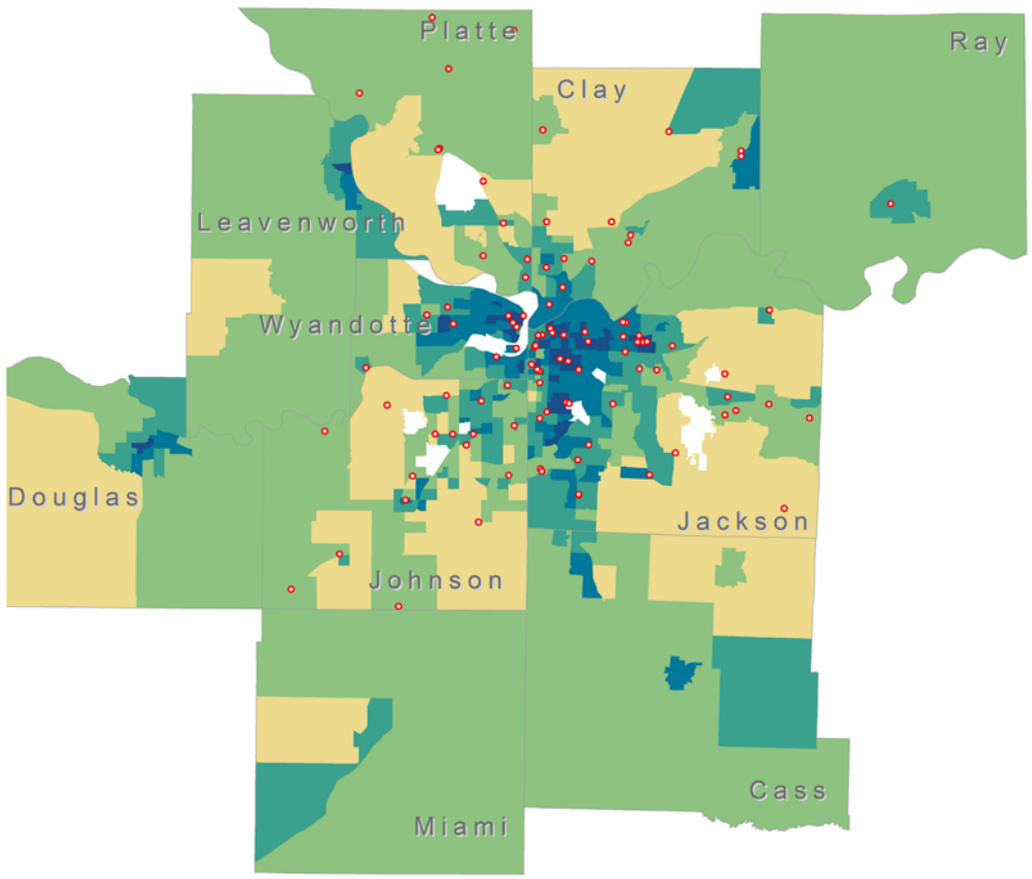
Socio-economic indicators:

- Disabled population
- Zero-vehicle households
- Population below 200% of poverty
- Population over 65
- Population over 65 and living alone
- Structures built before 1960

Heat vulnerability indicators:

- Tree canopy coverage
- Impervious surface

Heat Vulnerability Index



Heat Related Socioeconomic Stress Index with Cooling Centers

Socioeconomic Stress Index

- Highest
- High
- Medium
- Low
- Lowest

Counties

Cooling Centers

Census ACS 2014-2018, 5-year tract data

0 2.75 5.5 11 16.5 22 Miles

KANSAS MISSOURI

MARC Mid-America Regional Council

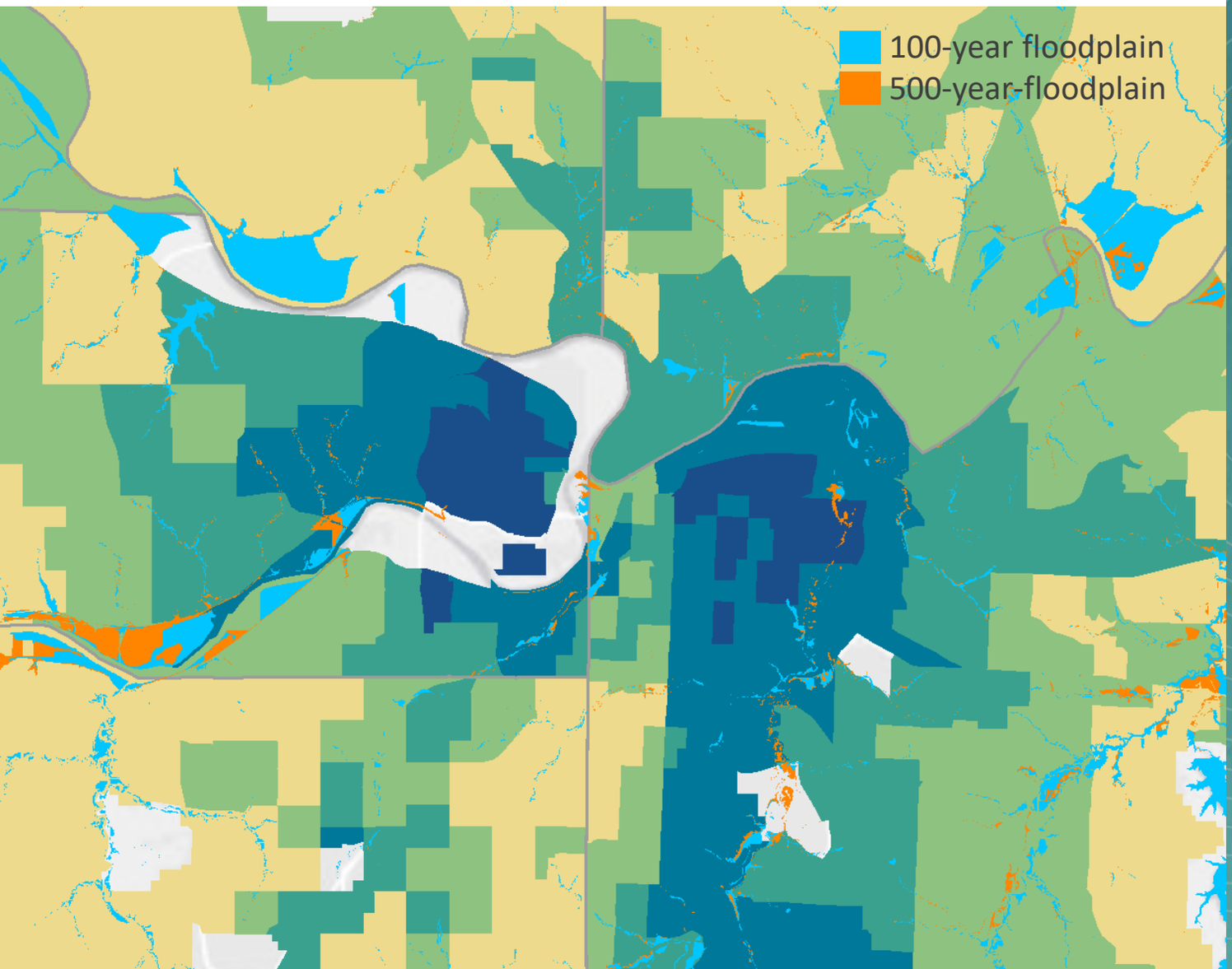
Socio-economic indicators:

- Disabled population
- Zero-vehicle households
- Population below 200% of poverty
- Population over 65
- Population over 65 and living alone
- Structures built before 1960

Heat vulnerability indicators:

- Proximity to cooling centers

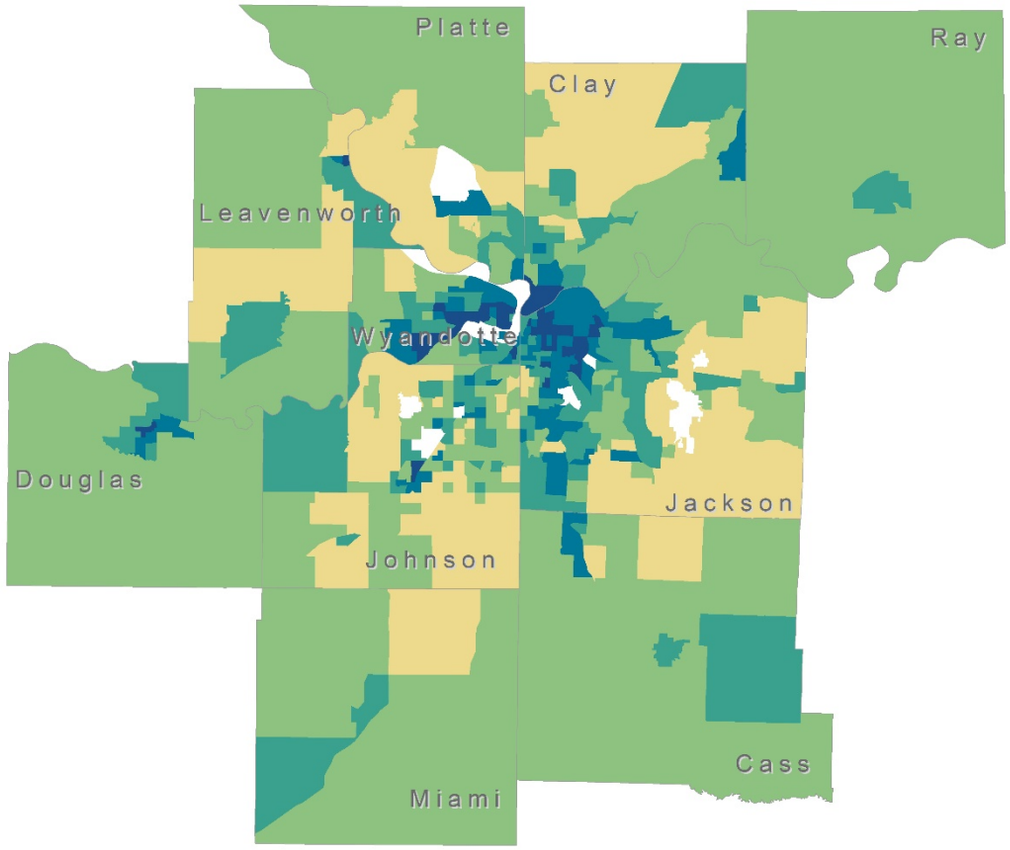
Flood Vulnerability Index



Vulnerability indicators:

- Less than highschool graduation
- Non-white population
- Population below 200% of poverty
- Population over 65
- Population 65 and Over Living alone
- Single parent families
- Uninsured
- Unemployed

Tornado Vulnerability Index



Tornado Related Socioeconomic Stress Index

Socioeconomic Stress Index

- Highest
- High
- Medium
- Low
- Lowest

Census ACS 2014-2018, 5-year tract data

KANSAS MISSOURI

MARC Mid-America Regional Council

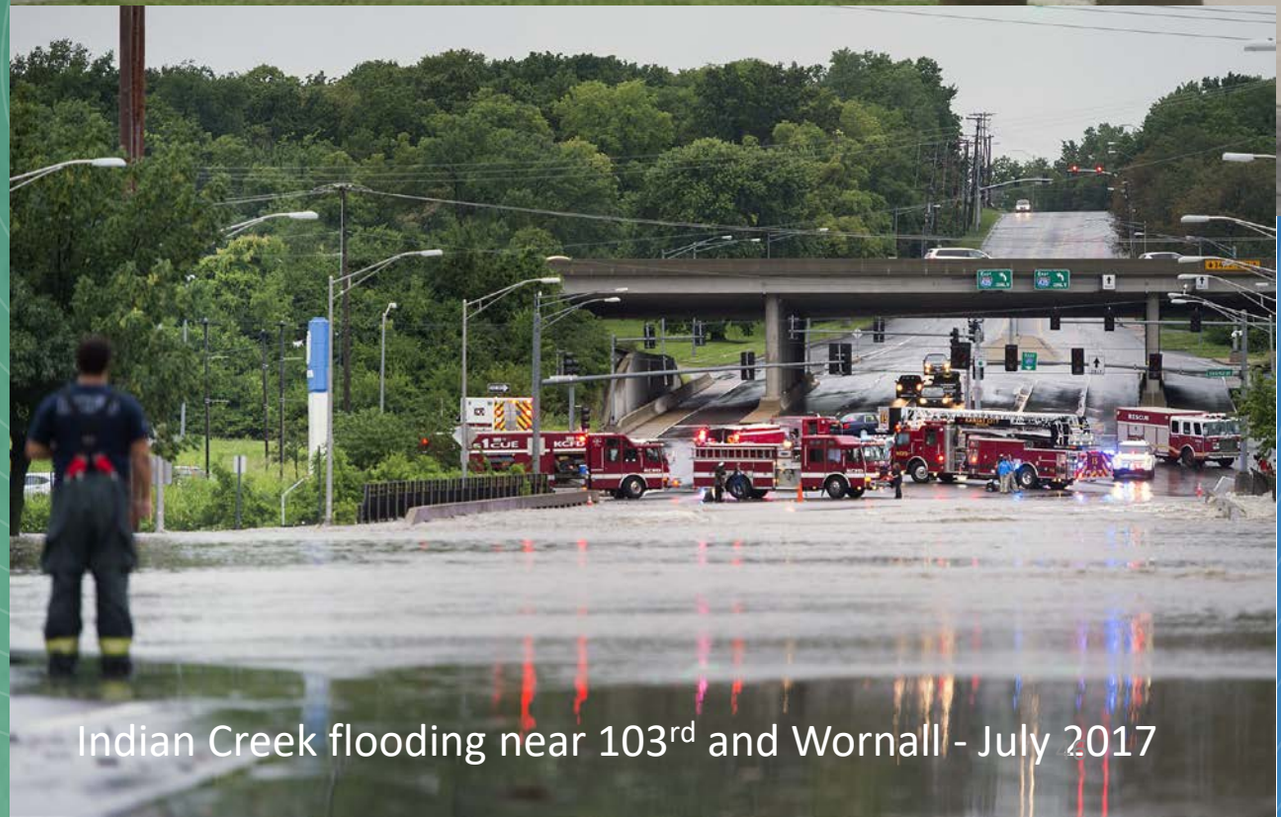
Vulnerability indicators:

- Disabled population
- Zero vehicle households
- Populations speaking English less than very well
- Population below 200% of poverty
- Housing with 10+ units
- Mobile Homes
- Population 65 and over living alone

Adaptive Capacity

What is our region's ability to adapt and bounce forward?

Do we accept losses, seek news ways to adapt, or take advantage of new opportunities that may arise?



Indian Creek flooding near 103rd and Wornall - July 2017

Indicators

Built Environment	Economy	Environment
. Infrastructure condition/ maintenance . Infrastructure capacity . Housing . Land use and Development . Urbanization rate	. Cost of living . Access to education . Unemployment . Economic diversity . Economic health	. Environmental quality

Government Capacity	Inequality	Public Health
. Migration . Community engagement . Resource availability . Interjurisdictional coordination . Access to relevant data . Budgetary capacity . Safety and security	. Access to basic services . Poverty/Income	. Access to healthcare . Health status . Environmental quality

Degree of Challenge Rating:

High* – *Moderate* – *Low* – *Supportive* – *Don't know

Indicators

Built Environment	Economy	Environment
. Infrastructure condition/ maintenance . Infrastructure capacity ← . Housing ← . Land use and Development ← . Urbanization rate	. Cost of living ← . Access to education ← . Unemployment ← . Economic diversity . Economic health ←	. Environmental quality ←

Government Capacity	Inequality	Public health
. Migration . Community engagement ← . Resource availability . Interjurisdictional coordination . Access to relevant data ← . Budgetary capacity ← . Safety and security ←	. Access to basic services ← . Poverty/Income ←	. Access to healthcare ← . Health status ← . Environmental quality ←

Degree of Challenge Rating:

High – Moderate – Low – Supportive – Don't know

← Impacts Equity Outcomes

Strengths to build on

- Caring & giving community
- Regional coordination & leadership
- Strong local professional and technical services
- Strong innovation ecosystem
- Social services network
- Low cost of living
- Environmental quality

Harvesters' volunteers sorting donations. Photo: KCUR

Findings & Opportunities

Sabrina Bornstein
Associate Principal
Buro Happold | Cities

Findings and Opportunities

- Major Emission Sources: **Building energy use** and **transportation**
- Mitigation opportunities:
  - Renewable energy & energy efficiency
  - Mobility options, electrification & low-carbon fuels
  - Organic waste management and food systems
  - Sequestration from natural lands

Major Climate Hazards: **Flooding** and **heat**

Adaptation opportunities:

- Heat island abatement (urban forestry, cool roofs)
- Heat wave relief and cooling programs
- Green infrastructure
- Climate resilient design standards
- Focused land use and development (MARC's Centers & corridors approach)

Approach:

- Integrated system thinking
- Equitable access
- Vulnerable populations, locations, and systems

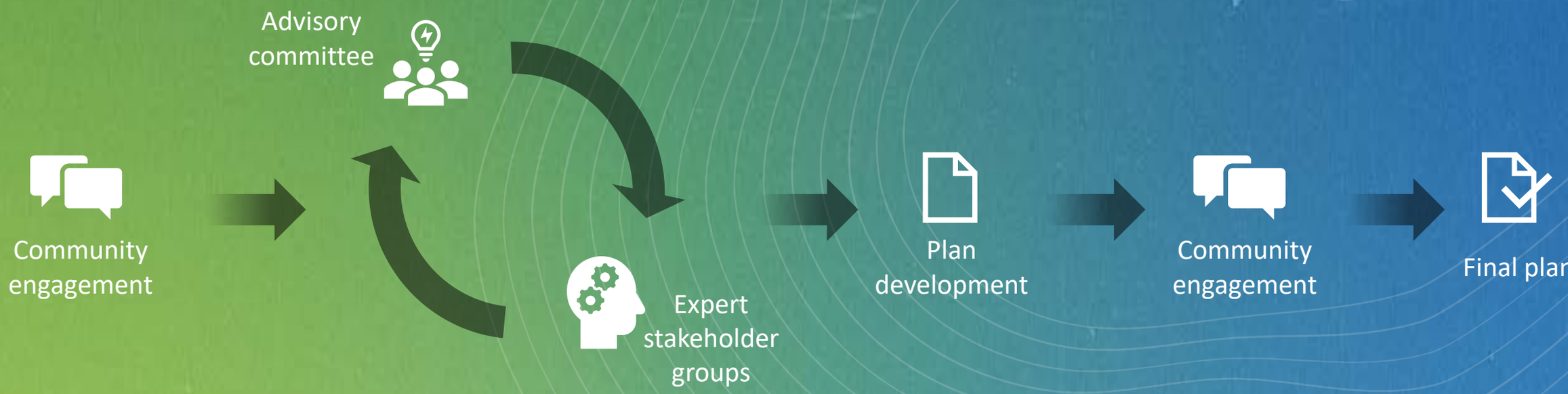
Developing a plan of action

Tom Jacobs
Director of Environmental Programs
MARC

Planning outcomes

- Meet emissions targets and adapt to climate-related shocks and stresses with equity as a central lens through which we work.
- Build up a hyper-local green economy by leveraging our strengths in innovation and professional and technical services.
- Build flexible implementation models that support a circular economy.
- Develop new funding models that support the significant investment in infrastructure updates and capacity building.
- Align existing investment programs to take resiliency into account.
- Create clear pathways for effective individual empowerment and action.
- Increase communication and engagement with vulnerable communities.
- Support local government's mitigation and adaptation initiatives.
- Develop a performance tracking system that measures GHG emissions and co-benefits.

Where we go from here



May-June 2020 ← → December 2020

Share your ideas.

MindMixer

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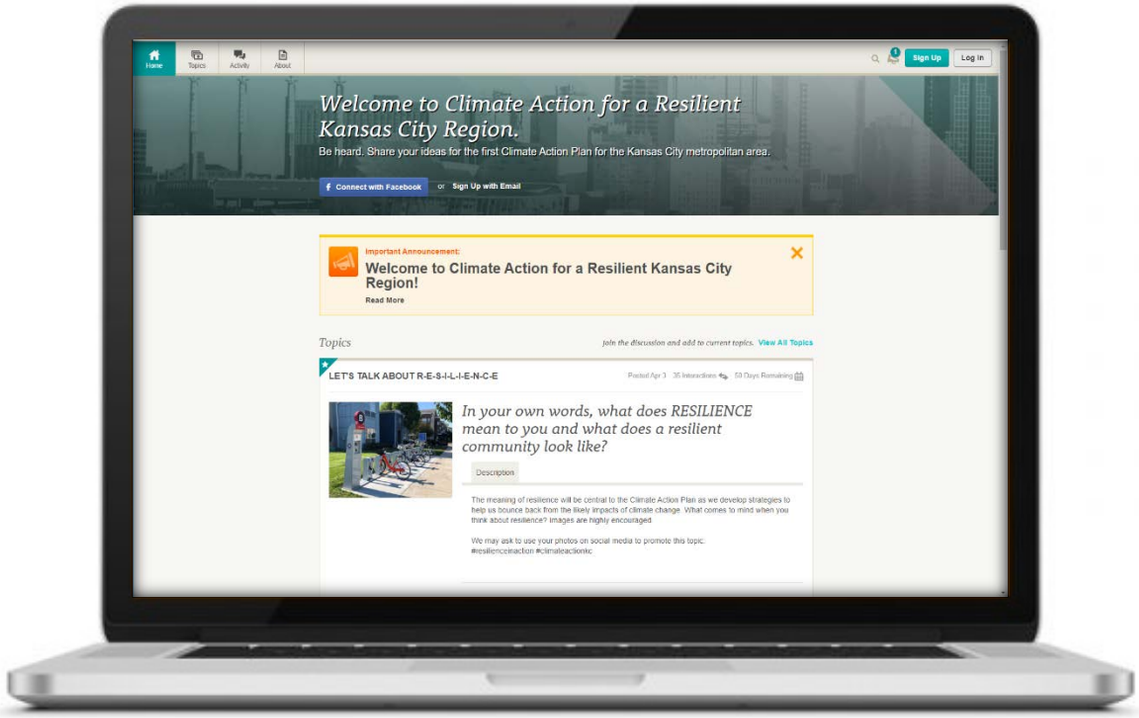

Weekly topics:

Resilience Week	May 4
Transportation Week	May 18
Food & Land Week	May 25
Built Environment Week	June 1
Energy & Industry Week	June 8
Priorities Week	June 15

- Mitigation & adaptation
- Lenses: Equity, green economy, environmental health, innovation
- Co-benefits
- Funding

Q & A

Please reach out.

climateactionkc@marc.org

Ask us anything
Request a presentation
Share an idea

Thank you!