Energy Efficiency for Grid Resilience

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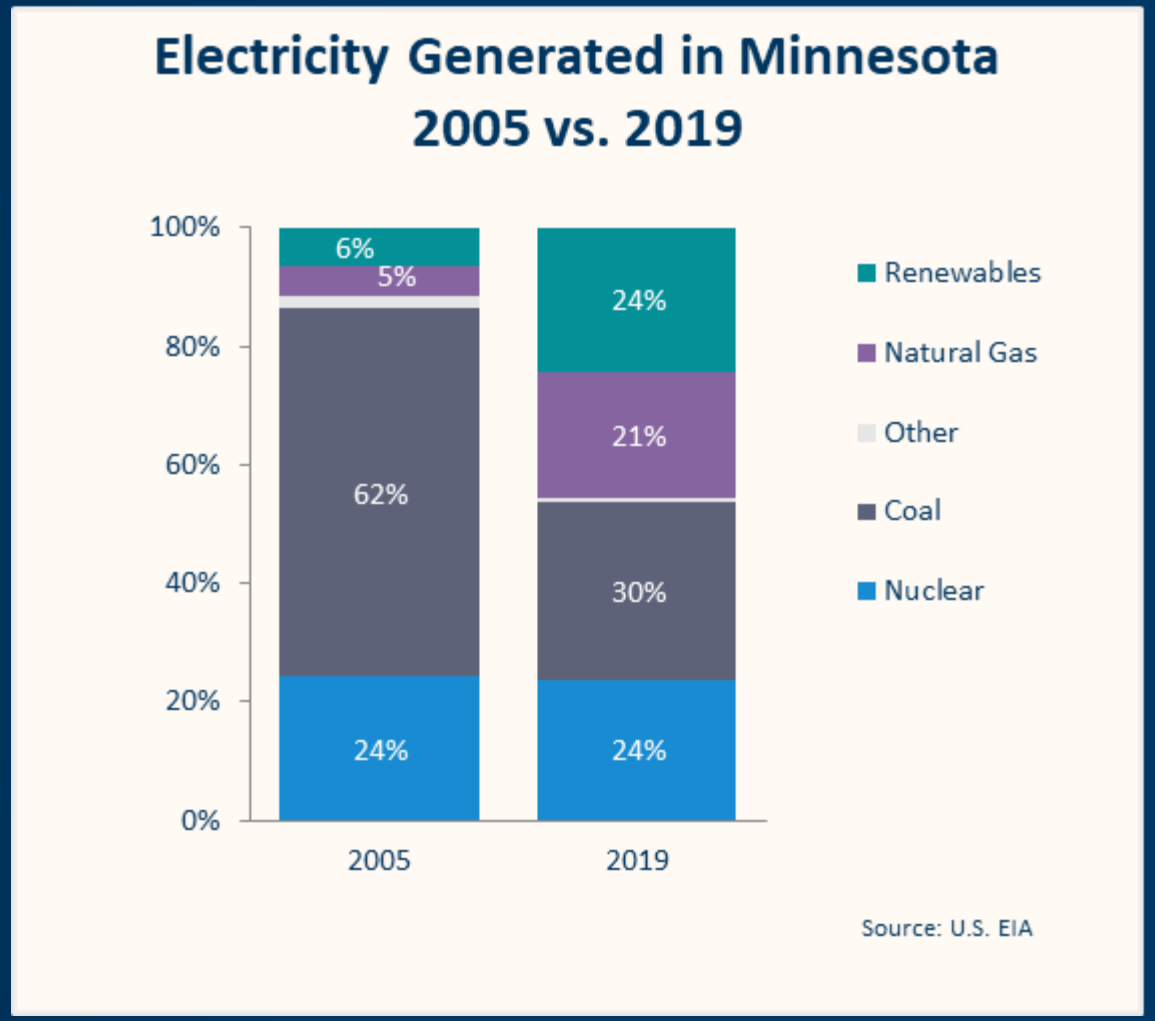
Division of Energy Resources

- Promote clean, reliable and affordable energy for Minnesota businesses and homes
- Advocate on behalf of public interest in state and federal regulatory proceedings
- Maintain state emergency energy planning and recovery plans
- Oversee the Conservation Improvement Program, including Conservation Applied Research & Development
- Promote energy-efficient buildings and emerging energy technologies
- Administer the Home Energy Assistance and Weatherization Assistance Programs

Electricity Generation Mix Changes Over Time



- Advancements in clean energy show we can reduce GHG emissions economically while meeting the needs of Minnesota's communities, businesses and residents.
- Emissions reductions in the electric power sector have resulted statewide policies working in tandem with market forces.
- In Minnesota, utilities continue to close coal-fired power plants and replace power generation with a mix of renewables, supported by natural gas in cases of high demand.

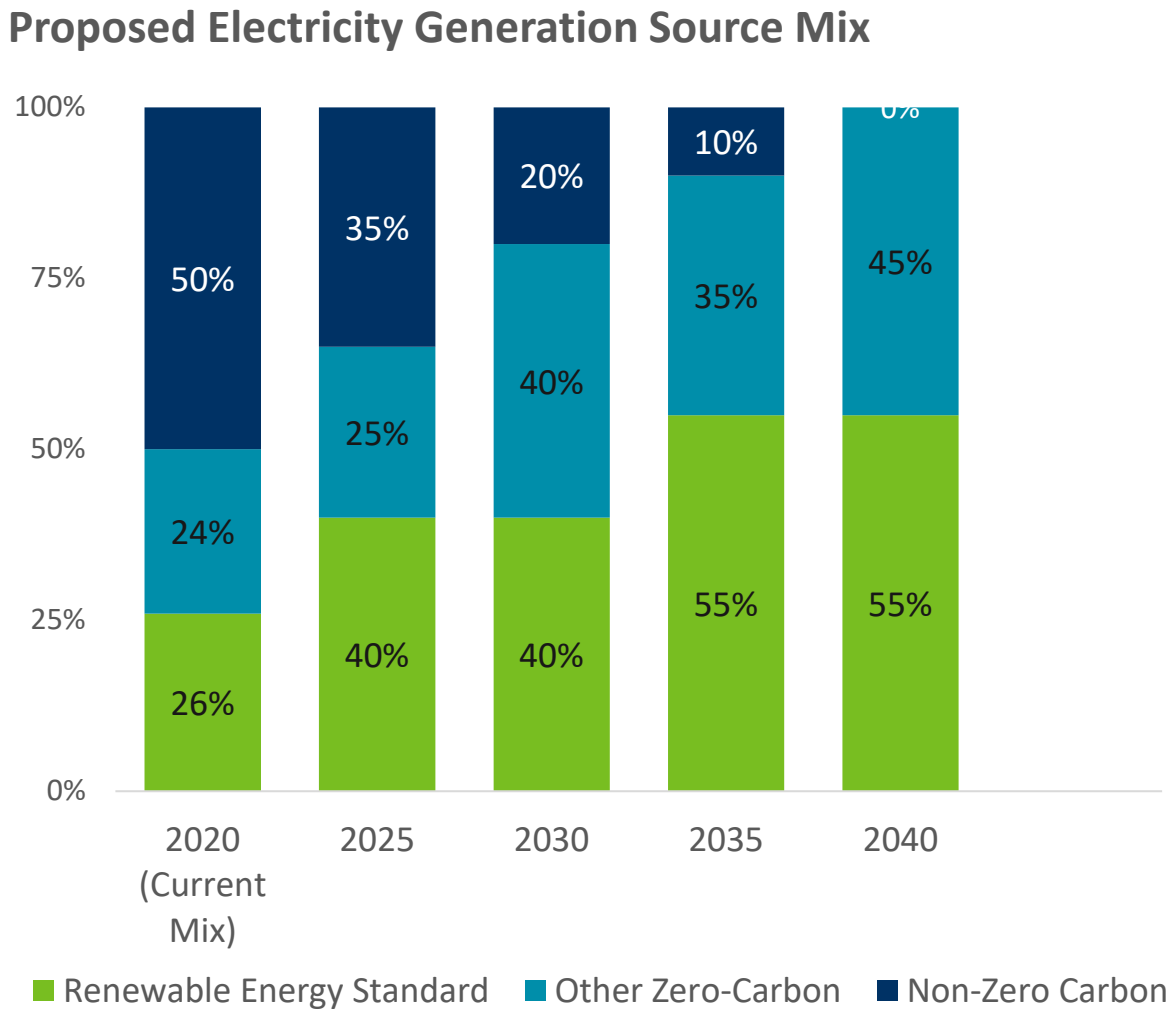
Remaining Electric Utility Owned Coal-Fired Generation

Facility	Size (nameplate capacity, MW; rounded)	Status
Hibbing Public Utilities Commission		
Hibbing 3	10	Standby/backup: available for service but not normally used
Hibbing 5	20	Standby/backup: available for service but not normally used
Hibbing 6	6	Standby/backup: available for service but not normally used
Minnesota Power		
Boswell unit 3	365	Operating
Boswell unit 4	558	Operating
Taconite Harbor Energy Center unit 1	75	Standby/backup: available for service but not normally used
Taconite Harbor Energy Center unit 2	75	Standby/backup: available for service but not normally used
Otter Tail Power Company		
Hoot Lake 2	54	Operating, full retirement by 2021
Hoot Lake 3	75	Operating, full retirement by 2020
Xcel Energy		
Sherburne County 1	680	Operating, full retirement by 2026
Sherburne County 2	682	Operating, full retirement by 2023
Sherburne County 3	876	Operating, proposed retirement by 2030
Allen S King	511	Operating, proposed retirement by 2028

- Most of the emissions reductions in the electric power sector have come from utilities retiring coal-fired electricity generating facilities.
- Recent and upcoming decisions by the MN Public Utilities Commission are expected to further reduce GHG emissions.

Governor's Clean Energy Package : 100% carbon free electricity goal by 2040

- The bill proposes to achieve 100% carbon free electricity by 2040
- This would be achieved by using a combination of:
  - Variable generation technologies (e.g., solar, wind)
  - Dispatchable generation technologies (e.g., hydro, nuclear, gas w/ carbon capture) and
  - flexibility technologies (e.g., energy storage, hydrogen, demand response)



Challenges for the Grid

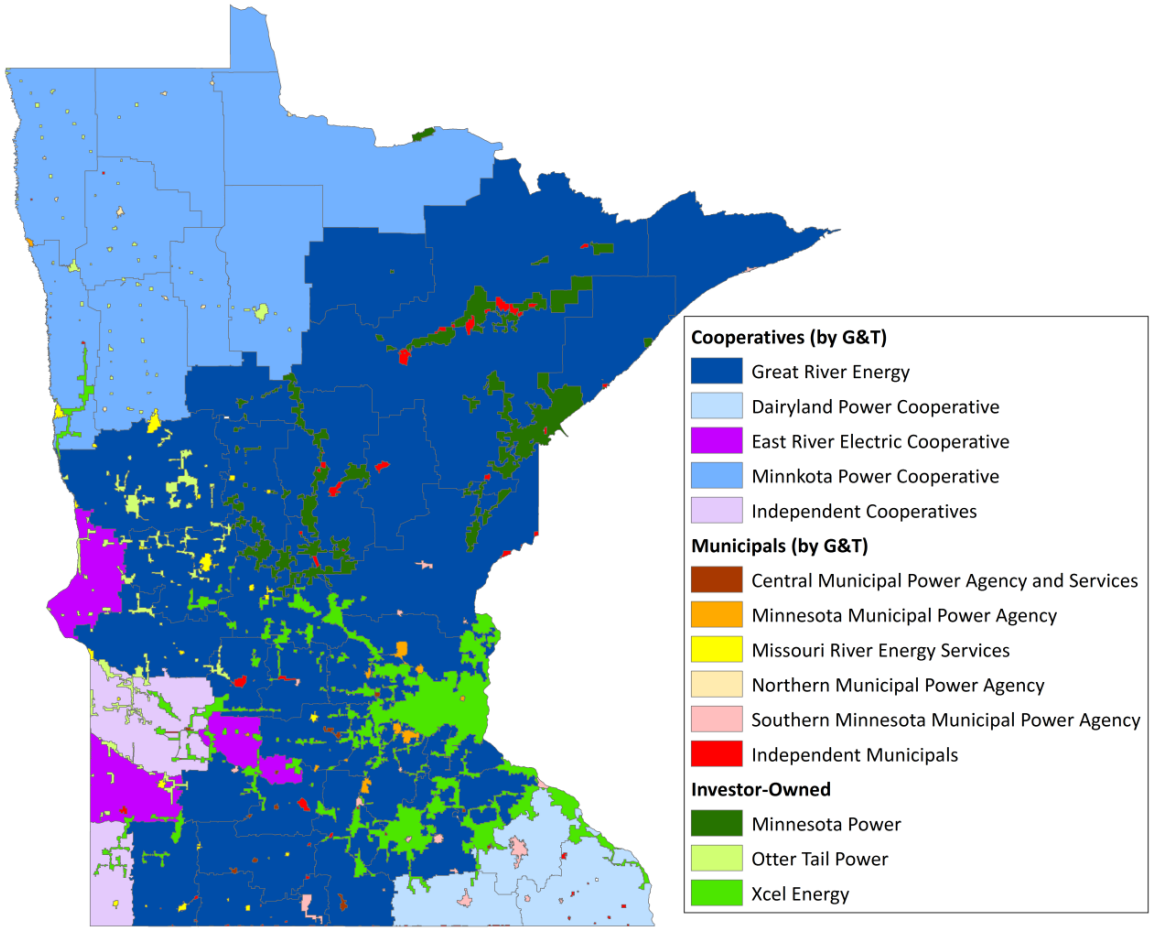
- How to maintain reliability in the face of a rapidly changing energy mix driven both by economics and policy drivers?
- How to incorporate greater contributions from intermittent sources
- How to handle new types of load e.g. Electric Vehicles

Minnesota's Conservation Improvement Program (CIP)

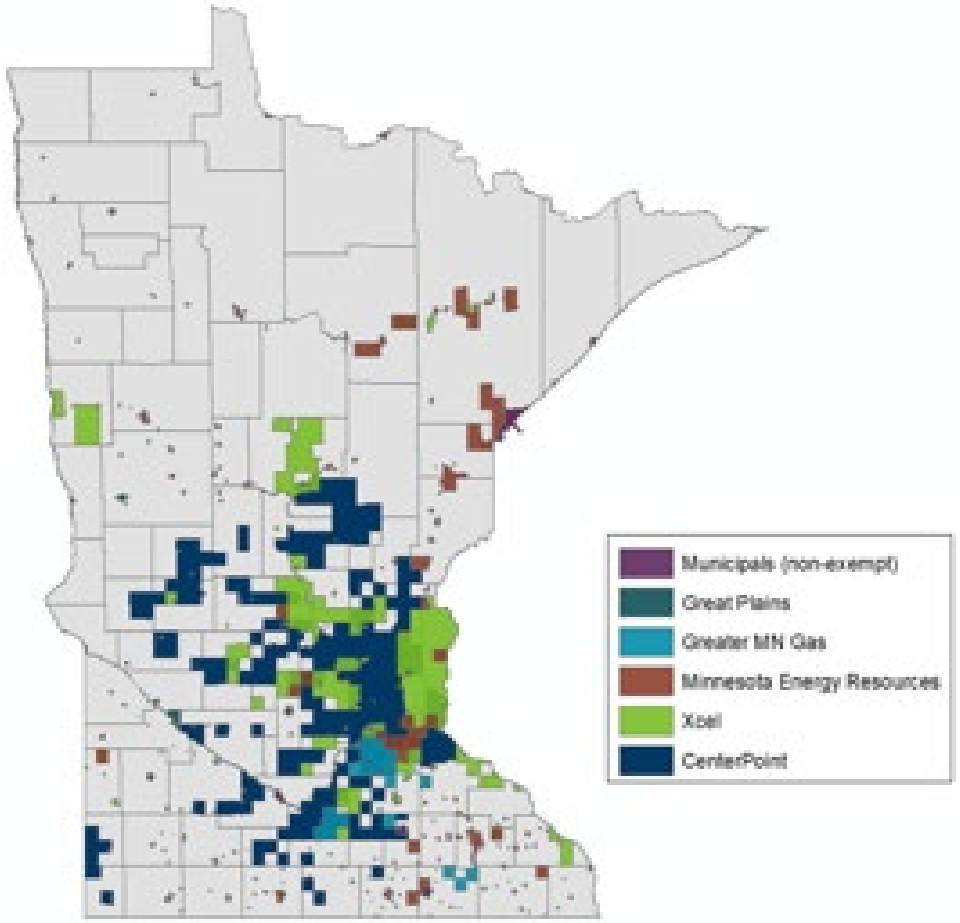
- CIP is a utility-administered program with regulatory oversight provided by the Minnesota Department of Commerce.
- Utility CIP portfolios promote energy-efficient technologies and practices by providing rebates, marketing, and technical assistance to utility customers.
- CIP helps Minnesota households and businesses use electricity and natural gas more efficiently – conserving energy, reducing carbon dioxide emissions, and lessening the need for new utility infrastructure.

Minnesota Utilities

Electricity



Natural Gas



CIP Savings & Spending Requirements

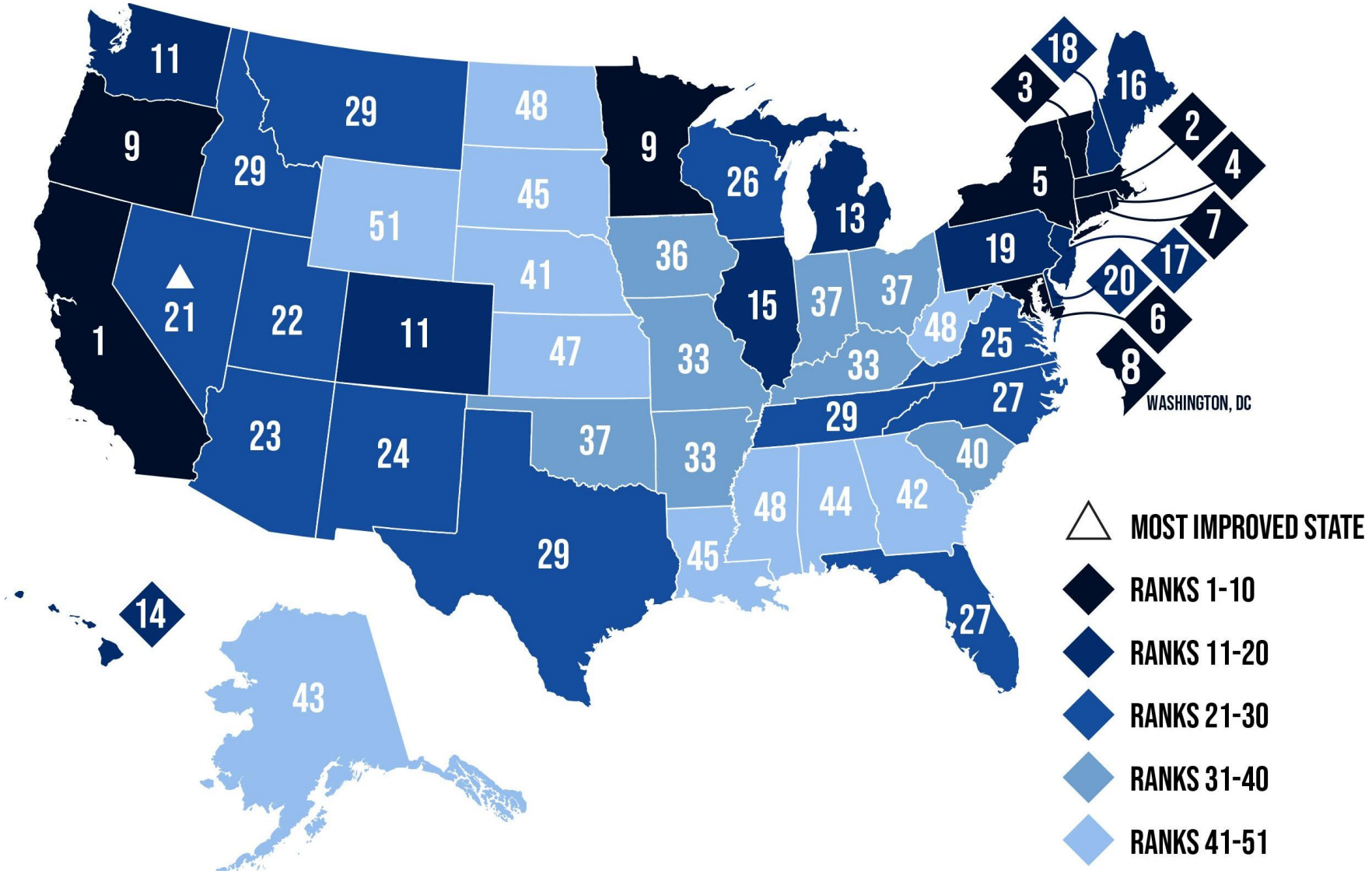
Utility Energy Savings Goal

- 1.5% of gross annual retail energy sales
- Utility can request lower savings goal ($\geq$ 1%)

Utility Spending Requirement

- Natural gas utilities: At least 0.5% of gross operating revenues (GOR)
- Electric utilities: At least 1.5% of GOR

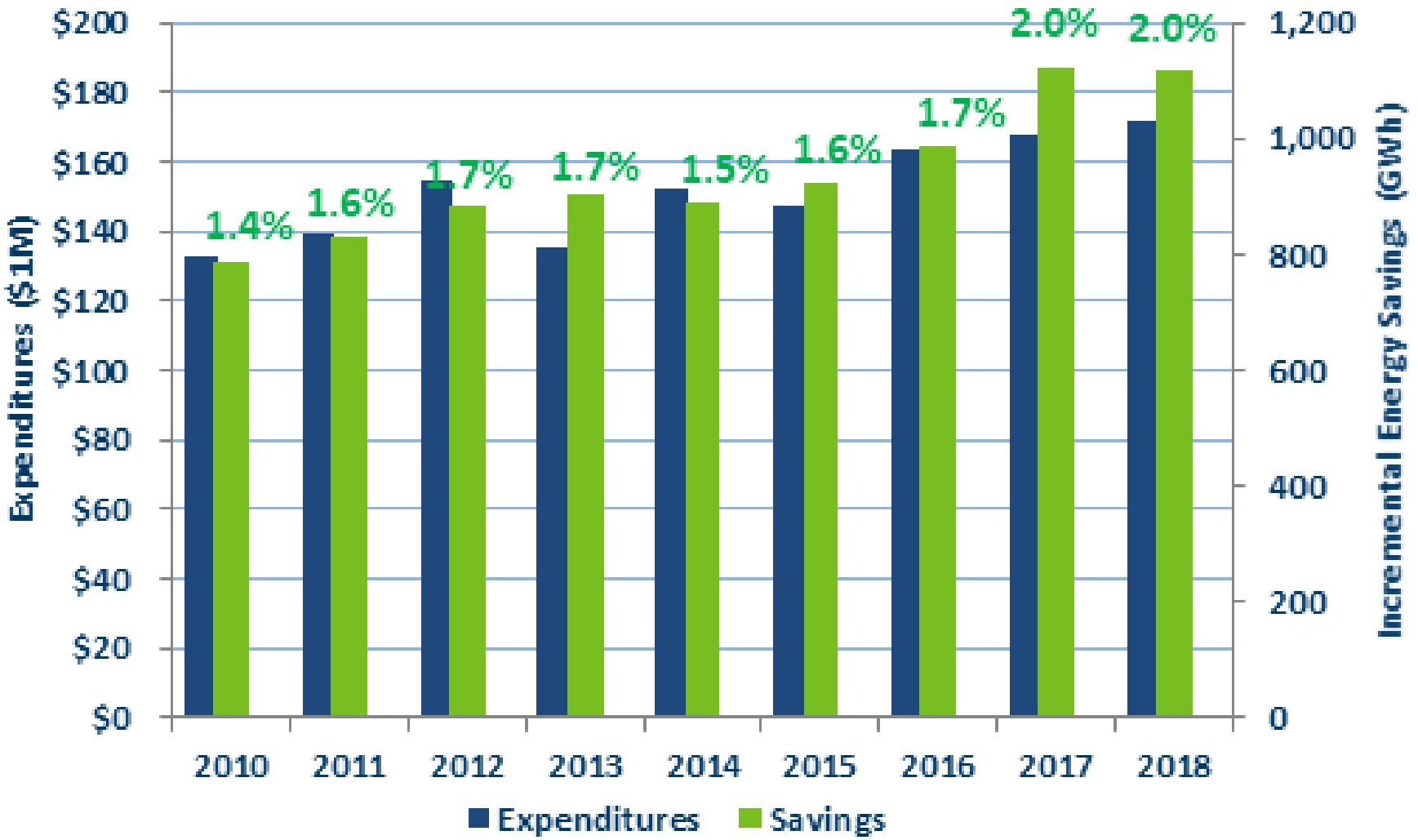
ACEEE State Energy Efficiency Scorecard Rankings



CIP Report Impacts: 2017-2018

- During both 2017 and 2018, electric utilities exceeded the CIP goal of 1.5% and natural gas utilities exceeded the statutory minimum of 1.0% energy savings.
- Saving around 15.2 trillion-Btus of energy – enough energy to heat, cool and power more than 160,000 Minnesota homes for a year.
- Reducing CO2 emissions by 1.79 million tons, equivalent to removing over 350,000 vehicles from the road for one year.
- Saving Minnesota's businesses and residents over $279 million in energy costs.
- Supporting over 47,000 energy efficiency jobs, representing the largest sector of Minnesota's clean energy employment.

Overall Electric CIP Performance



2017 and 2018 Electric Savings: IOUs and Munis/Coops

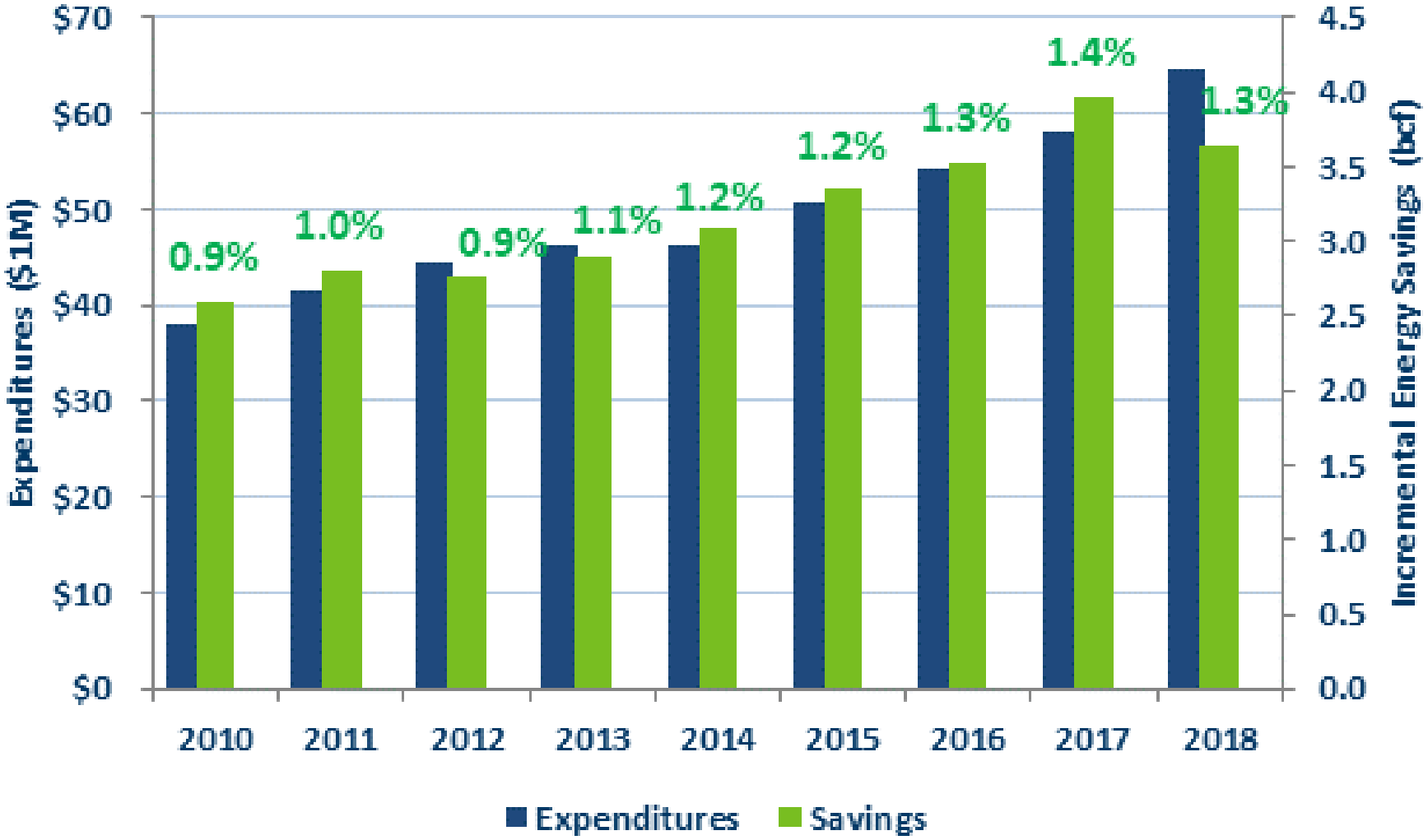
2017 Total Electric Performance by Utility Type

Utility Type	Incremental Energy Savings (kWh/yr)	Energy Savings %	Incremental CO2 Savings (tons/yr)	Expenditures	Expenditures %
INVESTOR-OWNED UTILITIES	785,399,342	2.36%	479,094	$123,730,181	3.91%
COOPS & MUNICIPALS	338,045,709	1.45%	206,208	$43,658,204	1.82%
TOTAL ELECTRIC UTILITIES	1,123,445,051	1.99%	685,301	$167,388,385	3.01%

2018 Total Electric Performance by Utility Type

Utility Type	Incremental Energy Savings (kWh/yr)	Energy Savings %	Incremental CO2 Savings (tons/yr)	Expenditures	Expenditures %
INVESTOR-OWNED UTILITIES	826,183,896	2.48%	488,688	$125,511,093	3.96%
COOPS & MUNICIPALS	289,560,655	1.28%	171,275	$46,390,664	1.91%
TOTAL ELECTRIC UTILITIES	1,115,744,551	1.99%	659,963	$171,901,757	3.07%

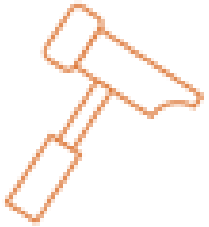
Overall Gas CIP Performance

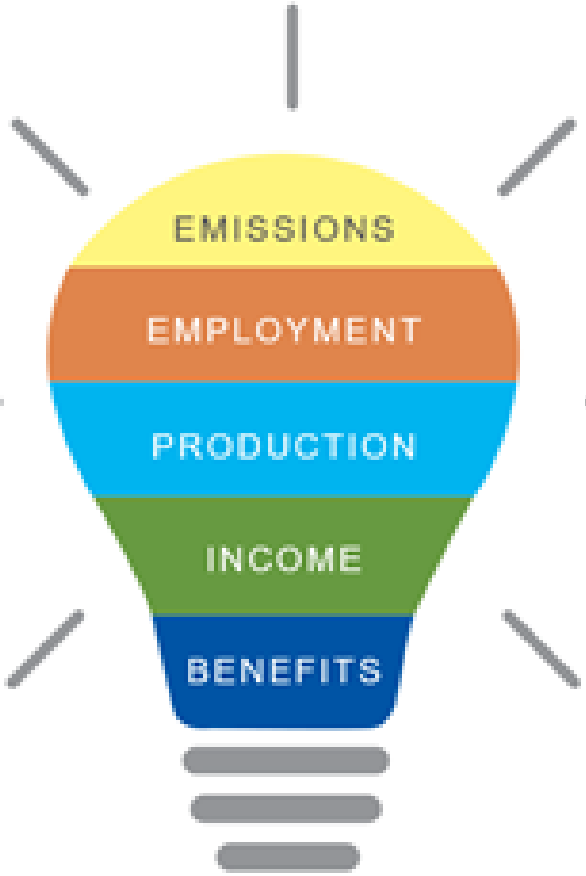


Economic Impacts of CIP

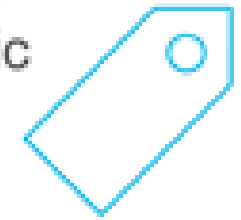
$146 million boost to GDP from emissions reductions

48,000 local jobs added

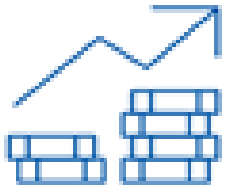




$11 billion in new economic activity



Each dollar spent on CIP generates **$3.75 in benefits to society**



Extra $900 in the wallet of each Minnesotan

Looking Forward in CIP

Recommendations for Utility Programs:

- Continue to test promising new approaches.
- Offer comprehensive program designs for larger and harder-to-reach customers.
- Develop upstream incentives and associated program support in selected markets.
- Incorporate operational savings into commercial and industrial programs.
- Employ segment-specific strategies to reach customers.
- Deepen trade ally engagement and training efforts.
- Incorporate AMI-enabled capabilities into programmatic strategies.
- Leverage interest by local governments in energy efficiency.

Coordination among Utilities:

- More systematically share best practices and program successes.
- Coordinate more closely on trade ally outreach and training.
- Work further towards coordinated and/or joint implementation of programs.

Governor's Clean Energy Package : Energy Conservation and Optimization (ECO)

- **ECO would expand CIP to include load management and efficient fuel-switching**, while protecting traditional energy efficiency, increasing CIP's ability to offer additional efficient choices for customers and support local job opportunities.

- **Projects supported by ECO are inherently local jobs in electrical, heating/cooling, ventilation, and insulation installation**

- ECO will **provide residents and businesses more opportunities to save money on their energy bills** and creating economic opportunities when needed most

Taking the building energy efficiency to next level: Statewide commercial building energy code

- The proposal is to institute an adoption framework for the statewide commercial building energy code that ensures all new commercial and large multifamily construction is net-zero by 2036.
- Aligns with the agency's statutory responsibility to adopt model commercial energy codes and consider amendments to the code to improve the efficiency of a building (MN Statutes 326B.106).
- Recommends adoption of a new model commercial energy code when it is issued every three years beginning with adoption of international ASHRAE standard 90.1 - 2019. DLI is beginning the rulemaking process now.
- Because the model code alone would likely be insufficient to achieve net zero by 2036, subsequent code adoptions would include an adjusted minimum percent efficiency or an equivalent set of enhancements to meet that goal.