Minnesota's Rural Electric Cooperatives

Powering Minnesota with affordable and reliable electricity

Darrick Moe, CEO

RMEB – March 2021

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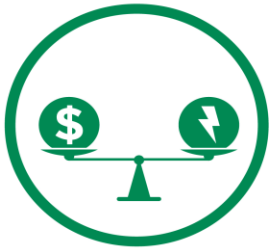
Rural Electric Cooperatives

Who We Are

Who are electric cooperatives?



At-cost electric service

Locally governed

Return excess revenue

Community builders

- **Community focused**
- **Efficiently deliver safe, reliable and affordable electricity to their member-owners**
- **Return margins to members, not investors**

Nobles Cooperative Electric

Worthington - Adam Tromblay and Tracey Haberman

Federated Rural Electric Association

Jackson - Scott Reimer

South Central Electric Association

Saint James – Jim Haler

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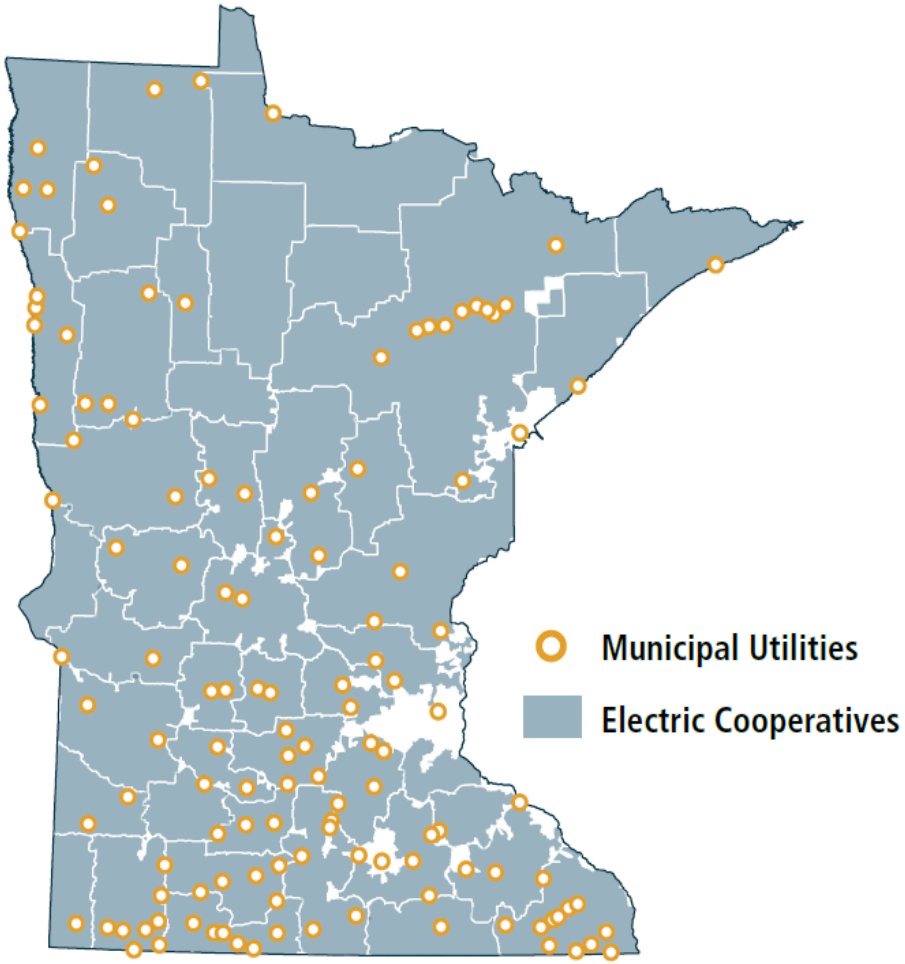
Electric cooperatives power Minnesota



Provide reliable electricity to one-third of state's population

Cover 85% of state's land and have members in all 87 counties.

Operate & maintain135,258 miles of distribution lines, more than any other provider

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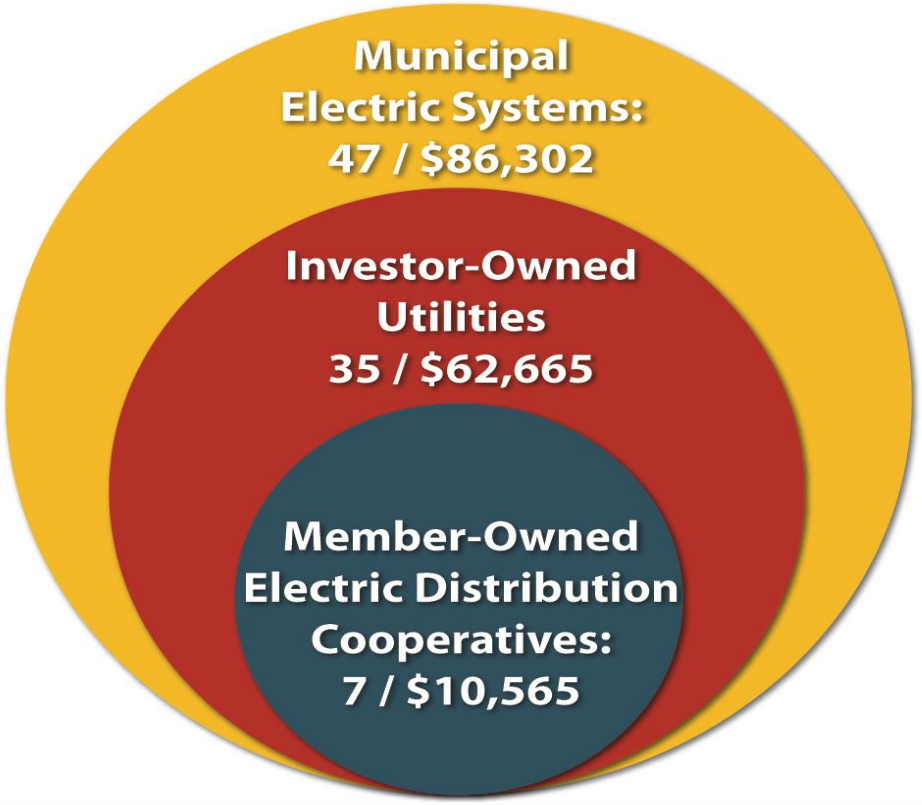
Cooperatives maintain more line per consumer

Because of higher population densities (more consumers served per mile of line), municipal electric systems and investor-owned utilities receive more revenue per mile of line than electric cooperatives.

Consumers served/revenue per mile of line for different utilities:

Local cooperatives
About 3/mile



Source: National Rural Electric Cooperative Association

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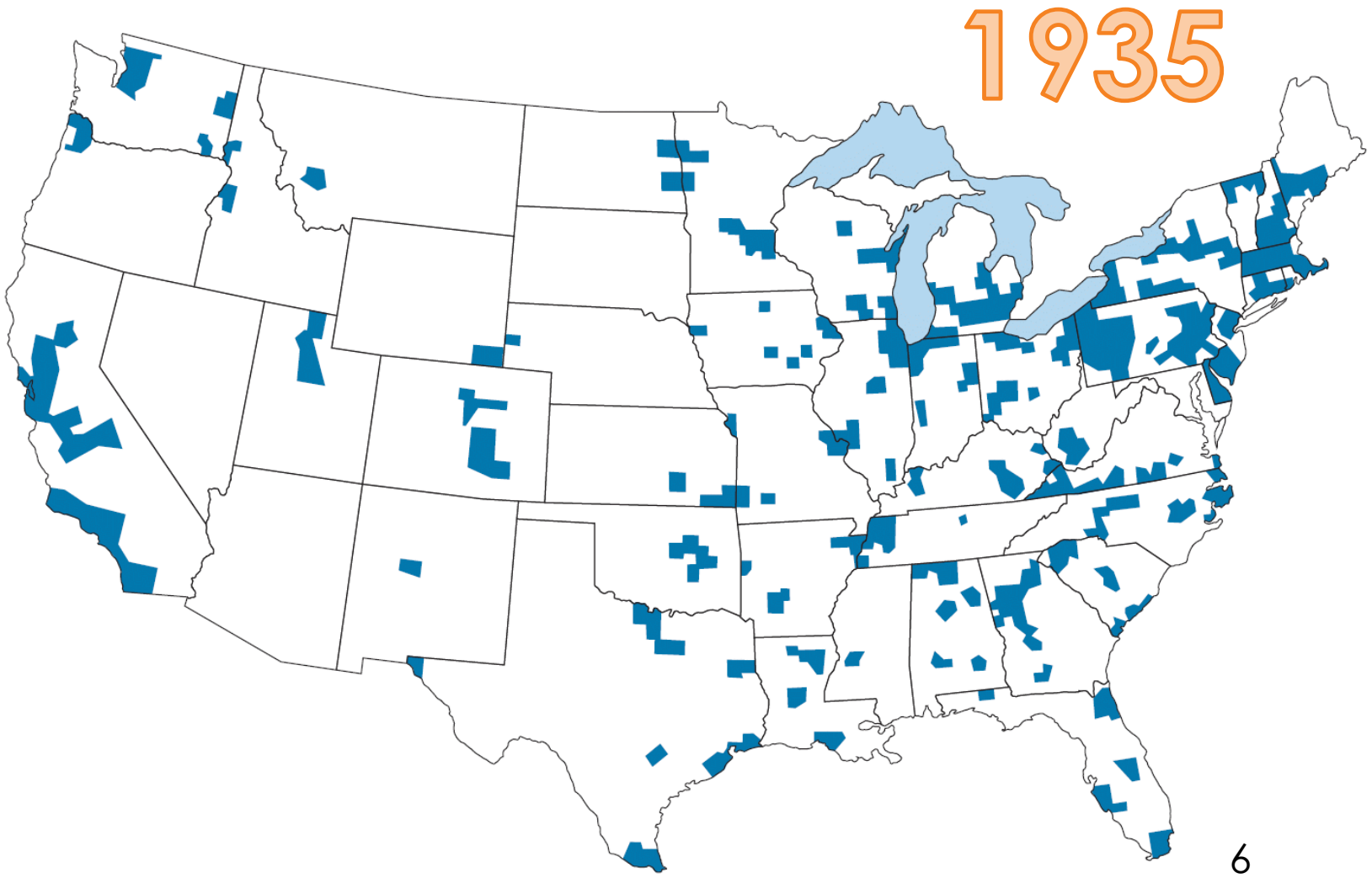
Who has lights ?



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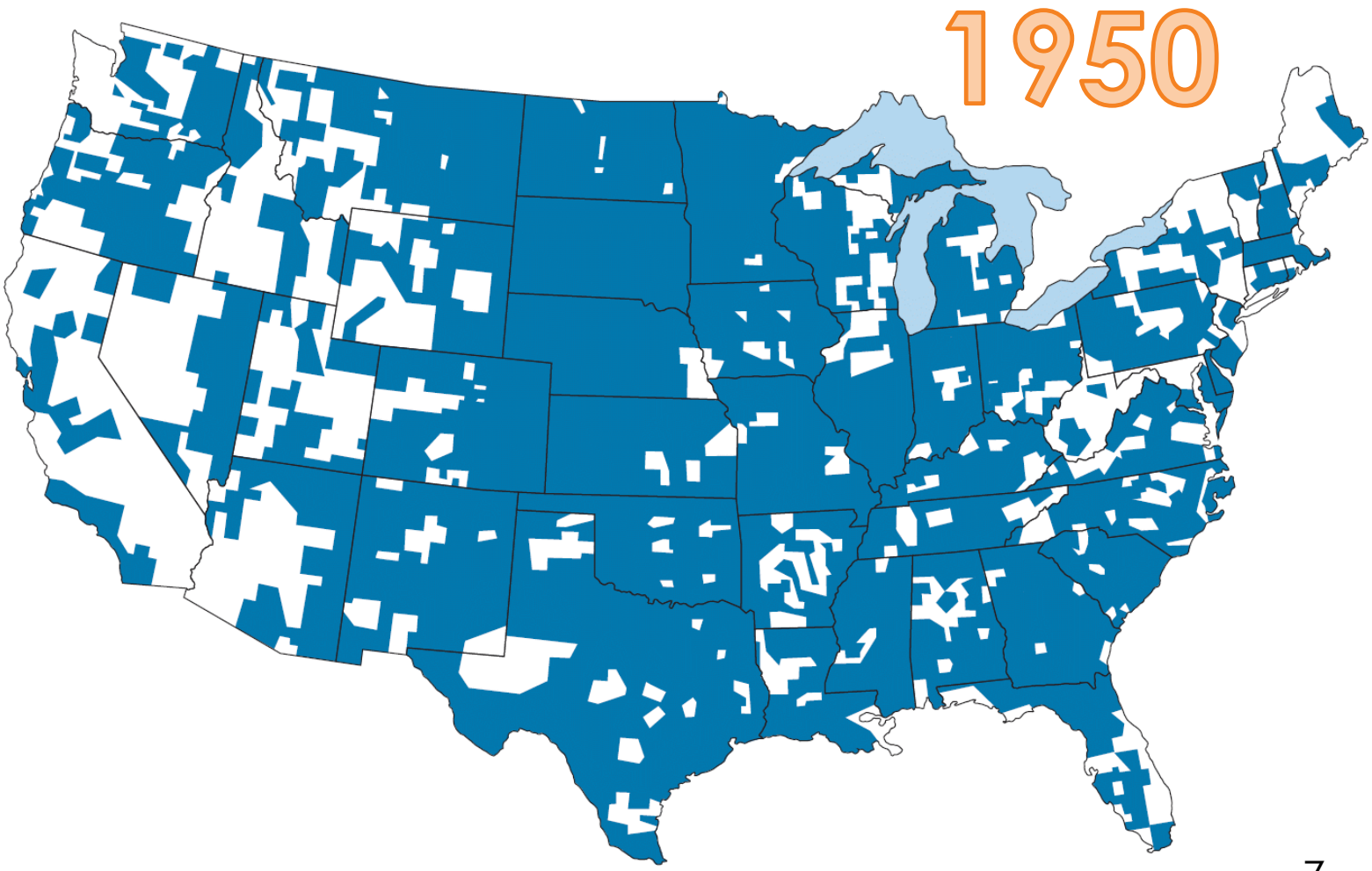
Electric cooperatives light up America!



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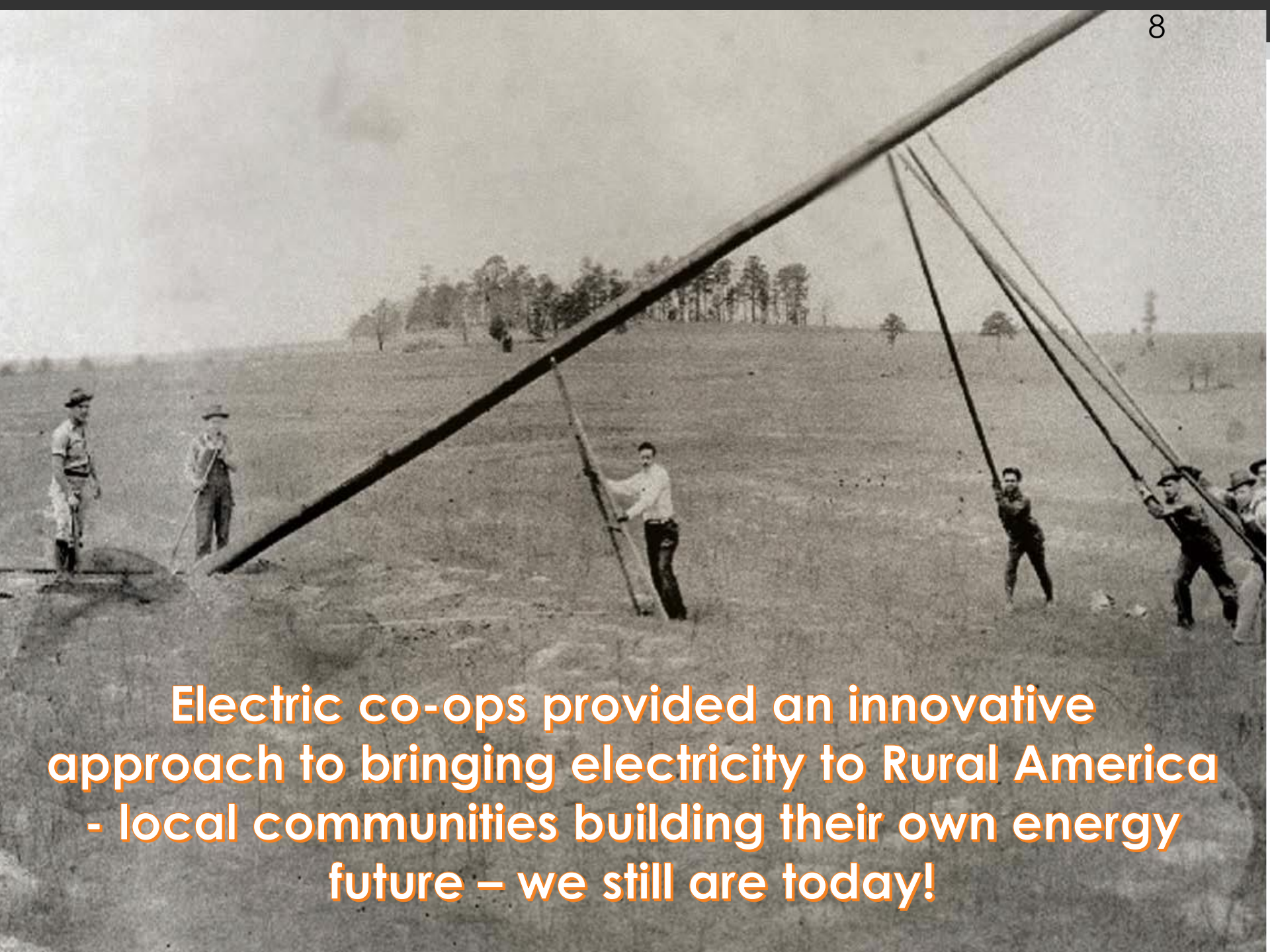

Electric co-ops provided an innovative approach to bringing electricity to Rural America - local communities building their own energy future – we still are today!

The Electric Power Grid

What is it?

The U.S. electric grid

Largest and most complex machine ever created

Electricity is a unique commodity: *Production and consumption must be instantaneously balanced at all times!*

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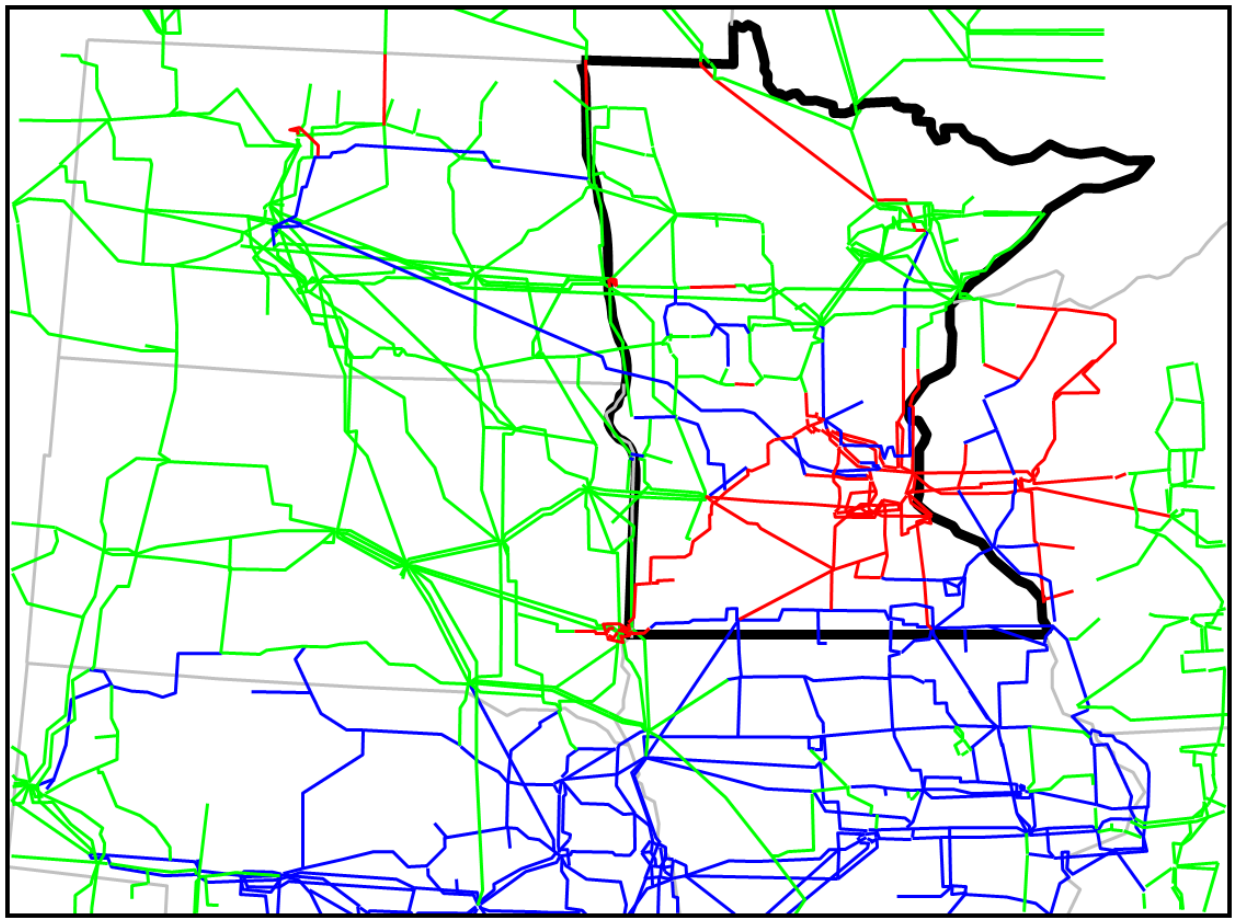
Interconnected power grid



Impacts travel over wide geographic area at speed of light

Operated by MISO, in partnership with utilities

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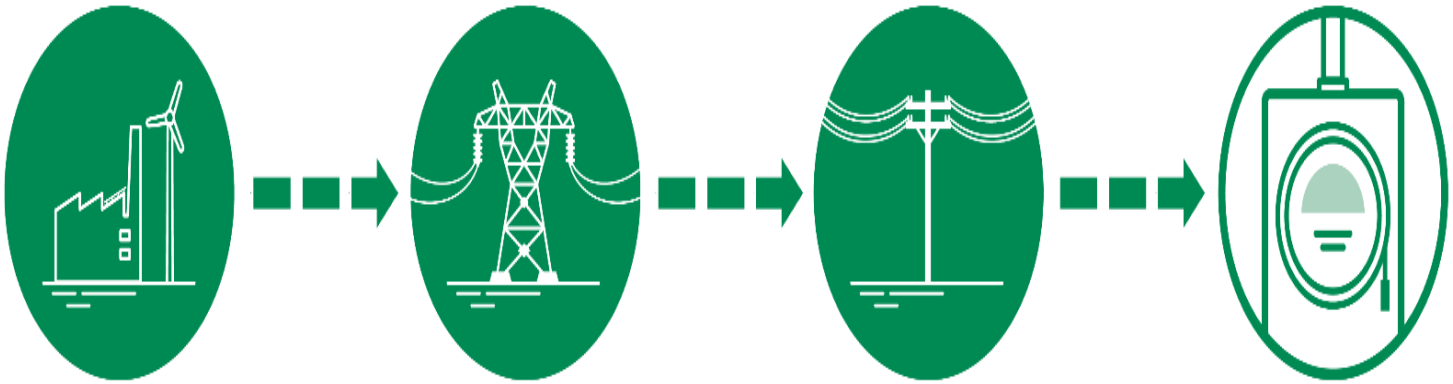
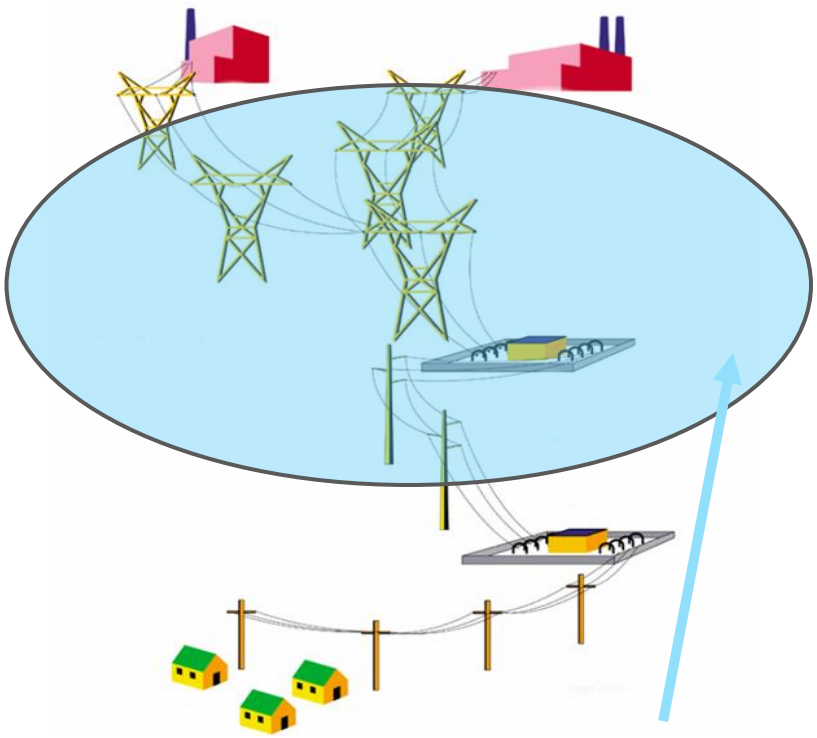


Electricity is first generated by a power source and delivered over high-voltage transmission lines, often by generation and transmission cooperatives. Then voltage is reduced for delivery by distribution cooperatives to homes, businesses and farms.

G&Ts and RTOs

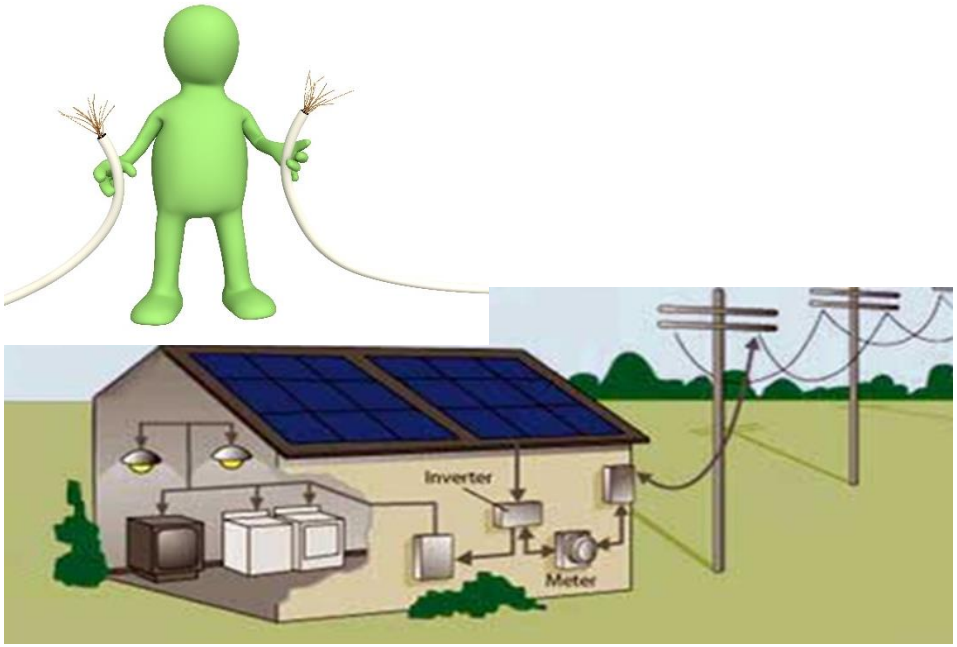


MN has six generation and transmission cooperatives (G&Ts) and 44 distribution cooperatives

Great River Energy (GRE) is the G&T serving most of the local cooperatives in this area

Regional Transmission Organizations (RTOs), such as the Midwest Independent System Operator (MISO) or SPP: generators sell into; loads purchase from in real-time.

Why not ‘cut the cord’?



Cutting that cord is technically impractical and/or terrifically expensive

Total electricity used and produced must be equal every instant

Or the things plugged into your wall won’t work!

The electric grid takes care of that with thousands of generators and loads precisely controlled and monitored

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Leveraging benefits for future

The grid is getting cleaner
Minnesota's electric cooperatives
are leading the way

Comments of the National Academy of Sciences and National Academy of Engineering, in ranking the electric power grid among all inventions

#1 Engineering achievement of the 20th Century

"Scores of times each day, with the merest flick of a finger, each one of us taps into vast sources of energy…all transformed into electricity, the workhorse of the modern world."

We must leverage this achievement to do even more in the 21st Century!

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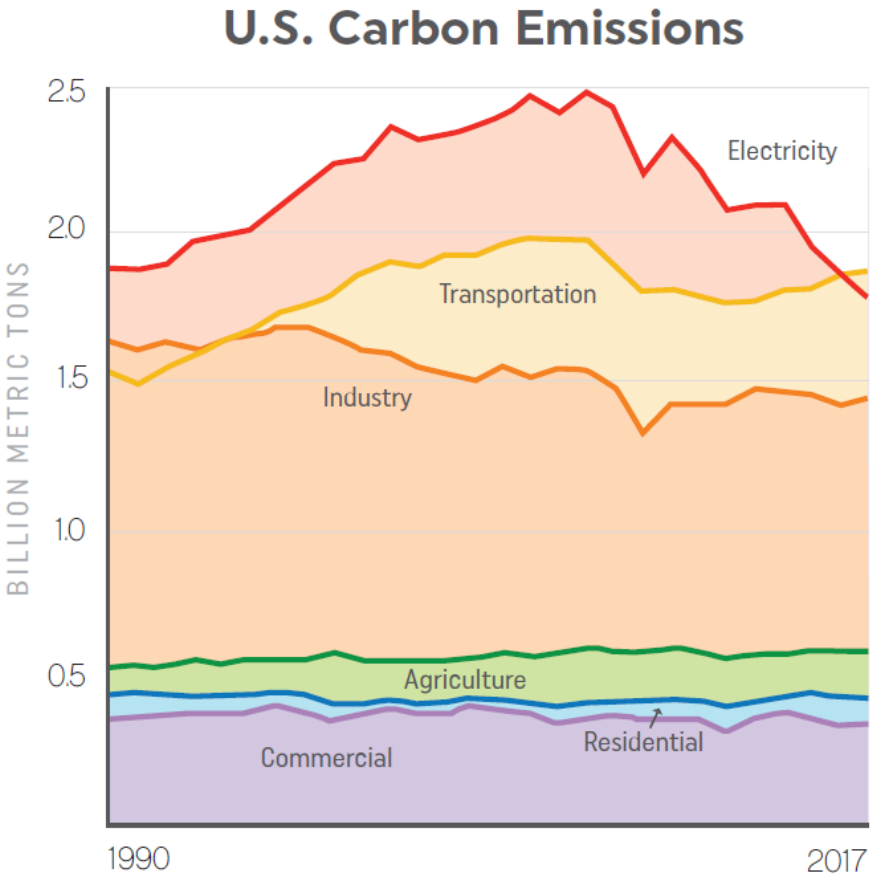
Electricity sector rapidly decarbonizing



Source: U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018, April 2020.

Only sector exceeding carbon reduction goals

Transportation now #1 source of greenhouse gases in U.S.

Continued rapid progress ahead

In MN, coal generation dropped from 66% in 2001 to 31% in 2019

NYT Oct 28, 2020

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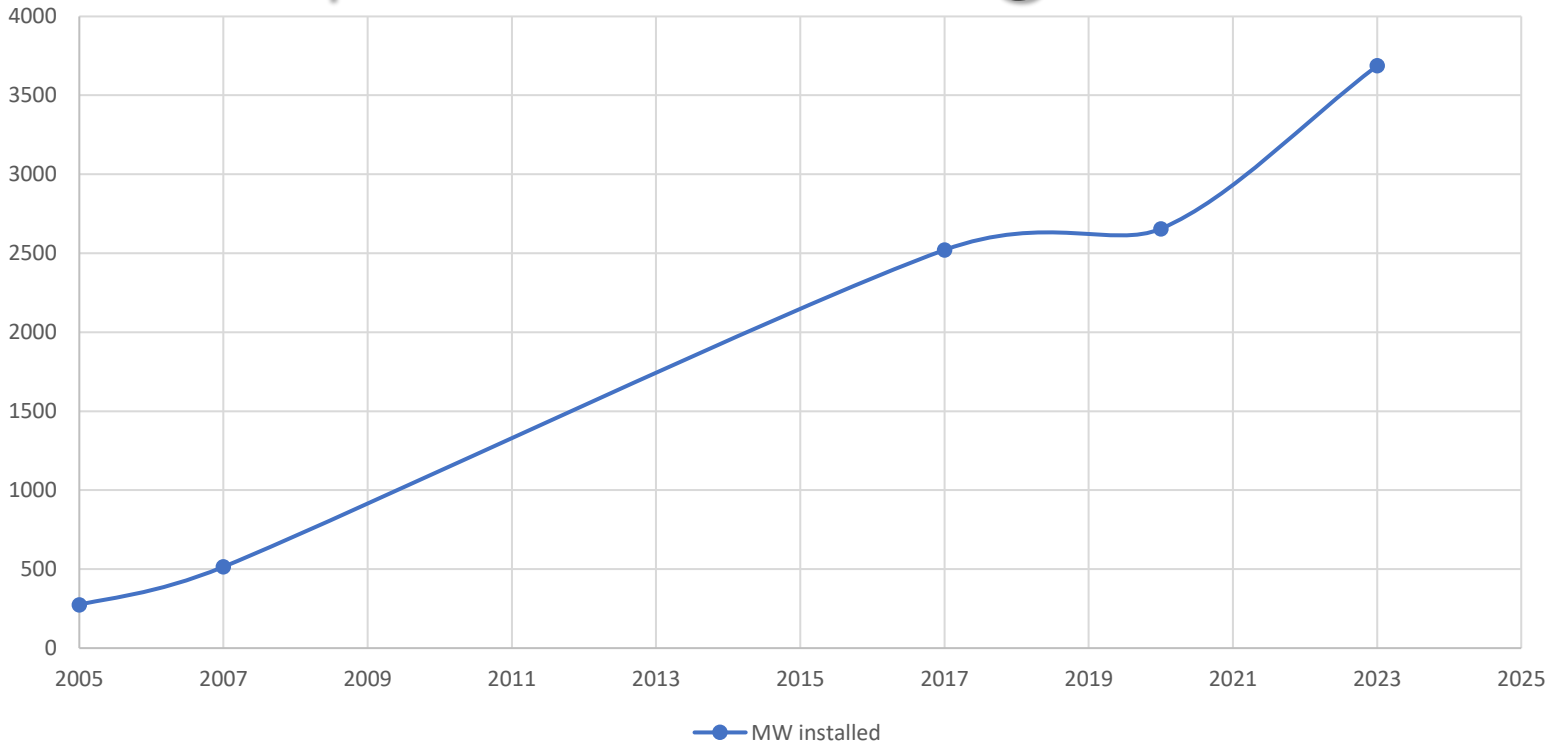
MN cooperative wind growth



Minnesota cooperatives have installed a lot of wind energy, growing from 274 MW of wind to over 3,600 MW from 2005 – 2023. They have all met the MN Renewable Energy Standard goals ahead of schedule.

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MN cooperatives innovating

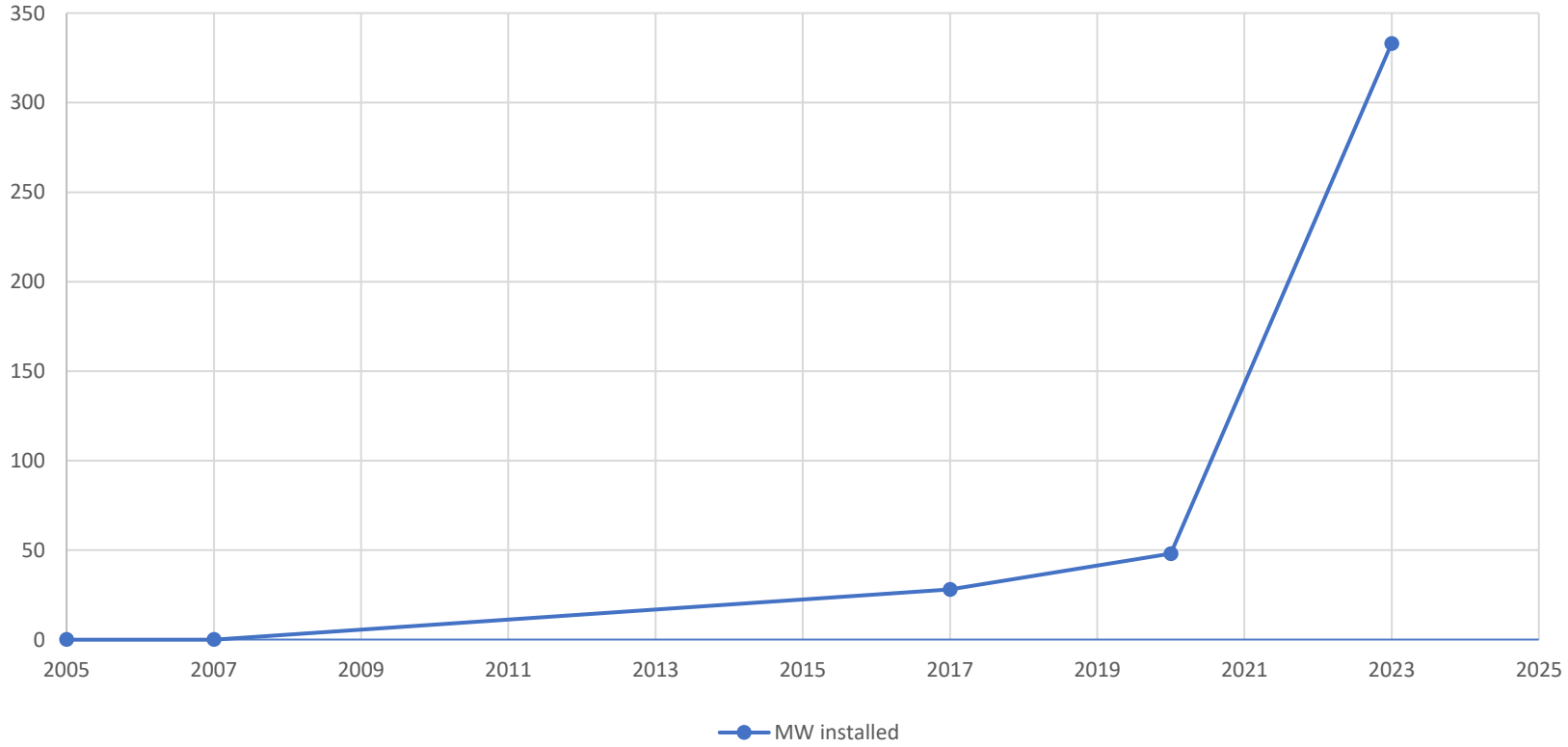
In 2018, Connexus Energy, a MN cooperative, installed the largest battery storage facility in the Midwest

MiEnergy Cooperative, also MN based, has piloted battery storage in the homes of consumer-members

Great River Energy - G&T serving RMEB area

- 95% carbon free by end of 2023
- Planning a long-duration (150 hour) battery storage project

MN cooperatives solar growth



As solar costs have come down, Minnesota cooperatives have moved to rapidly ramp up installed solar energy.

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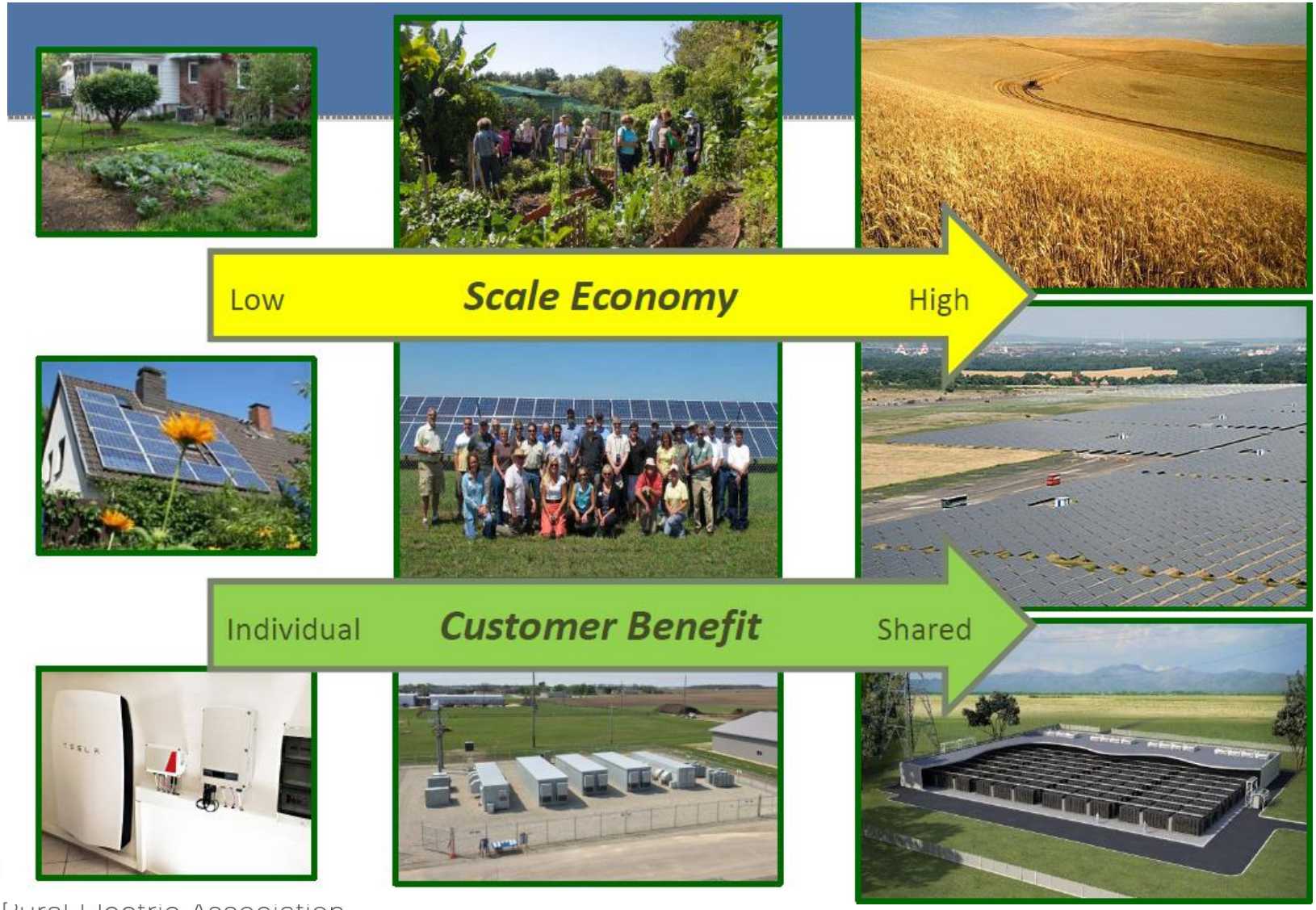
Grid provides economy of scale



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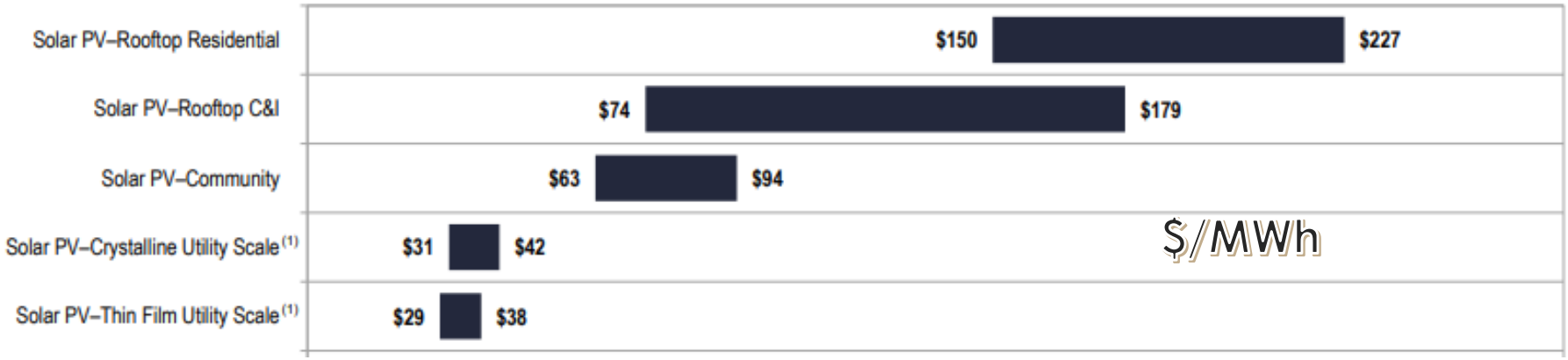
Economy of scale – solar data



Lazard's Levelized Cost of Energy Analysis, Oct 2020

Actual cooperative projects in MN confirm averages

Leveraging the power grid and building renewable generation at scale is the most cost-effective way to continue rapid decarbonization.

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Power Grid Reliability

Nothing works without it

Don’t take reliability for granted!

It is imperative everyone be able to turn on their lights and heat anytime, all the time, everywhere!

California has first rolling blackouts in 19 years — and everyone faces blame

While California braced for another round of rolling blackouts Monday night, the state's grid operator held off for a second straight night.

By **DEBRA KAHN** and **COLBY BERMEL** | 08/18/2020 12:19 AM EDT | Updated 08/18/2020 01:24 PM EDT

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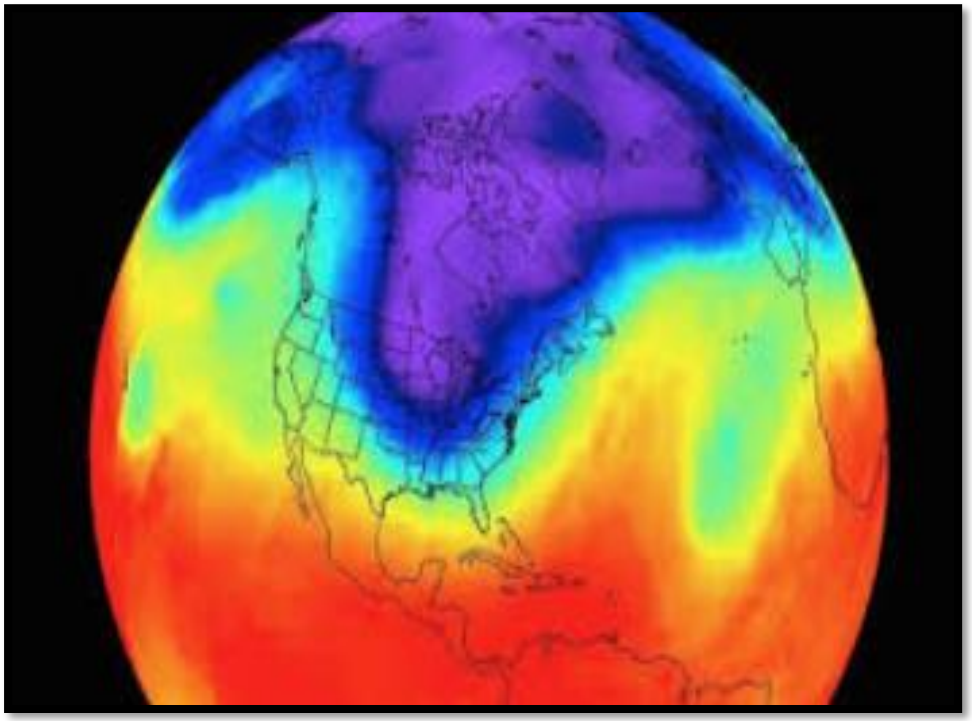
100% fossil-fuel-free by 2050?

Challenge: How to provide reliable electricity 24/7/365 with intermittent resources…

Consider recent extreme weather events



Thermal image of the 2019 Polar Vortex

Thermal plants, such as natural gas peaking plants, continue to be needed to power and heat our homes and businesses.

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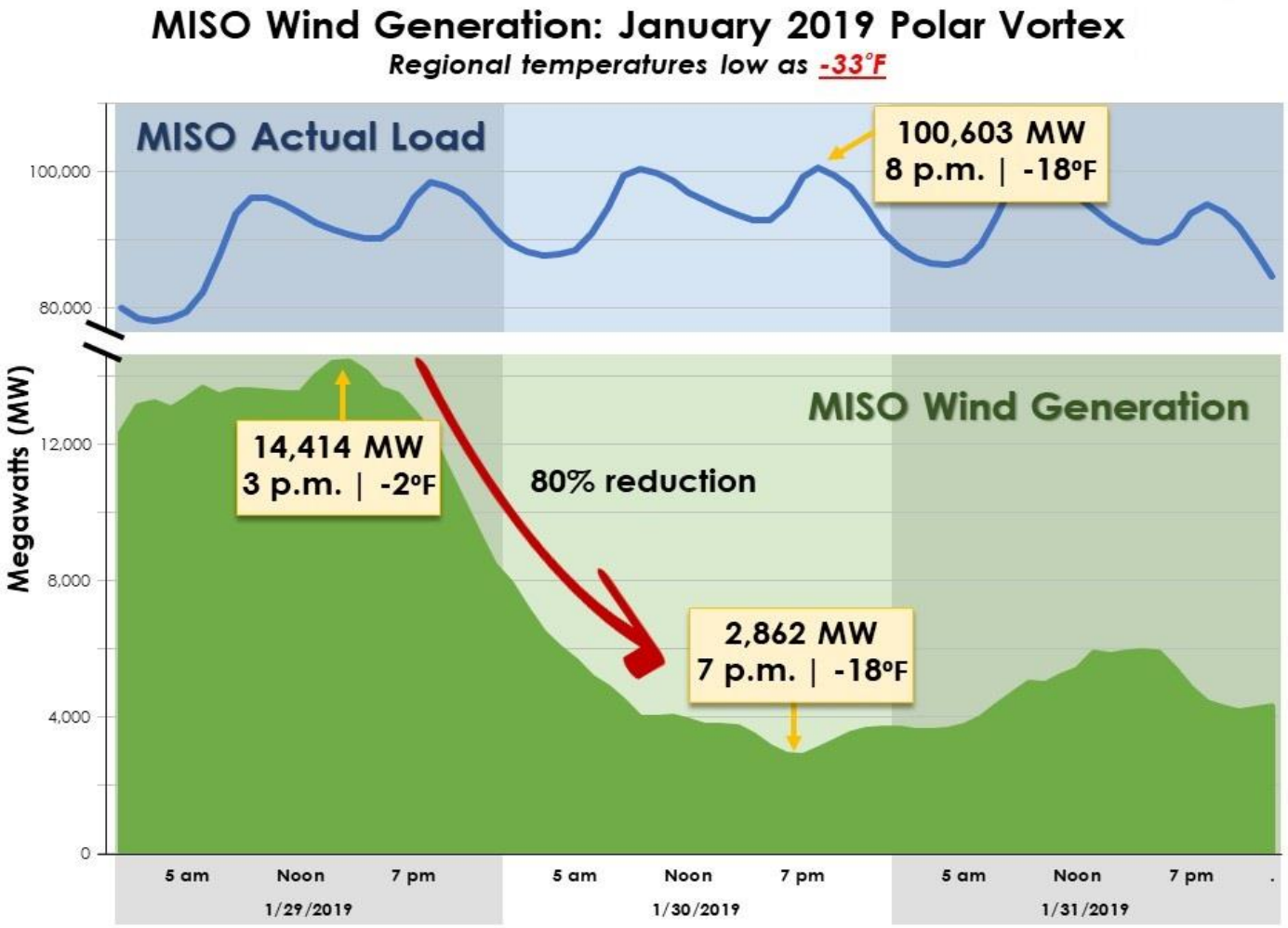
Resources not dependent on intermittent wind or sun needed



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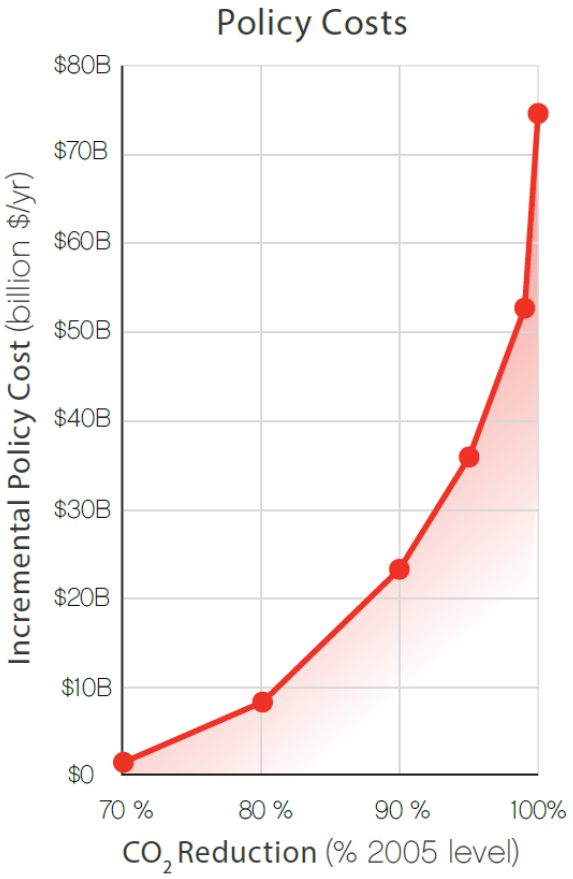
Avoid extreme decarbonization mandates



Source: EPRI presentation to Minnesota PUC, Aug. 2020

According to an EPRI analysis, achieving a 100% Clean Energy Standard (CES) in Minnesota by 2050 is prohibitively expensive.

EPRI modeling for 2050 shows a 2,000 MW deficit in half of the days, even assuming improved future technologies, at a cost of $50,000/MWh (*vs current rates of $120/MWh*).

Beneficial electrification combined with more modest clean electricity goals can reduce more carbon emission for less cost. It also reduces the risk of California-style rolling blackouts[1].

1. See *Preliminary Root Cause Analysis, Mid-August 2020 Heat Storm*; Oct. 6, 2020, by CA-ISO, CA PUC, CEC.

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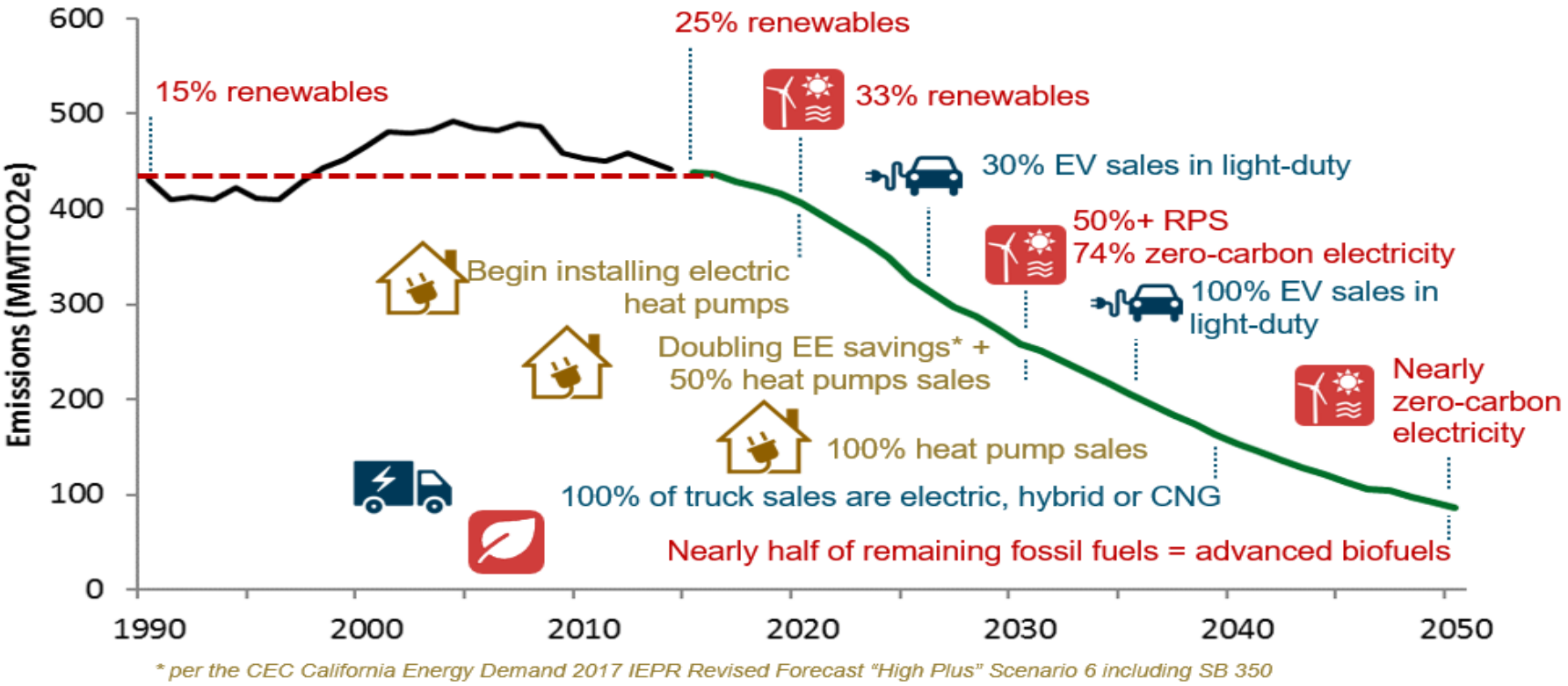
Maximizing carbon reductions across all sectors requires preserving effectiveness of electricity grid



** per the CEC California Energy Demand 2017 IEPR Revised Forecast "High Plus" Scenario 6 including SB 350*

Keep electricity affordable and reliable, so we can transition other sectors of the economy to electricity and achieve our goals.

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Legislative Priorities

Joyce Peppin, Director of Government Affairs & General Counsel

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Legislative update

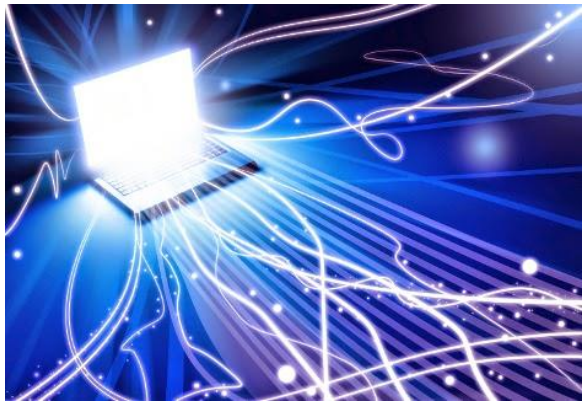
2021 session priorities -- ECO Act HF 164/SF 227

- The ECO Act would provide co-ops more flexibility to meet their annual energy savings goals by allowing them to count EV incentives, electric storage water heaters, and air source heat pumps toward their goal.
- It would benefit the environment, reduce greenhouse gas emissions, and foster a more resilient grid.
- Supported by a large stakeholder group, many legislators, and Gov. Walz.
- Opposed by the Minnesota Chamber, delivered fuels/propane, etc.
- Bill authors are Sen. Jason Rarick and Rep. Zach Stephenson.
- The bill has passed both the House and Senate Energy Committees and is awaiting floor action in both House.

Legislative update

2021 session priorities -- Broadband Easements HF 686/SF 1304

- HF 686/SF 1304, authored by Rep. Rob Ecklund and Sen. Torrey Westrom, clarifies that existing electrical easements may be used for broadband purposes with no need for co-ops to obtain new easements from each individual landowner.



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