

# CLEAN ENERGY ECONOMY MN



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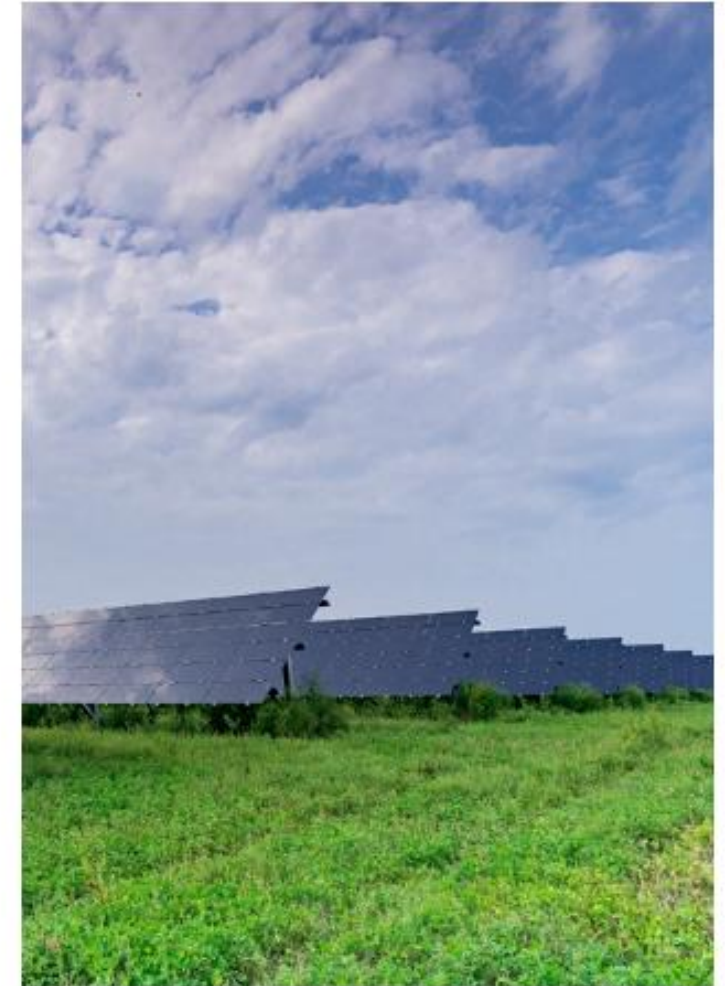
national**grid**  
renewables

**Betsy Engelking**

January 2023

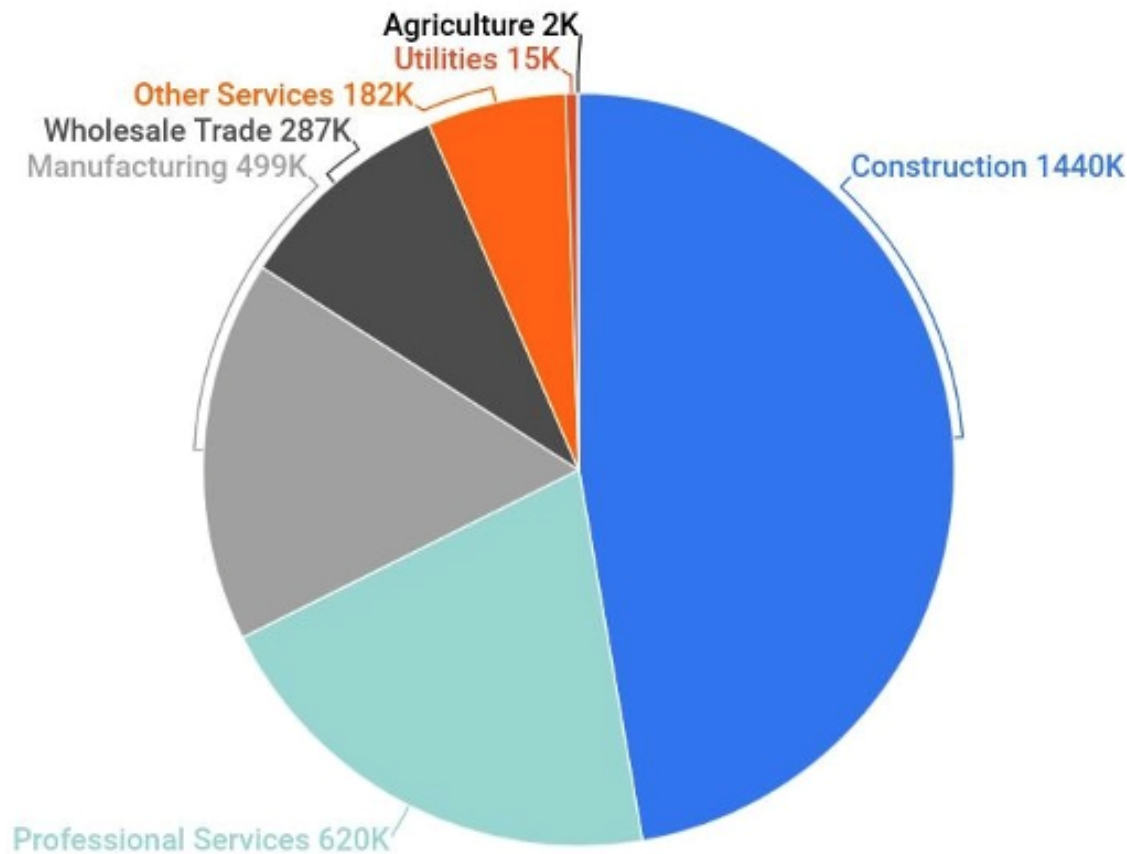
## Expertise as Top U.S. Renewable Energy Company

- National Grid Renewables is a leading North American independent developer and operator of utility-scale renewable energy and battery storage projects
- National Grid Renewables includes the renewable energy development company formerly known as Geronimo Energy, whose team has successfully developed over 2,800 megawatts (MW) of wind and solar projects that are currently in operation or under construction
- We are experts in renewable energy project development, construction and operations
- The robust National Grid Renewables pipeline stretches across the United States, including projects in advanced development phases



# Clean Energy is an engine for job growth

## NUMBER OF U.S. CLEAN ENERGY JOBS



- **3.2 million Americans** are employed by the clean energy sector as of 2022.
- The US clean energy sector added over **300,000 new jobs** to the market between 2020-2021.
- From 2015 to 2019, clean energy jobs **increased 70% faster** than the total nationwide job growth rate.
- The median hourly wage of clean energy workers **is 25% higher** than the national median.
- **Wind turbine service technician and solar photovoltaic installer jobs are projected to be the fastest-growing occupations over the next decade.**

# Clean Energy brings revenues to Greater Minnesota

- **62% of Minnesota Counties host Clean Energy Projects**
- **Minnesota Counties received \$16 million in production tax revenues in 2020**
- **Minnesota Landowners received \$23.6 million in land lease payments in 2020**
- **Local lodging, restaurants and other businesses reap the benefits of Clean Energy construction**



# Inflation Reduction Act will supercharge Clean Energy Growth

- **10+ year extension of clean energy tax credits (PTC & ITC) + direct pay for munis and coops**
- **Extension of credits to stand-alone storage and carbon free/carbon neutral energy production**
- **New incentives for green hydrogen**
- **Incentives to pay prevailing wages, attract apprentices and use domestic content in projects**
- **Incentives to construct domestic manufacturing facilities**



# Transmission Congestion is a barrier to MN reaping these benefits

## The transmission system serving MN is “full”

- Lack of low cost/low upgrade interconnection locations
- Needed upgrades in other states

**MISO “Tranche 1” may help, but significant MN transmission will likely not be built until Tranche 2.**

**Minnesota needs policies to encourage utilities to construct transmission for more MN projects.**





Betsy Engelking

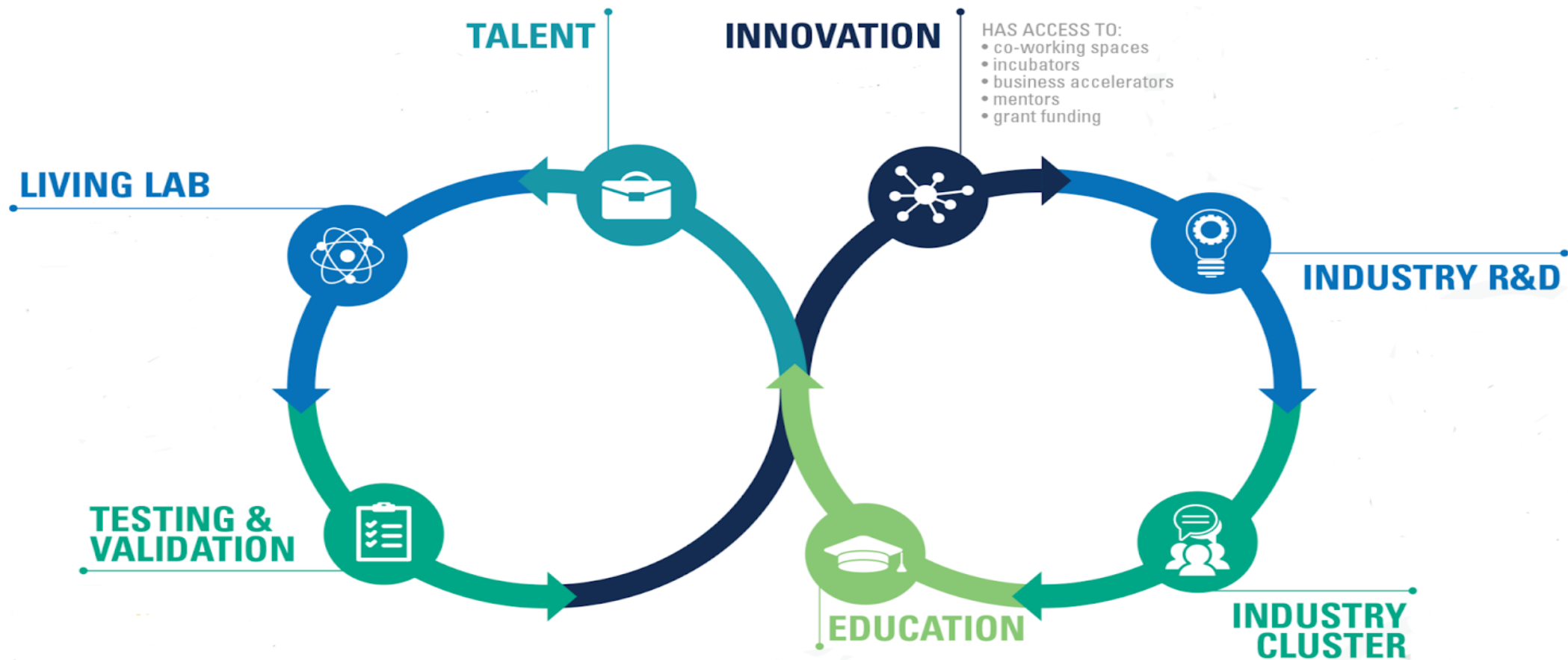
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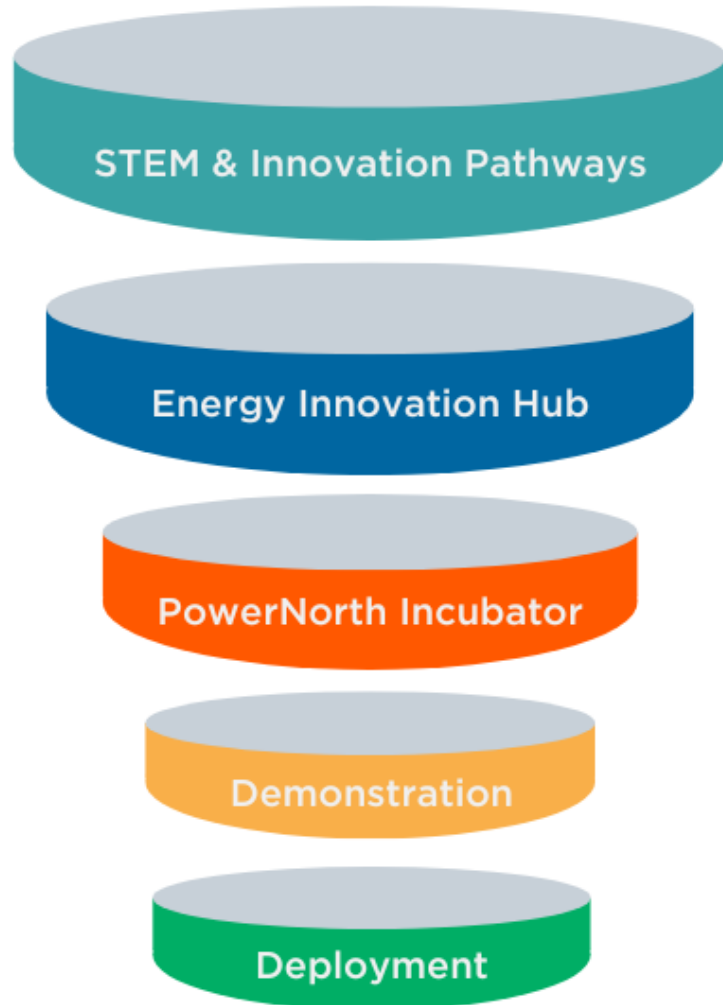
# Building a MN Cleantech Innovation Ecosystem



*\$70 billion invested globally in this sector in 2022. 89% increase from 2021. Source - holoniq.com.*

# Minnesota Energy Alley

Supporting Innovation, Entrepreneurs, Small Business, and the Regional Economy



01

## STEM Pathways

Programming to increase equity and access in STEM-related innovation careers for high school & college students

02

## Energy Innovation Hub

Entrepreneurship 101 - build your network, solution, business & impact

03

## PowerNorth Incubator

Expert mentorship to refine go-to-market strategies

04

## Demonstration Accelerator

Real world proof-of-concept tested with establish MN leaders in clean energy, catalyzed by investments

05

## Deployment & Small Business Growth

Innovation is scaled across the market, positioning the new businesses for growth and impact



# Cummins Destination Zero

Satish Jayaram

General Manager,

PSBU Innovation Program Office

January 11, 2023

PUBLIC USE

# Destination Zero:

Our company strategy to achieve zero emissions by reducing greenhouse gas (GHG) emissions and supporting the transition to decarbonized power



**Lower  
emissions today**



**Reduce well-to-  
wheels emissions**



**Drive wide-scale  
customer adoption**



**Achieve zero  
emissions by 2050**

*Accelerating toward*  
**Destination  
Zero**

Cummins will continue to innovate and invest as we advance along the path to zero, but we can't do it alone.

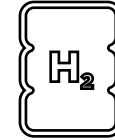
Action is required today

Collaborative relationships with stakeholders and partners is critical

**ENERGY SOURCES**



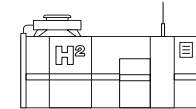
**LOW CARBON  
FUELS**



**GREEN HYDROGEN  
ECONOMY**

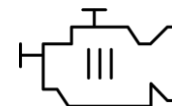


**DECARBONIZED  
GRID**

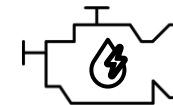


**STORAGE**

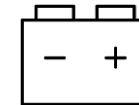
**POWER SOLUTIONS**



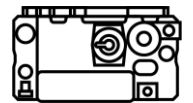
**ADVANCED  
ENGINES**



**HYBRID**



**BATTERY  
ELECTRIC**



**FUEL CELL  
ELECTRIC**

# Site overview

Established in 1969 under the Onan brand, Fridley has evolved into the global flagship manufacturing facility for Cummins Power Systems



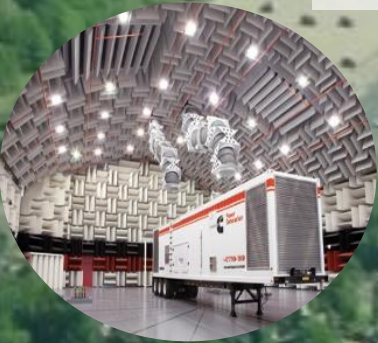
Warehouse



Waste, landfill and water reduction targets monthly



Tech Center + Acoustical Testing Center



10+ Manufacturing Lines  
Gen-set, switchgear & sub-assemblies  
5 Test Cell areas



Office Space

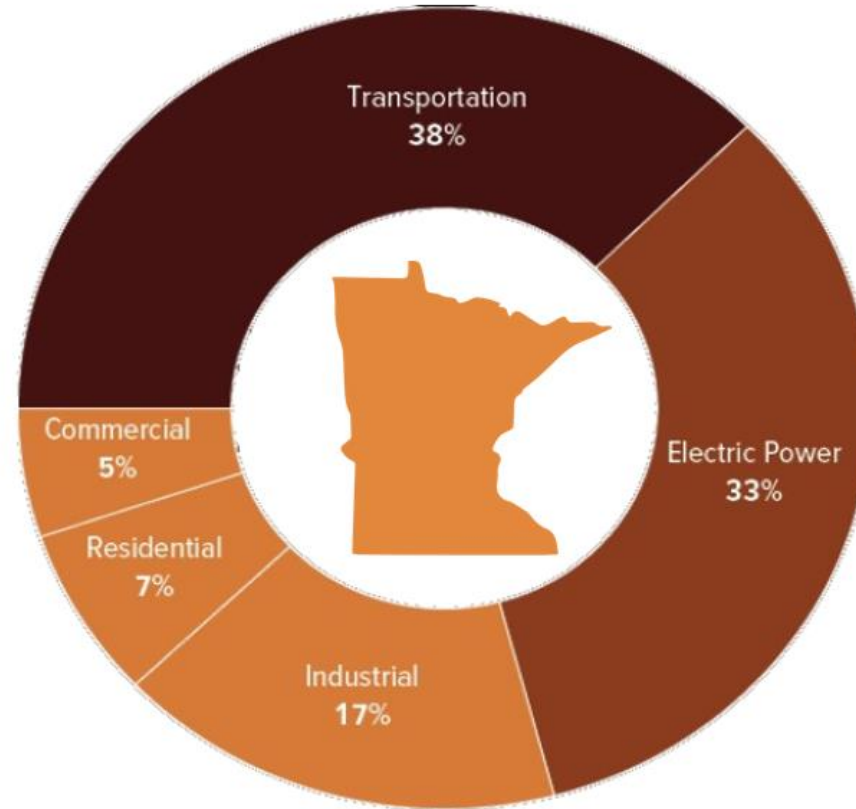
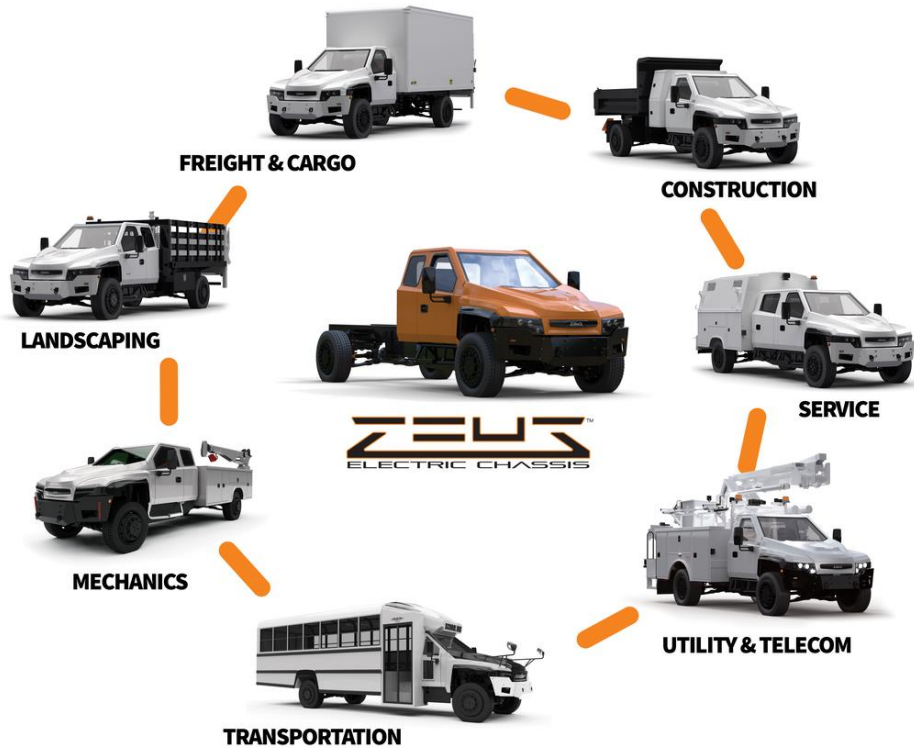


Uninterruptible Power Supply for peak shaving + backup. Energy storage being explored

1.1M+ Sq-ft of space  
526,000 – Manufacturing  
406,000 – Warehouse  
171,000 – Office, Eng, & Tech Center  
1250 employees (700 Operations)  
On-site health center



Zeus is a Class 4-6 Electric Vehicle  
Manufacturer Located in White  
Bear Lake, MN



- Air pollution from vehicles is the largest source of air pollution across Minnesota.
- Trucks and buses make up just over 3% of vehicles on MN roads.
- MD/HD vehicles produce ¼ of all transportation emissions.
- Replacing one diesel bus can reduce greenhouse gas emissions by 54,000 pounds each year.



Zeus is the defining the **Industry Standard** for safety and performance

**ZEUS**  
ELECTRIC CHASSIS



Implement policy and regulation to support the rapid acceleration of EV adoption:

- ✓ Fund Research and Technology Innovation
- ✓ Incentives and Technology Development
- ✓ Strategic Deployment



**ZEUS**  
ELECTRIC CHASSIS



## *Jim Steffes*

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# Ever-Green Energy

# 40

YEARS OF  
OPERATIONS &  
MANAGEMENT  
EXPERIENCE

BASED IN SAINT PAUL  
WITH PROJECTS ACROSS  
NORTH AMERICA



Buildings consume over 40% of the energy used in MN



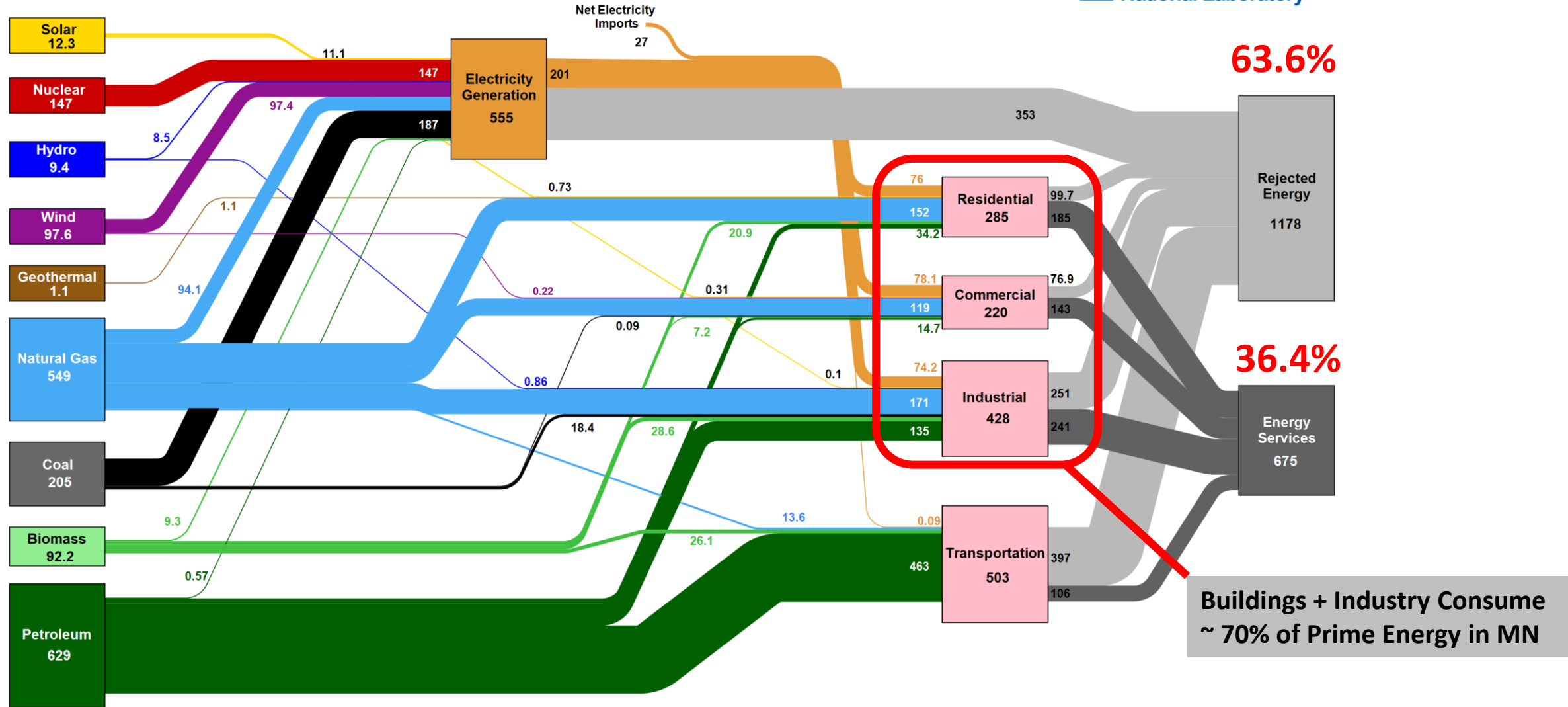
***“Utilities are meeting their energy savings goals, but overall emissions and energy use from buildings are increasing.”***

Energy Policy and Conservation  
Quadrennial Report, 2020  
March 1, 2021

Source: [mn.gov/commerce](http://mn.gov/commerce)

# Prime Energy

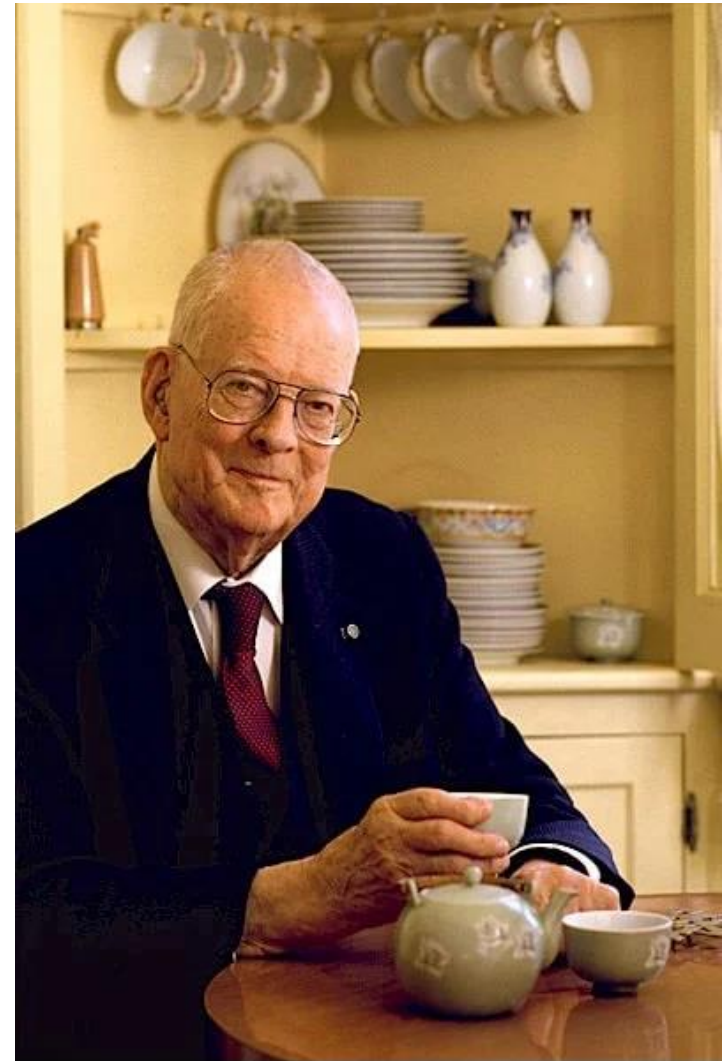
## Minnesota Energy Consumption in 2019: 1853 Trillion BTU



Source: LLNL August, 2021. Data is based on DOE/EIA SEDS (2019). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 0.65% for the residential sector, 0.65% for the commercial sector, 0.49% for the industrial sector, and 0.21% for the transportation sector. Totals may not equal sum of components due to independent Rounding. LLNL-MI-410527

*“The system is perfectly designed to get the results it is producing”*

*Edwards Deming*



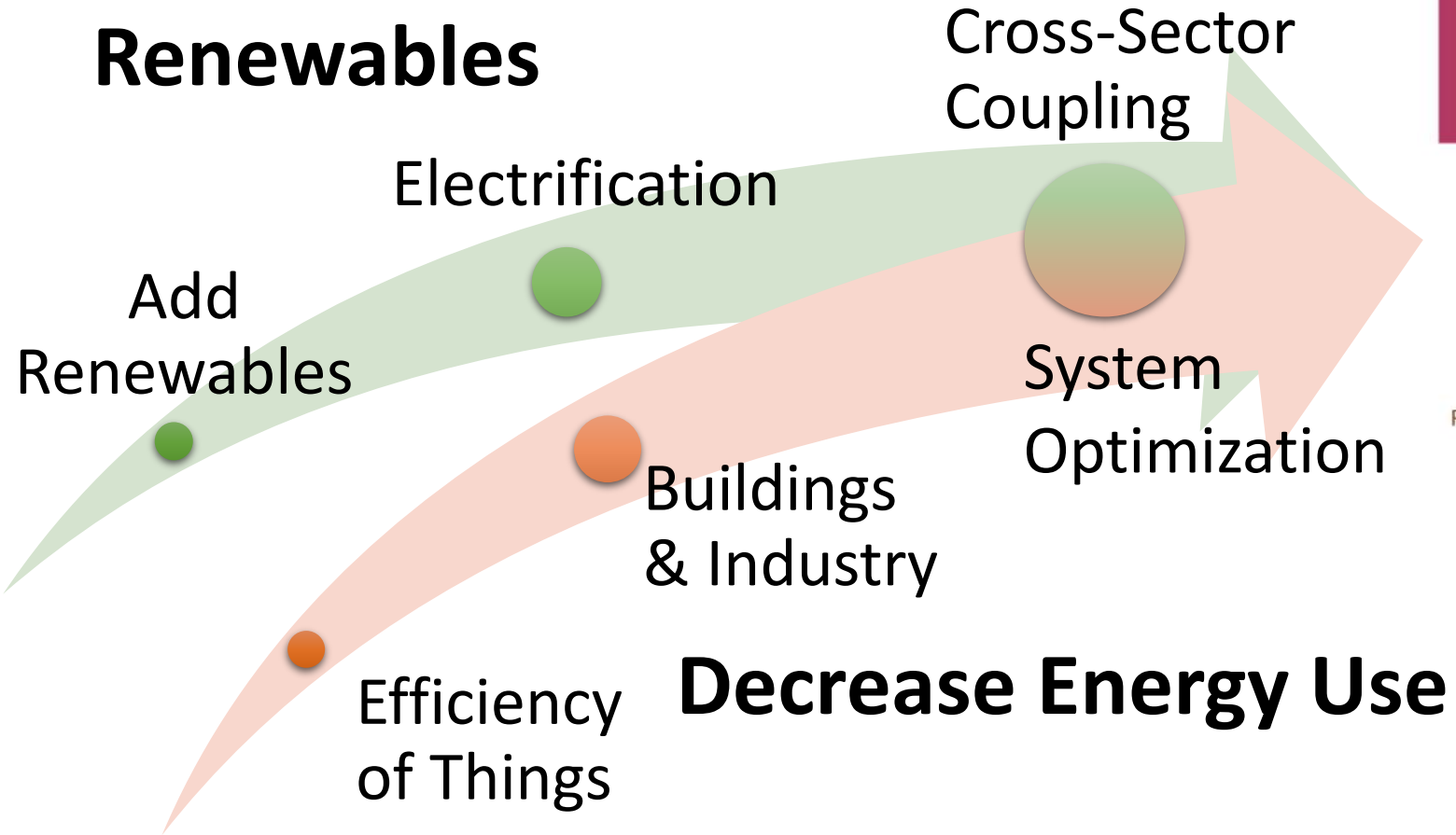
*W. Edwards Deming*

# Opportunities for MN to Change the System

- Close Open Loops
  - Recover energy from thermal waste streams to optimize the energy system, reducing waste and carbon emissions
  - Share energy between buildings and across sectors
- Thermal Energy Integration Opportunities
  - New multi-building developments and redevelopments
  - Industrial parks
  - Food/ag processing
  - Wastewater treatment plants
  - Data centers
  - New hydrogen & ammonia generation hubs
  - Campuses and communities where district energy systems already exist
- Policy Regarding Decarbonization of Building Heating

# Progression of the Energy System Transition

**Increase Use of Renewables**





*Thank You!*



**EVER-GREEN  
ENERGY™**