Metropolitan Council

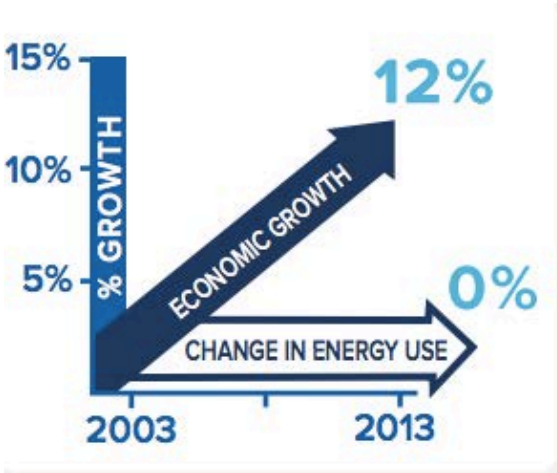
December 14, 2016

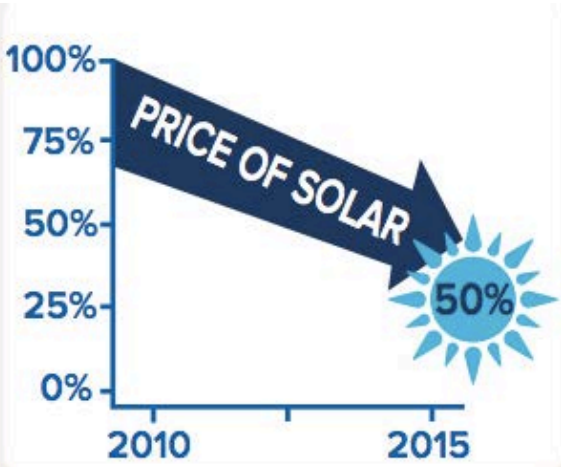
Outline for today's presentation

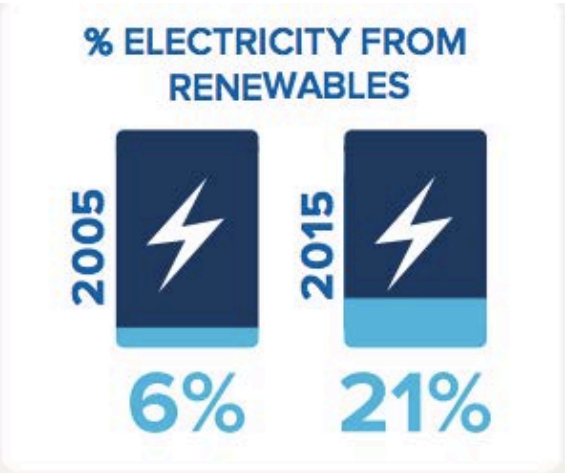
1. Introduction to Energy Action Plan project
2. Overview of Minnesota's energy landscape, state energy goals, & current status
3. Stakeholder-driven strategies for success:
    1. Transportation
    2. Energy Supply and Grid Modernization
    3. Efficient Buildings and Integrated Energy Systems
    4. Industrial and Agricultural Processes
    5. Local Planning and Action
4. Next steps
5. Q&A

The energy landscape is changing

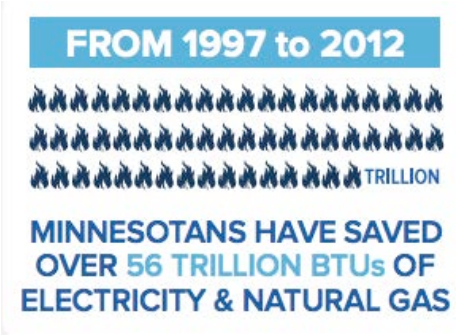
- In Minnesota and around the country, the energy landscape is changing due to market forces, technological development, demand for consumer choices, and state and federal policies.







Minnesota's 2025 Energy Action Plan



Minnesota is positioned to strengthen its clean energy leadership

Purpose of 2025 Energy Action Plan:

- Develop recommended next steps to leverage near-term opportunities for a clean, affordable, reliable, and resilient energy system
- Emphasize consensus-driven strategies with traction to move forward

Minnesota's 2025 Energy Action Plan

- Funded by US Department of Energy grant
- Project team:
  - Minnesota Department of Commerce,
  - Legislative Energy Commission,
  - Rocky Mountain Institute,
  - Great Plains Institute,
  - LHB
- Stakeholder advisory committee
- Additional input from over 50 subject matter experts from multiple sectors

Minnesota's 2025 Energy Action Plan

LOCAL PLANNING & ACTION Coordinated energy and resilience planning, adopting best practices

TRANSPORTATION
Electric vehicles and alternative-fuel vehicles

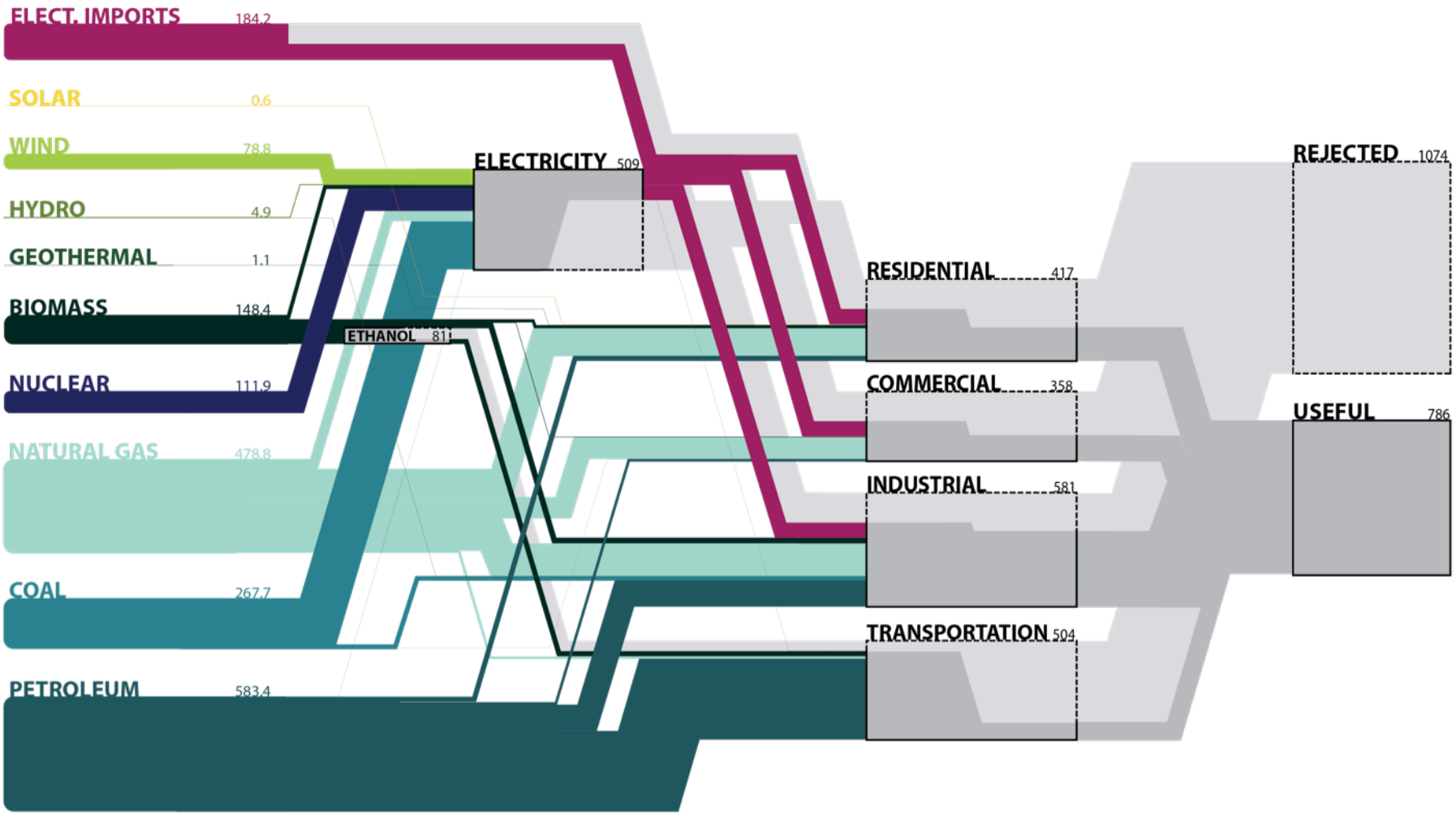
ENERGY SUPPLY & GRID MODERNIZATION
Smart meters and smart inverters, storage, updated pricing and programs

EFFICIENT BUILDINGS & INTEGRATED ENERGY SYSTEMS
Low-energy design, efficient operations, thermal energy integration

INDUSTRIAL & AGRICULTURAL PROCESSES
Advanced biofuels, business leadership on energy

ESTIMATED MINNESOTA ENERGY USE IN 2013

1860 TRILLION BTU



Data source: U.S. Energy Information Administration. State Energy Data System (SEDS): 1960-2013. July 2015.

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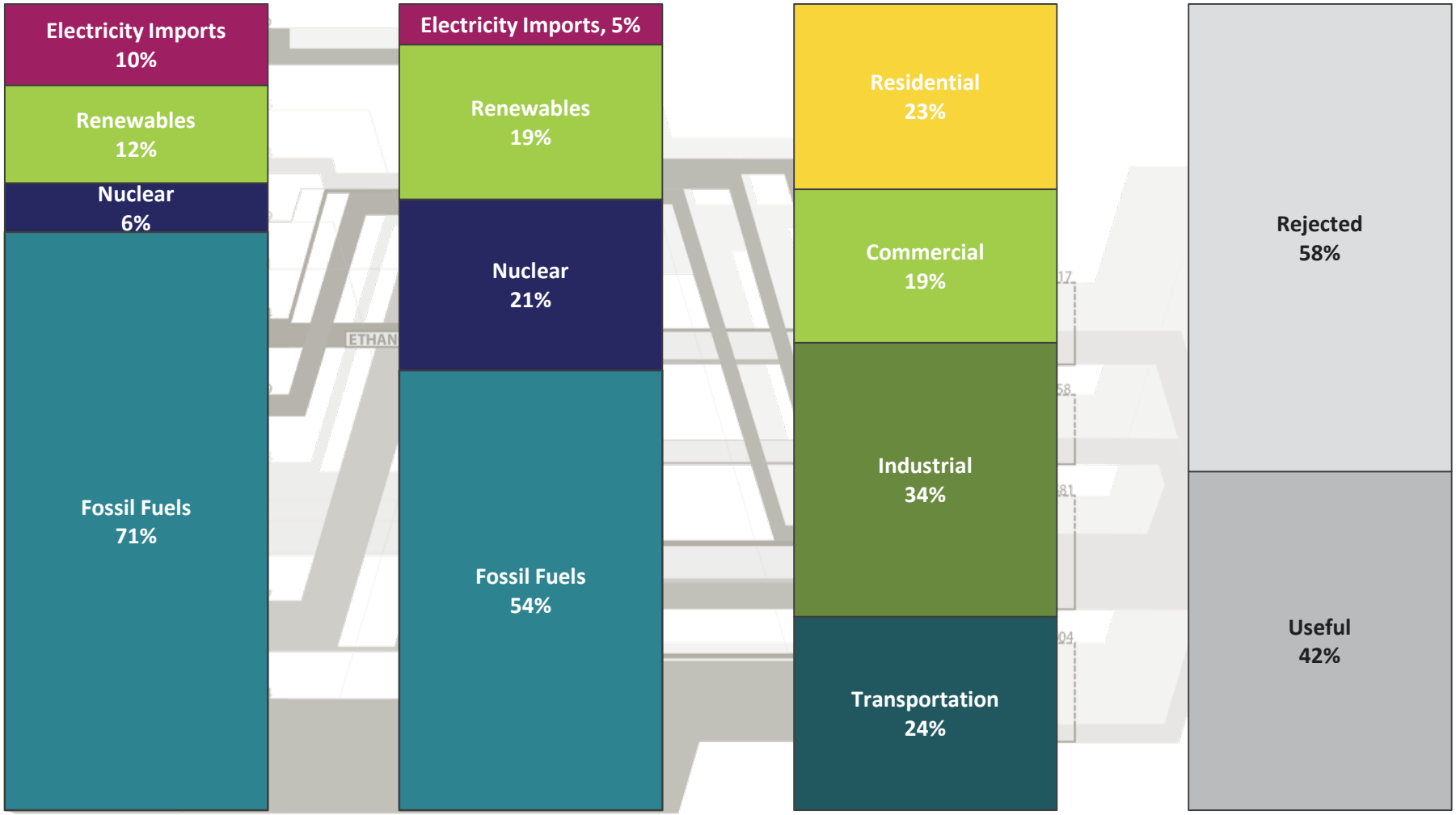
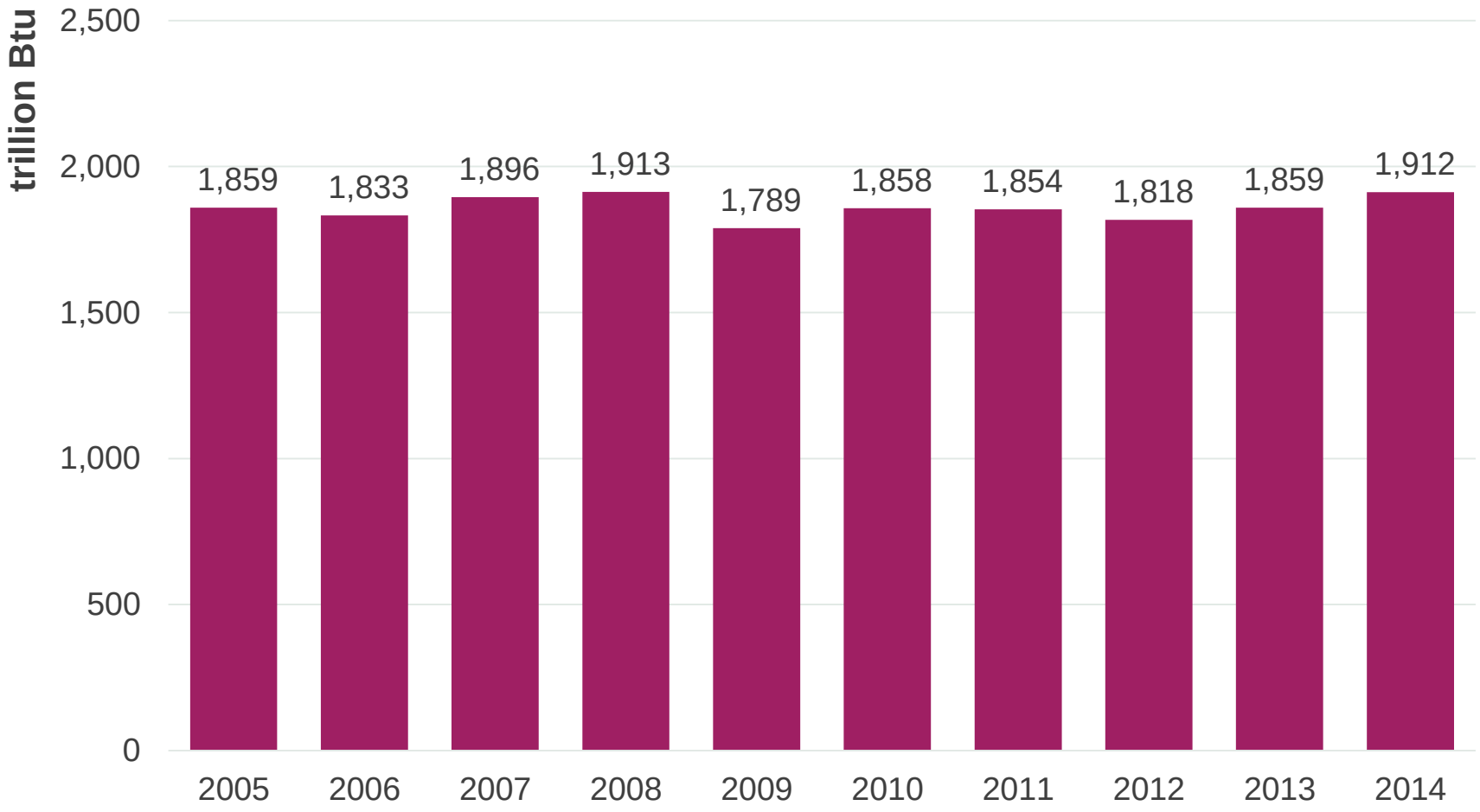


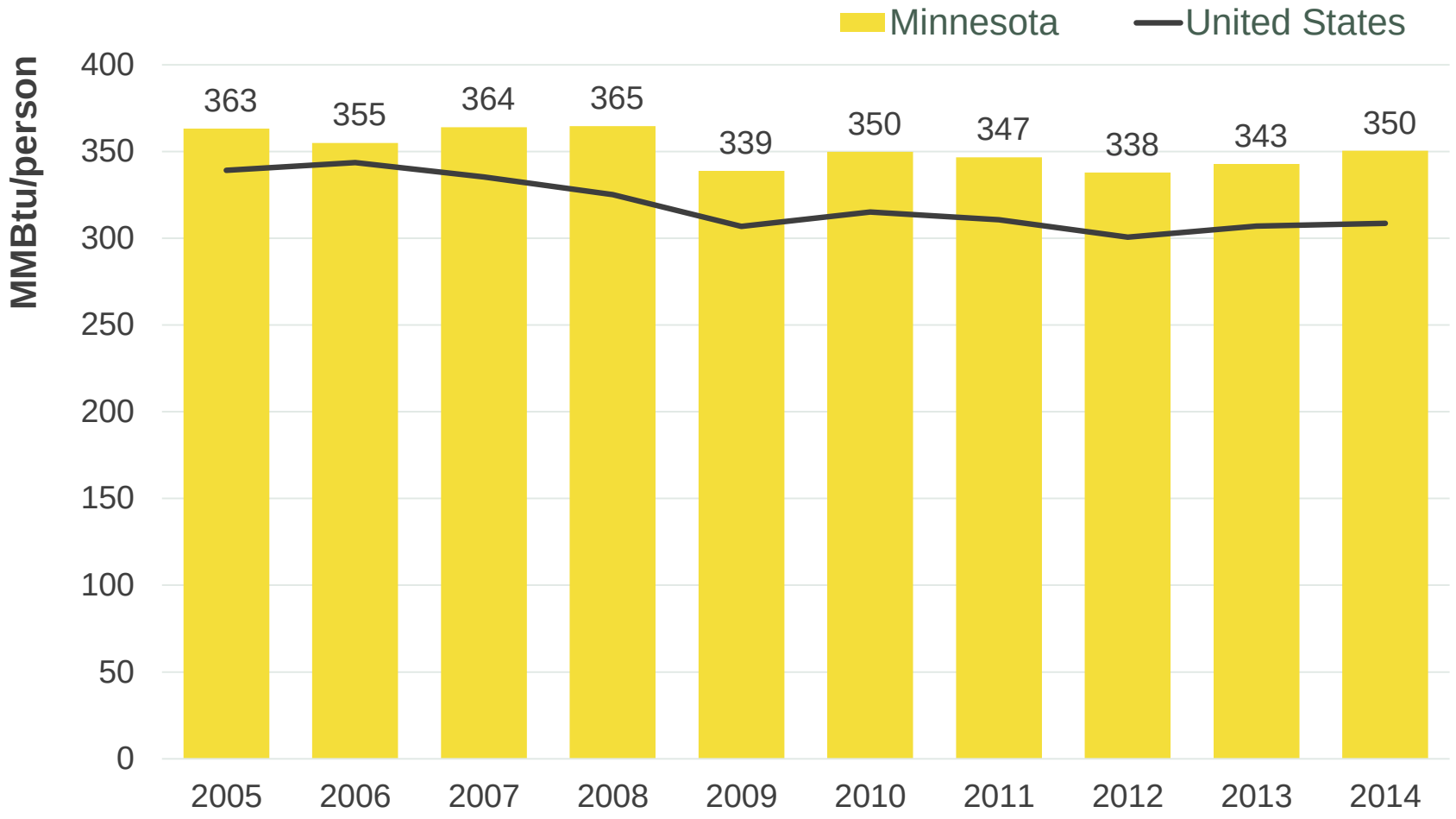
Data source: U.S. Energy Information Administration. State Energy Data System (SEDS): 1960-2013. July 2015.

Minnesota energy use



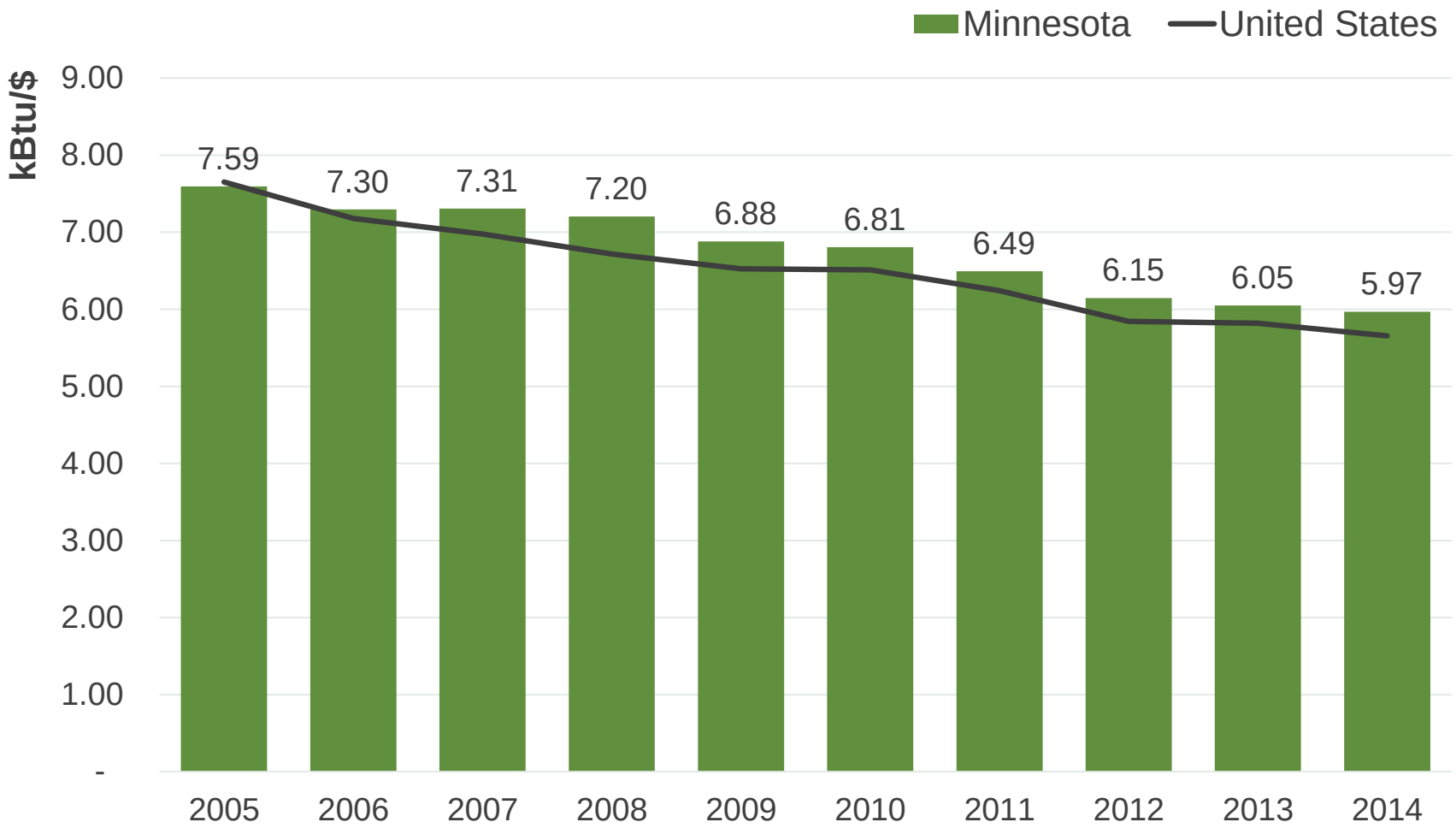
Data source: U.S. Energy Information Administration. State Energy Data System (SEDS): 1960-2014. October 2016.

Minnesota energy use per capita



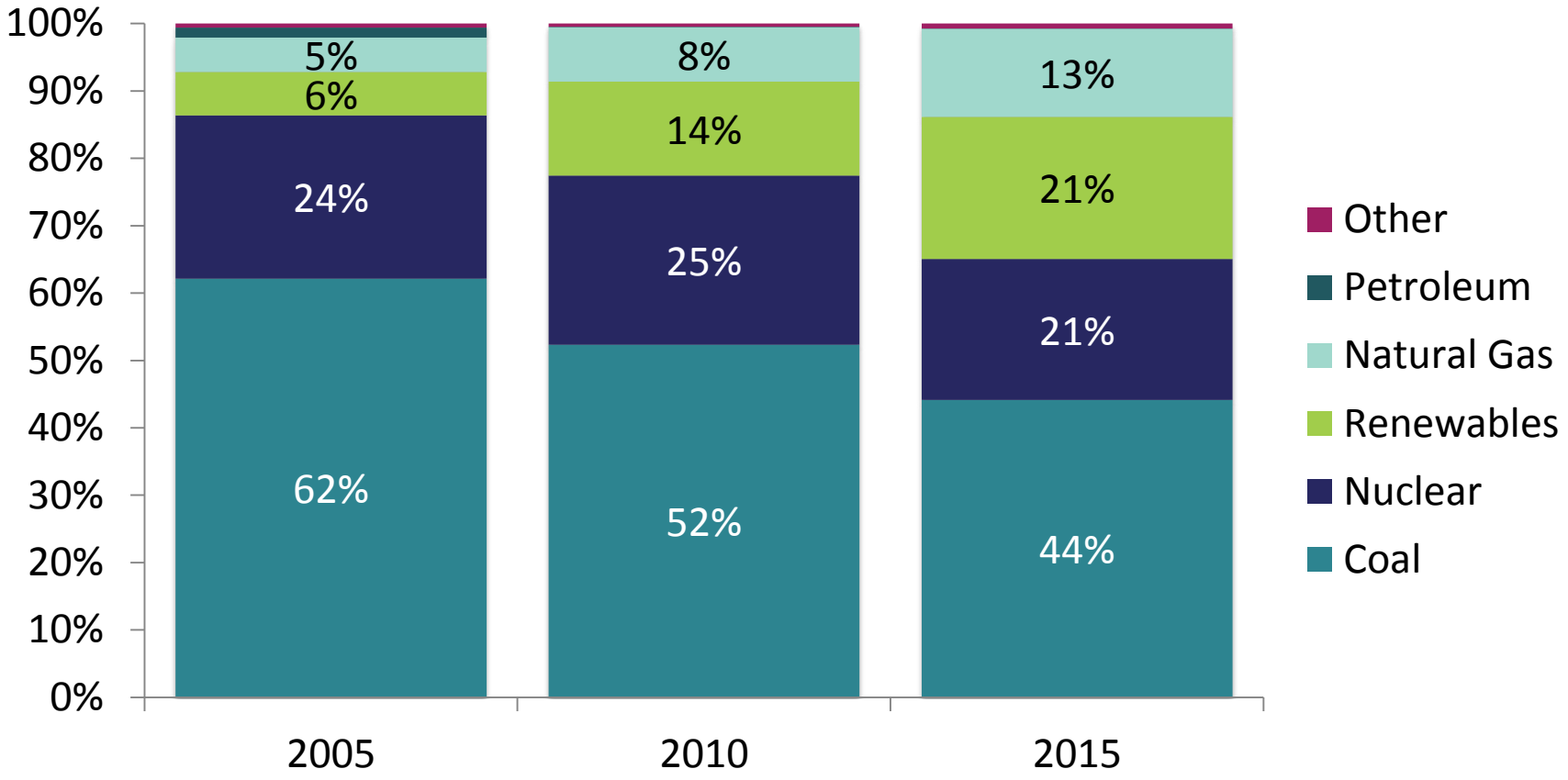
Data source: U.S. Energy Information Administration. State Energy Data System (SEDS): 1960-2014. October 2016. U.S. Census Bureau

Minnesota energy use per GDP



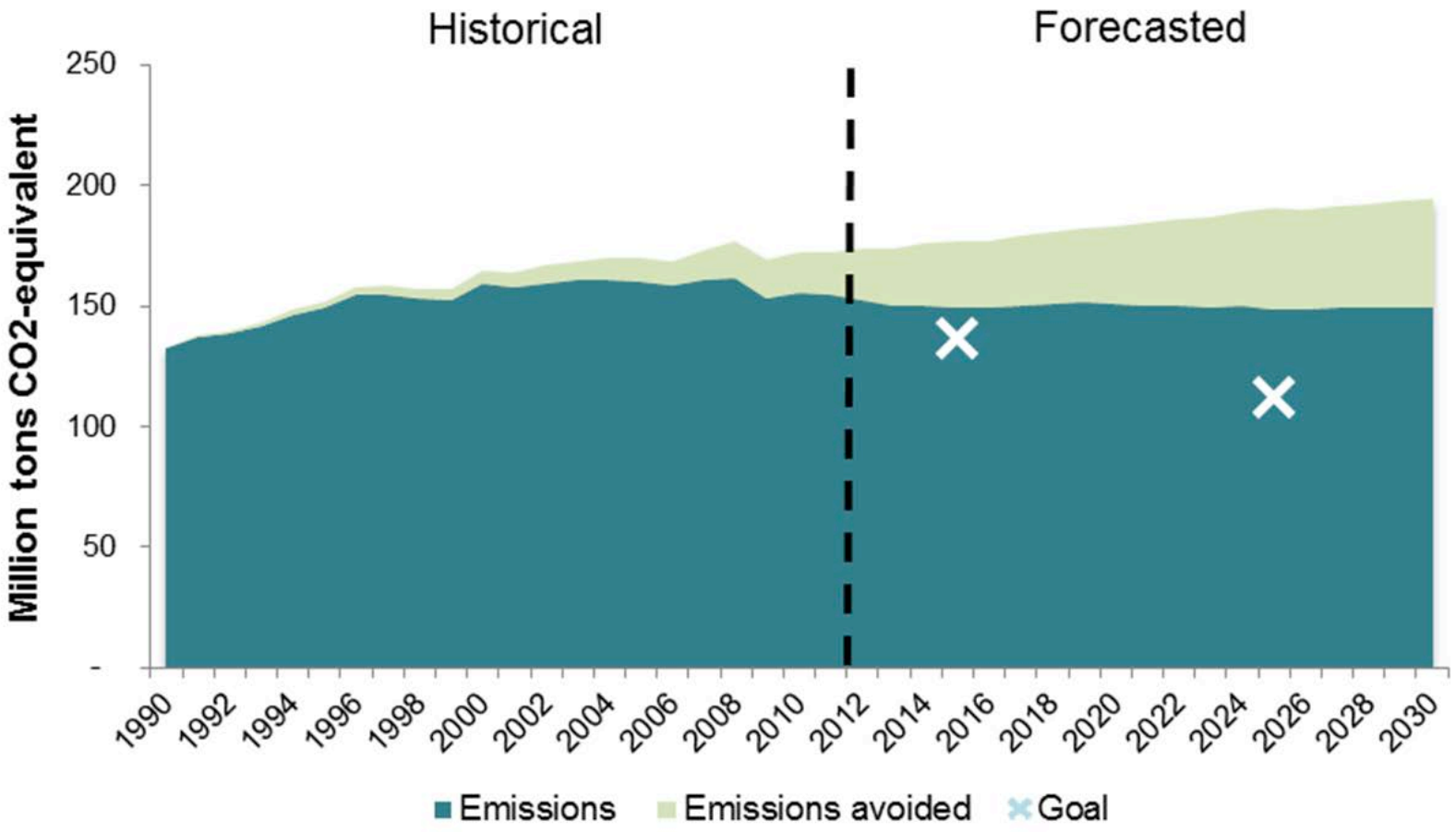
Data source: U.S. Energy Information Administration. State Energy Data System (SEDS): 1960-2014. October 2016. Federal Reserve Bank of St. Louis.

Minnesota electricity net generation by source



Data source: U.S. Energy Information Administration "Net Generation by State by Type of Producer by Energy Source (EIA-906, EIA-920, and EIA-923), 1990-2014" and "Electric Power Monthly with data for December 2015, Net Generation by State by Type of Producer by Energy Source," U.S. Energy Information Administration."

Minnesota greenhouse gas emissions



MN 2025 Energy Action Plan, Fig. 10, p. 26

Source: MN Pollution Control Agency

Stakeholder strategies for success

- Strategies selected through consensus process, based on the following criteria:
  - The potential impact to support Minnesota's current goals related to energy, climate and air quality, and environmental justice
  - The potential to significantly advance progress toward clean energy
  - Anticipated benefits relative to costs
  - Commitment by champions to advance the strategy and ability to leverage additional resources
  - Potential to provide benefits across economic sectors
  - A timeframe of ten years or less for implementation

Stakeholder strategies for success (cont'd)

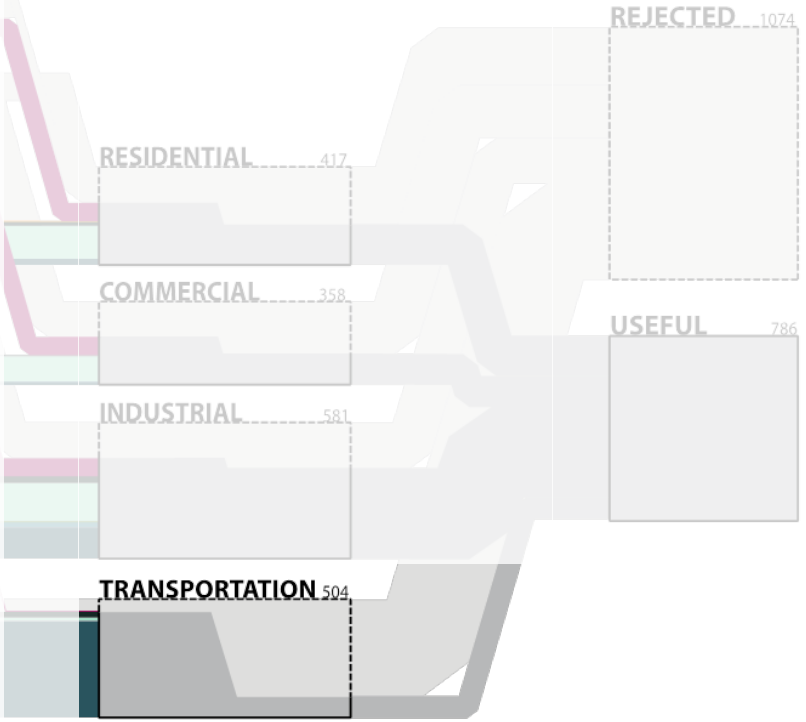
- Each strategy identifies:
  - Specific actions for strategy implementation
  - Champions and key participants
  - Success factors
  - Indicators of strategy success
  - Cross-sector opportunities and synergies
  - Ongoing Minnesota initiatives
  - Additional resources

Cross-sector opportunities: Example

			Cross-sector opportunities				
Sector	Strategy	Purpose	Transportation	Energy Supply and Grid Modernization	Efficient Buildings and Integrated Energy Systems	Industrial and Agricultural Processes	Local Planning and Action
Transportation	Increase adoption of personal electric vehicles	Electric vehicles offer reduce emissions and lower operating costs compared to conventional vehicles		■	■		
	Electrify buses	Electric buses offer increased fuel efficiency and reduced air emissions		■			■
	Electrify fleets	Electric vehicles in high-mileage fleets offer increased economic benefits		■			■
	Increase adoption of alternative-fuel heavy-duty vehicles	Heavy-duty vehicles powered by renewable natural gas offer emissions savings				■	

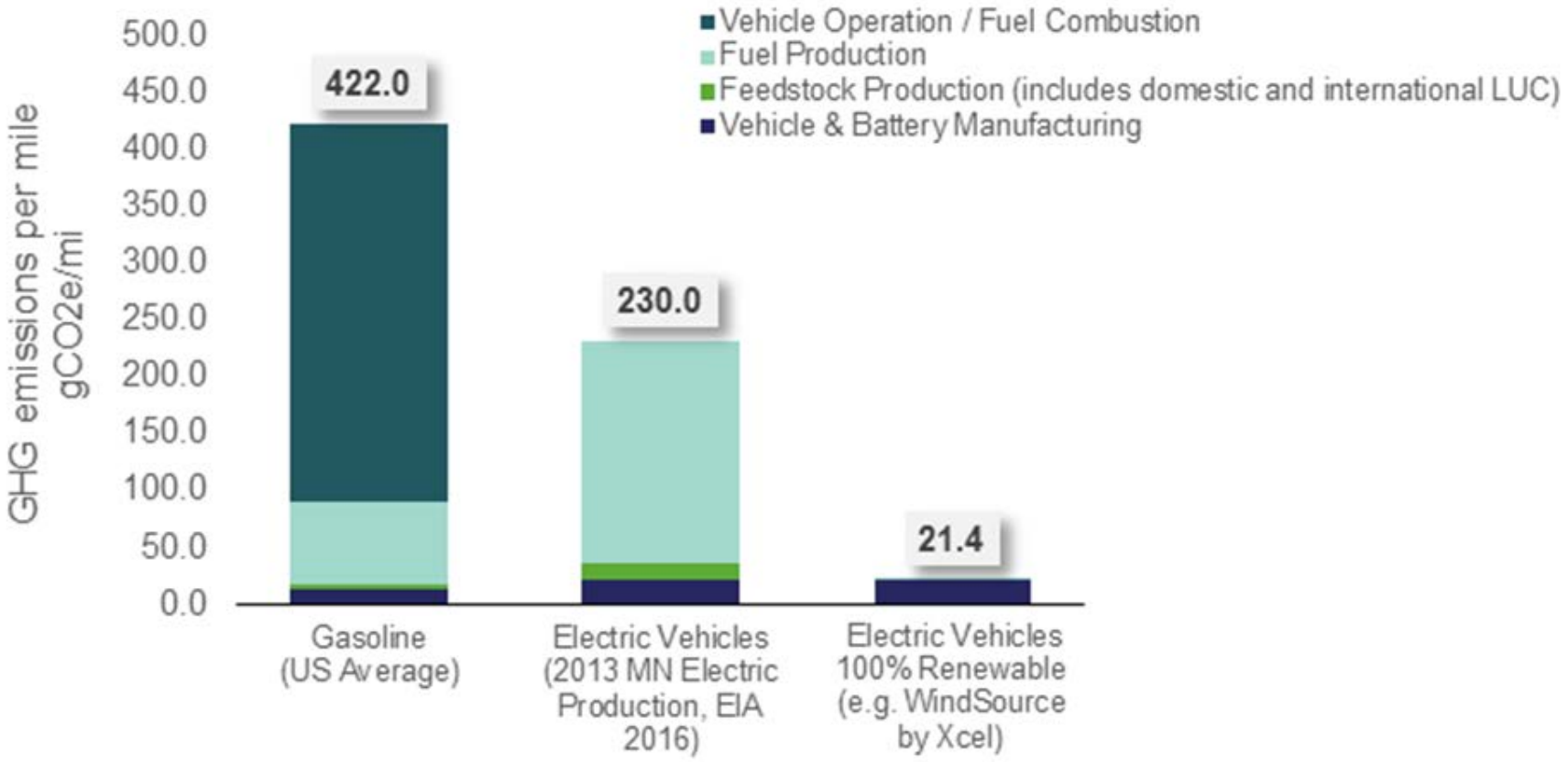
Transportation

- Electric vehicles:
  - Increasing adoption of personal electric vehicles
  - Encouraging electric vehicles in fleets
  - Promoting electric buses
- Increasing adoption of heavy-duty alternative-fuel vehicles



Transportation: EV emissions

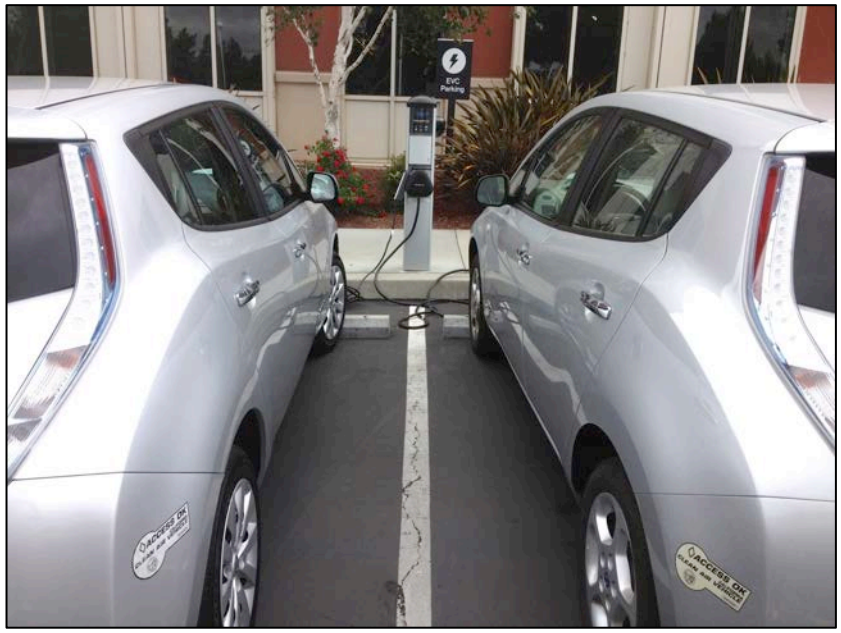
Total GHG emissions per mile for light-duty vehicles, by fuel



MN 2025 Energy Action Plan, Fig. 12, p. 40

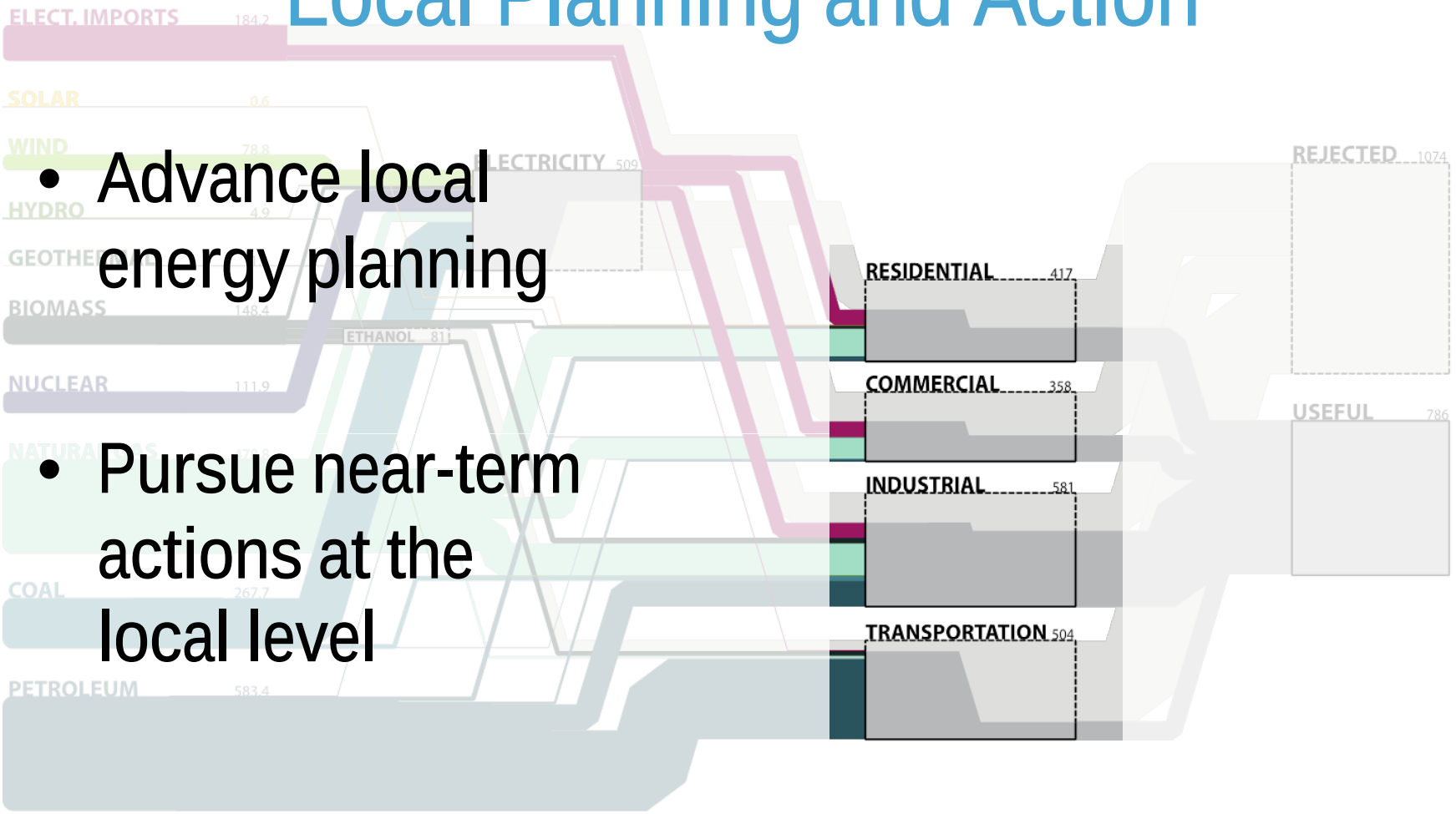
Source: GPI, based on ANL 2015 GREET MODEL

Transportation: Ongoing activities



Local Planning and Action

- Advance local energy planning
- Pursue near-term actions at the local level



Local Planning

KEY ELEMENTS OF COMMUNITY ENERGY PLANNING

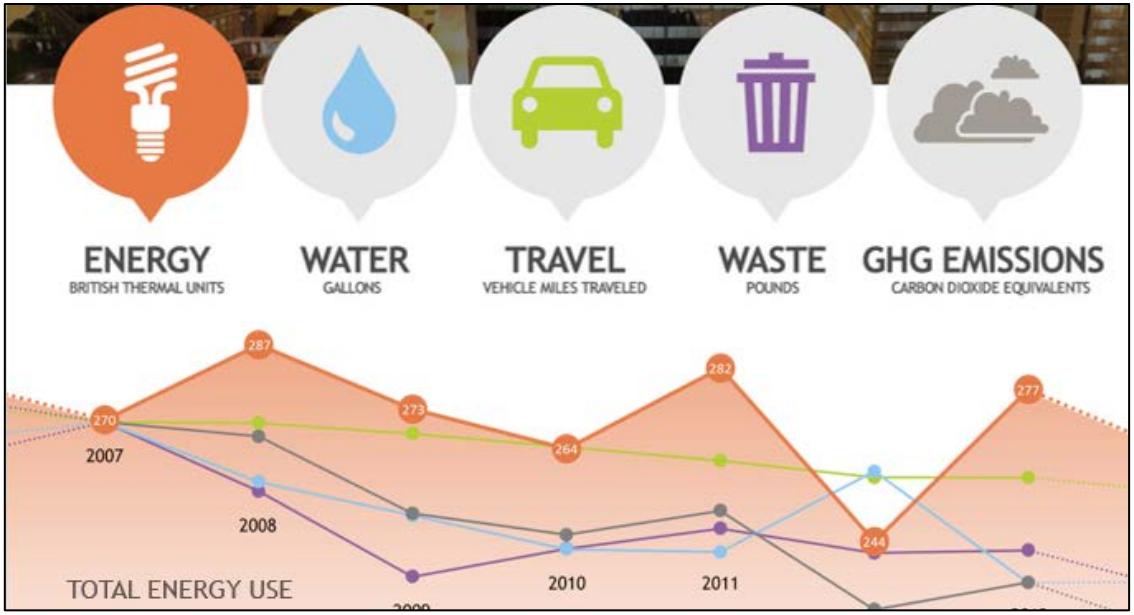
ELEMENTS OF COMMUNITY ENERGY PLANNING	EXAMPLE ACTIVITIES
IDENTIFY AND BRING TOGETHER KEY LEADERS	• Assemble a small group of individuals with a shared interest in advancing a community energy action plan • Secure the support of a few key leaders, seek third-party consultants, and collect their input
BUILD A SHARED UNDERSTANDING OF THE GOALS	• Organize a collaborative workshop for key stakeholders to coalesce around a vision, strategies, goals, and next steps
BASELINING: INVENTORY CURRENT ENERGY USE AND INITIATIVES	• Understand current energy use, energy expenditures and associated greenhouse gas emissions, and investment and job opportunities • Map related initiatives in order to leverage and to build upon success
PRIORITIZE STRATEGIES AND TACTICS	• Select strategies and tactics to achieve the community's goals for its energy future
DEVELOP A PLAN THAT CAN MOBILIZE THE COMMUNITY	• Establish a plan that will empower the community to achieve the envisioned energy future and solicit community feedback
SEEK COMMITMENTS TO THE PLAN	• Adopt a plan via appropriate avenues (e.g., city-council vote, business commitments, county-commission vote, or another appropriate avenue) • Execute strategy and tactics within the specified timeframe
MEASURE PROGRESS AND SHARE RESULTS	• Monitor progress and periodically release results to the community and other interested parties

Local Action: Ongoing activities

minnesota clean energy community

A program of the Minnesota Pollution Control Agency and its partners
Minnesota GreenStep Cities

CLEAN ENERGY RESOURCE TEAMS



MINNESOTA LoGoPEP

Local Planning and Action: Cross-sector opportunities

			Cross-sector opportunities				
Sector	Strategy	Purpose	Transportation	Energy Supply and Grid Modernization	Efficient Buildings and Integrated Energy Systems	Industrial and Agricultural Processes	Local Planning and Action
Local Planning and Action	Advance energy planning at the local level	Third parties can support local governments to plan for energy efficiency and renewables	■		■	■	
	Pursue near-term actions at the local level	Local governments can leverage their unique authority to advance clean energy	■		■	■	

Next Steps

- Review Action Plan and identify how your work is reflected in various strategies
- Convene small groups of stakeholders on strategies to identify next steps
- Work with stakeholders and interested groups to promote Action Plan
- Identify conference/speaking opportunities to present information about Action Plan

ACKNOWLEDGEMENTS

This project was made possible by a grant from the U.S. Department of Energy and the Minnesota Department of Commerce through the Energy Policy and Conservation Act (42 U.S.C. 6321 et seq. and amendments thereto); U.S. Department of Energy Financial Assistance Rules (10CFR600); and Title 2 of the Code of Federal Regulations.

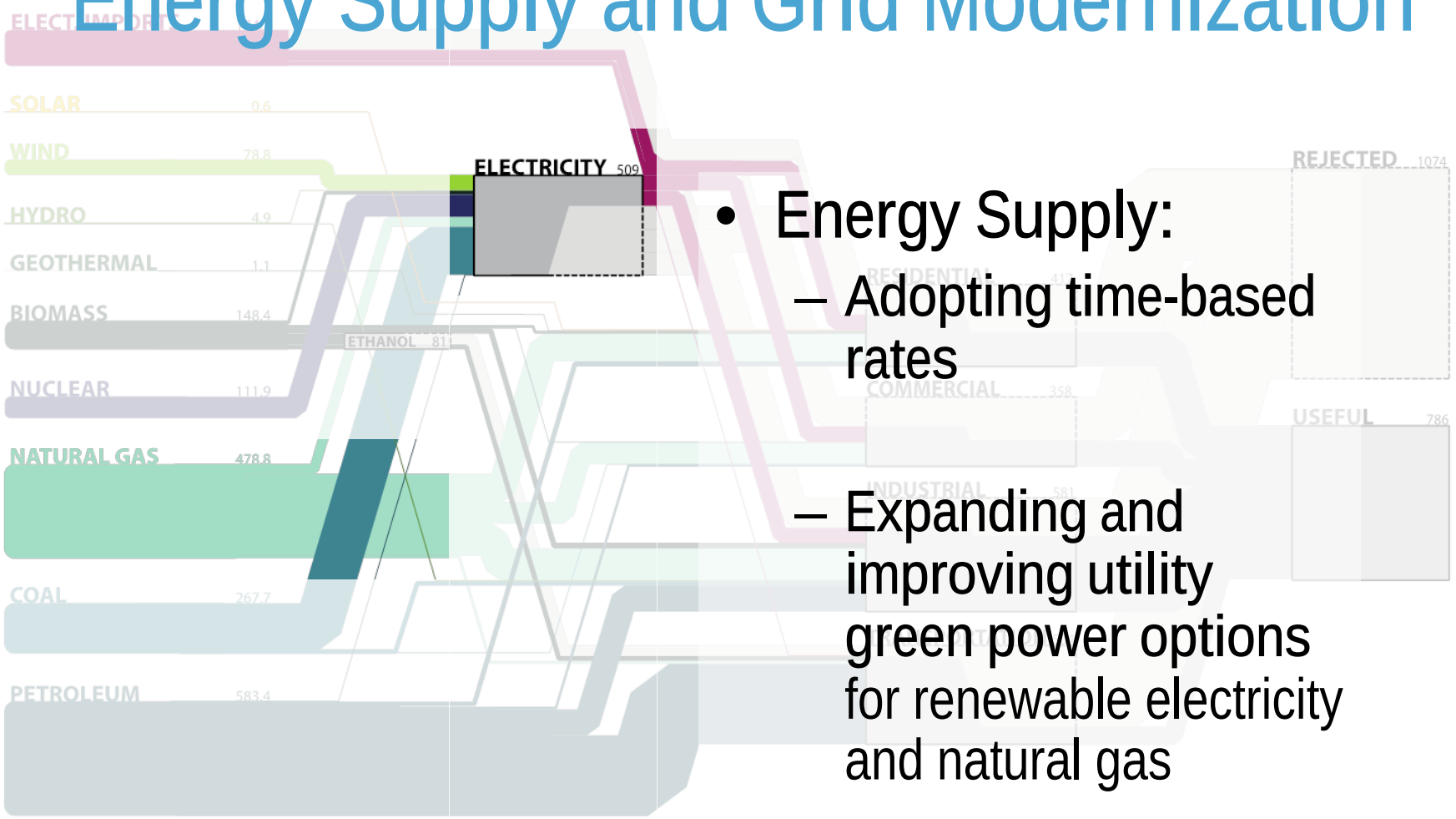
The Minnesota Department of Commerce and the Legislative Energy Commission provided high-level guidance to ensure that the project meets guidelines for DOE funding. The following consultants conducted analysis and research to support the deliberations of the Stakeholder Advisory Committee: Great Plains Institute (committee facilitation, stakeholder engagement); LHB, Inc. (metrics and indicators); and Rocky Mountain Institute (analysis and report development). Additional project guidance and contributions came from Energy Systems Consulting, the Minnesota Environmental Quality Board, the Minnesota Pollution Control Agency, and the U.S. Department of Energy.

Check out the complete Plan at:

http://www.lec.leg.mn/projects/2025/MN_E2025_final.pdf

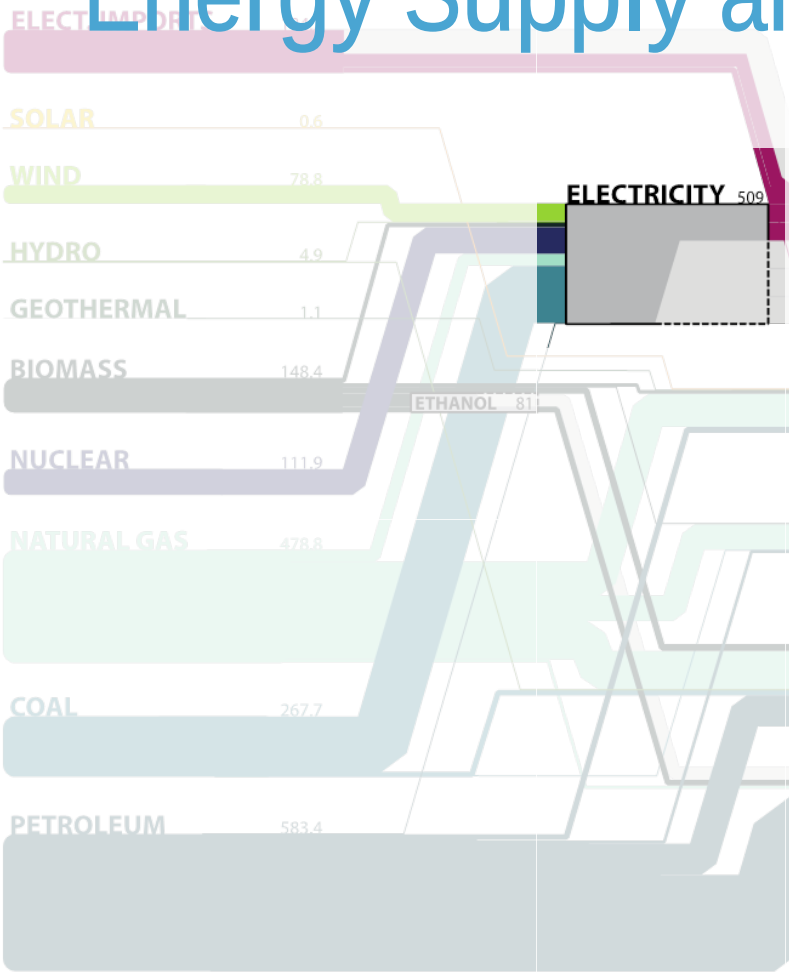
Additional Slides

Energy Supply and Grid Modernization



- Energy Supply:
  - Adopting time-based rates
  - Expanding and improving utility green power options for renewable electricity and natural gas

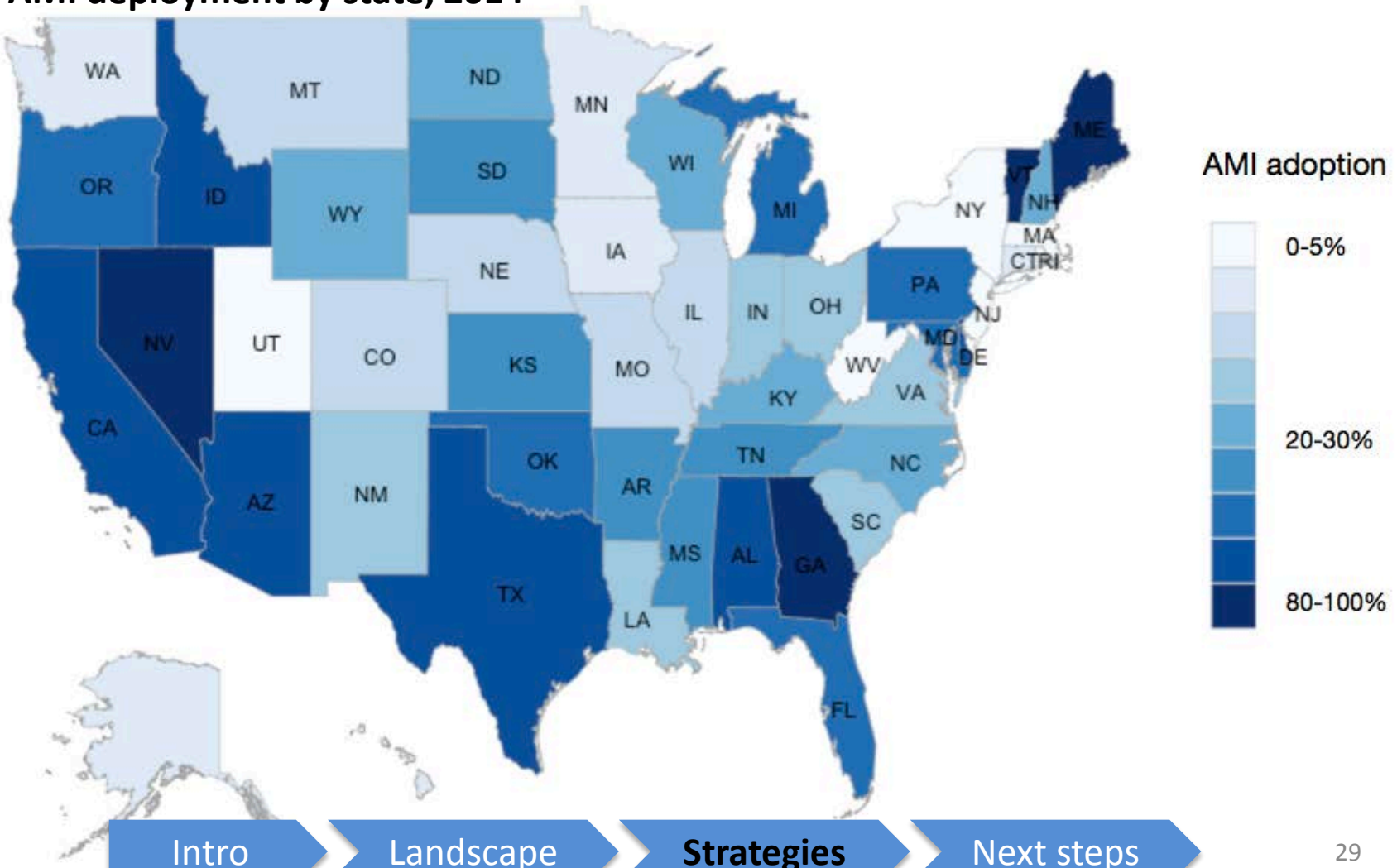
Energy Supply and Grid Modernization



- Grid modernization:
  - Deploying advanced metering infrastructure (AMI)
  - Enabling smart inverter functionality
  - Integrating energy storage and demand response

Energy Supply and Grid Modernization

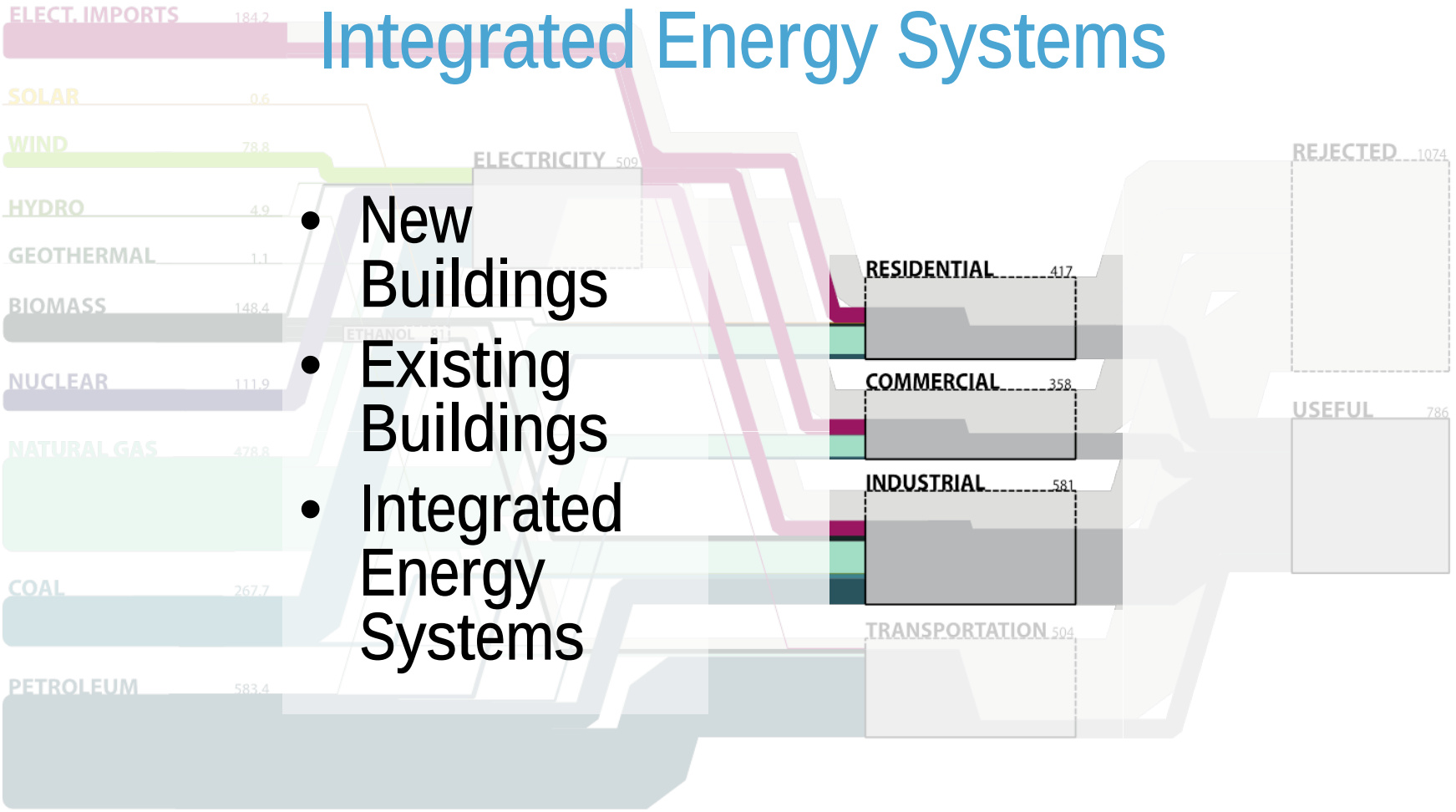
AMI deployment by state, 2014



Energy Supply and Grid Modernization: Ongoing activities

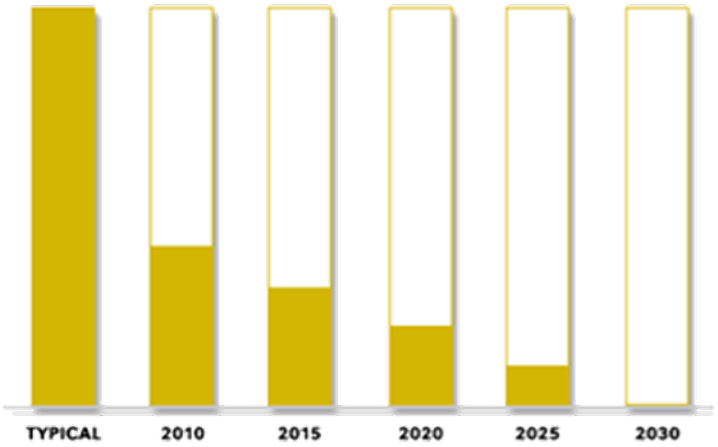
Efficient Buildings and Integrated Energy Systems

- New Buildings
- Existing Buildings
- Integrated Energy Systems



Efficient Buildings and Integrated Energy Systems

- New Buildings
  - Adopting SB 2030 as an optional stretch code for new buildings, additions, and major renovations



SB 2030 Energy Standard

Building Energy Consumption from Carbon Producing Fuel

Efficient Buildings and Integrated Energy Systems

- Existing Buildings
  - Enhancing energy data access
  - Increasing adoption of commercial-building energy-benchmarking and disclosure programs
  - Improving building operations
  - Promoting behavioral energy efficiency strategies

Make data available

Identify opportunities

Address energy savings opportunities

Data Access and Benchmarking

Xcel Energy

Billing & Payment | Start, Stop, Transfer | Programs & Rebates | Outage & Emergencies

Home / Programs and Rebates / Business Programs & Rebates / New Construction and Whole Building / Energy Benchm

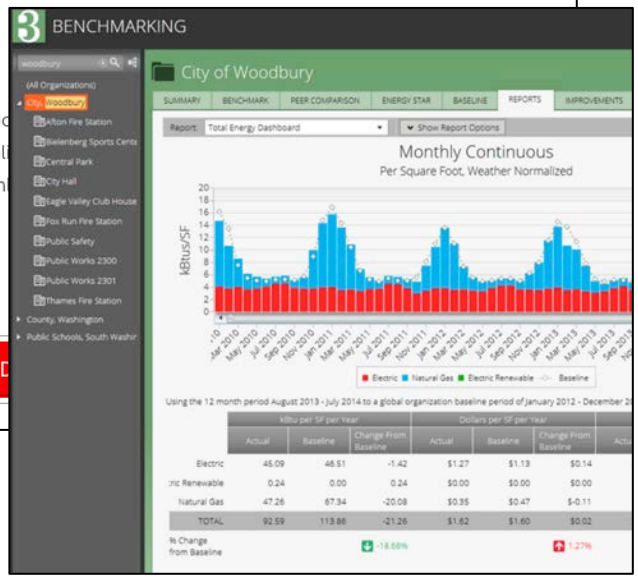
Energy Benchmarking

Energy benchmarking is a key energy management best practice that enables you to identify the energy performance of your building(s), invest strategically in energy efficiency upgrades and monitor effectiveness of energy improvements. Benchmarking is the process of comparing measurements against a standard, average or best practice with the purpose of improving current practice and moving toward the use of best practices.

What's included?

We are providing a direct feed of whc
repository into ENERGY STAR Portfoli
we will update your data on a month
energy.

Get Started



Project and Technical Assistance

The Minnesota Department of Commerce provides and supports a number of programs to assist public entities with the implementation of energy efficiency and renewable energy projects.

These programs provide various levels of technical assistance for project development, financing, implementation and performance evaluation. Review the programs outlined below to determine which program best addresses your needs.

Technical Assistance Programs | Project Resources

Technical Assistance Programs

Guaranteed Energy Savings Program (GESP)

The Guaranteed Energy Savings Program is a procurement and financing mechanism that assists state agencies, local units of government, school districts and institutions of higher education with the development, implementation and ongoing measurement & verification of energy efficiency and/or renewable energy projects. Participants gain access to technical assistance from Commerce, pre-qualified Energy Services Companies, Master Contract, selection and procurement documents, and GESP staff oversight for each phase of the project that can last up to 25 years. The intent of the program is to maximize job creation and operational cost savings through investment in public facilities.

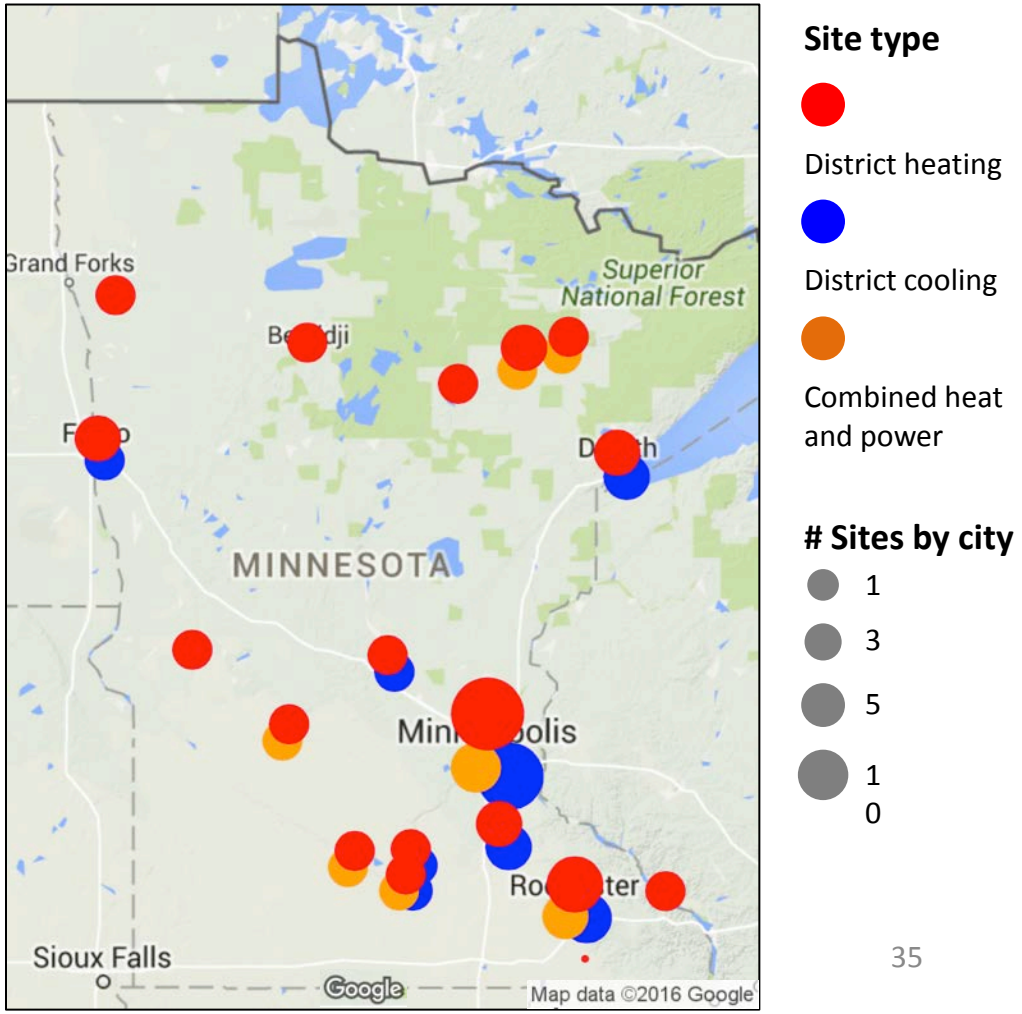
Local Energy Efficiency Program (LEEP)

The Local Energy Efficiency Program helps local units of government and school districts identify, study, implement, and finance energy efficiency and recommissioning projects. LEEP makes it easy to identify site-specific goals, find high-quality firms to perform an investment grade audit, and gain access to low-interest lease-purchase financing. Participants gain access to Commerce's technical assistance through each stage of the process, ensuring a comprehensive, cost-effective, quality project.

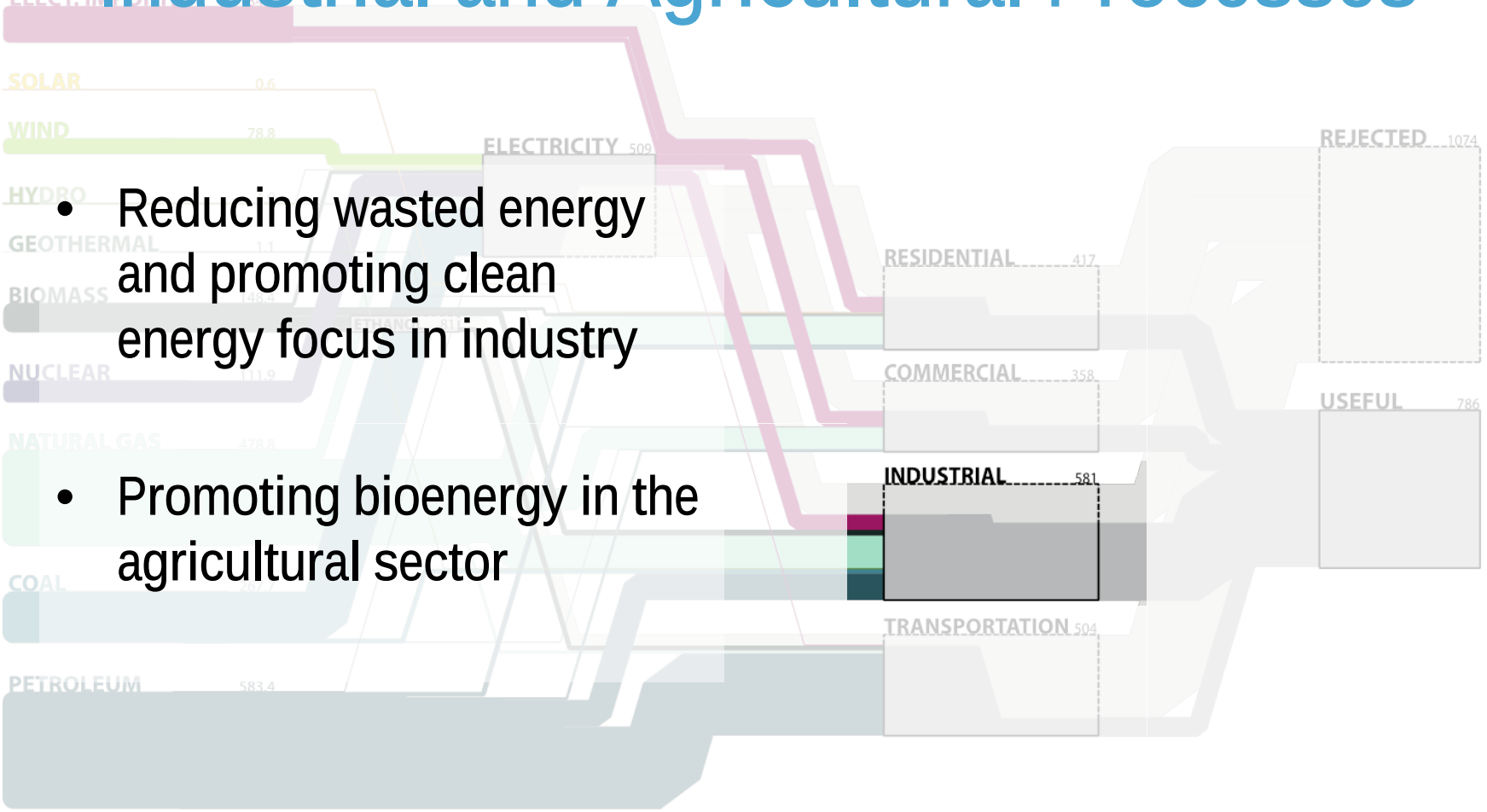
Efficient Buildings and Integrated Energy Systems

- Integrated Energy Systems
  - Identifying opportunities for thermal energy grids
  - Supporting combined heat and power (CHP) development

Selected university, hospital, and municipal thermal energy projects in Minnesota, by city, as of January 2016



Industrial and Agricultural Processes

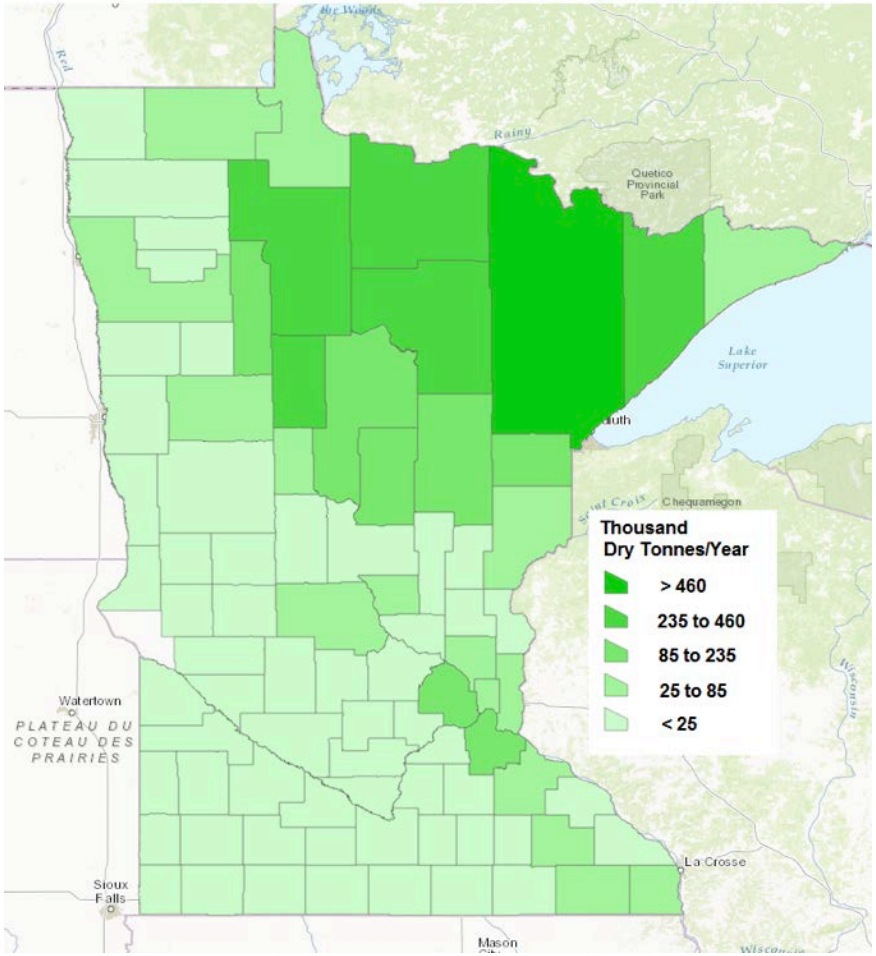


- Reducing wasted energy and promoting clean energy focus in industry
- Promoting bioenergy in the agricultural sector

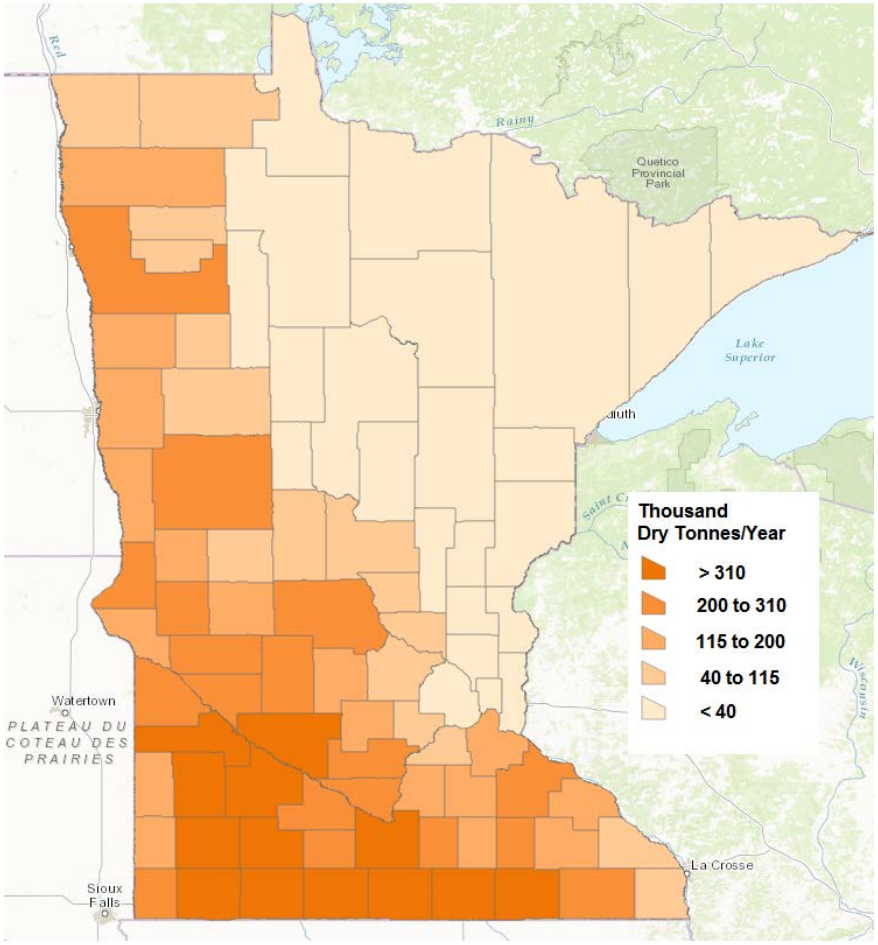
Industrial and Agricultural Processes:

Promoting bioenergy in the agricultural sector

Annual Forest and Wood Residue Available by County



Annual Crop Residue Available By County



Industrial and Agricultural Processes:

Reducing wasted energy and promoting clean energy focus in industry

- Promoting industrial and agricultural efficiency practices by sharing state and federal programs to improve energy productivity, and strengthening peer networks to share best practices on energy management

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Superior Energy Performance® U.S. DEPARTMENT OF ENERGY

MnTAP

Industrial and Agricultural Processes: Cross-sector opportunities

Sector	Strategy	Purpose	Cross-sector opportunities				
			Transportation	Energy Supply and Grid Modernization	Efficient Buildings and Integrated Energy Systems	Industrial and Agricultural Processes	Local Planning and Action
Industrial and Agricultural Processes	Commercialize advanced biofuels and biobased chemicals	Leverage agriculture and forestry sectors to produce biofuels and biobased chemicals	■		■	■	
	Capture organic feedstocks through anaerobic digestion	Anaerobic digestion uses waste material to produce renewable natural gas, heat, and electricity	■	■	■	■	
	Promote industrial efficiency practices	Industrial facilities can take advantage of opportunities to increase efficiency and save money		■		■	
	Coordinate and promote the clean energy industry	Increase coordination and communication across the clean energy industry to maximize economic development		■	■	■	■