



The State of Solar In Minnesota

Minnesota Solar Interconnections



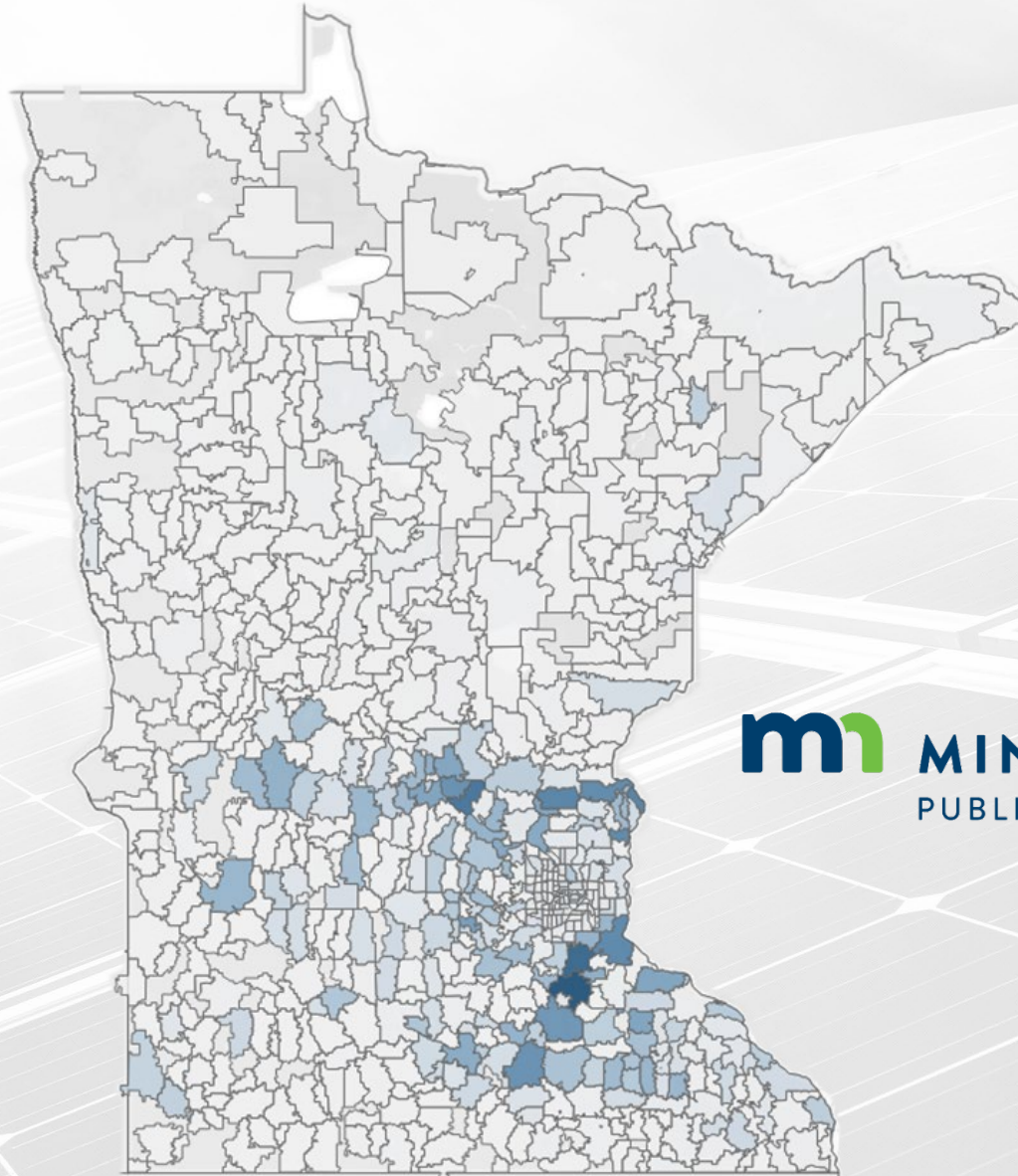
Minnesota Solar Interconnections



Topics to Cover

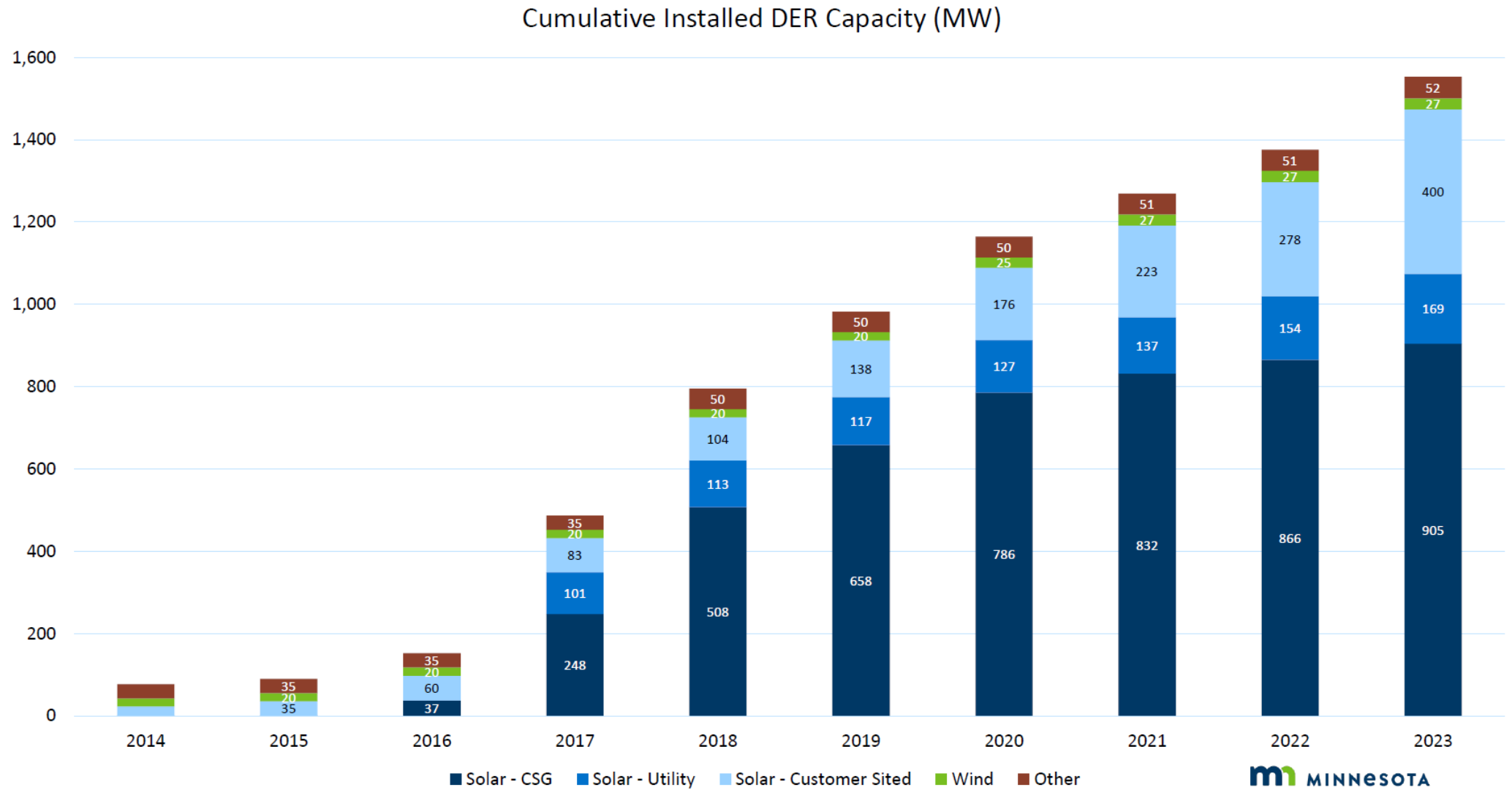
- How renewable interconnections have grown in Minnesota
- Itasca-Mantrap and GRE's Energy Mix
- Federal and State Incentive Programs
- What to expect from Solar Systems
- Considering Energy Storage Systems
- Finding an Installer

Minnesota Solar Interconnections



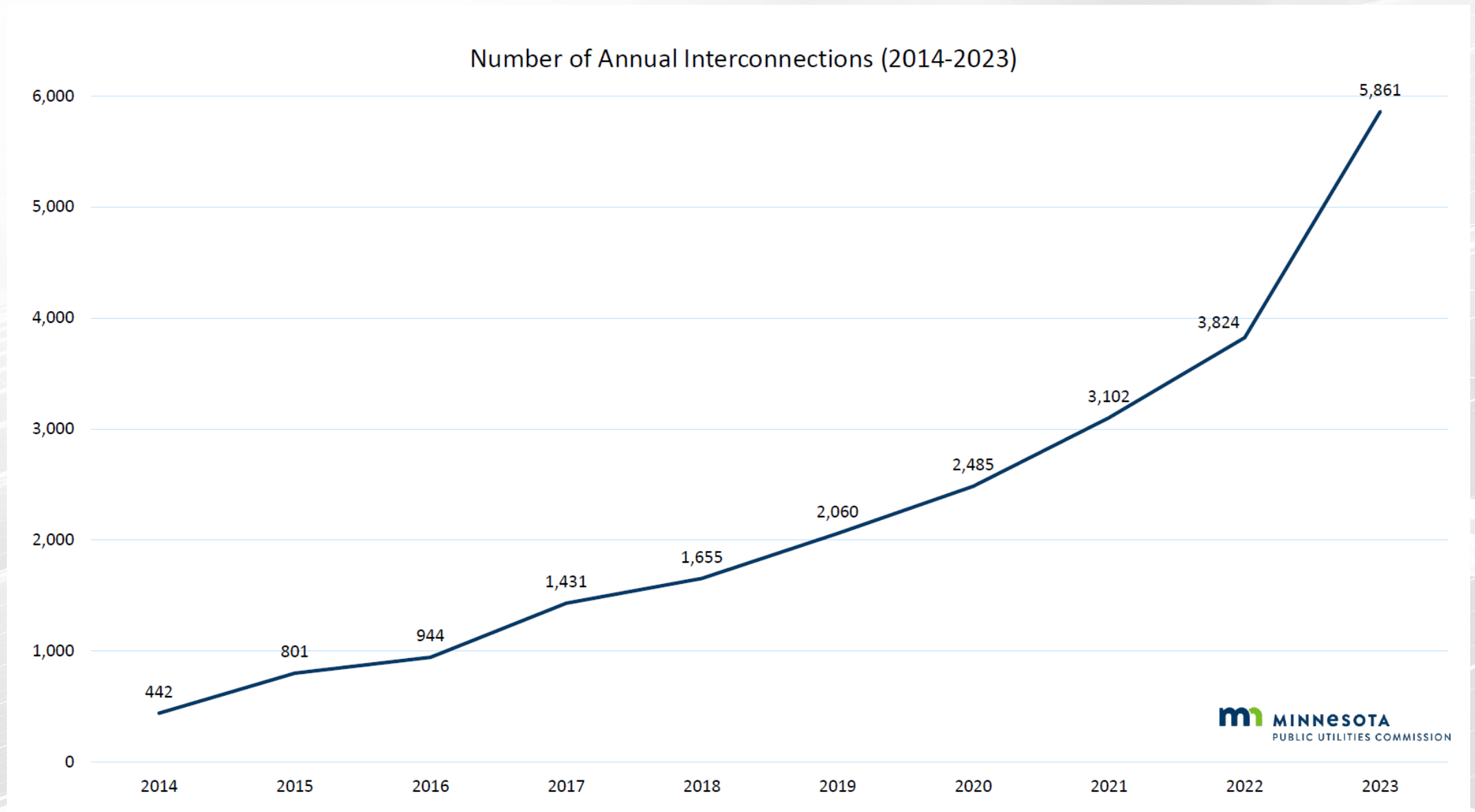
m1 MINNESOTA
PUBLIC UTILITIES COMMISSION

Minnesota Interconnections



*Other includes biogas, biomass, hydro, methane, municipal solid waste, storage, and natural gas

Minnesota Interconnections



Minnesota – Carbon-free by 2040

State law passed in 2023

- **80% Carbon-free by 2030** (60% for non Investor-Owned Utilities)
- **90% Carbon-free by 2035**

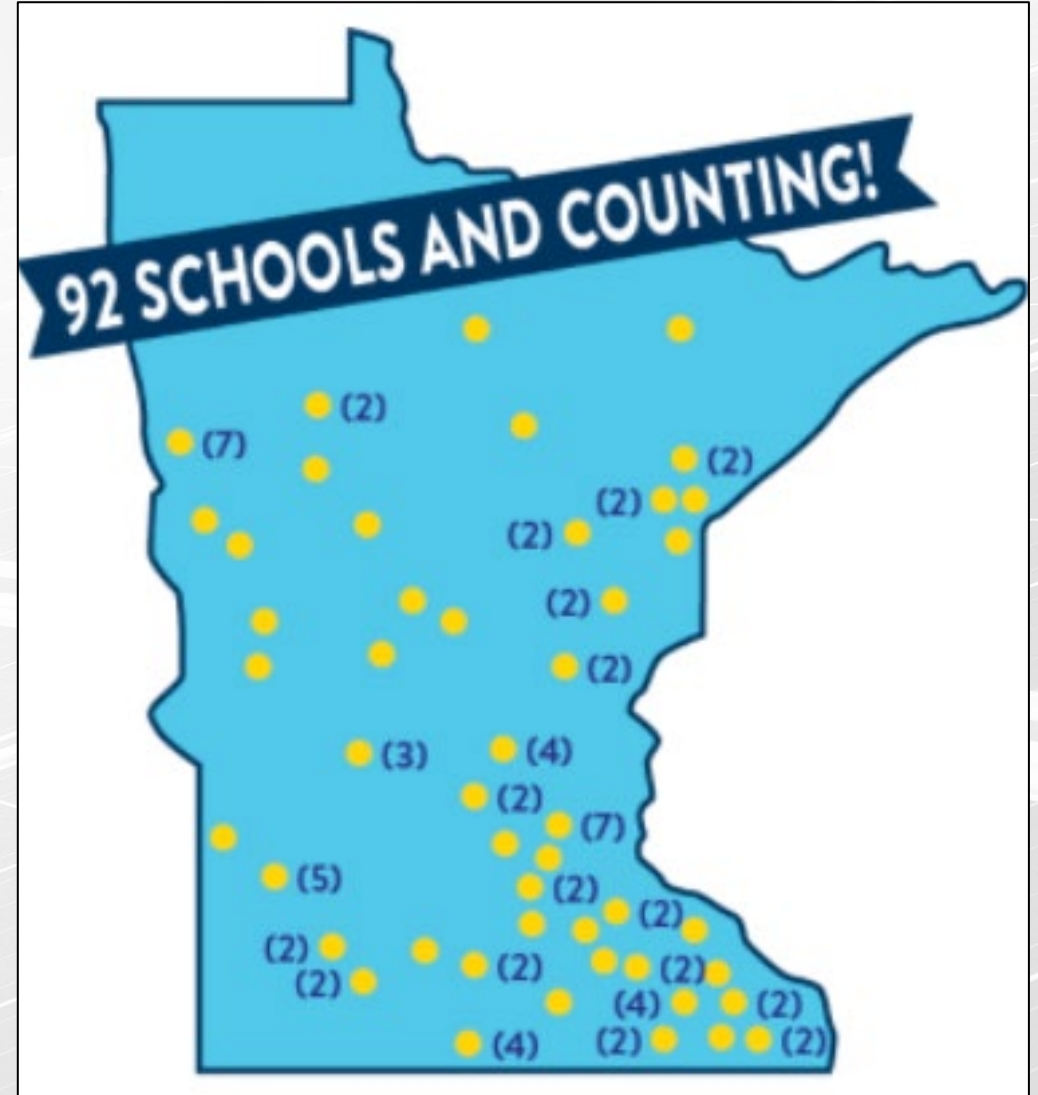
Renewable Energy Standard – passed in 2007 requires renewable resources to make up a specific percentage for retail energy sale

- **25% by 2025**
- **55% by 2035**

Minnesota – Solar for Schools

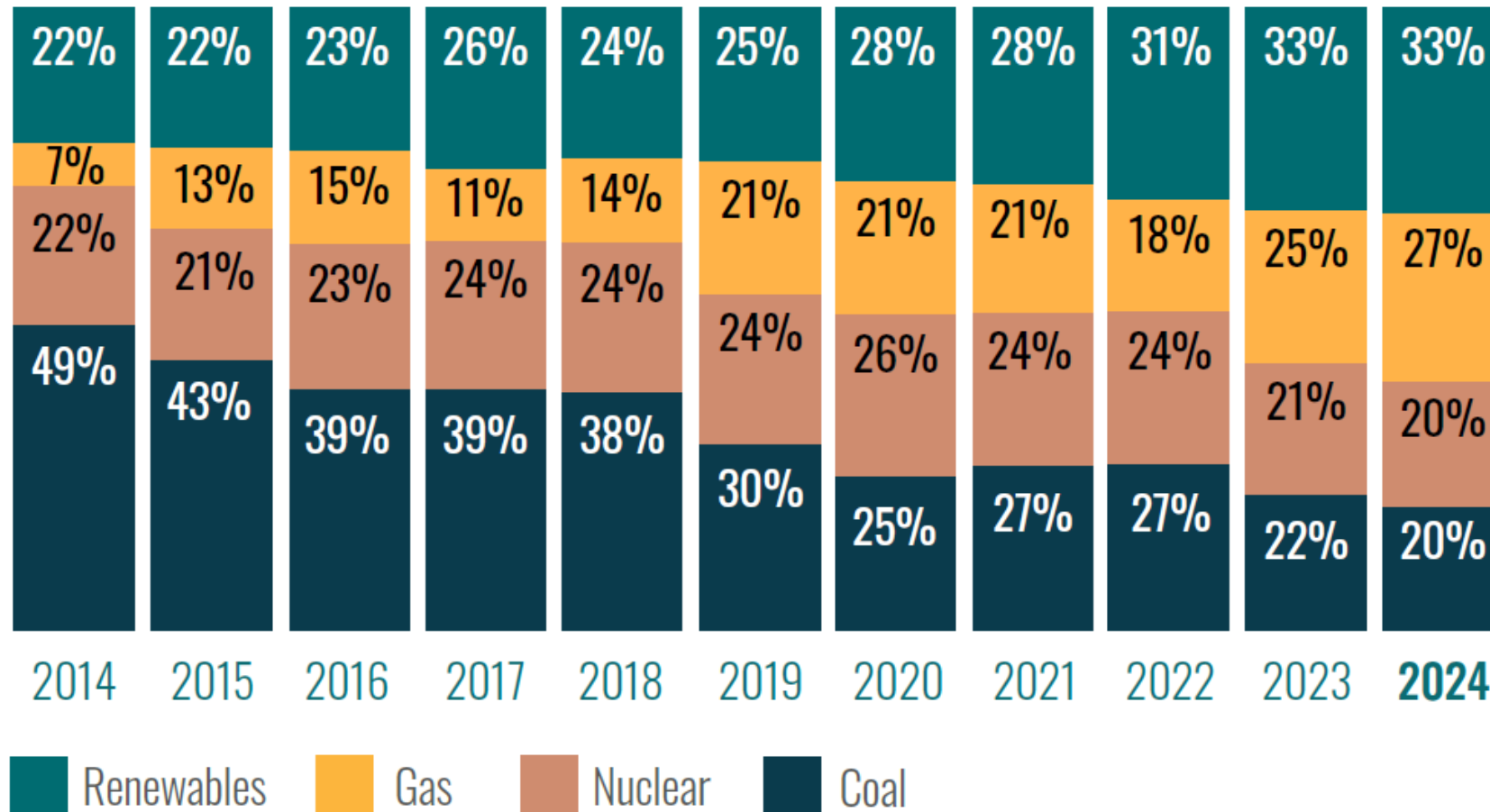
State program passed in 2022

- Grants are typically \$102,000
- Grants cover 40 -70 % of the project



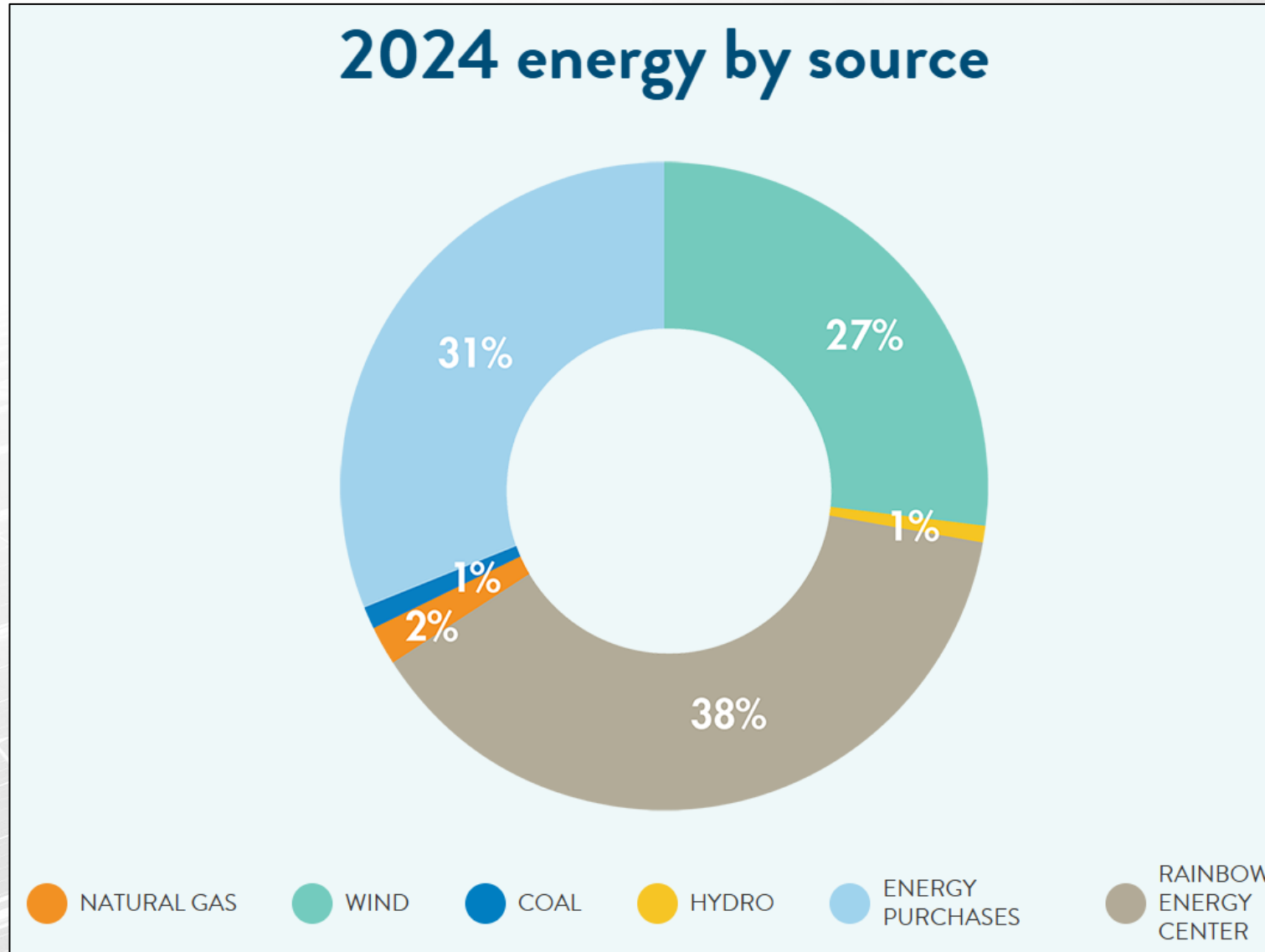
Minnesota Energy Mix by Technology

Figure 5: Minnesota electricity generation mix by technology

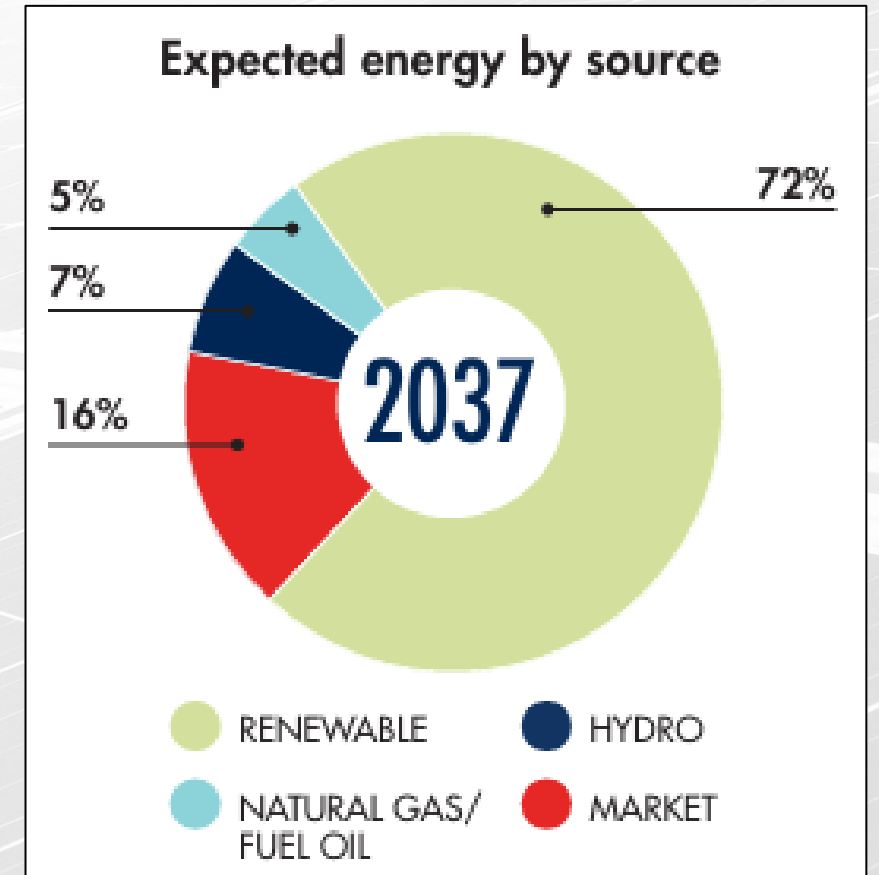
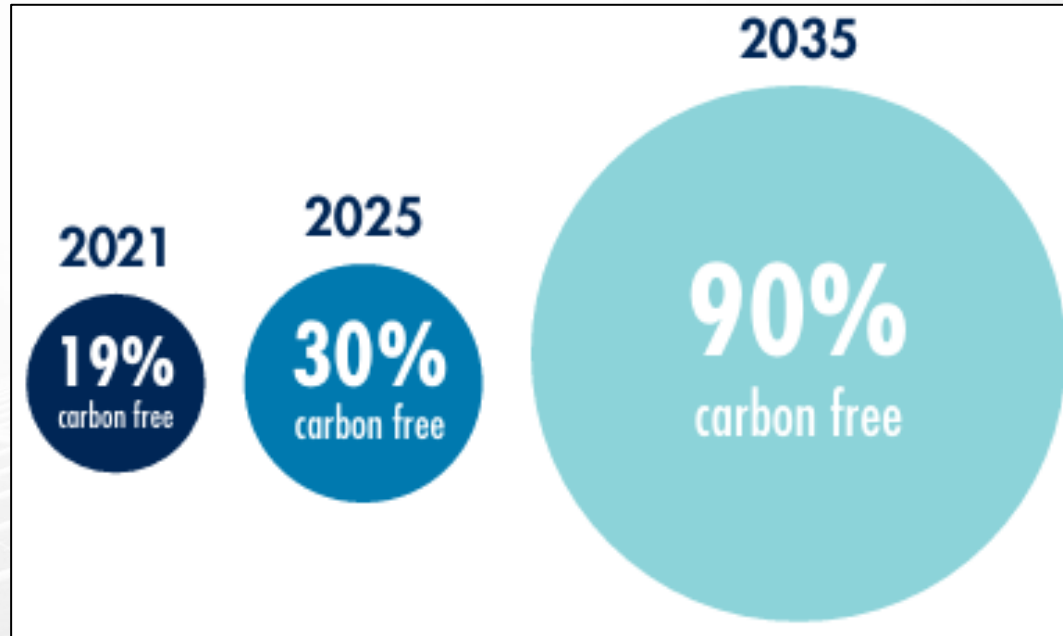


Source: BloombergNEF, EIA.

Great River Energy Mix by Technology



GRE's Integrated Resource Plan (2023 -2027)



Solar Fiscal Considerations for Members

DSIRE[®]



NC CLEAN ENERGY
TECHNOLOGY CENTER

<https://www.dsireusa.org/>

PVWatts[®] Calculator

<https://pvwatts.nrel.gov/>



Rural Development

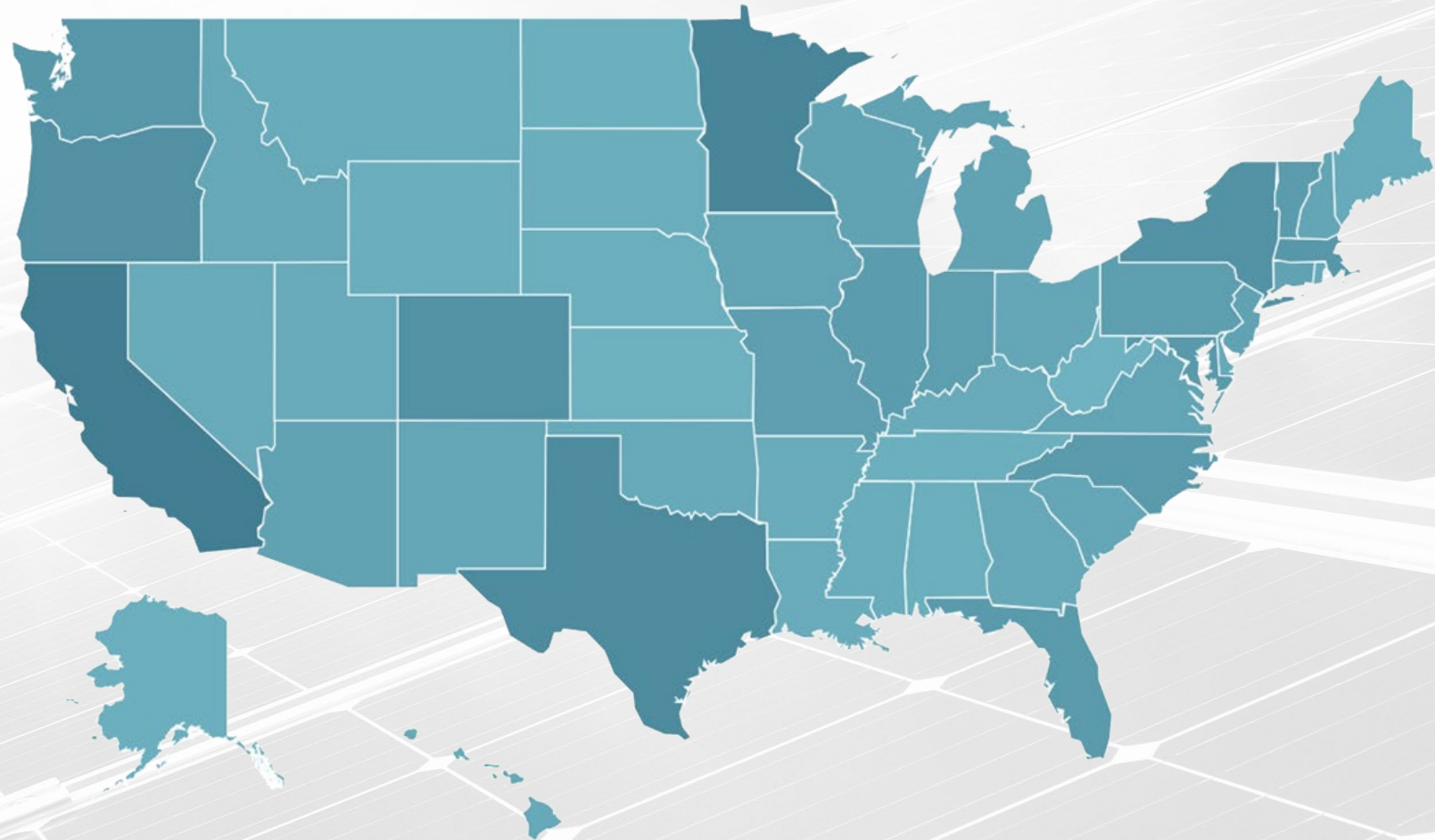
U.S. DEPARTMENT OF AGRICULTURE

Google: USDA REAP

DSIRE[®]



Find Policies & Incentives by State



<https://www.dsireusa.org/>

Federal Incentives - Expiring

Big, Beautiful Bill Changes:

- The Residential Solar Tax Credit (25D) for residential system expires end the year. If you install a residential PV system...
 - Between 2022 (retroactive) and ~~2032~~ **December 31, 2025**, you will receive a 30% tax credit
 - ~~In 2033... 26%~~
 - ~~In 2034... 22%~~
- The solar + storage equipment expenses is included in the 25D. Energy storage devices that have a capacity rating of 3 kilowatt hours or greater are included starting in 2023. This includes stand-alone storage.

More Federal Incentives – Also Expiring

Expires December 31, 2025

Homeowners Weatherization & Efficiency of Homes (25C)

- \$1,200 for energy efficient property costs and certain energy efficient home improvements, with limits on exterior doors (\$250 per door and \$500 total), exterior windows and skylights (\$600) and home energy audits (\$150)
- \$2,000 per year for qualified heat pumps, water heaters, biomass stoves or biomass boilers

Expires December 31, 2027

Production Tax Credit (PTC 45Y) & Clean Electricity Tax Credit (48E ITC)

- Must be in service by December 31, 2027
- Typically, utility scale system for these incentives



Rural Development
U.S. DEPARTMENT OF AGRICULTURE

Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Guaranteed Loans & Grants

Application Window:

CLOSED

Program Application Period:

The Agency is not accepting REAP grant applications at this time. Guaranteed loan applications may be submitted.

Application Windows:

The Agency will not be accepting REAP grant or combined grant and guaranteed loan applications between July 1 and Sept 30, 2025. If the Agency receives an application during this time, it will not be reviewed or processed, and the application will be returned. Guaranteed loans may be accepted and compete on an on-going basis in accordance with 7 CFR 5001.315.

Google: USDA REAP

Tariffs

Tariffs on solar panels and components have been around for decades

- **2012** - First focused on China (state-subsidized panels) – 30% tariff
- **2013** - China moves production to Taiwan – 30% tariff on Taiwan
- **2017** – 30% tariff on pretty much all imported crystalline silicon solar modules and cell (declines by 5% annually)
- **2025** – Chinese tariffs are ~25% - 50% and significant tariffs on solar components made in Southeast Asia: Cambodia, Malaysia, Thailand and Vietnam

Fiscal Analysis of a Solar System

Assumed Installed Cost: \$3.45 per watt AC

- 10 kW AC System List Price: \$34,500
- *Federal Tax Credit: (\$10,350)*
- *Domestic Bonus Credit: (\$3,430)*


10 kW Assumed

Net Installed Cost: \$20,720



PVWatts[®] Calculator

PVWatts[®] Calculator



My Location

park rapids, mn
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Українська


HELP

FEEDBACK


RESOURCE DATA

SYSTEM INFO


RESULTS


Go to
system info

RESULTS

 Print Results

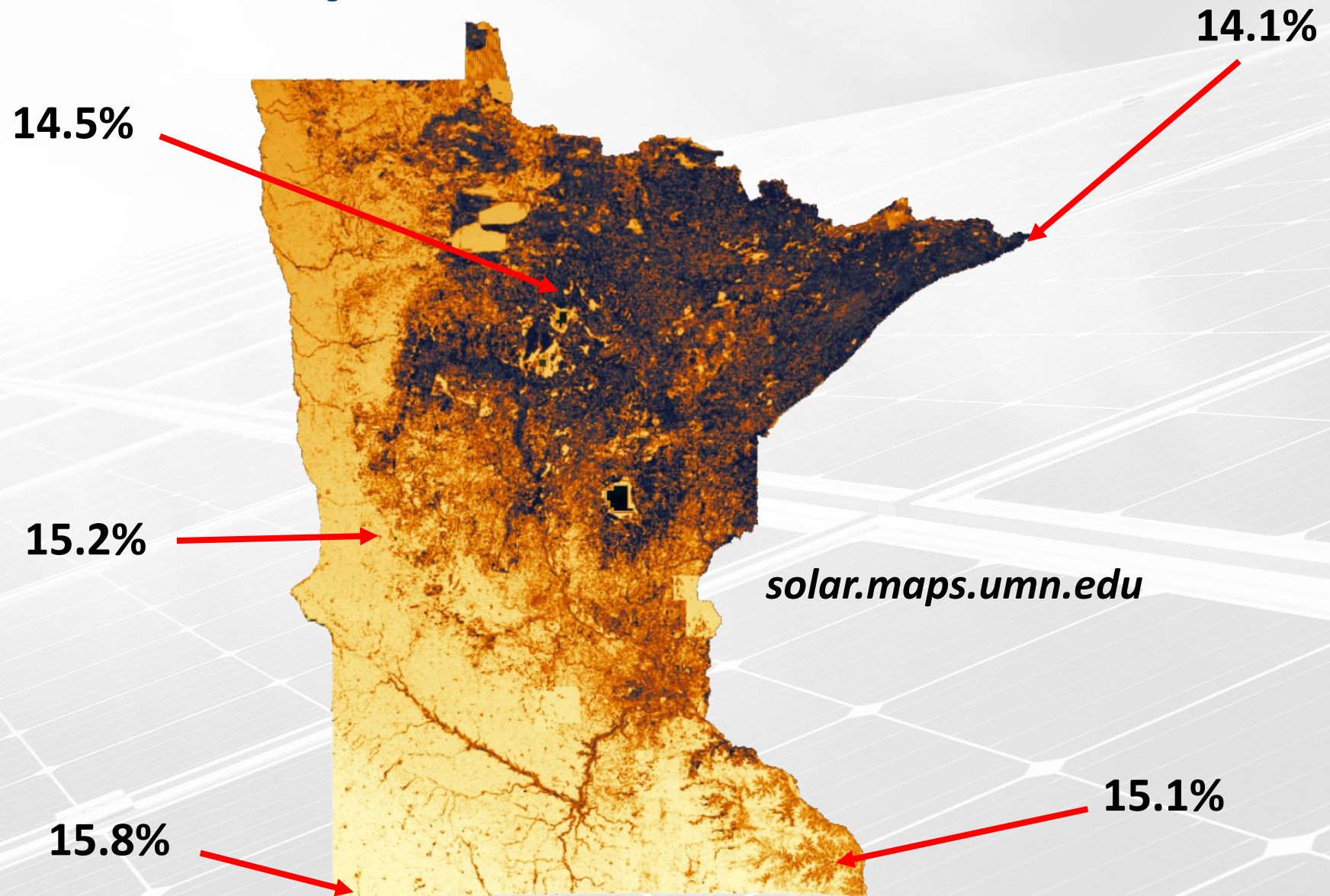
16,188 kWh/Year*
*System output may range from 15,199 to 16,700 kWh per year near this location.
Click [HERE](#) for more information.*



Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)
January	2.54	846
February	3.55	1,065
March	4.92	1,555
April	5.77	1,870

<https://pvwatts.nrel.gov/>

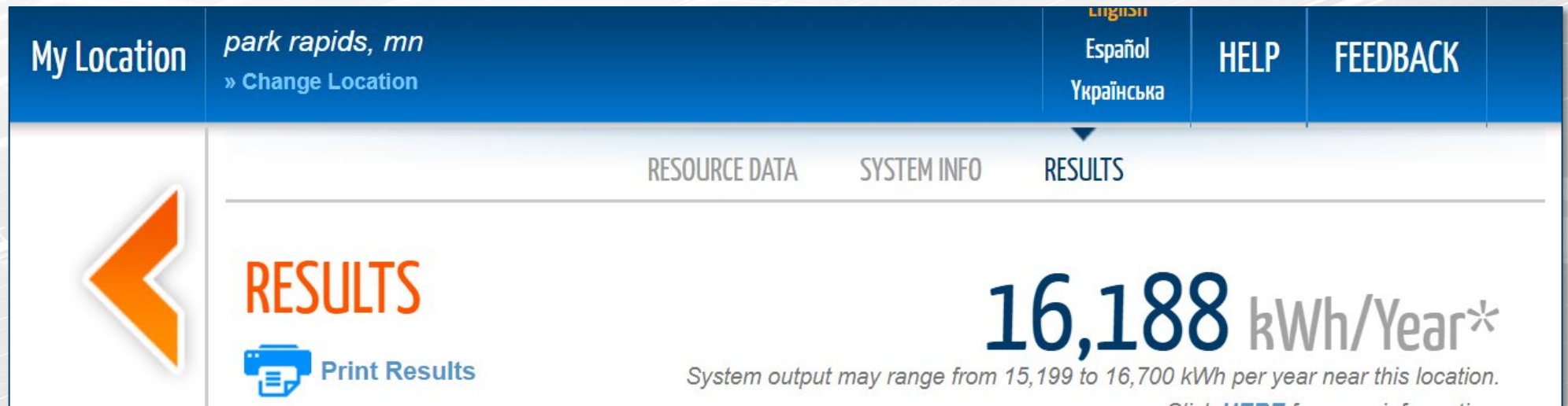
Production Expectations



Production Expectations

10 kW AC System (12 kW DC)

- Rushford: 15,843 kWh
- Hills: 16,634 kWh
- Grand Portage: 15,428 kWh
- Bemidji: 15,188 kWh
- Park Rapids: 16,118 kWh
- Duluth: 14,976 kWh

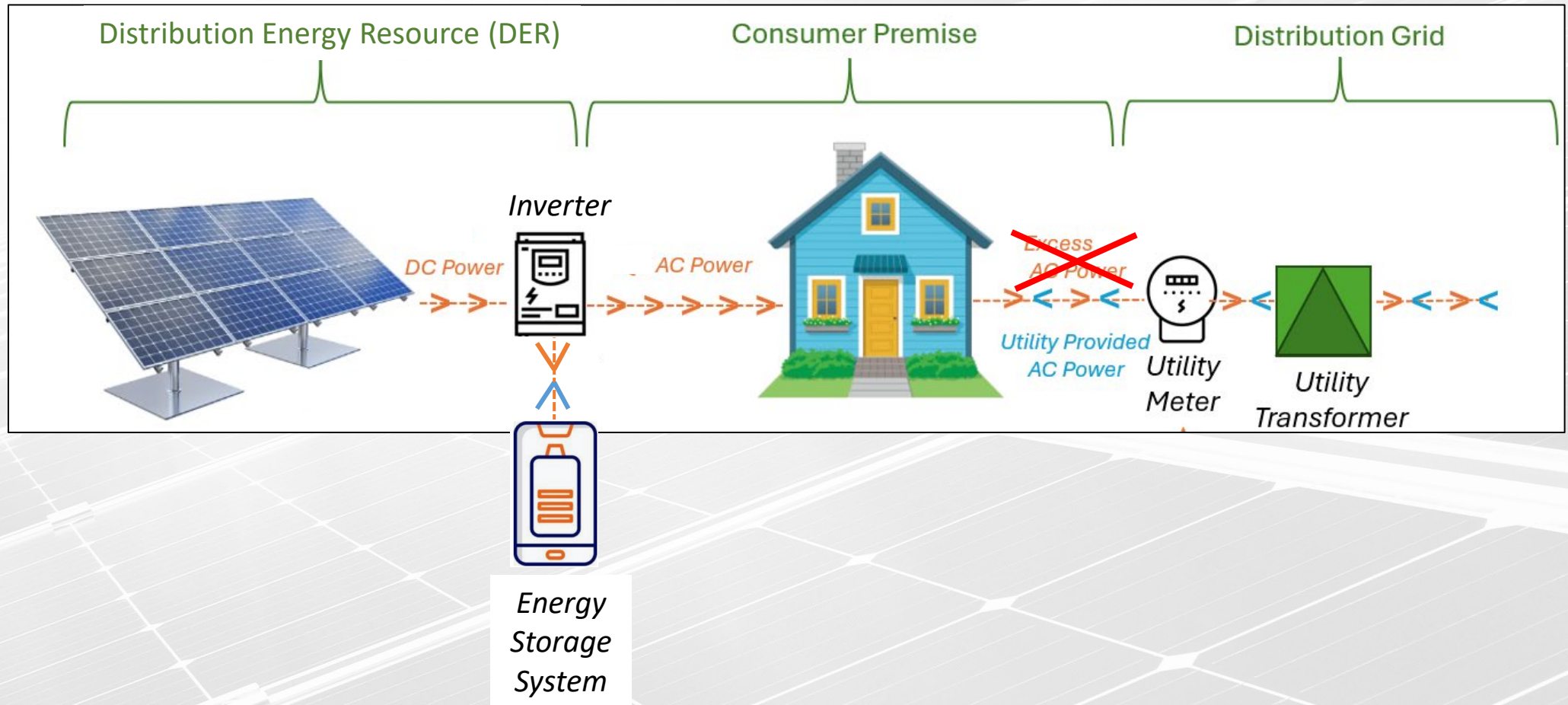


pvwatts.nrel.gov

Energy Storage Systems



Energy Storage Systems



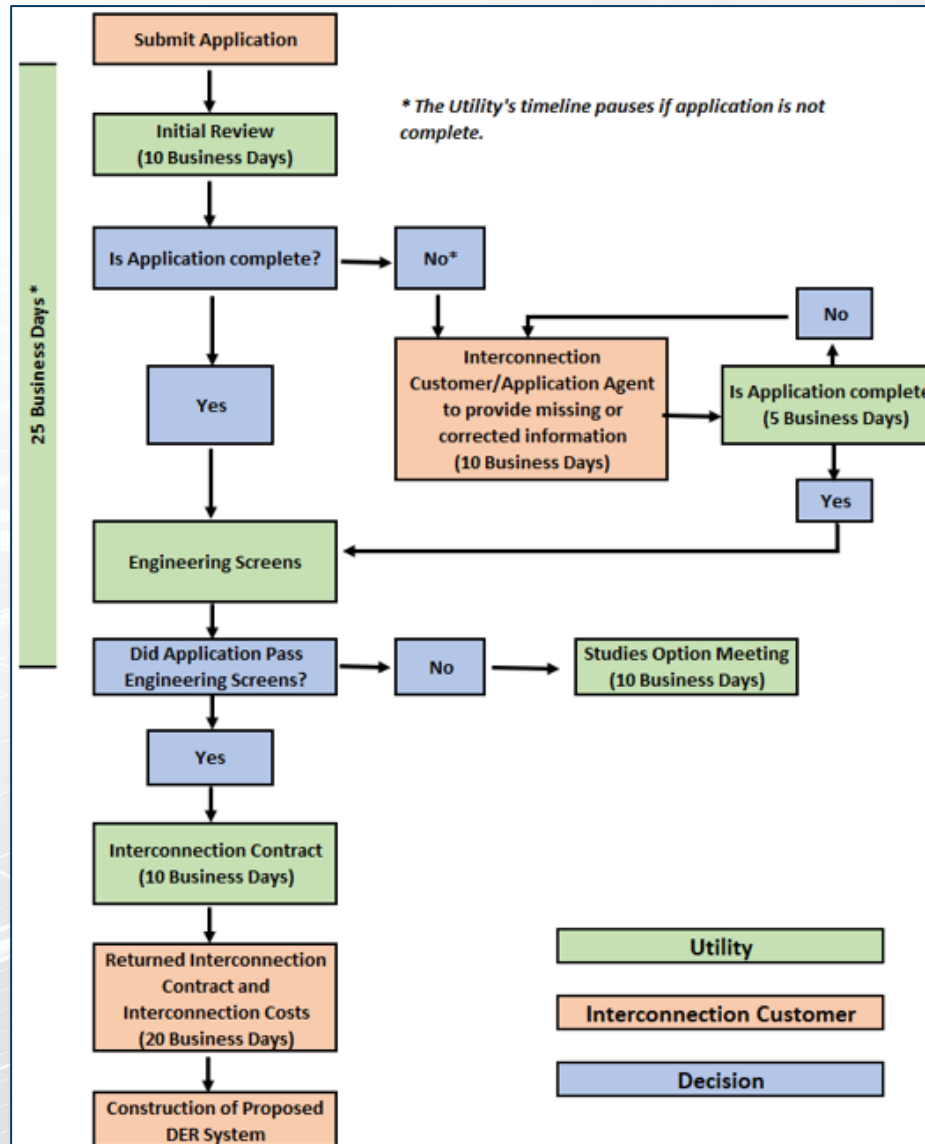
Applying for Interconnection



Your Touchstone Energy® Cooperative 



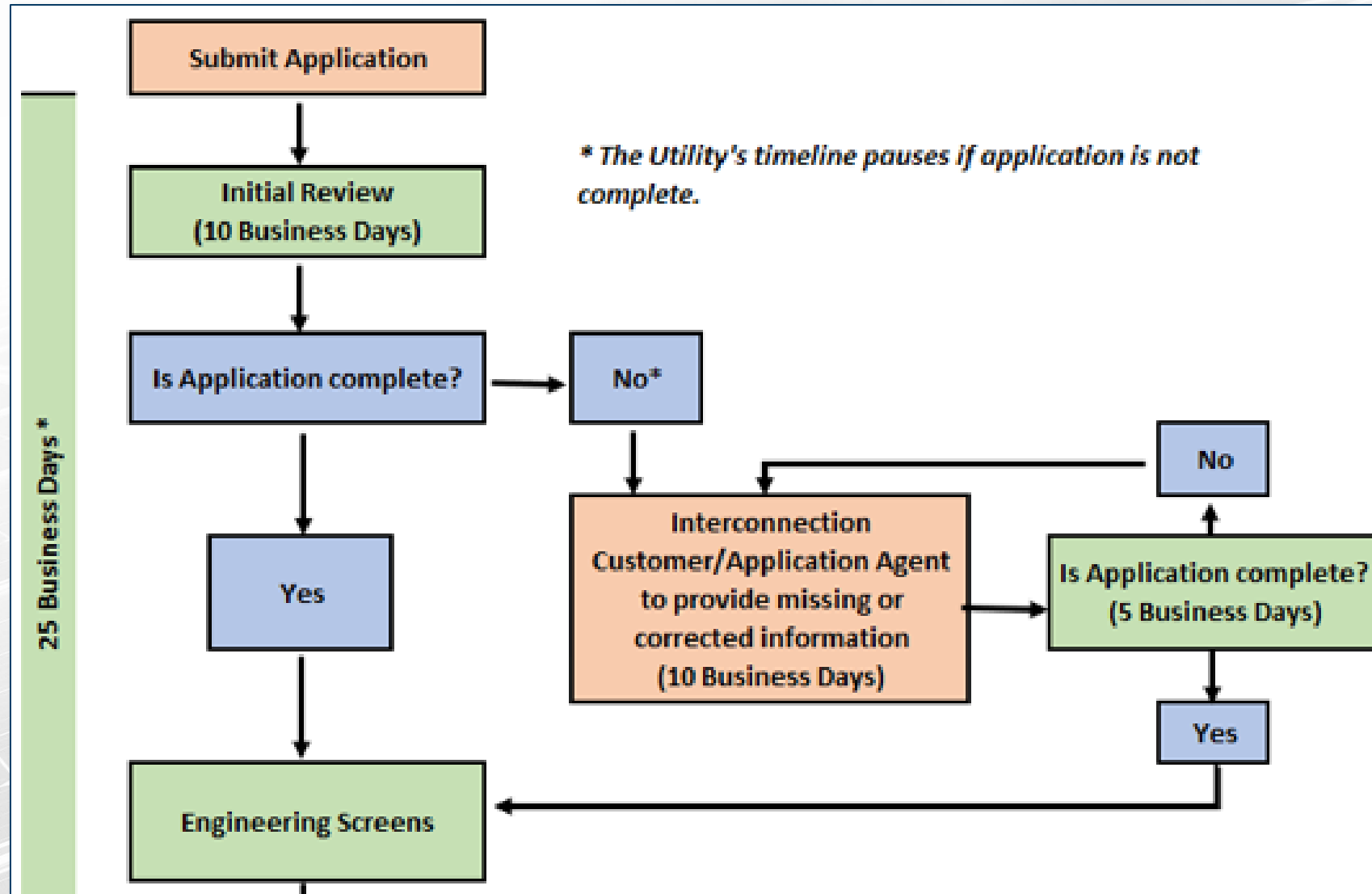
Interconnection Process Steps



Interconnection Applications

- **For an application to be considered complete, it needs:**
 - Application completely filled out and signed by the solar owner
 - Non-refundable processing fee
 - One-line diagram
 - Site diagram
 - Appropriate manufacturer equipment specification documents
 - Proof of Site Control

Reviewing the Application



Interconnection Application



DER System Generation

Purpose of this Interconnection Application?

- ☒ Application is for a **New** DER
- ☐ Application is for a **Capacity Addition** to an existing DER

If Capacity Addition, Provide Capacity of **Existing** DER types (and Storage): (kW_{AC})

Estimated install date

06/11/2024



Installation Cost (Without incentives)

\$ 150,000

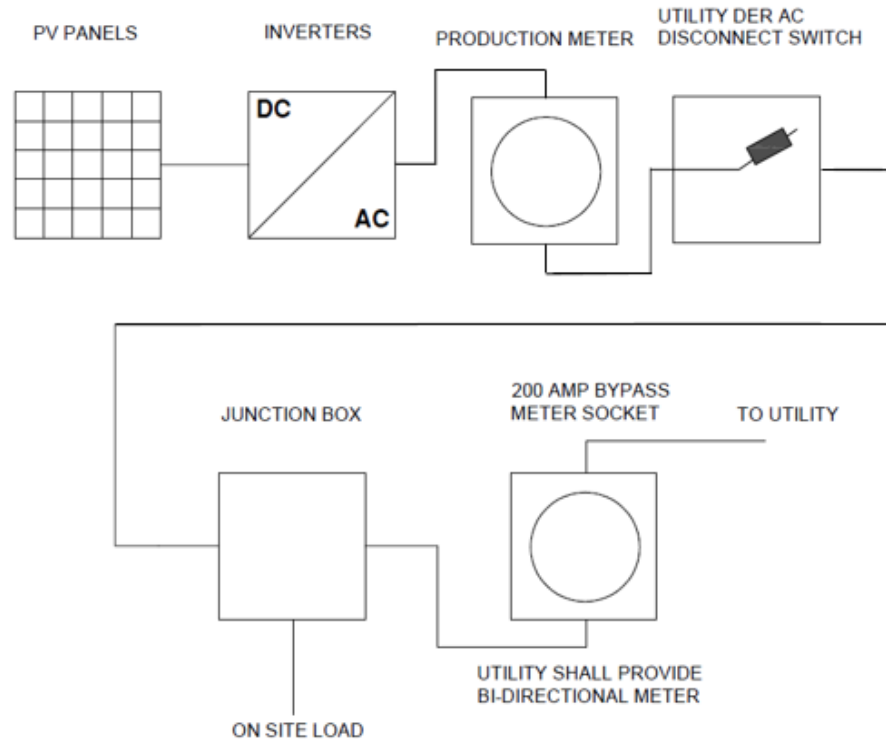
Primary Intention of the Proposed DER System (Select all that apply.)

- ☒ Net Metering
- ☐ Backup Power
- ☒ Supply Power to the Interconnection Customer
- ☒ Supply Power to the Electric Utility Company

One-line Diagram

ELECTRIC ONE - LINE DIAGRAM WITH PRODUCTION METER

MFG: Solar Point
MODEL: XX-100Z-US



MANUFACTURE SPECIFICATION SHEETS ON THE INVERTERS
ARE ATTACHED.

DER VENDER

VENDER: Sunshine Solar
ADDRESS: 123 Loss Ave
Central Valley, CA
96080

CONTACT:
PHONE #: 951-456-1234

DER SYSTEM

TYPE: Solar
SIZE (AC): 25.5 KW AC
OPERATING VOLTAGE: 120/240V
MAX. CURRENT: 180 Amps
PHASE: Single Phase
NOTES:

CUSTOMER NAME

CUST: In The Hole Golf Course
PHONE: 1-800-456-9753
SITE: 65487 Hope Rd, Aberdeen, SD
SERVICE: 120/240V, Single Phase
PROJ: Main Building
SIZE: 25.5 KW AC

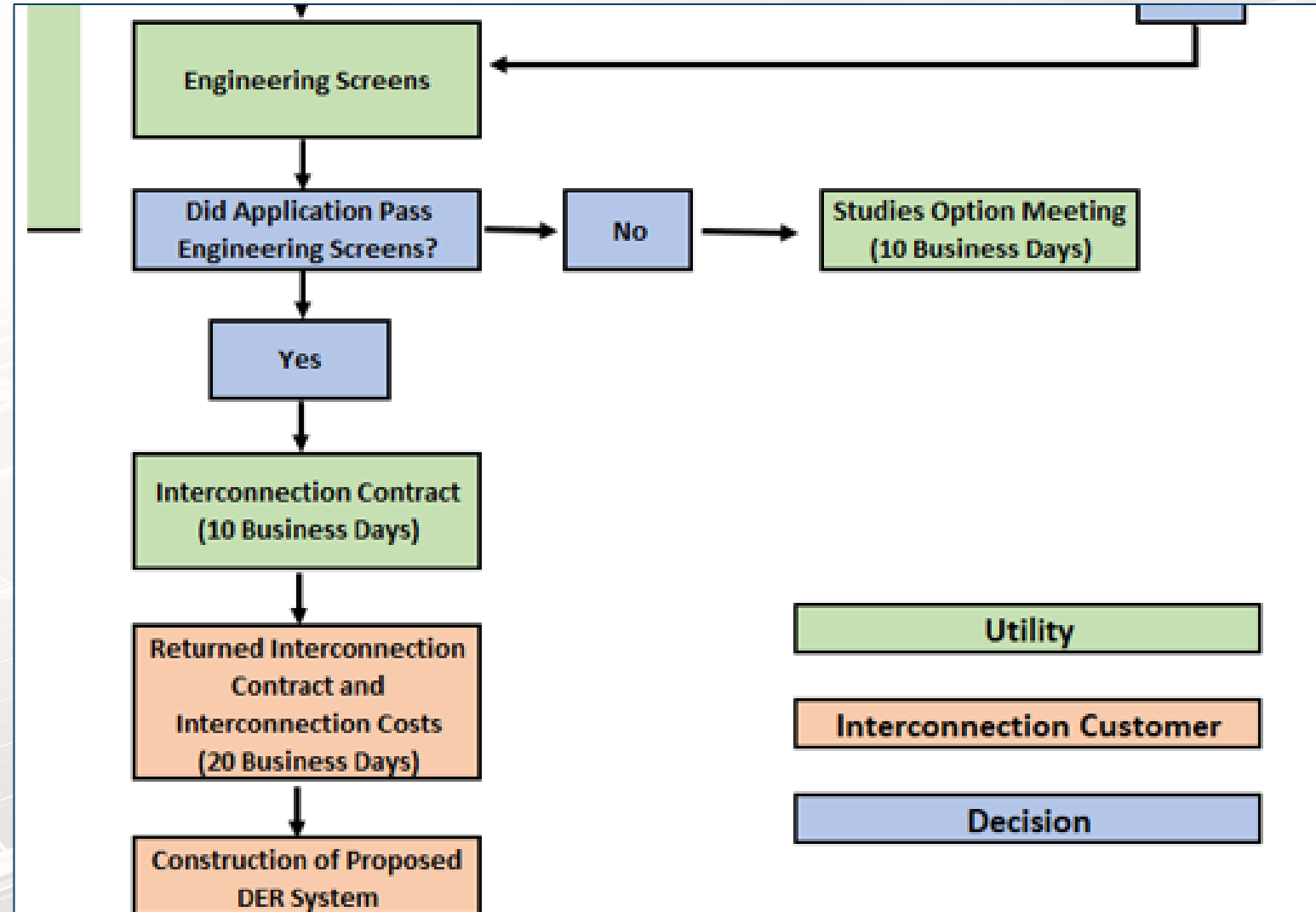
UTILITY

UTILITY: Lights On Cooperative And Power
LOCATION: 12-23-303
ACCOUNT #: 123456987
METER #: 987654321
WORK ORDER #: 20-0315
CONTACT: Members Services



DWG: DG 1-LINE
BY: BJR
DATE: 10/2023
SHEET: 1 OF 1
REV:

Passing Engineering Screens



Member's View



DER Interconnection Application Project Details

Simplified Application 10326

Status: **Interconnected**

Queue Date: **4/9/2024 6:55:09 PM**

Estimated Install Date: **4/20/2024**

DER = Distributed Energy Resource

DER Project Location

Lidgerwood, ND 58053

45.922, -97.238

Utility DER Coordinator

Equipment Contractor

,

DER System Owner

☒ SMS enabled

☒ Verified

Email Coordinator

Email Engineer(s)

No Pending Payment Requests or Documents to Sign

Submit a Change Request >>

Review Application Data >|

View or Upload Files >|

Payment History >|

Communication Log >|

Progress Tracker >|

Notification Preferences

Finding a Solar Vendor

- **Be a savvy shopper:**
 - Prices vary; get multiple quotes
 - Ask for references, years of experience, etc.
 - Check BBB.org and online customer reviews
 - Verify installer is qualified to work in Minnesota and is licensed
 - Clearly identify costs, payments, milestones, and completion timelines
 - Permits and inspections
 - If it sounds too good to be true, it most likely is.



Better Business Bureau®



CERTS

CLEAN ENERGY RESOURCE TEAMS

Minnesota Solar Interconnections





Questions?

Kristi Robinson, *Director of Operations*

STAR Energy Services LLC

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Phone 320.762.1697 | **Fax** 320.762.1479

Web www.star-energy.com