GROW SOLAR

WAUSHARA COUNTY

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COMMUNITY FOUNDATION
OF CENTRAL WISCONSIN

CAP
SERVICES

Coloma Public
Library

VILLAGE OF
COLOMA

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Today's Agenda

1. What is the Grow Solar Waushara County group buy program?
2. How does solar power work?
3. Solar options & considerations
4. Costs and cost-saving incentives
5. How to begin your solar journey

GOAL: Simplify a complex topic and make it easier and more affordable to go solar.


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Why are we here?
To lead in creating more sustainable communities by making solar simple and more affordable.
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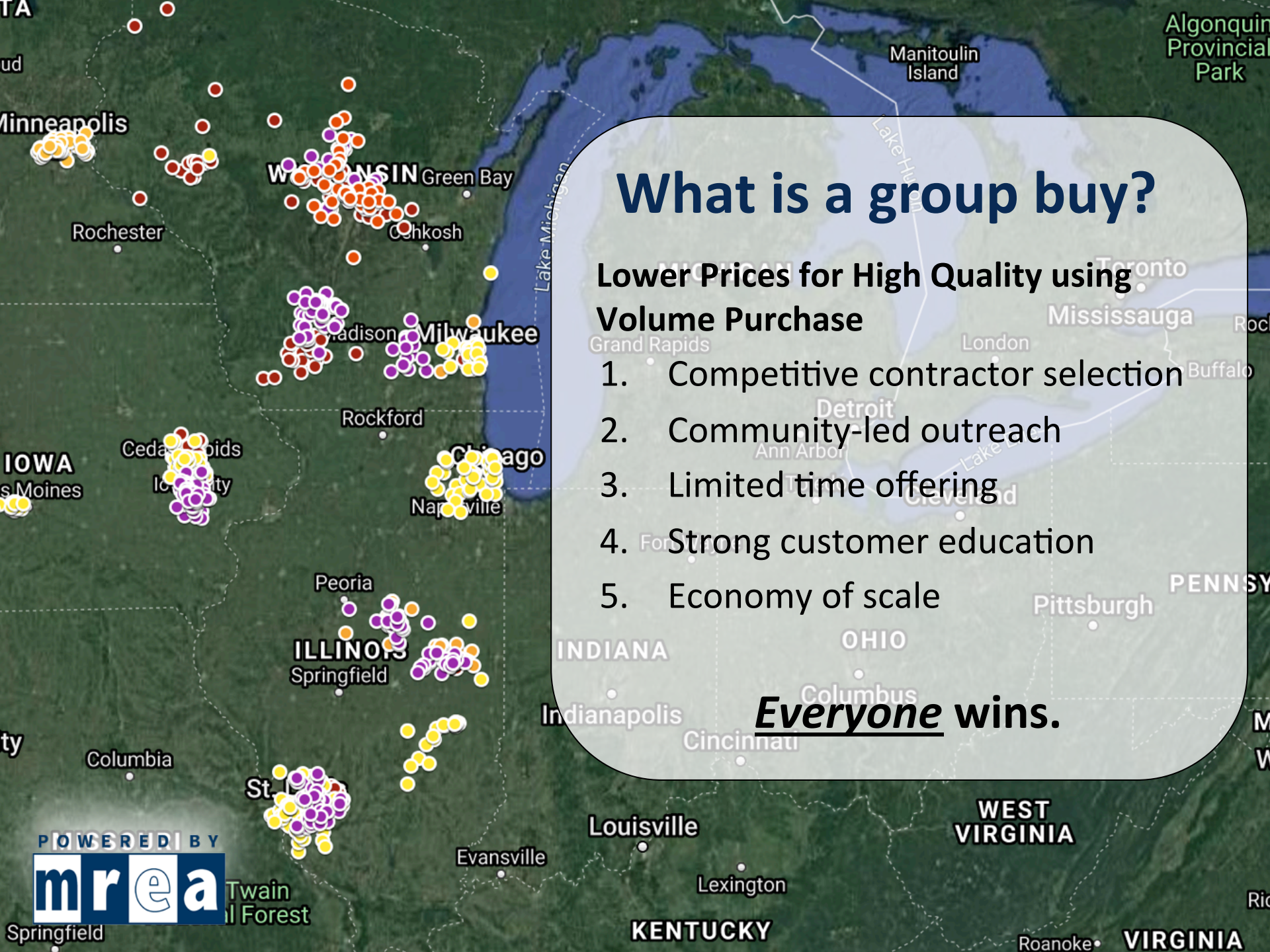

What is a group buy?

Lower Prices for High Quality using Volume Purchase

1. Competitive contractor selection
2. Community-led outreach
3. Limited time offering
4. Strong customer education
5. Economy of scale

Everyone **wins.**

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Selecting the Installer

- NABCEP Certification
- Must have all applicable licensure
- Lower than market rate prices for the group
- Must provide volume-based pricing structure
- History of quality installations

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Grow Solar Waushara County Group Buy

How it works

- Educational sessions throughout the summer
- Installer selected April 2021
- Open to all **Waushara County** property owners, businesses, farms, and nonprofits
- **Turnkey system**: program Pricing includes design, permitting, components, installation (all-in cost), and warranties (5 years on labor and 10-25 years on equipment)
- Financing available; American-made modules tier 1 offering

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Who is the MREA?

- Founded in 1990 with the first Energy Fair
- Promote renewable energy through educational courses in solar PV, solar thermal and small wind
- 42 Solar group buys, 1,946 properties, 14,000 kW of solar

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How Does Solar Work?

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What's a Kilowatt Hour (kWh) and a Kilowatt (kW)?

KILOWATT HOUR (kWh)
a unit of energy used or produced. This is what shows up on your bill.

KILOWATT (kW)
a measurement of capacity: how big your array is.

Every home's system size and energy use is different.

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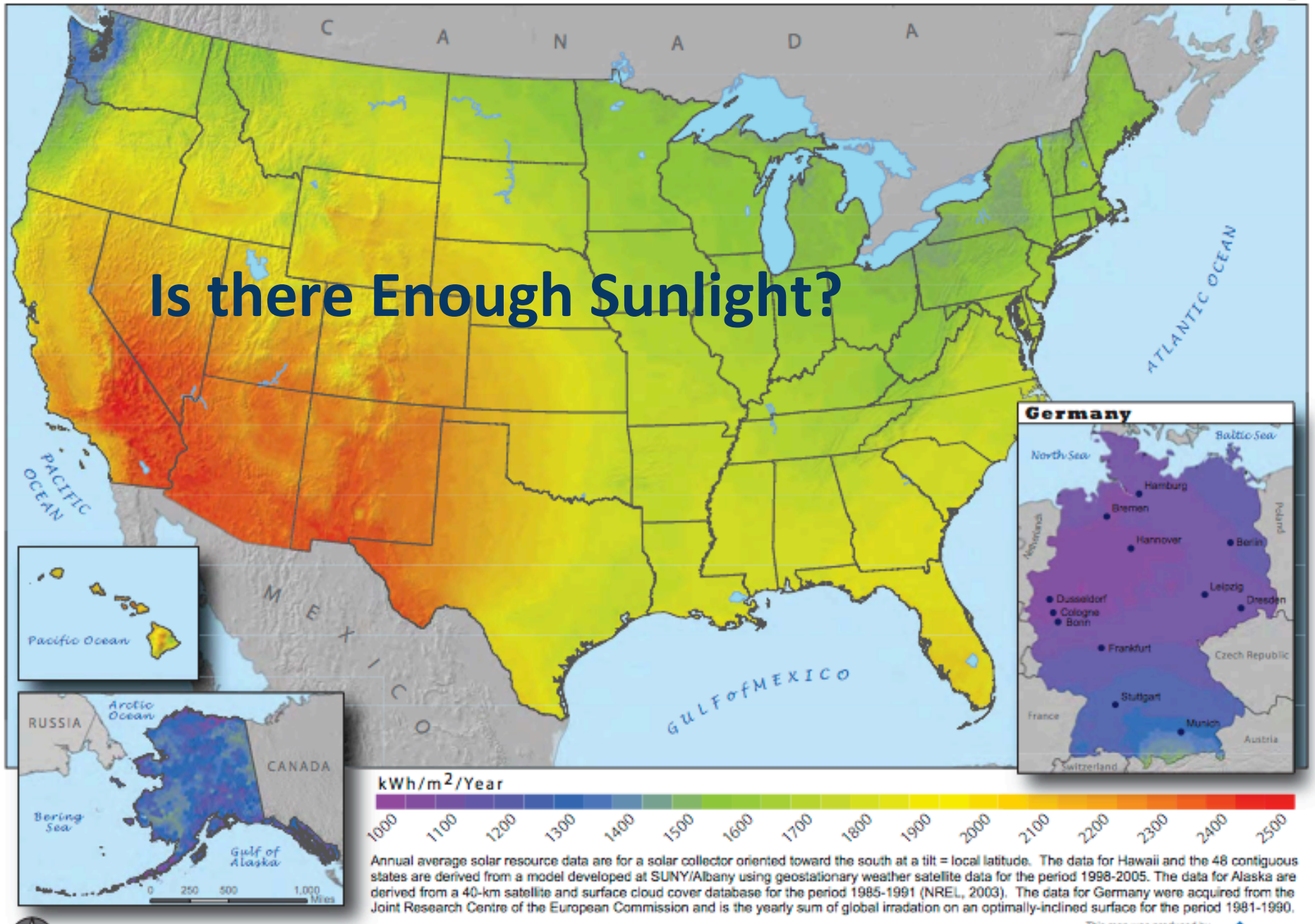
Photovoltaic Solar Resource : United States and Germany



Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude. The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005. The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003). The data for Germany were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990.

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy. May 30, 2008

NREL

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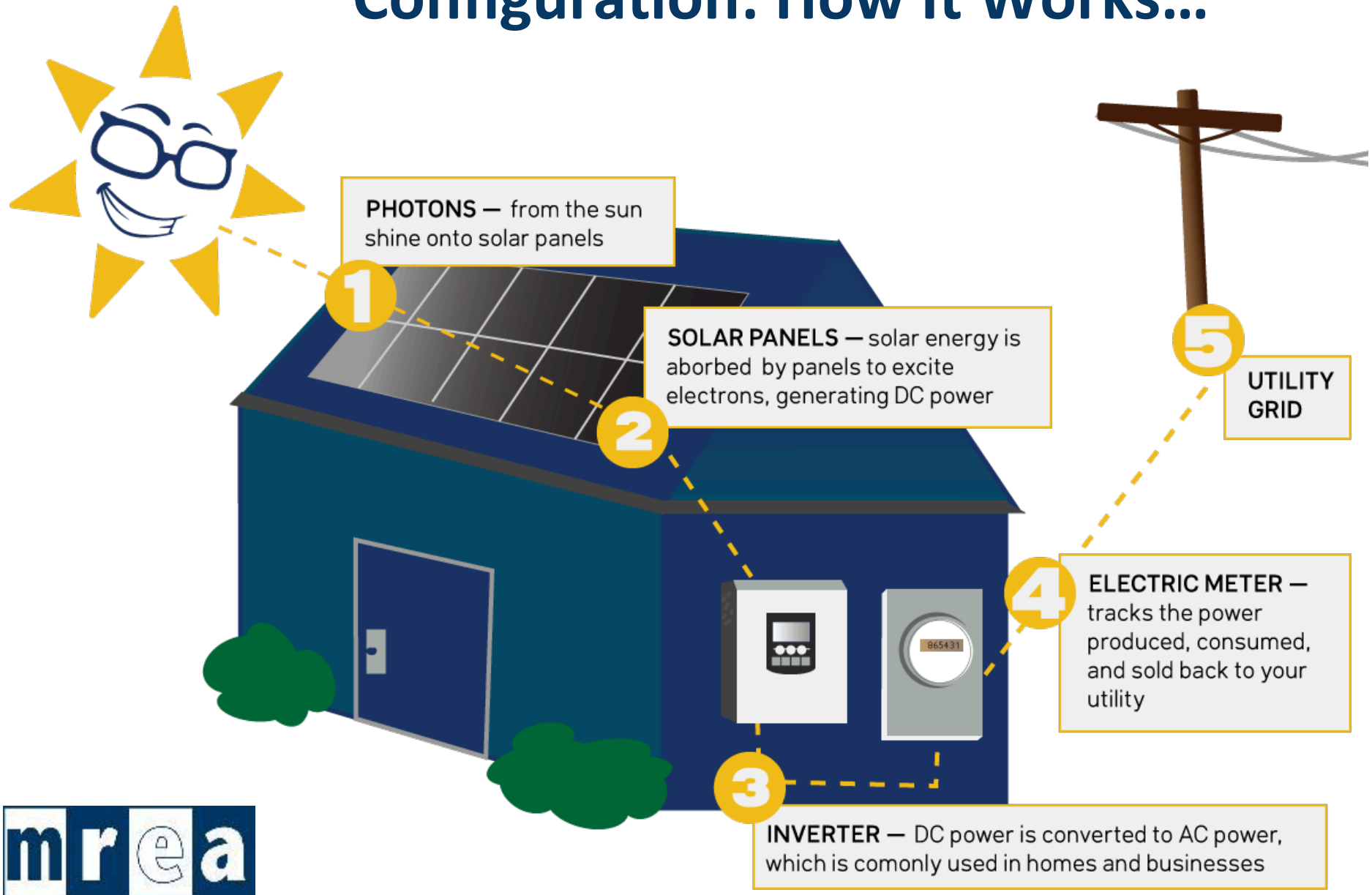
Configuration: How It Works…



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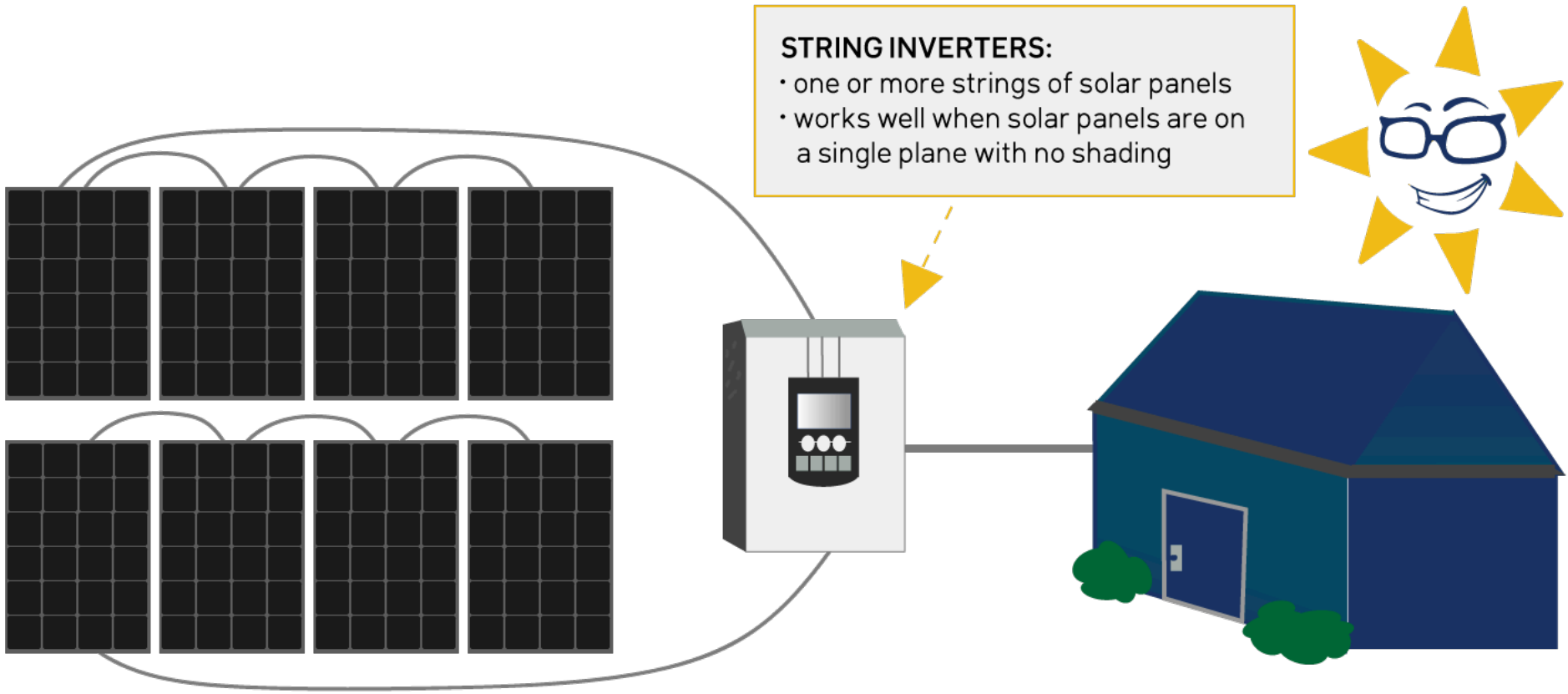
Inverter, the heart of the array.



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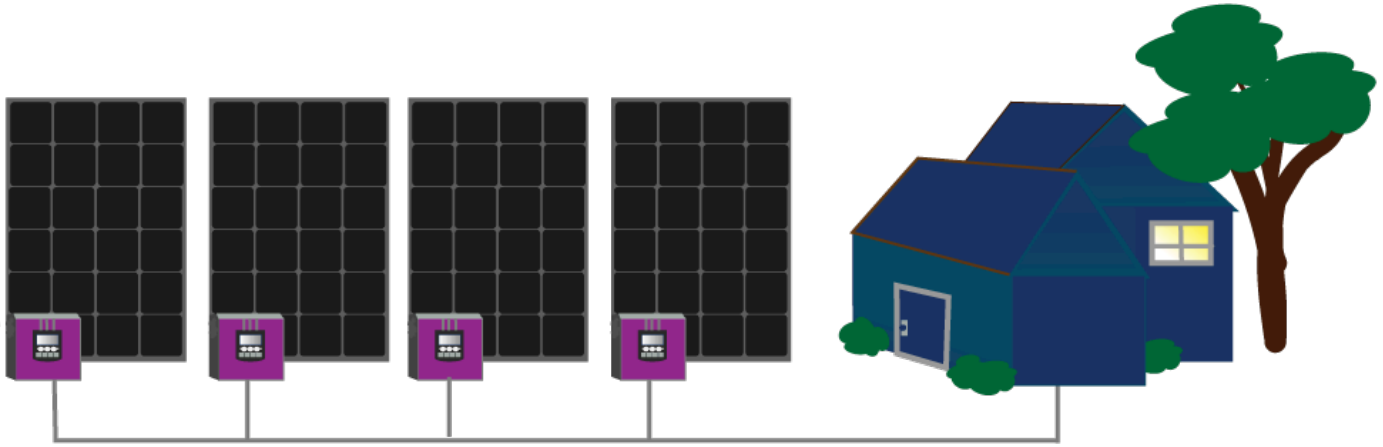
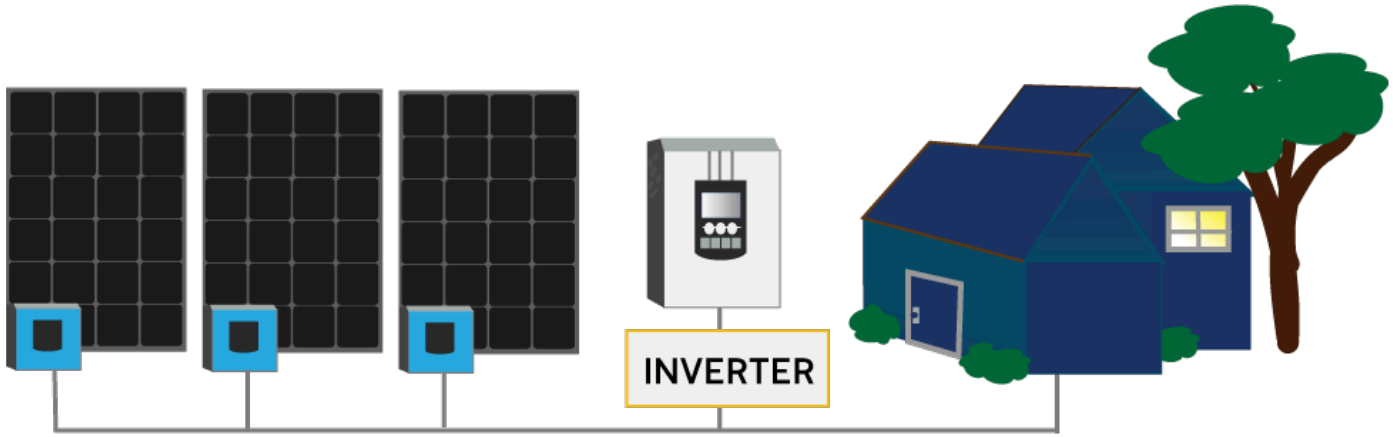
Inverter, the heart of the array.

MICRO INVERTERS:
- one microinverter per panel
- function well on roofs with shade or multiple panel orientations



POWER OPTIMIZERS:
- one optimizer per panel,plus central string inverter
- function well on roofs with shade or multiple panel orientations



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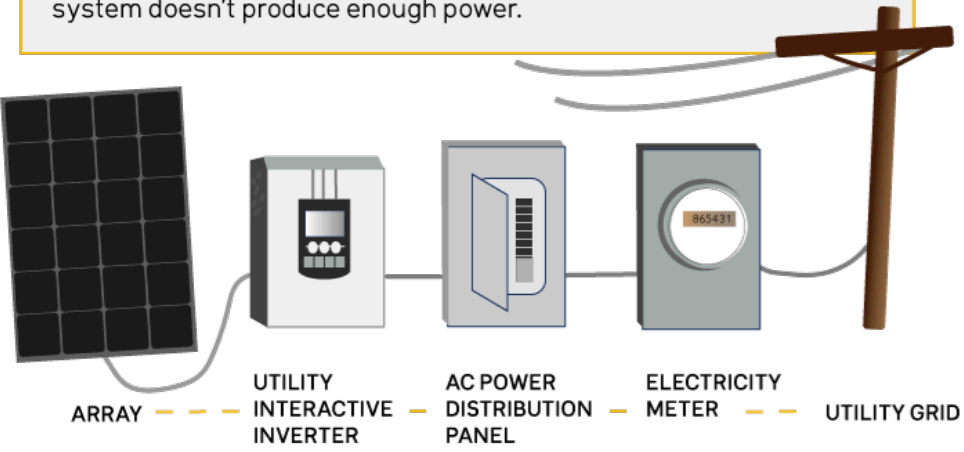
Grid-Tied VS. Off-Grid

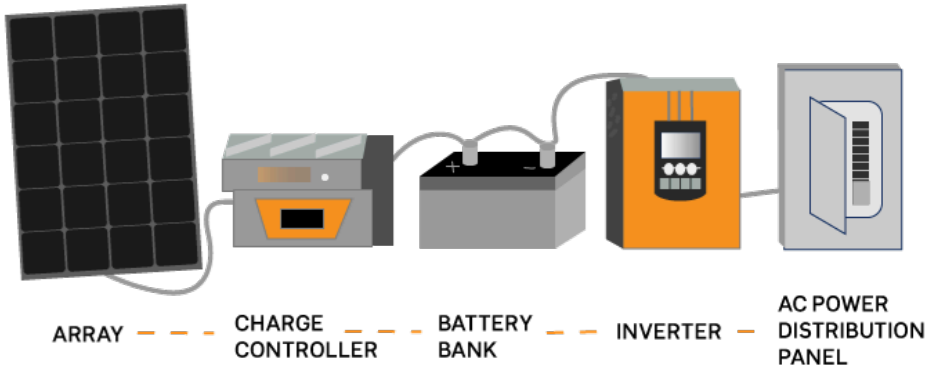
GRID-TIED DESIGN:
Excess electricity can be delivered to the utility grid, **AND** you can use electricity from the utility grid when your system doesn't produce enough power.

- Least Expensive Option
- Allows for Net Metering
- Grid Off = Solar Off



OFF-GRID DESIGN:
A stand-alone PV system that operates autonomously and supplies power to electrical loads indpendent of the utility grid.

- Requires Batteries & Charge Controller
- Not Connected to the Grid
- Grid Off = Solar On



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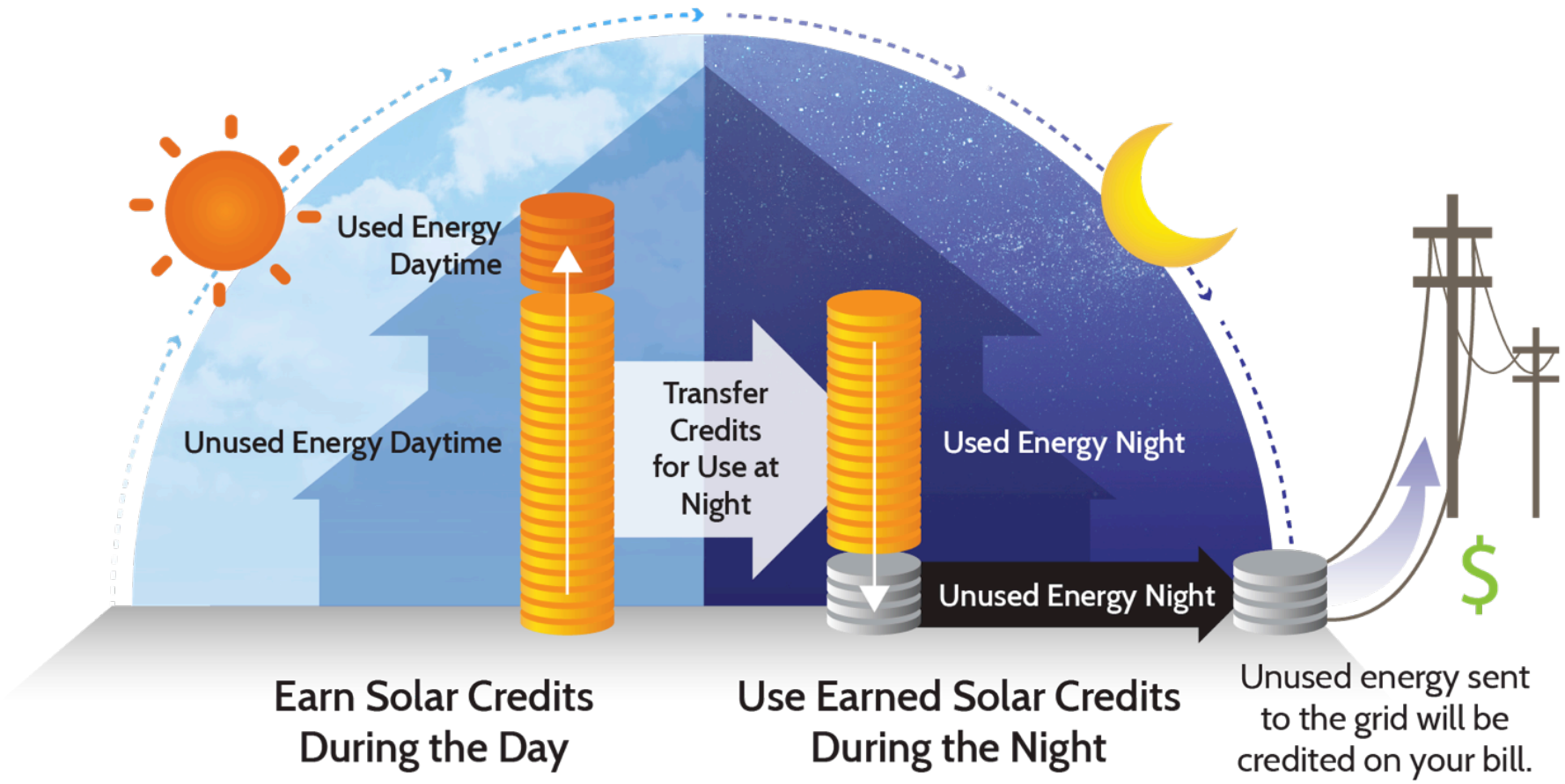
How Net Metering Works



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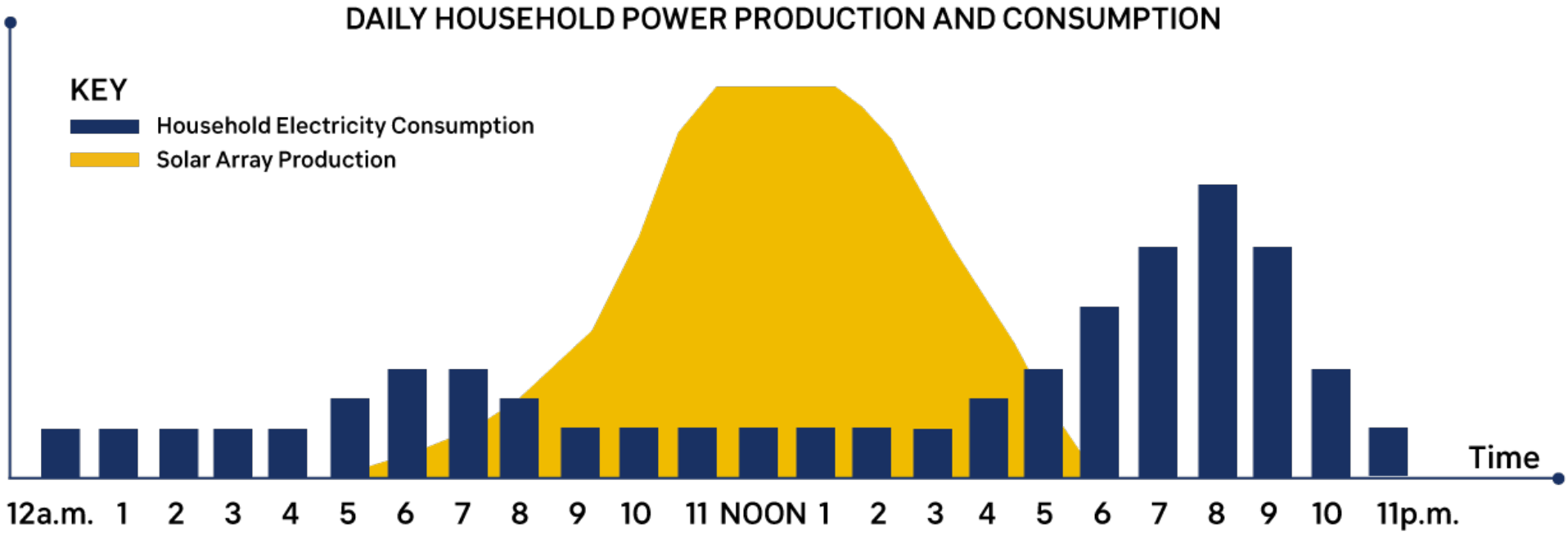
"A Day in the Life" of a Grid-Tied / Net Metered Home



— Net Metering is generally calculated on a monthly basis
— Net Metering policies vary based on utility

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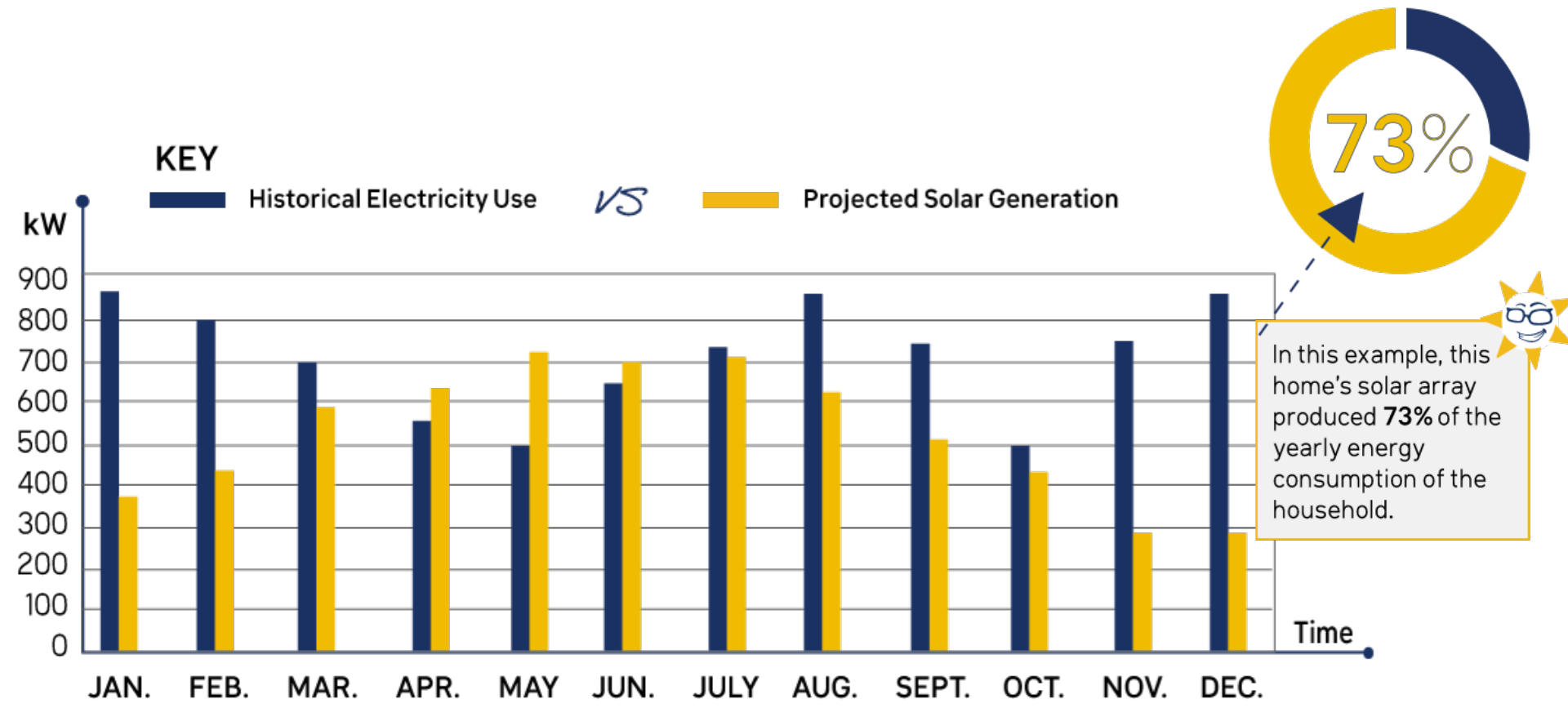
"A Year in the Life"
of a **Grid-Tied / Net Metered Home**



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Options & Considerations
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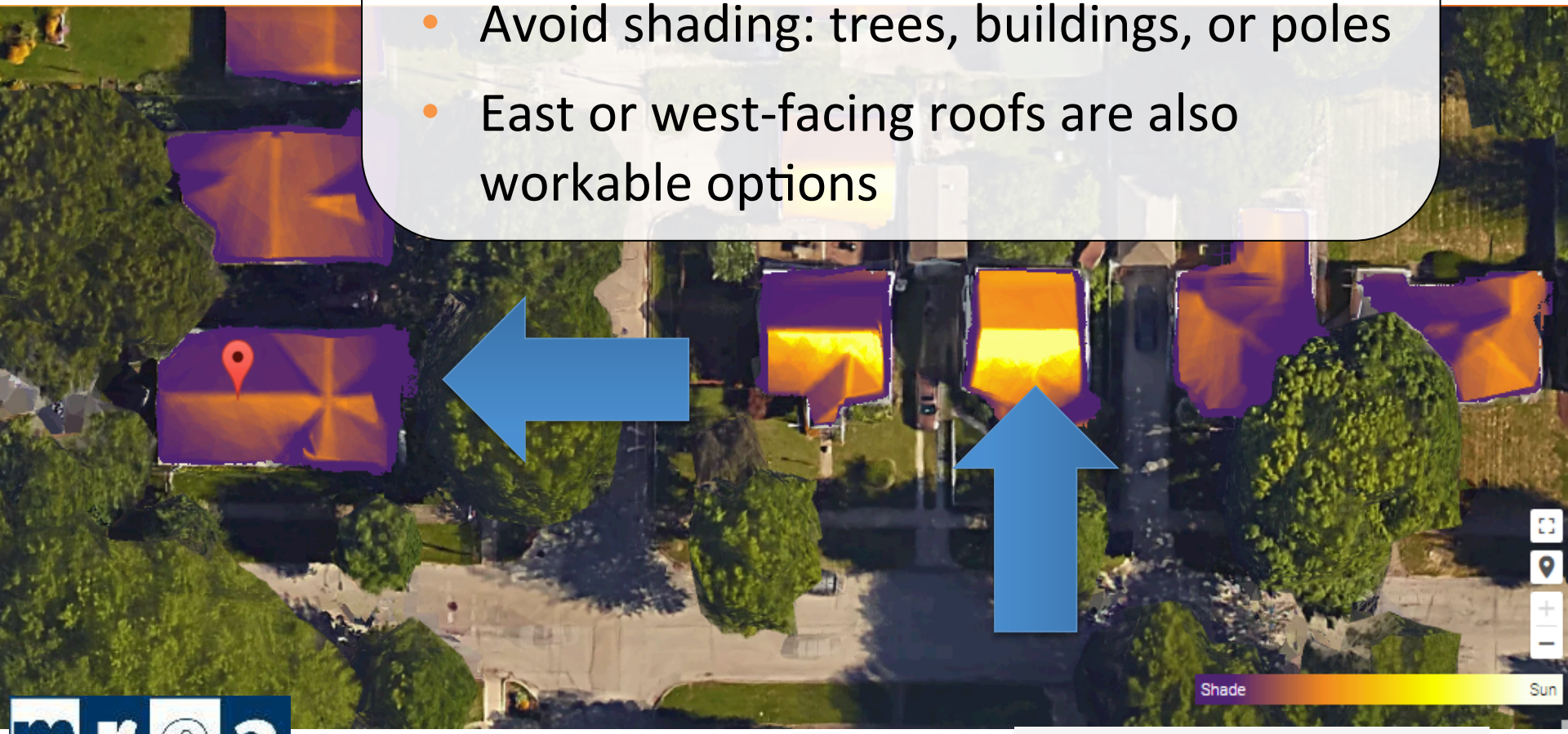
Location and Siting

- South-facing with 9am-3pm sun exposure is ideal
- Avoid shading: trees, buildings, or poles
- East or west-facing roofs are also workable options



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Mounting:
Roof Mounted Solar

- Roof is most common
- Need good solar window
  - South is ideal, but E/W only reduce ~20%
  - Trees can partially shade

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Mounting: Ground Mount

- Good for larger arrays and for properties where house roof is shaded
- Require large un-shaded area
- Take advantage of best solar window
- Anchor to ground mounts
- Easy to remove snow, dust
- Static, but may have a summer/winter adjustment

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Considerations

- System size and design
- Module type
- Inverter type
- Slope, height of roof
- Complexity of electrical interconnection
- Age & type of roof
- Multiple PV arrays

- Need good solar "window"
  - South is ideal, but East + West only reduces production ~20%
- Environment
  - Shading
  - Snow / Hail
  - Wind Loading
  - Squirrels

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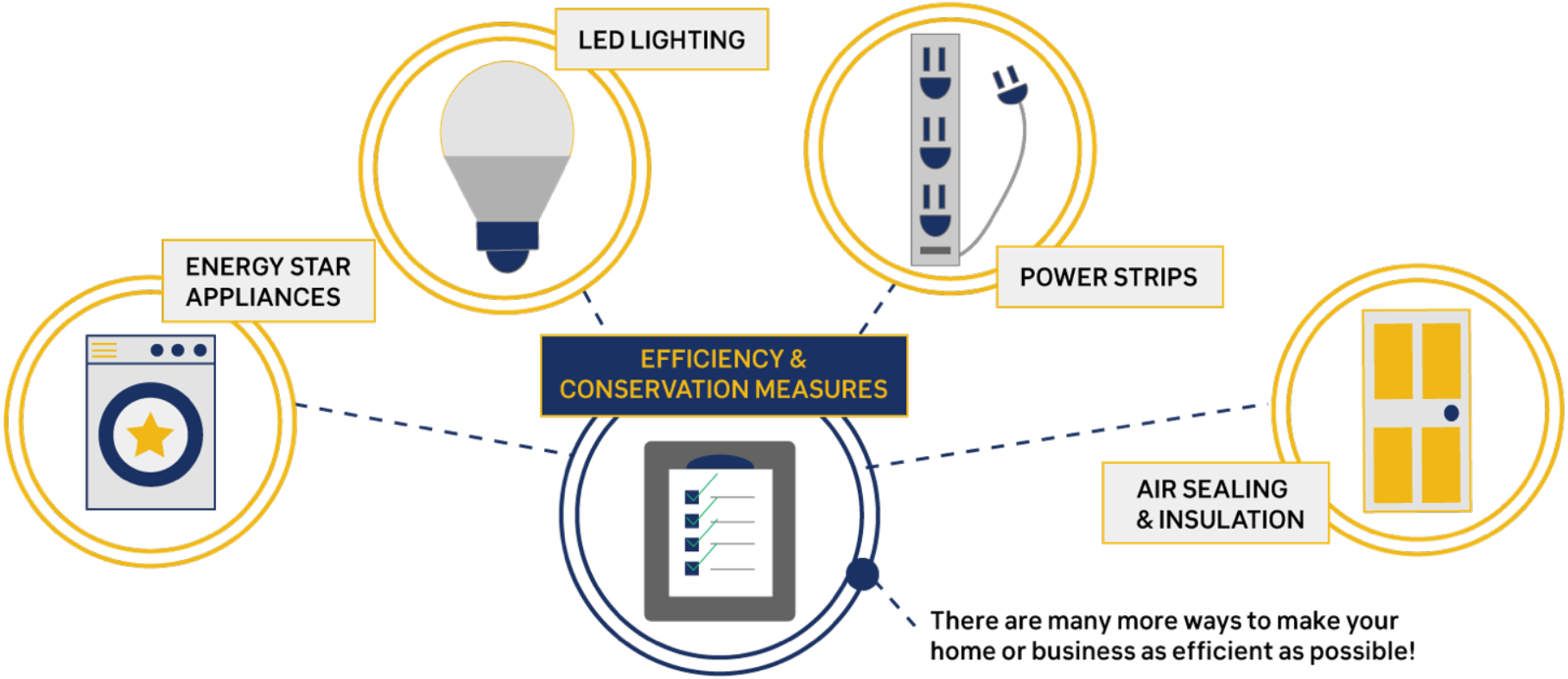
Energy Efficiency

The cheapest kWh is the one that's never used.



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Is my home well-suited for solar?

- ❑ Do I have a south facing roof?
- ❑ Are there shade issues?
- ❑ When do I anticipate re-roofing?
- ❑ Is my roof structurally sound?
- ❑ Is my home energy efficient?

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Solar Costs

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Every Home Is Different

Your PV system will be tailor-made to fit your needs.

Pricing Varies by Site and Needs:

- System Design and Size
- Age and Type of Roof
- Panel Type
- Inverter Type
- Height and Pitch of Roof
- Complexity of Electrical Interconnection
- Multiple PV Arrays
- Energy Storage
- Transformer & Electric Service Upgrade

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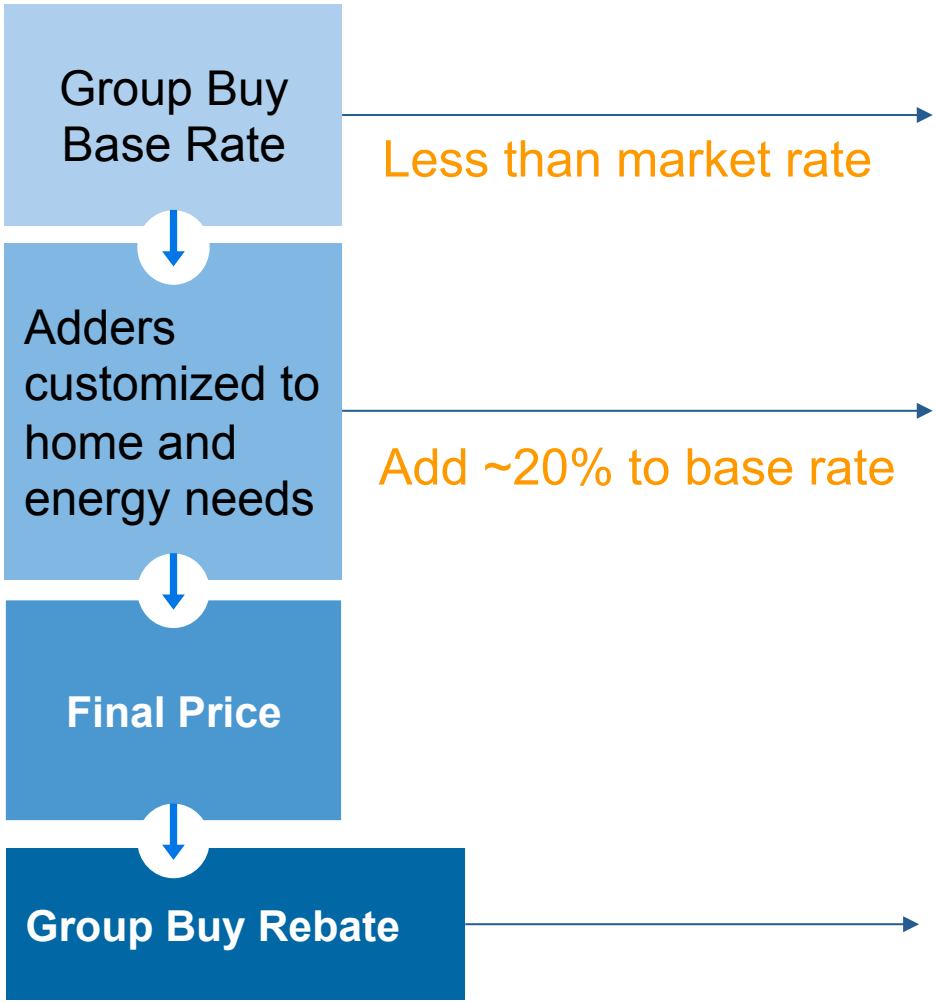
Pricing Structure



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Case Study: 6.6kW System

Estimated Year 1 Production = 7,054 kWh

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6.6 KW Residential System

Grow Solar Price

6.6 kW Central Wisconsin Residential Roof Array	
Base Cost (**$2.62/Watt**)	$17,292
Estimated Adders	$208
Focus on Energy	- $500
26% Federal Tax Credit (Post-Focus rebate)	-$4,290
Max group buy savings (~4%)	-$990
Net Cost	**$11,720**

Market Price

6.6 KW Market Price Residential Roof Array	
Base Cost (**$3.06/ Watt**)	$20,196
Estimated Adders	$208
Focus on Energy	- $500
26% Federal Tax Credit (Post-Focus rebate)	-$5,045
Group buy savings	$0
Net Cost	**$14,859**

NORTHWIND SOLAR
ESTD 2007
WORKER OWNED

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Case Study: 6.4kW System

Estimated Year 1 Production = 8,100 kWh

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Photo Credit: Solar Connection

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Case Study

6.4 kW DC Residential Roof System	
Install Cost **($3.30/Watt)**	$21,120
Focus on Energy (WI only)	($500)
Max Group Buy Discount	($1,280)
26% Federal Tax Credit	($5,028)
Net Cost	**$14,312**

Simple Payback: 13.9 yrs

Estimated Year 1 Solar production = 8,100 kWh
Assumes Avg kWh rate from utility = $0.125/kWh

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Focus on Energy Rebate (WI only)

Solar Electric (PV) System	Incentive
Residential Single Family Homes	$500 per installation
Business **Up to 5 kW**	$200 per kW, up to $1,000
Business **5 - 10 kW**	$1,000 + $150 per kW above 5 kW, up to $1,750
Business **10 - 100 kW**	$1750 + $125 per kW above 10 kW, up to $13,000

- Additional eligibility requirements and status of remaining funds can be tracked at https://focusonenergy.com/residential/renewable-energy

Residential & Commercial Renewable Energy Tax Credit (Federal)

- Tax credit of **26%** on qualified expenditures
  - Includes labor costs, system installation, interconnection wiring
  - Does not include new roof unless roof reinforcement is necessary to support the solar panels
- No maximum credit
- Res: The home must be owned by the taxpayer but does not have to serve as the principal residence
- Goes away for residential in 2024 (remains at 10% for commercial)

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Home Values

Zillow has released a report stating that homes with solar panels sell for 4.1% more than their generation-naked counterparts.

Zillow Economic Research

A study by the National Renewable Energy Laboratory found that homes with solar sold faster and for more than equivalent non-solar homes.

NREL (National Renewable Energy Laboratory)

In a study across six states, Berkeley National Lab found that home buyers will pay a premium for solar homes.

Lawrence Berkeley National Laboratory

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Next Steps
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CLEAN ENERGY
CREDIT UNION

Financing Solar

Clean Energy Credit Union

- 100% clean energy loans - first of its kind launched 2017
- Not for profit
- **Choose one or both of these loan types:**
  - 12-18 month loan for 26% of system cost (covers the 26% Federal Tax Credit)
  - 12-year fixed rate loan up to the remaining 74% solar electric system cost

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CAP SERVICES

Financing Home Repair and Solar

CAP Services Inc

- Nonprofit community action agency

- **Financing for income eligible households**
  - Up to 15 year term loans at 5% fixed rate for solar projects
  - Home repair/rehabilitation loans deferred up to 30 years as long as the property is borrower's primary residence

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Environmental Benefits

Over the life of a 5 kW system, the electricity produced is equivalent to 163 tons of carbon dioxide (CO_2).

That's the CO_2 equivalent of any one of these:

Planting 3,798 trees.

Driving reduced by 326,000 auto miles, or 16,626 gallons of gasoline.

Recycling 515 tons of waste instead of sending it to landfill.

158,831 pounds (79.4 tons) of coal burned.

and you will help avoid the use of up to **3,975,500 gallons of water by Thermoelectric Powerplants.**

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Become a member of MREA!

Your support as a member makes a long lasting impact.

Everyone who goes solar through the program gets a **FREE Basic Family Membership!**

You help sustain and grow our many programs, including:

- Grow Solar Group Buy Program
- Solar on Schools Initiative
- Solar Professional Training
- Solar Ready Wisconsin Workforce Development Project
- Solar Corps Internship Program
- Rise Up Midwest, **and more!**

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www.midwestrenew.org/membership

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