March 23, 2021

COUNCIL ON CLIMATE SOLUTIONS

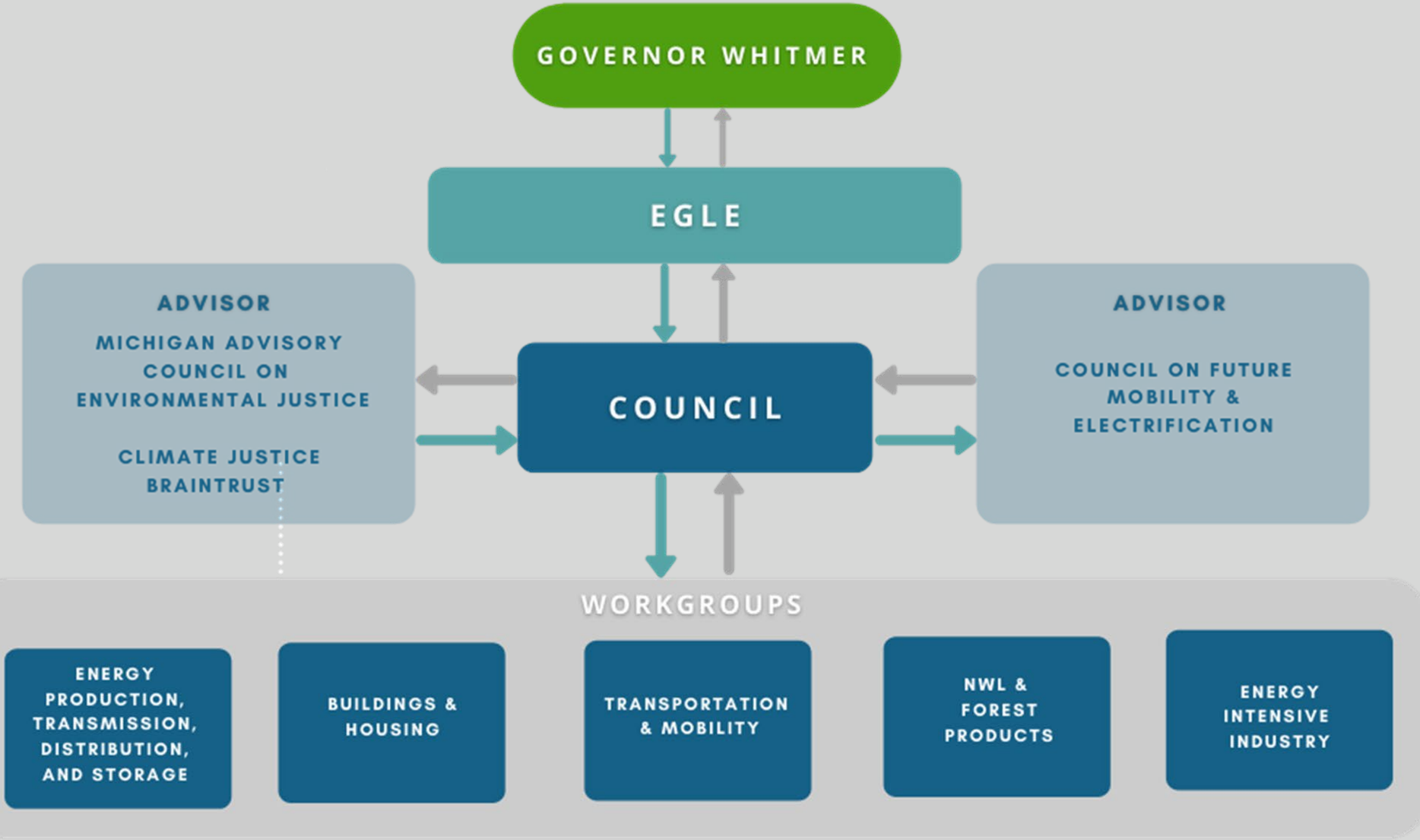
Energy Production, Transmission, Distribution & Storage

GOVERNOR WHITMER

EGLE
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

COUNCIL ON CLIMATE SOLUTIONS

ORGANIZATIONAL CHART



WORKGROUP FOCUS

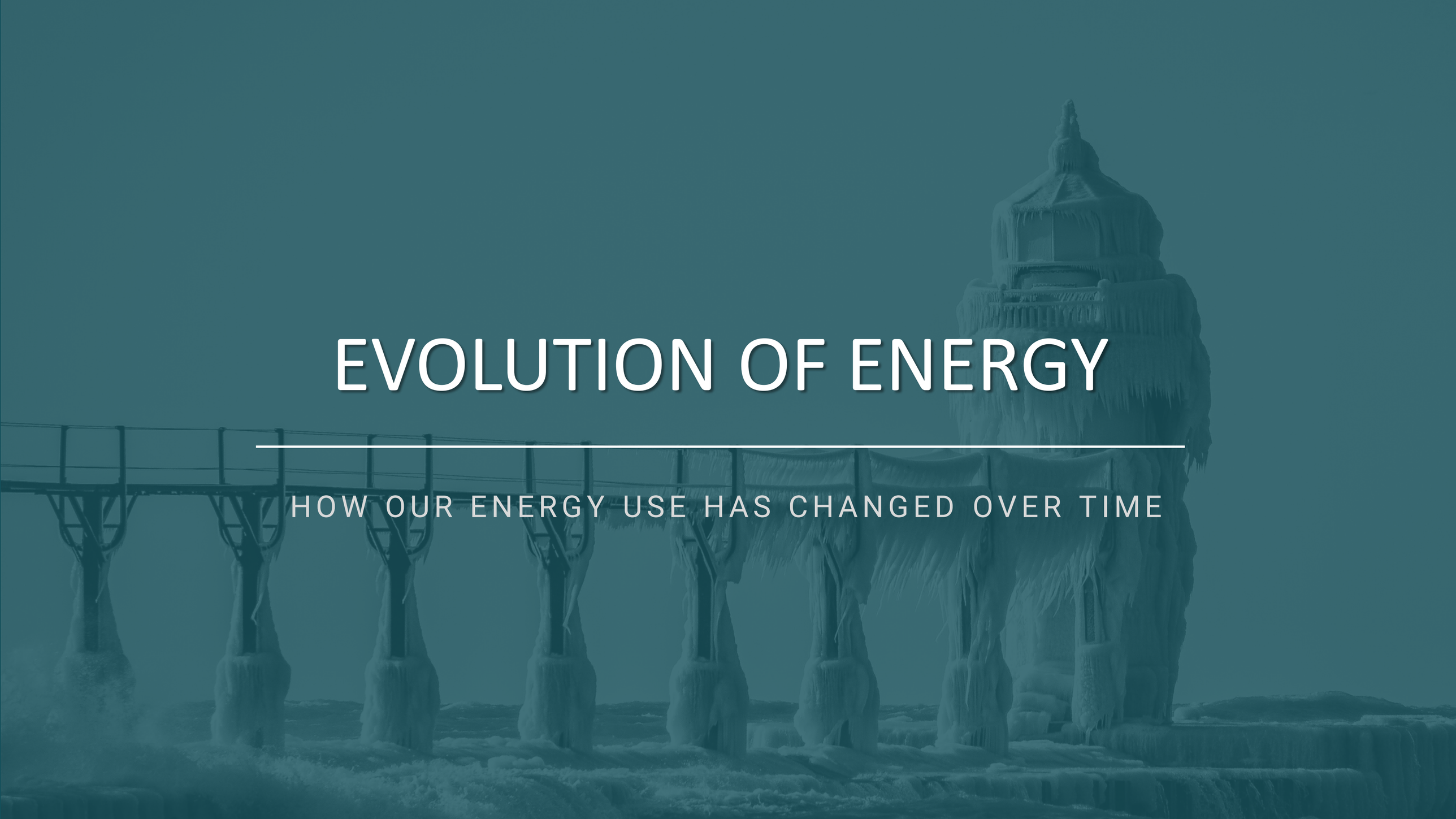
Energy Production, Transmission, Distribution & Storage

WORKGROUP CO-CHAIR INTRODUCTION

Energy Production, Transmission, Distribution & Storage

OVERVIEW

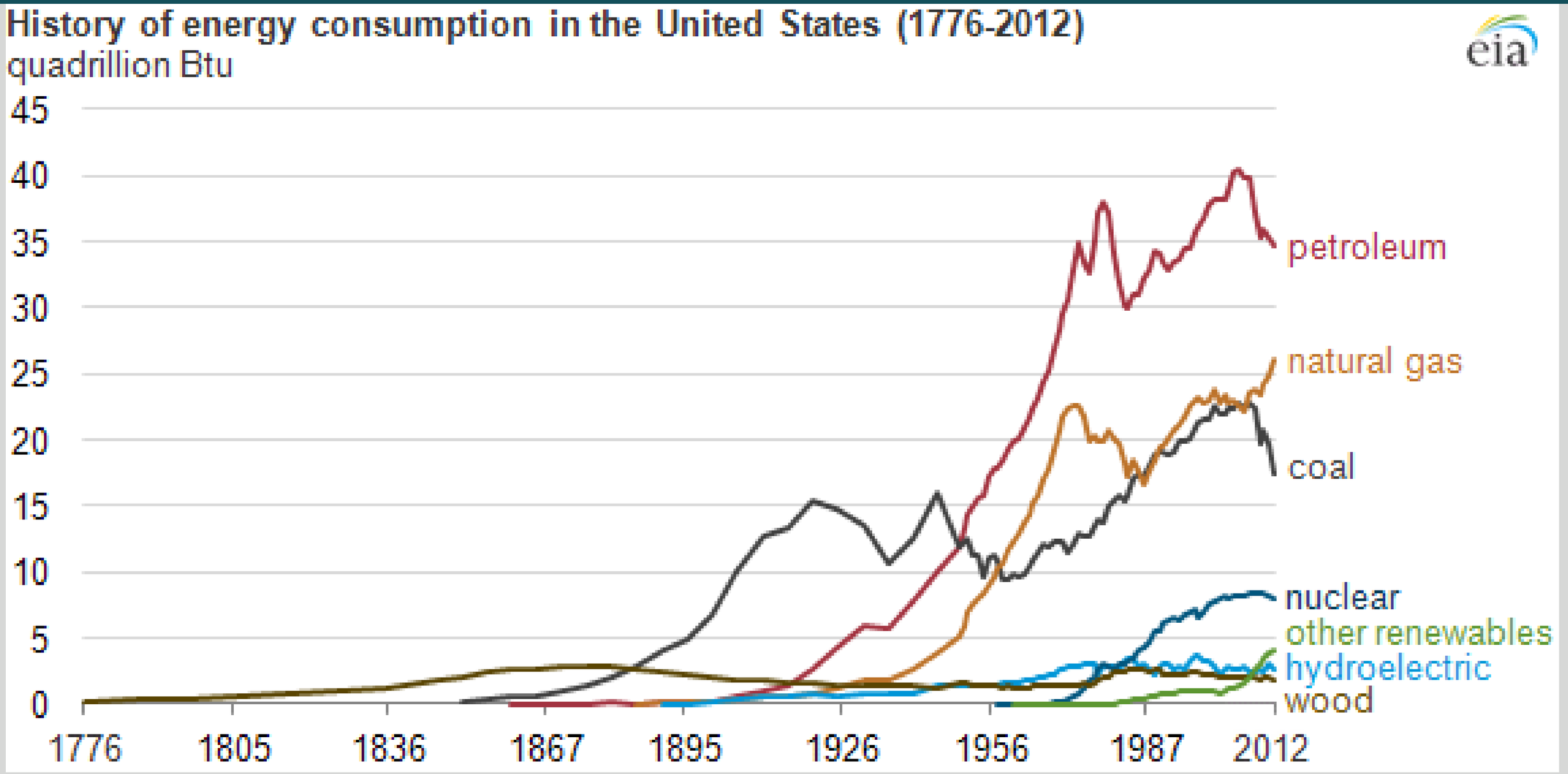
- Energy areas of focus: Electricity and natural gas
  - Propane, oil, and other forms of energy will be left to other workgroups
- Schedule
  - Tuesday afternoons every other week
  - 90-minute meetings from 1-2:30pm
- Structure
  - Phase 1: Exploratory introductory status and idea presentations by major stakeholders
    - Feedback is written
  - Phase 2: Deliberation and decision-making meetings
    - Issues to be determined from introductory presentations
    - Feedback is live during meetings
    - Utilization of breakout rooms and notetaker reporting
  - Phase 3: Resolving differences and packaging idea list for presentation to Council
    - Workgroup will see final recommendations to Council prior to submission



EVOLUTION OF ENERGY

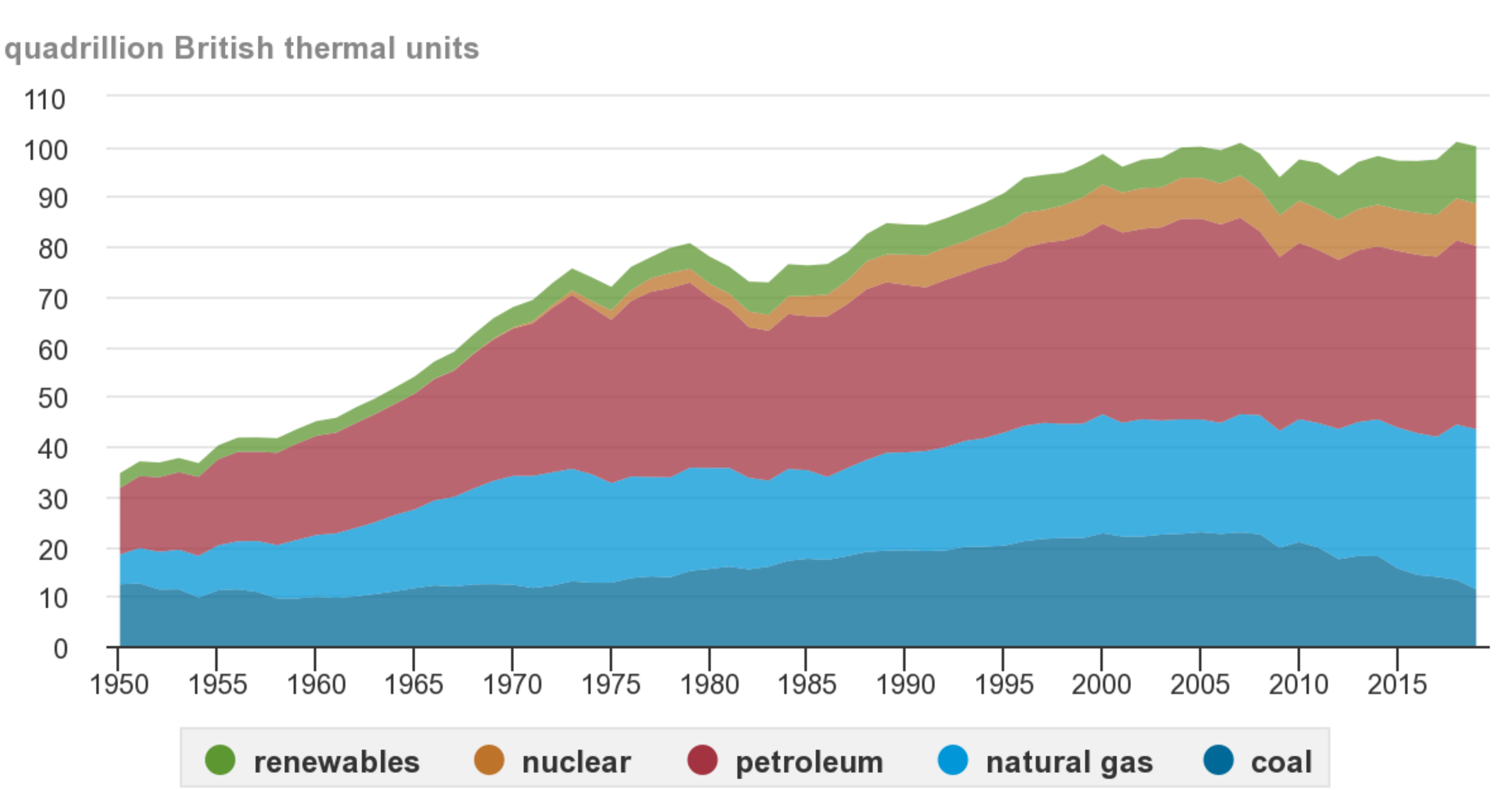
HOW OUR ENERGY USE HAS CHANGED OVER TIME

How has our energy use changed?



U.S. EIA 2018

U.S. Energy Consumption by major sources, 1950-2019



Note: Petroleum is petroleum products excluding biofuels, which are included in renewables.
Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 1.3, April 2020, preliminary data for 2019

ENERGY PRODUCTION, TRANSMISION, DISTRIBUTION AND STORAGE

Energy Production, Transmission, Distribution and Storage

Doug Scott

Great Plains Institute

Michigan Council on Climate Solutions

March 23, 2021

GREAT PLAINS INSTITUTE

Better Energy.
Better World.

How Did the Power Sector Develop?

Largely coal—cheap, reliable

Central Station power generation—cost-effective

One-way power distribution

Gas, Nuclear developed over time—but still same system

Goal: bring electricity to the nation; it worked

Disproportionate impacts on low-income, people of color

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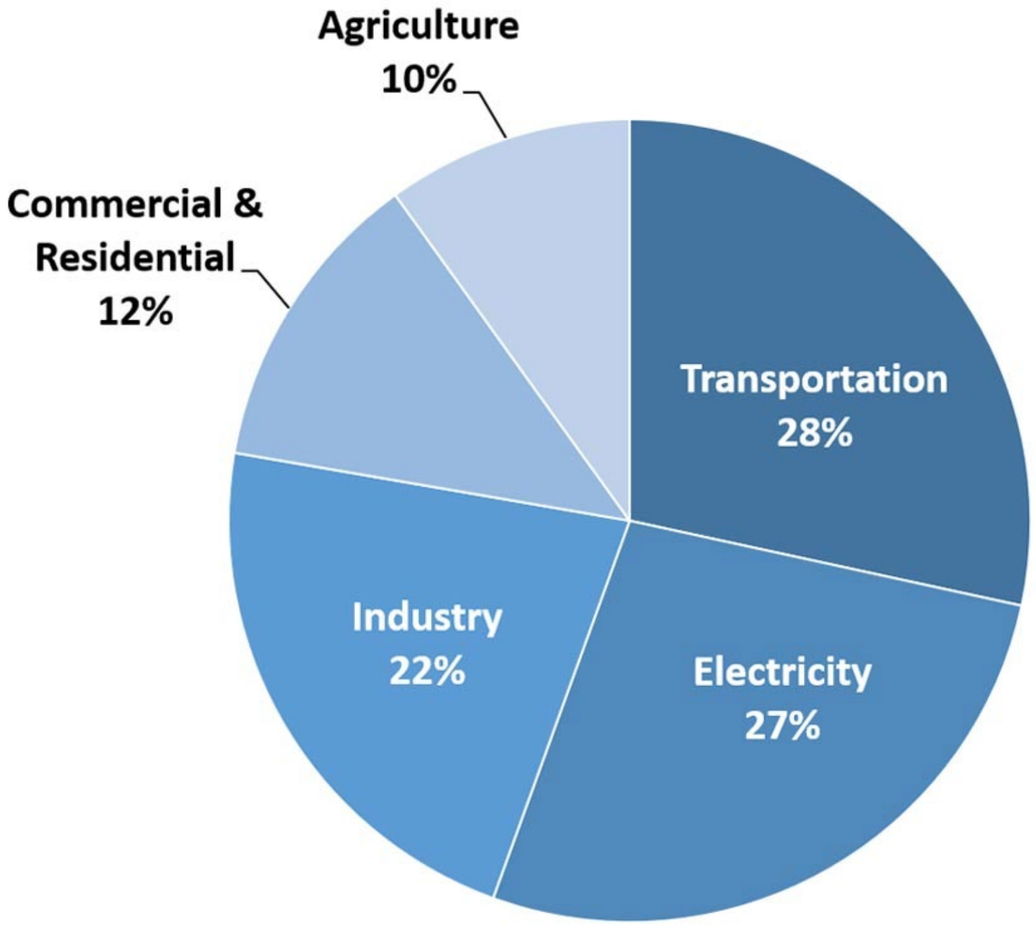
Sources of Greenhouse Gas Emissions in 2018



Source: 5 Lakes Energy

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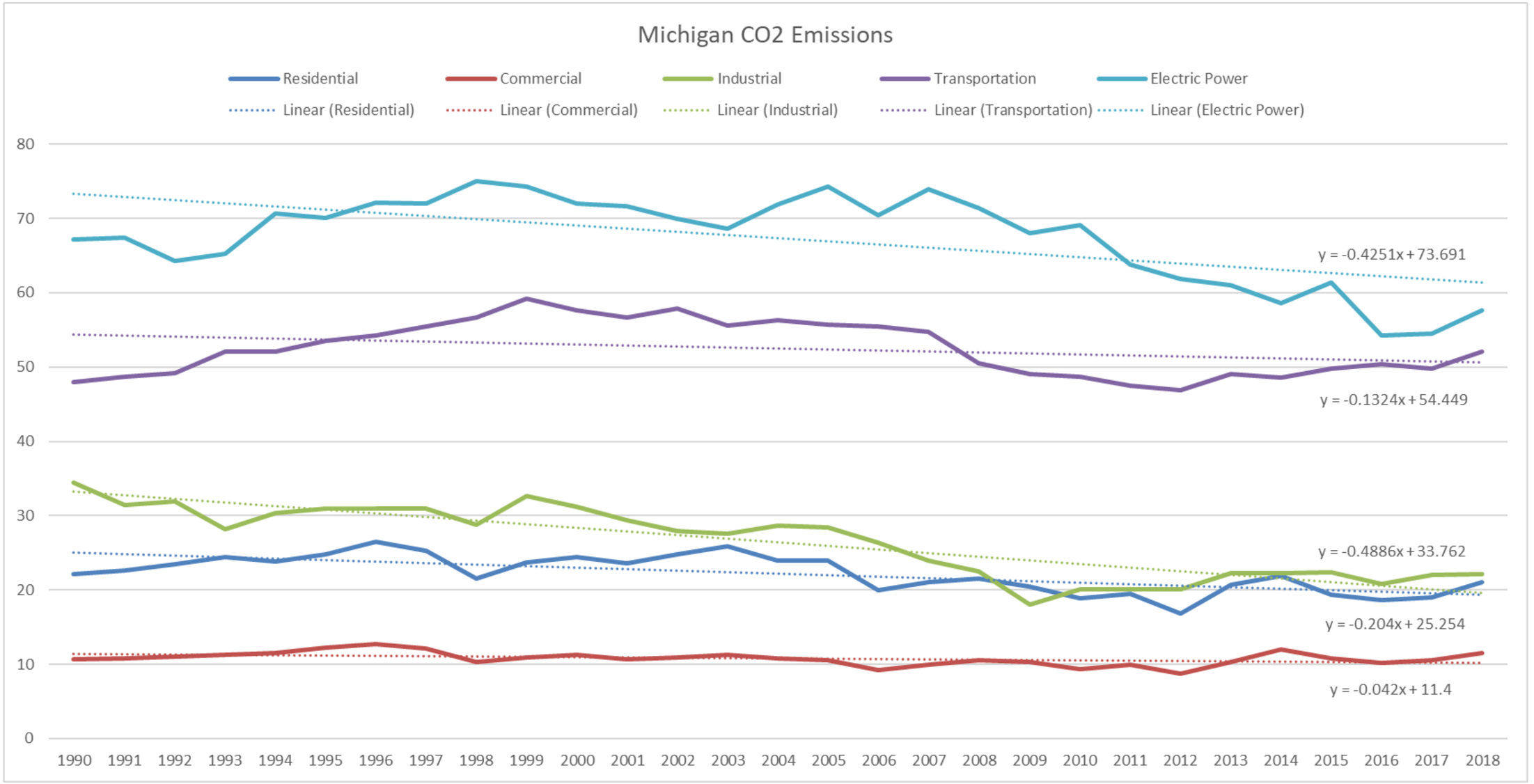

Michigan C02 Emissions Baseline

Source: 5 Lakes Energy

Michigan Carbon Emissions 2005 (million metric tons)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal	0.0	0.3	7.3	0.0	67.8	75.4
Petroleum Products	4.6	0.9	5.8	53.8	0.8	65.9
Natural Gas	19.3	9.4	12.0	1.5	7.0	49.2
Total	23.9	10.6	25.1	55.3	75.6	190.5

Michigan Carbon Emissions 2017 (million metric tons)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal	0.0	0.0	5.0	0.0	42.6	47.6
Petroleum Products	2.3	1.6	3.3	48.4	1.3	56.9
Natural Gas	16.6	9.0	9.7	1.1	11.7	48.1
Total	18.9	10.6	18.0	49.5	55.6	152.7

Michigan Carbon Emissions 2017-2005 (% change)	Residential Sector	Commercial Sector	Industrial Sector	Transportation Sector	Electric Power Sector	All Sectors
Coal		-89%	-32%		-37%	-37%
Petroleum Products	-49%	78%	-43%	-10%	63%	-14%
Natural Gas	-14%	-4%	-19%	-27%	67%	-2%
Total	-21%	0%	-28%	-10%	-26%	-20%
				Further reduction by 2025 (MMT)		-15.5
				% Reduction 2017-2025		-10.2%

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Drivers of Change What's Different Now?

Technology Changes

Cost of Renewable Energy

- Economic Development Tool
- Cheaper Electricity—don't have to engage for climate reasons

Customer Preferences

- All customer classes

Cost of Natural Gas

Criteria Pollutant, Coal Ash Regulations

New Technologies may Assist in Decarbonization

STORAGE

- Tremendous help with renewable deployment, demand-side management
- Need for longer-term storage technology

ADVANCED NUCLEAR

- Small Modular Reactors (SMR)
- Hydrogen Technology

CARBON CAPTURE and STORAGE

- Coal, gas plays
- Cost factors
- Federal Legislation

Technology Advances, cont.

DISTRIBUTED GENERATION

- Demand Response
- Rate Design (Time of Use, Critical Peak Pricing)

ENERGY EFFICIENCY

- Smart Thermostats
- Smart Appliances
- Appliance Standards, Building Codes
- Low-Carbon Products
- Heat Pumps

Role of Transmission in Power Sector Transformation

Evolution of Regional Transmission Organizations (RTOs)

Michigan in two RTOs—MISO, PJM

- Different market rules
- Different fuel Mixes

Grids Cleaner

- SPP—March 14—81.39% renewable energy
- How to include DERs?

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What Are Other States Doing?

United States Climate Alliance

- Response to US leaving Paris Accords
- Michigan one of 28 members (also IL, MN, WI)

Governor's Targets

- IL –Comprehensive Legislation
- MN, WI—Clean Energy Plans
- Modeling through MSEC for Power Sector GHG Reductions (RGGI, MW Accord)
- Numerous States with ambitious goals
- Equity, Diversity, Inclusion Efforts

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Federal Administration, Congress

Clean Slate—no Clean Power Plan, no Affordable Clean Energy Rule

Climate obviously consideration for every Agency, plus national and domestic climate offices

Rejoin Paris—new targets in a month

Re-use Clean Air Act s. 111, or another vehicle?

Criteria pollutants, coal ash

Congress? Clean Energy Infrastructure funding, but beyond?

Some Additional Thoughts

Role of power sector in decarbonization—over-sized role, to enable decarbonization in other sectors

Transportation, buildings, industrial—more difficult

Move to electrification

- **Grid upgrades**
- **Transmission needs**
- **What do we do with natural gas infrastructure?**

What are the costs, impacts on customers?

This isn't easy!

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THANK YOU

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MICHIGAN PERSPECTIVE

Michigan Council on Climate Solutions
Energy Planning Overview

March 23, 2021

Dan Scripps, Chair
Michigan Public Service Commission

MPSC
Michigan Public Service Commission

Integrated Resource Planning

- PA 341 of 2016 added requirement that regulated electric utilities file “integrated resource plans” based on 5, 10, and 15 year energy and capacity outlooks
- Integrated resource plans (IRPs) are required to include the following:
  - Long-term forecasts of utility sales and peak demand
  - Generation technologies, as well as proposed capacities and fuel costs
  - Projections on energy purchased or produced by renewable resources and cogeneration
  - Details on plans to reduce energy waste, including annual EWR projections
  - Projected load management and demand response savings, and associated costs
  - Analysis of potential new or upgraded transmission options
- In evaluating IRPs, the MPSC must find that the plan represents “the most reasonable and prudent” means of meeting the utility’s energy and capacity needs and considers the following seven factors:
  - Ability to serve peak loads, including planning reserve margin and local clearing requirements
  - Compliance with state and federal environmental regulations
  - Competitive pricing
  - Reliability
  - Commodity price risks
  - Diversity of generation supply
  - Cost-effectiveness of proposed EWR and peak load programs
    - Exceedance of renewable energy and EWR goals not evidence of unreasonableness

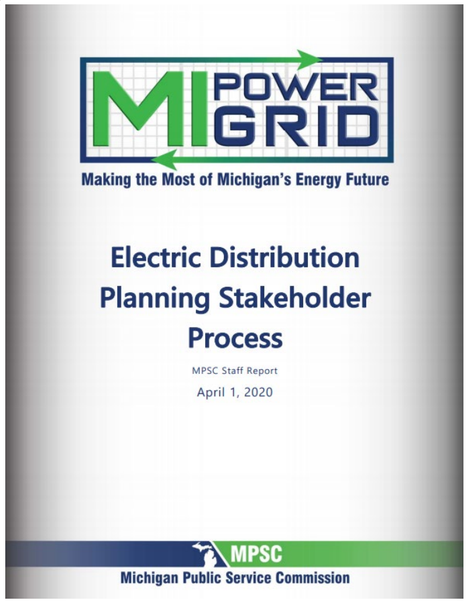
Distribution System Planning

- Distribution planning, like resource planning, seeks to optimize utility investment decisions
  - Increasingly important as utility distribution spending now exceeds generation investments
  - Distribution spending is also increasing, driven by need to replace aging infrastructure
- Distribution planning also adds transparency, and allows for consideration of alternatives, as well as providing opportunities for customer preferences and new technologies to be considered
- In 2018, MPSC required DTE and Consumers to file distribution plans, held a technical conference, and Staff filed Distribution Planning Framework report
  - I&M directed to file distribution plan in 2019
  - Not currently required for other utilities

- Distribution plans allow greater understanding of how specific proposed investments are tied to longer-term (5 year) strategies
  - Stakeholders allowed opportunity to comment on utility plans, though unlike IRPs not currently conducted as contested cases
  - Also, unlike IRPs, distribution plans are not ultimately subject to Commission approval
    - Instead, specific investments are reviewed in utility rate cases

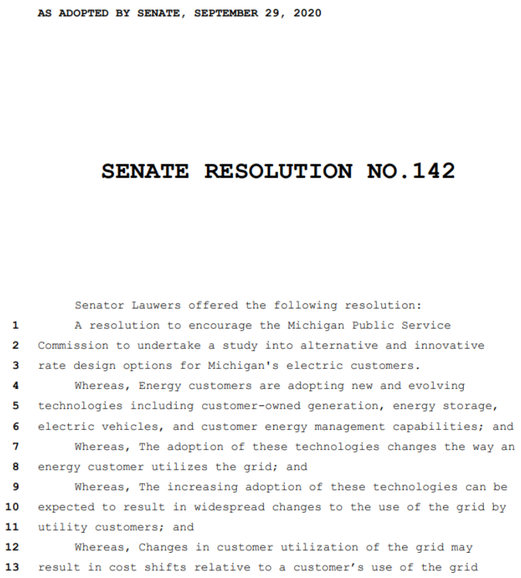
Distribution System Planning

- In 2019, MPSC launched MI Power Grid, a multi-year stakeholder initiative to maximize the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses
- Initial focus included updating framework for utility distribution plans, as well as on other foundational issues such as updating interconnection rules and service quality rules and technical standards, improving the demand response framework, and better ways of evaluating utility pilot programs
  - Phase II includes focus on competitive procurement, new technologies and business models, and advanced planning
- Second round of distribution plans for Consumers Energy, DTE, and Indiana Michigan due in Aug. 2021
  - Still not required for other utilities
- Additionally, greater focus on integrating resource and distribution planning processes
  - Consumers Energy to align IRP and distribution plans in 2021
  - NSP agreed to do the same as part of its next IRP
  - Important as distribution elements included in IRPs



Other ongoing processes

- Under PA 341, MPSC must update the IRP planning parameters and filing requirements every five years
  - Currently ongoing, with the MI Power Grid advanced planning workgroup expected to develop the inputs for this effort, which will be concluded in 2022
  - Following announcement of the MI Healthy Climate Plan, advanced planning workgroup charged with evaluating how to consider carbon reduction goals within planning process
    - Commission issued order in February requiring IRPs to model compliance with MI Healthy Plan goals
    - Power sector expected to overperform in order to meet 2025 targets, though questions remain as to how much
- MPSC also working to update EWR and demand response potential studies, as required by statute
  - Will include separate data for UP and Lower Peninsula
  - Project expected to be completed by Aug. 30, 2021
  - Initial stakeholder meeting held Dec. 2, 2020
- Michigan Senate also requested MPSC to conduct a study to consider various rate design options to account for changing customer use of the grid
  - Launched study process with March 9 stakeholder session
  - Study to be completed by Oct. 31, 2021



AS ADOPTED BY SENATE, SEPTEMBER 29, 2020

SENATE RESOLUTION NO.142

Senator Lauwers offered the following resolution:

A resolution to encourage the Michigan Public Service Commission to undertake a study into alternative and innovative rate design options for Michigan's electric customers.

Whereas, Energy customers are adopting new and evolving technologies including customer-owned generation, energy storage, electric vehicles, and customer energy management capabilities; and

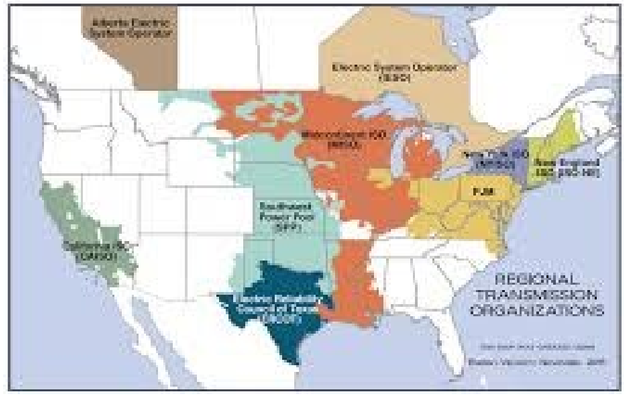
Whereas, The adoption of these technologies changes the way an energy customer utilizes the grid; and

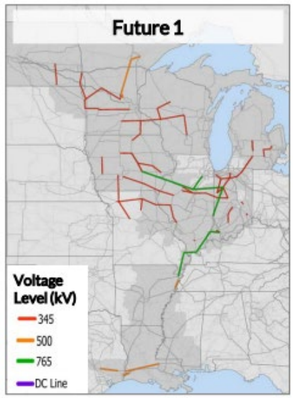
Whereas, The increasing adoption of these technologies can be expected to result in widespread changes to the use of the grid by utility customers; and

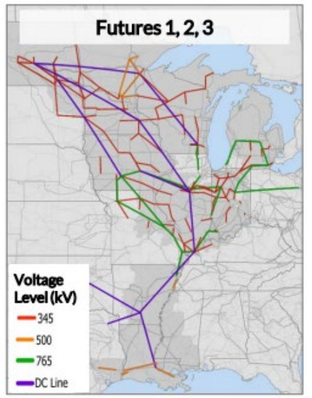
Whereas, Changes in customer utilization of the grid may result in cost shifts relative to a customer's use of the grid

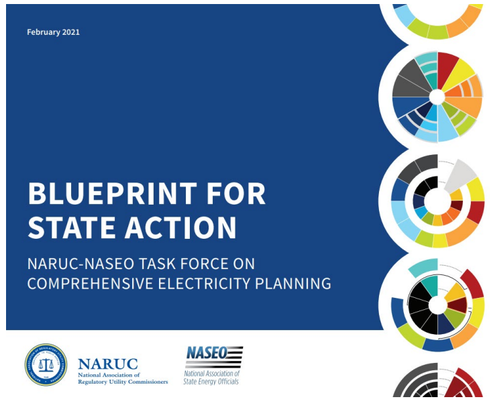
Transmission Planning

- Unlike resource and distribution planning – which are under state jurisdiction – transmission planning largely takes place at MISO and PJM
  - RTOs (except ERCOT) operate under the jurisdiction of the Federal Energy Regulatory Commission
- MISO recently launched a Long-Range Transmission Planning process based on a set of assumptions of what the future may look like
  - Futures consider shifting generation fleet, electrification of other sectors, and need to maintain reliability
- In 2019, we asked MISO to examine transmission constraints that limit power flows into/ out of Mich.
  - CIL-CEL study ongoing; final results expected very soon
- Michigan working to integrate transmission planning with state processes
  - IRP requires consideration of transmission options and RTO processes require consideration of non-transmission alternatives
  - MPSC and Energy Office participated in multi-year NARUC-NASEO Task Force on Comprehensive Electricity Planning
    - Blueprint and state action plans released in Feb. 2021



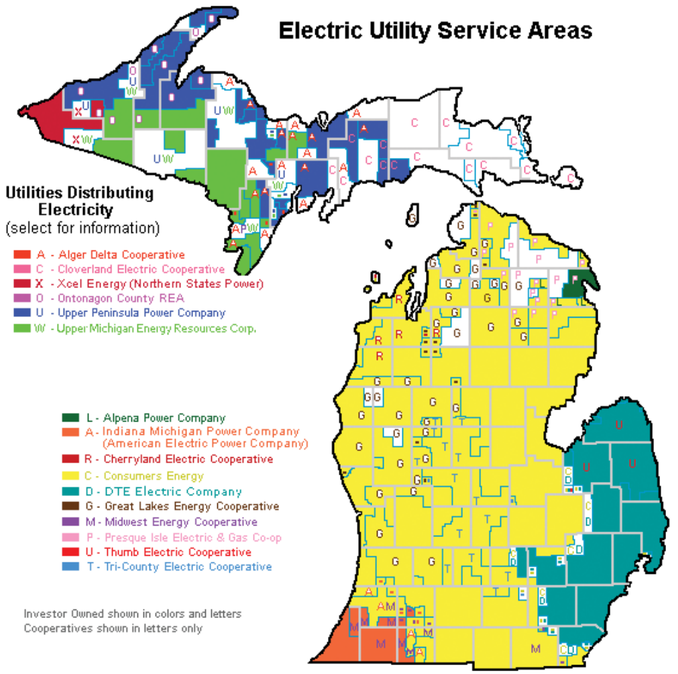






Limits of planning framework

- IRP process seeks to optimize resource planning for individual utilities, but not across utilities
  - Also does not account for planning done by municipal and cooperative utilities not under MPSC's jurisdiction
- Increasing overlap between planning for generation, transmission, and distribution
  - Challenges increase when looking at resources that can participate in both retail and wholesale markets
- Business model and jurisdictional issues create barriers to comparing generation and transmission alternatives on equal footing
- Planning to date focused on power sector; significant differences between electricity and gas add complexity to gas system planning
- Planning to date (both at MPSC and RTO level) largely does not consider climate change or GHG emissions



EQUITY & ENERGY JUSTICE

Justice and Equity in energy are important priorities for planning, because:

- Energy issues and the detrimental effects associated with energy generation have been studied historically and broadly as environmental injustices.
- Low-income communities and neighborhoods bear economic and environmental impact disparities in energy consumption.
- Research on energy usage and community advocacy have been instrumental in exposing energy inequities.

OPEN DISCUSSION

NEXT STEPS

NEXT MEETING - APRIL 27, 2021

Meetings will generally be held the fourth Tuesday of every month at 3pm.

WORKGROUPS

Workgroup Co-Chairs will communicate meeting information in the coming weeks.

MEETING MATERIALS

Meeting materials will be distributed to council members prior to each meeting and subsequently posted online. Michigan.gov/Climate

Reach Us Online

WEBSITE

Michigan.gov/Climate

EMAIL ADDRESS

EGLE-ClimateSolutions@Michigan.gov