Welcome to

GROW SOLAR

JEFFERSON/WAUKESHA

Solar Power Hour!

We will begin our presentation shortly, starting with a brief introduction to zoom.

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BETTER BEFORE BIGGER

HEART OF THE CITY

WAUKESHA COUNTY

GREEN TEAM

Community powered. Sustainability driven.

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Thank you to our Co-hosts!

WAUKESHA COUNTY GREEN TEAM
Community powered. Sustainability driven.

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HEART OF THE CITY

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Wisconsin Sustainable Business Council

www.wisconsinsustainability.com

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City of Waukesha
Looking Back - Reaching Forward

www.waukesha-wi.gov

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U.S. GREEN BUILDING COUNCIL

www.usgbc.org/chapters/usgbc-wisconsin

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Sustainability Fair

Discover. Connect. Engage.

Saturday
August 28th, 2021
9:30am to 3:00pm
at the Retzer Nature Center

Join us!
Activities for families, kids and adults of all ages!

More information at:
www.WaukeshaCountyGreenTeam.org

Waukesha County Parks and Land Use

Plowshare Fair Trade Marketplace & Education for Peace

WAUKESHA COUNTY GREEN TEAM

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Today's Agenda

1. What is the Grow Solar Jefferson and Waukesha Counties 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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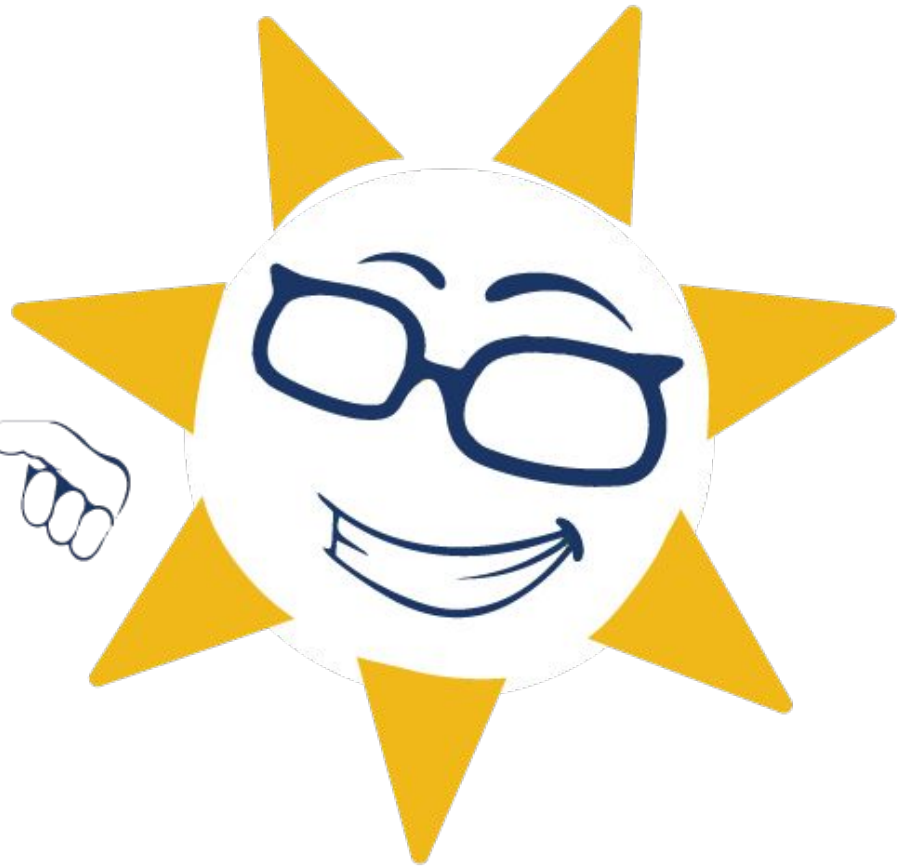
It's time for a poll!



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Why are we here?

There are problems with the way you currently buy electricity.

1. Unpredictable rate increases
2. Not building equity
3. Pollution

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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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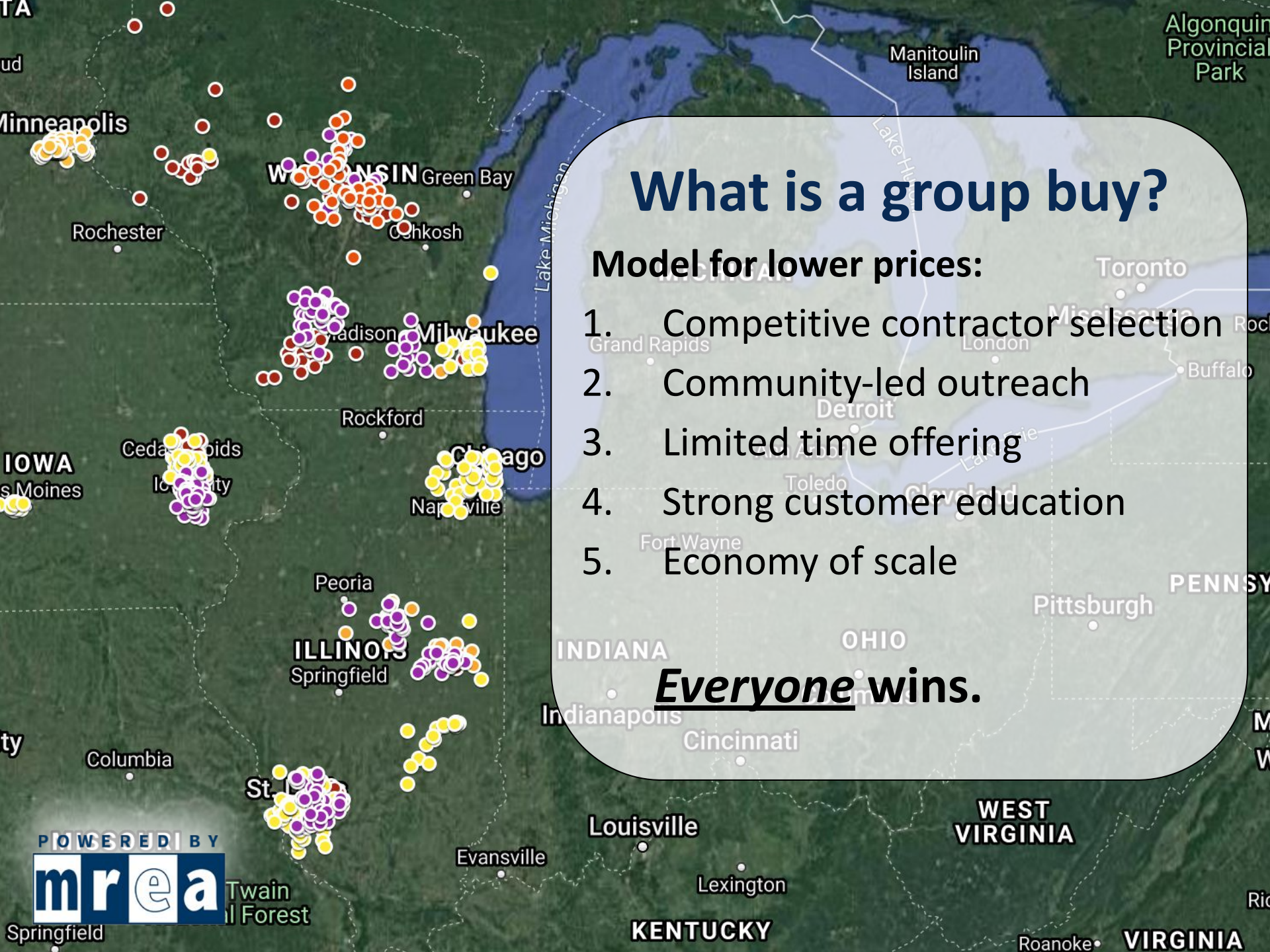

What is a group buy?

Model for lower prices:

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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Grow Solar Jefferson + Waukesha Group Buy

- 12 Educational sessions throughout the summer
- Open to all **Jefferson & Waukesha** residents, businesses, farms, and nonprofits
- Start with a free, no-obligation site assessment
- **Turnkey system**: program Pricing includes design, permitting, components, installation (all-in cost), and warranties
- 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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INSTALLER PROFILE

- **All Energy Solar** will custom design your solar array based on your last 12 months of kWh consumption on your electric utility bill. All Energy Solar will also submit the application to interconnect to the specific utility company.
- All Energy Solar will construct your solar array in conjunction with NABCEP certified designers/installers. No subcontractors will be utilized on any projects in this group buy.
- Your solar array will be connected to your home, business or farm, by All Energy Solars Electricians.
- All Energy Solar Solar will submit your Focus on Energy incentive (Federal Tax Credit is simpler)
- This process is a turnkey solution for everyone.

Expertise:

- Our team consists of NABCEP certified technical sales, CAD designers, project managers, NABCEP certified solar installers, numerous master and journeyman electricians and LEED certified architects.
- Our team supports >5,250 solar customers across >60MW or projects, as of Q1 2021
- All Energy Solar was incorporated in 2010

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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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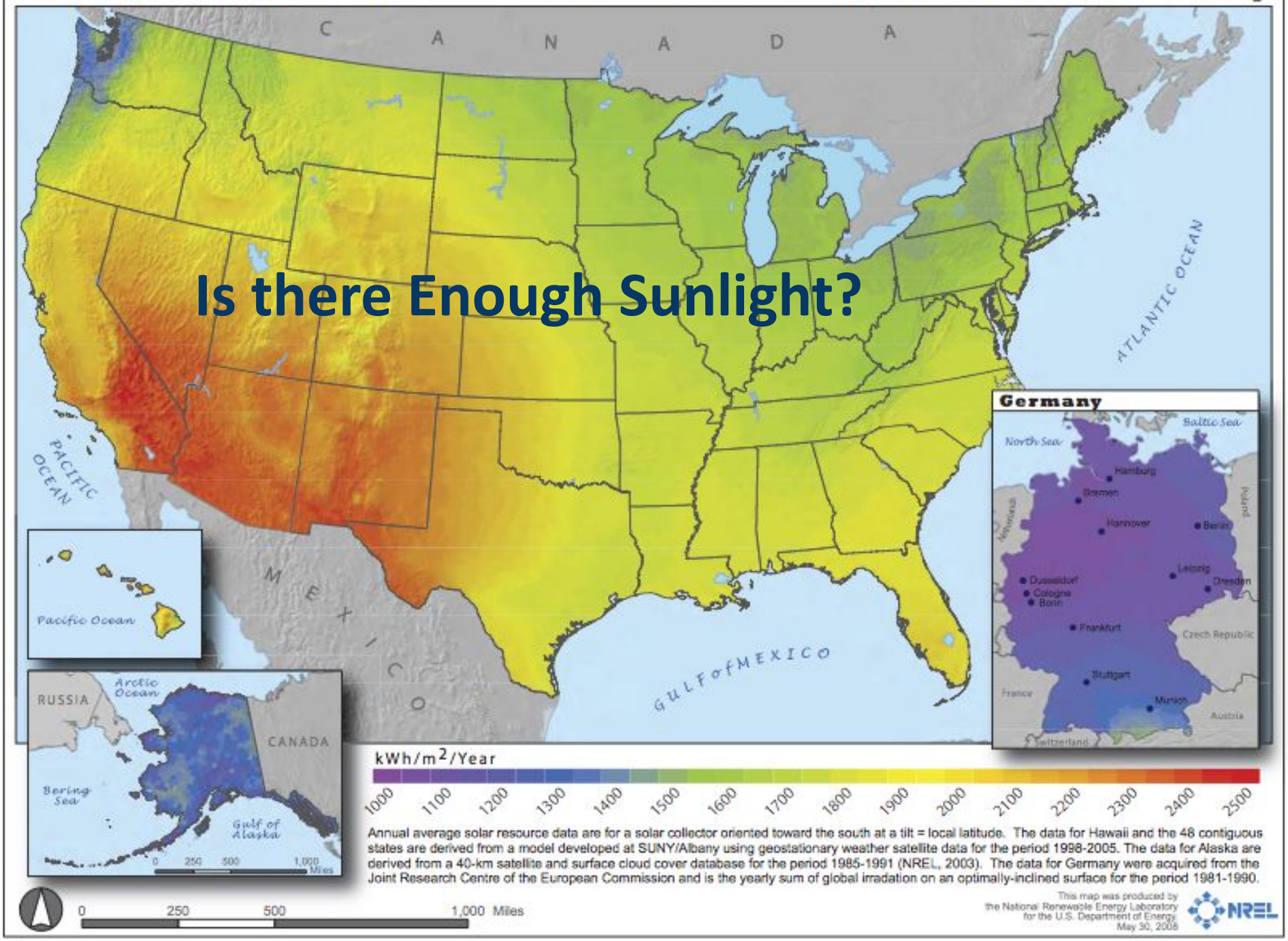
Photovoltaic Solar Resource : United States and Germany



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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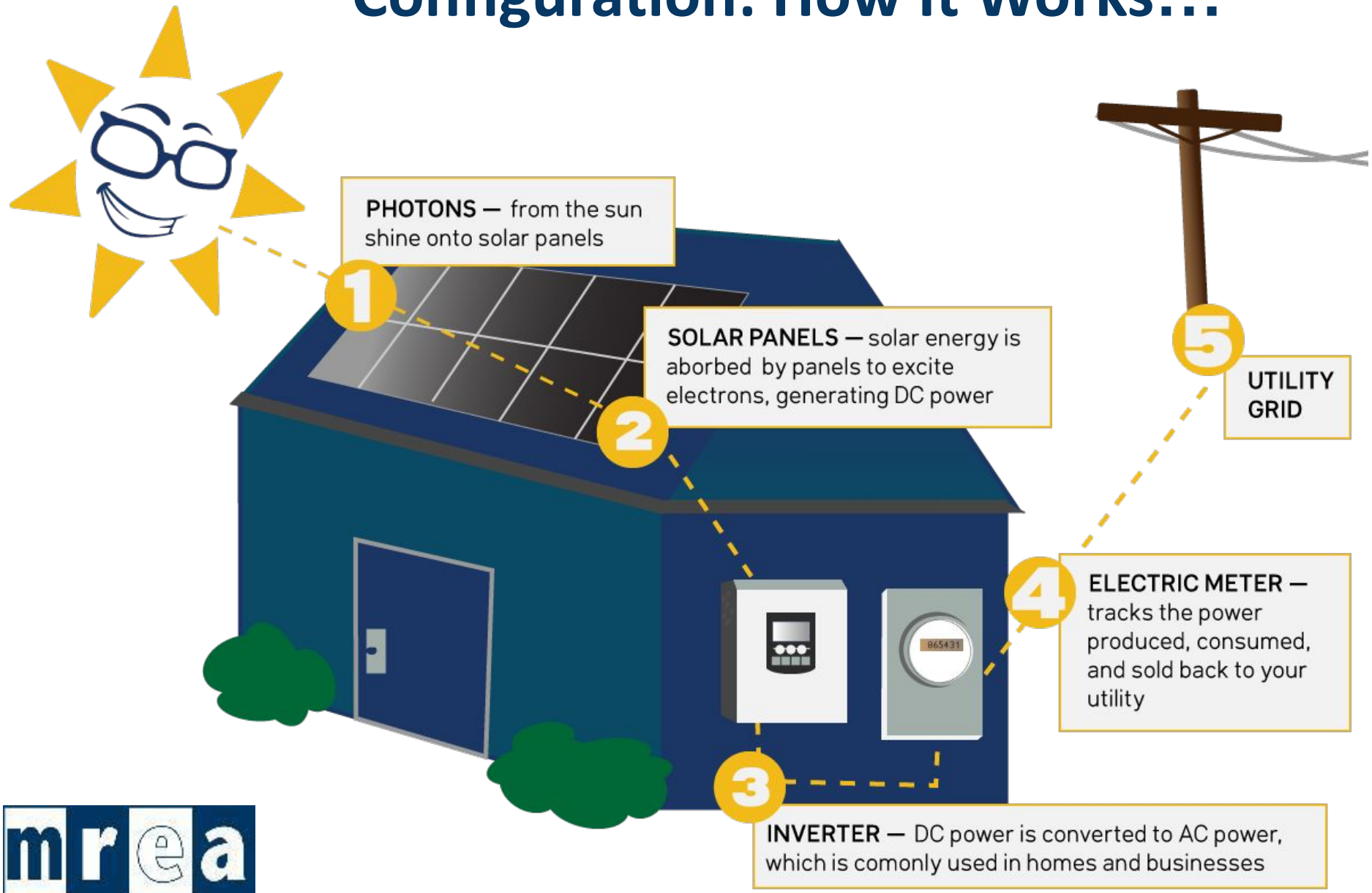
Configuration: How It Works…



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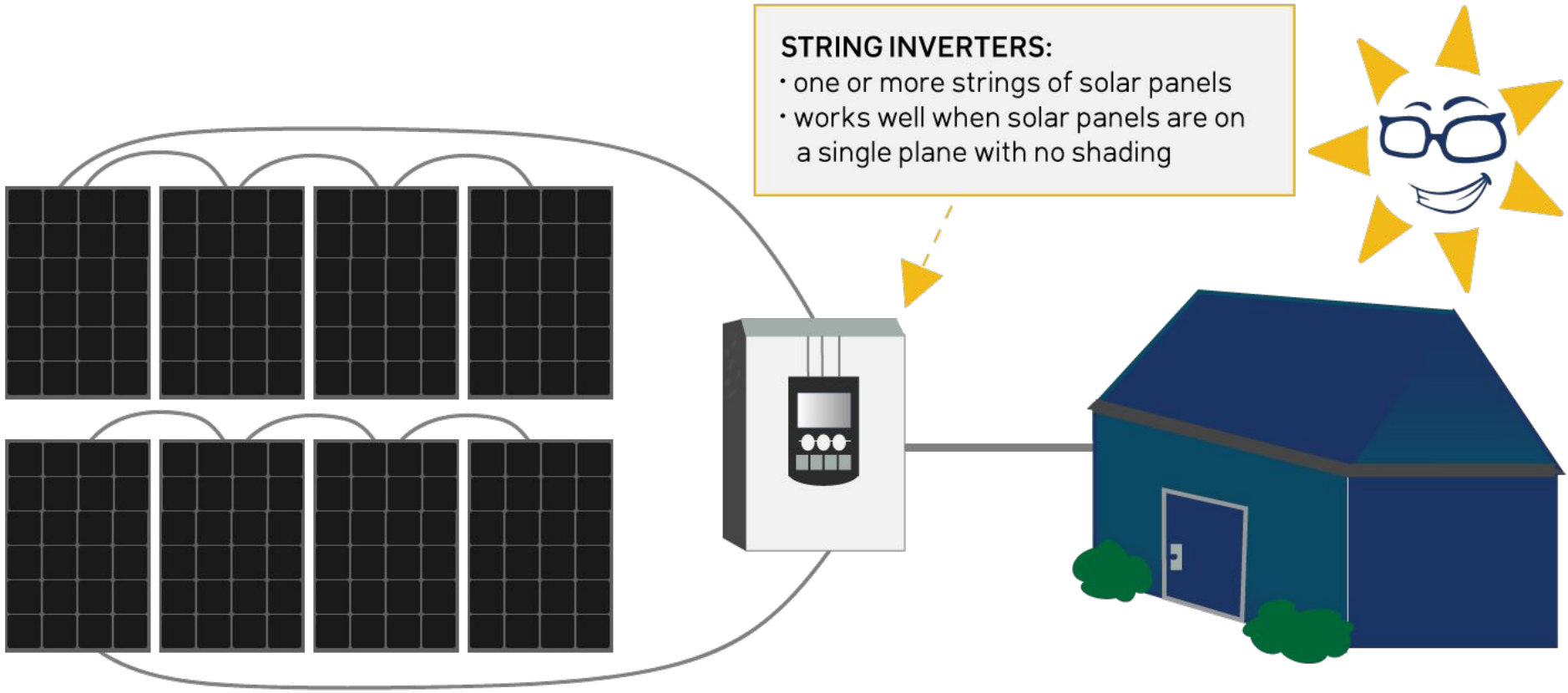
Inverter, the heart of the array.



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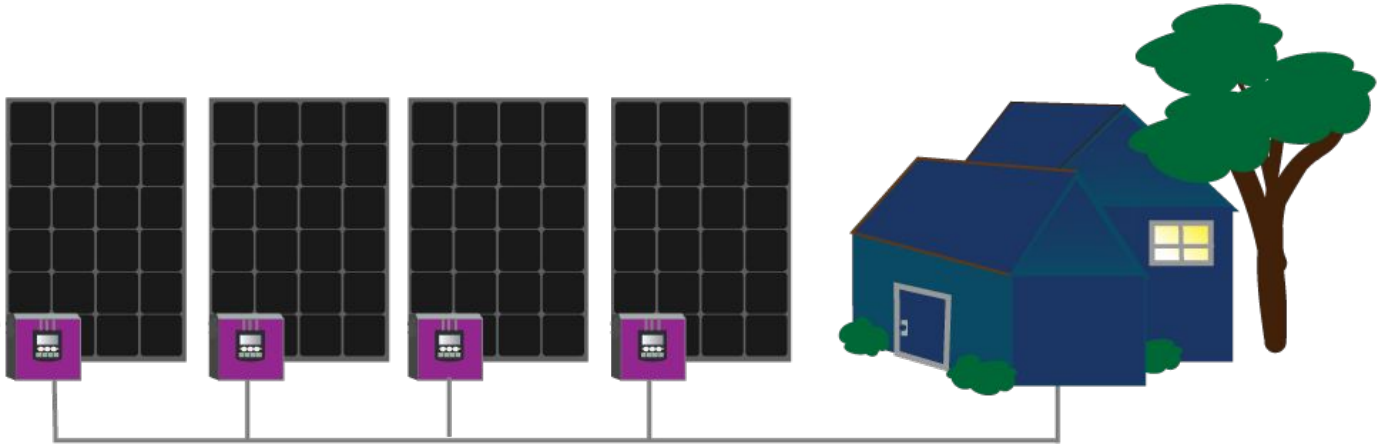
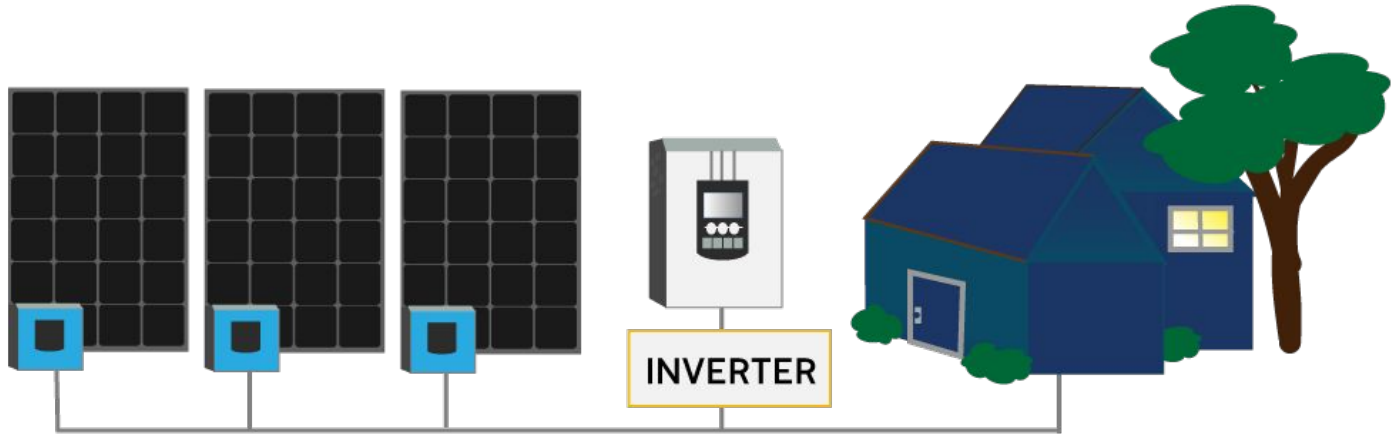
Inverter, the heart of the array.

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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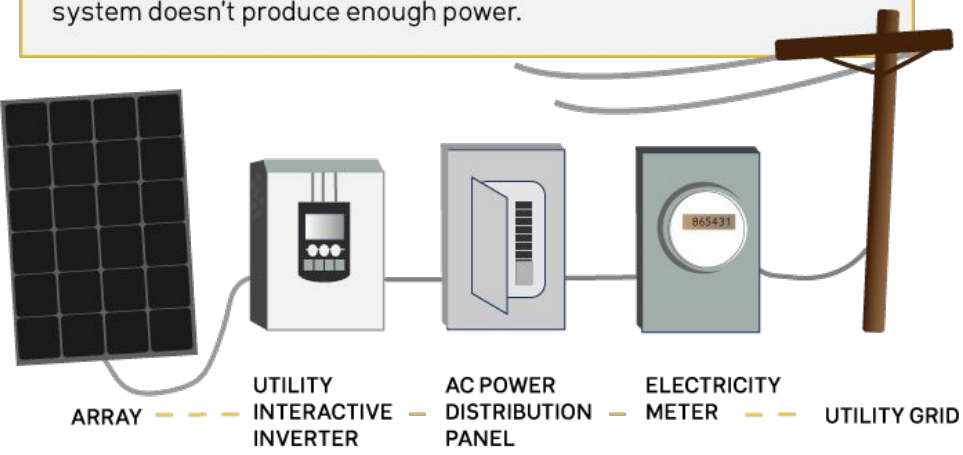
Grid-Tied VS. Off-Grid

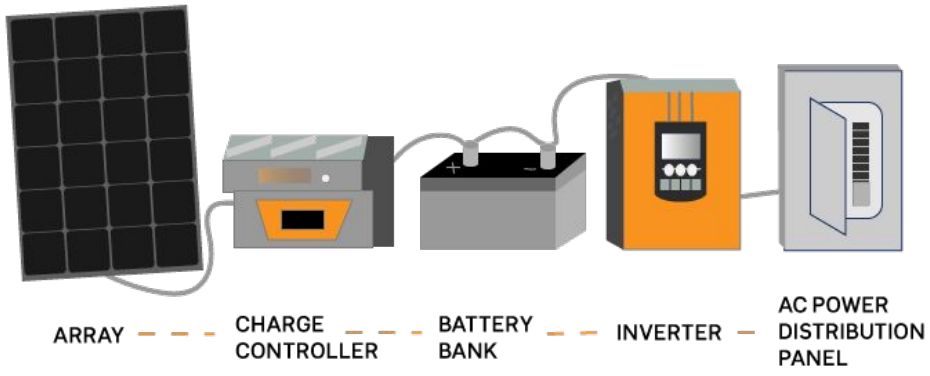
GRID-TIED DESIGN:
Excess electricity can be delivered to the utility grid, **AND** you can use electricity from the utility grid when your system doesn't produce enough power.

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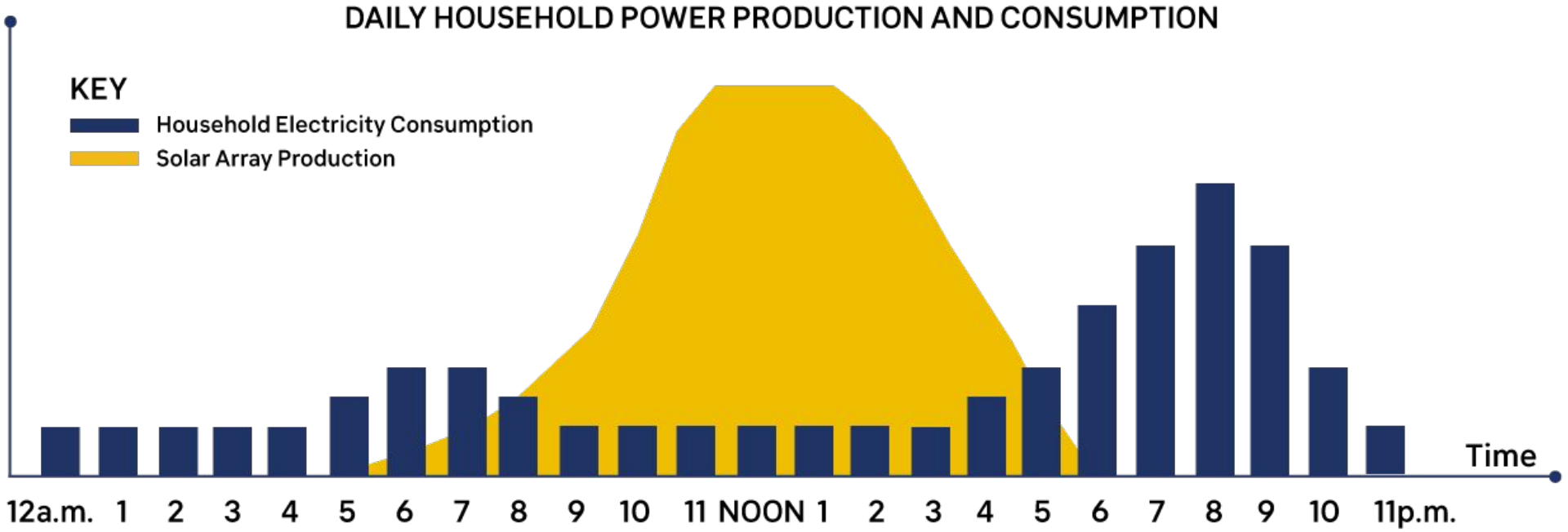
"A Day in the Life" of a Grid-Tied / Net Metered Home



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

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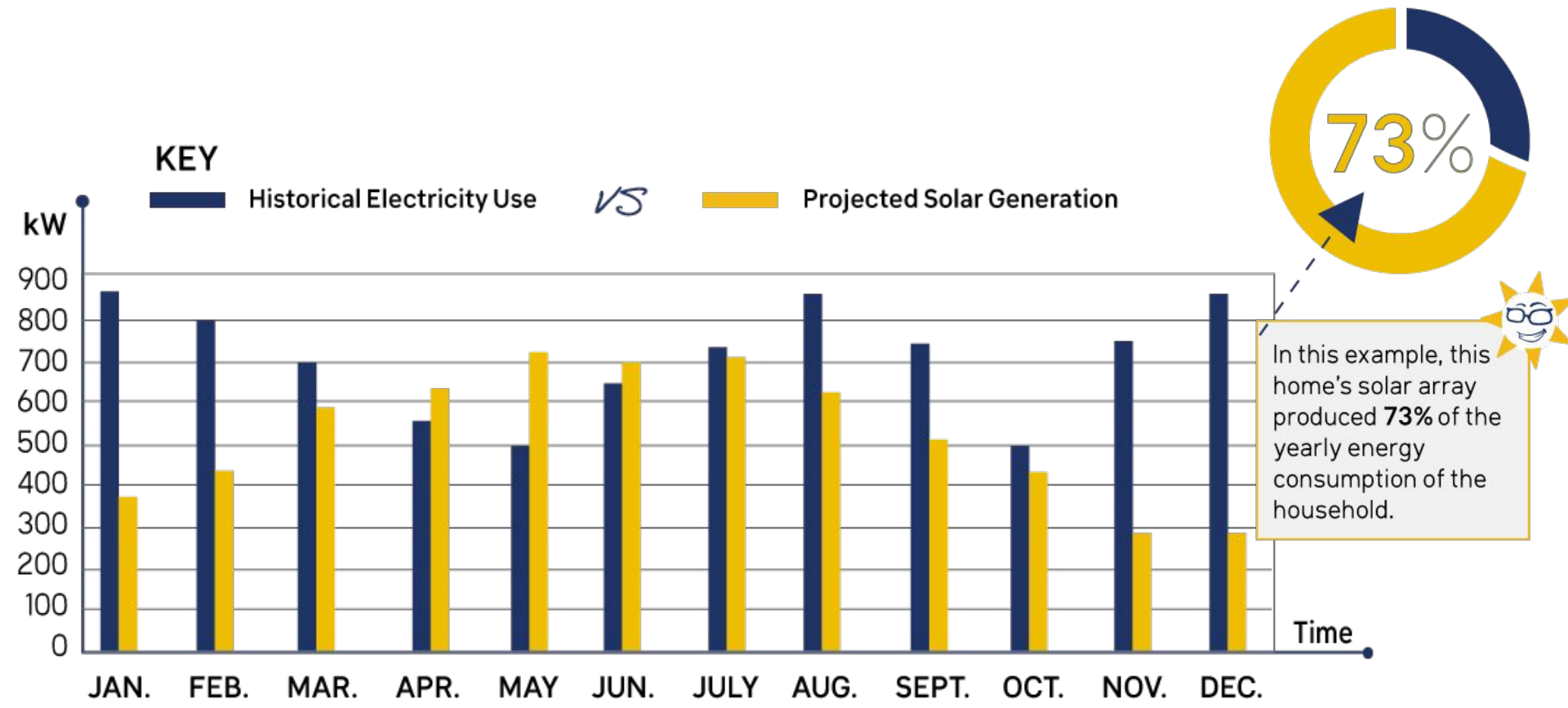
"A Year in the Life"
of a **Grid-Tied / Net Metered Home**



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Options & Considerations
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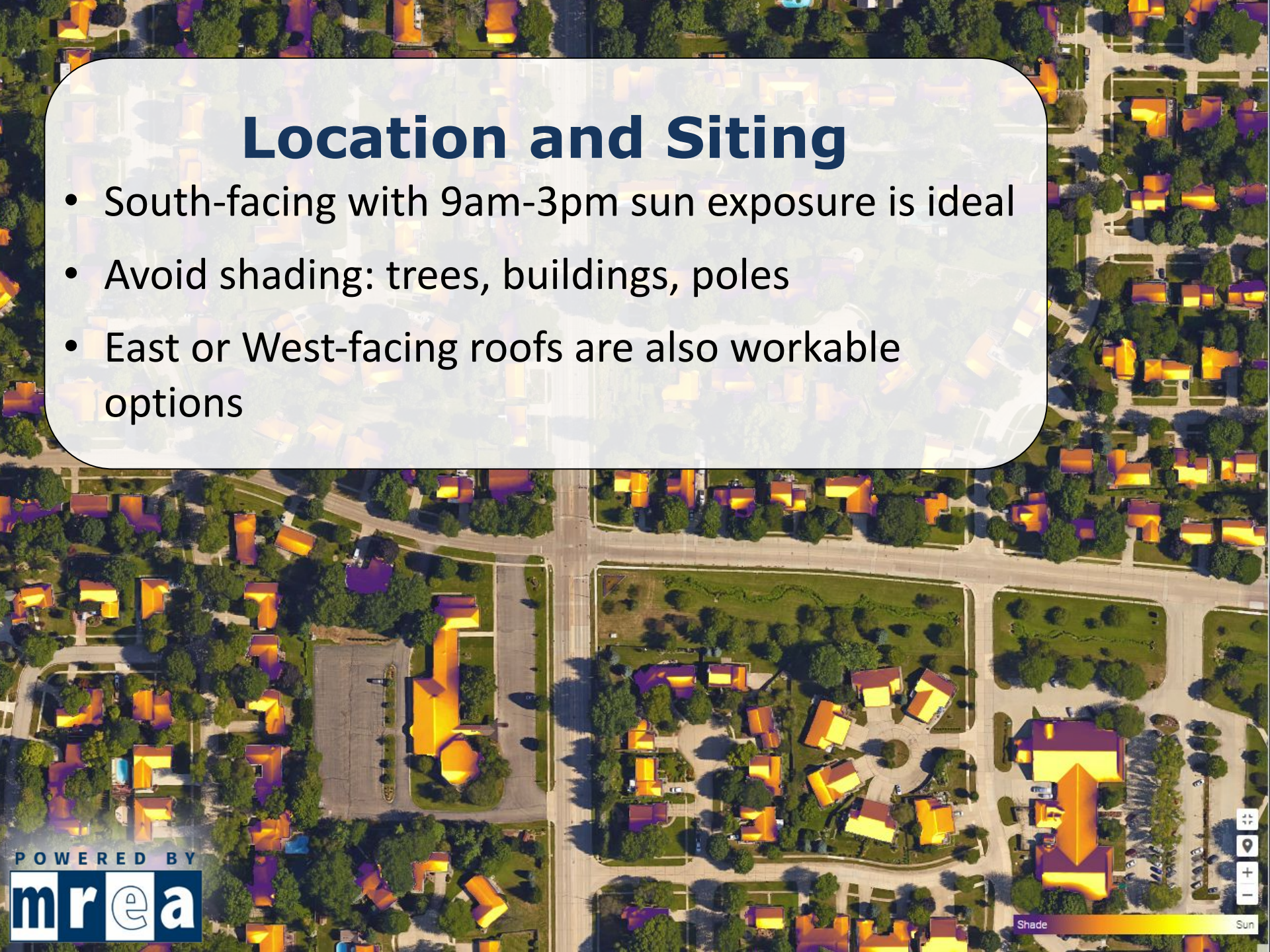
Location and Siting

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



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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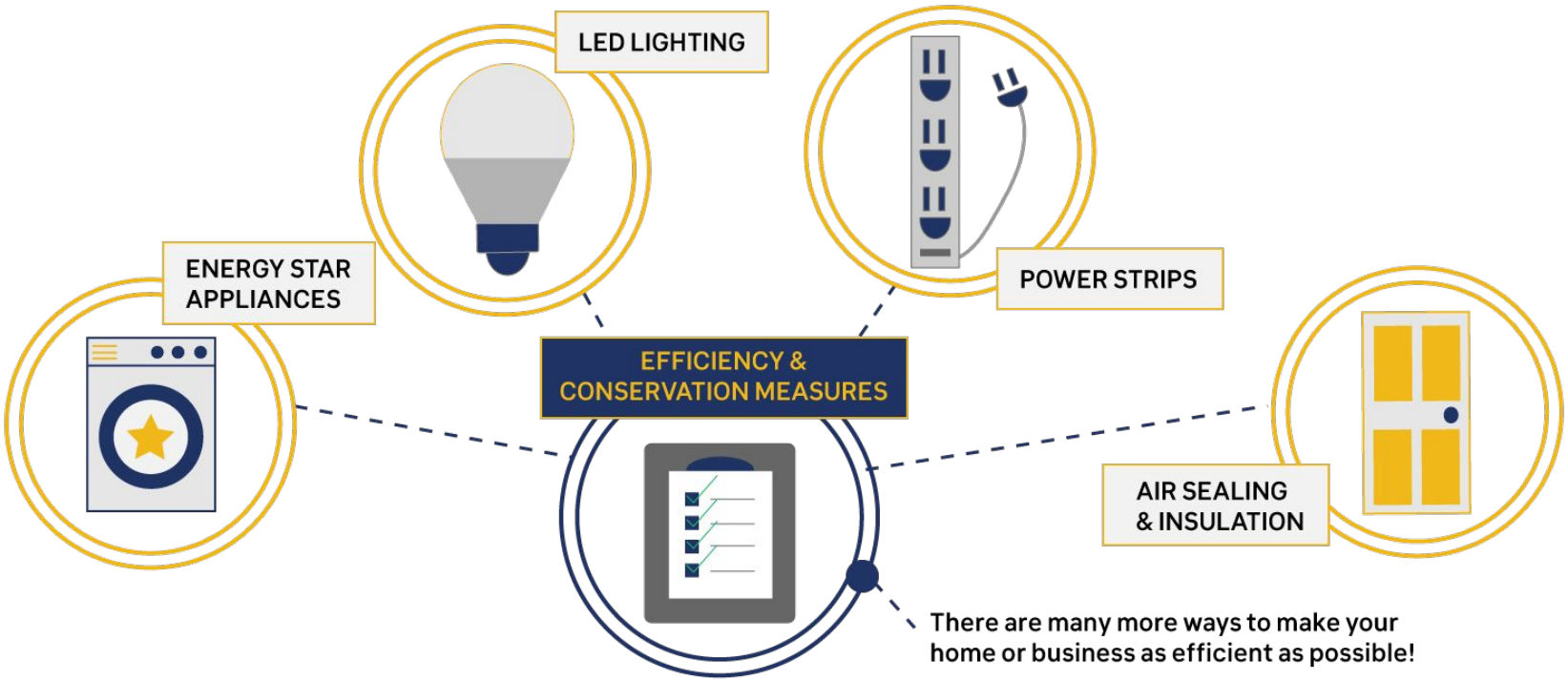
Energy Efficiency

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



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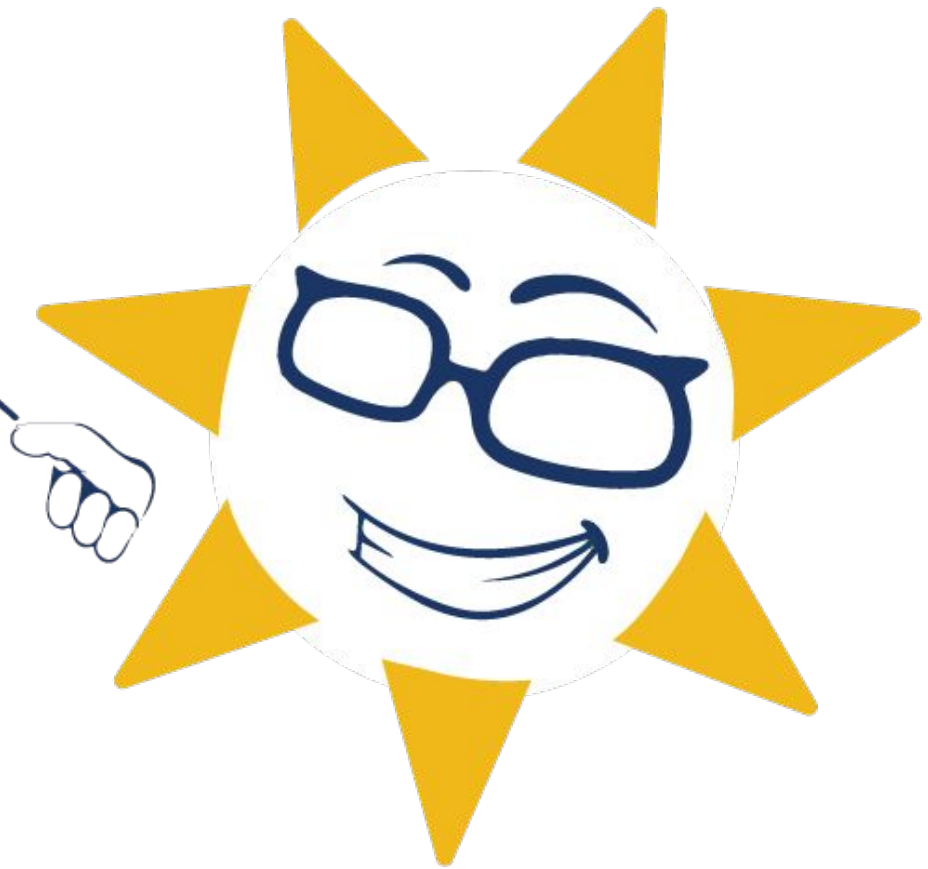
It's time for a poll!



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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
- Dual Fuel/Off-Peak Metering
- Inverter Type
- Height and Pitch of Roof
- Complexity of Electrical Interconnection
- Multiple PV Arrays
- Energy Storage
- Transformer & Electric Service Upgrade

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How Group Buys Work

The more properties that go solar, the lower the price:

Base Price:

$2.60/Watt

Base price is lower than installer's market rate.

Group Buy Volume Discounts

Collective kW	>50 kW	>150kW	>250kW	>350kW
Cumulative Discount per watt	$.05/W	$.10/W	$.15/W	$.20/W
Cumulative Discount per kilowatt	$50/kW	$100/kW	$150/kW	$200/kW
Approx. # of Homes	7-10 homes	20-30 homes	35-50 homes	55-80 homes

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Typical installation

Pictured above is a 21 module, or 7.455 kW DC, solar array.
Estimated annual solar production = **8,929** kWh

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7.455 KW Residential System

Grow Solar Price

7.455 kW Jefferson or Waukesha County Residential Roof Array	
Base Cost (**$2.60/Watt**)	$19,383
Estimated Adders	$1,340
Focus on Energy	- $500
Max group buy savings ($.20/W)	-$1,491
26% Federal Tax Credit (Post-Focus rebate)	-$4,870
Net Cost	**$13,862**

Market Price

7.455 KW Market Price Residential Roof Array	
Base Cost ($2.82/ Watt)	$21,023
Estimated Adders	$1,340
Focus on Energy	- $500
Group buy savings	$0
26% Federal Tax Credit (Post-Focus rebate)	-$5,684
Net Cost	**$16,179**

Wisconsin Focus on Energy Rebate

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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Next Steps
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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.

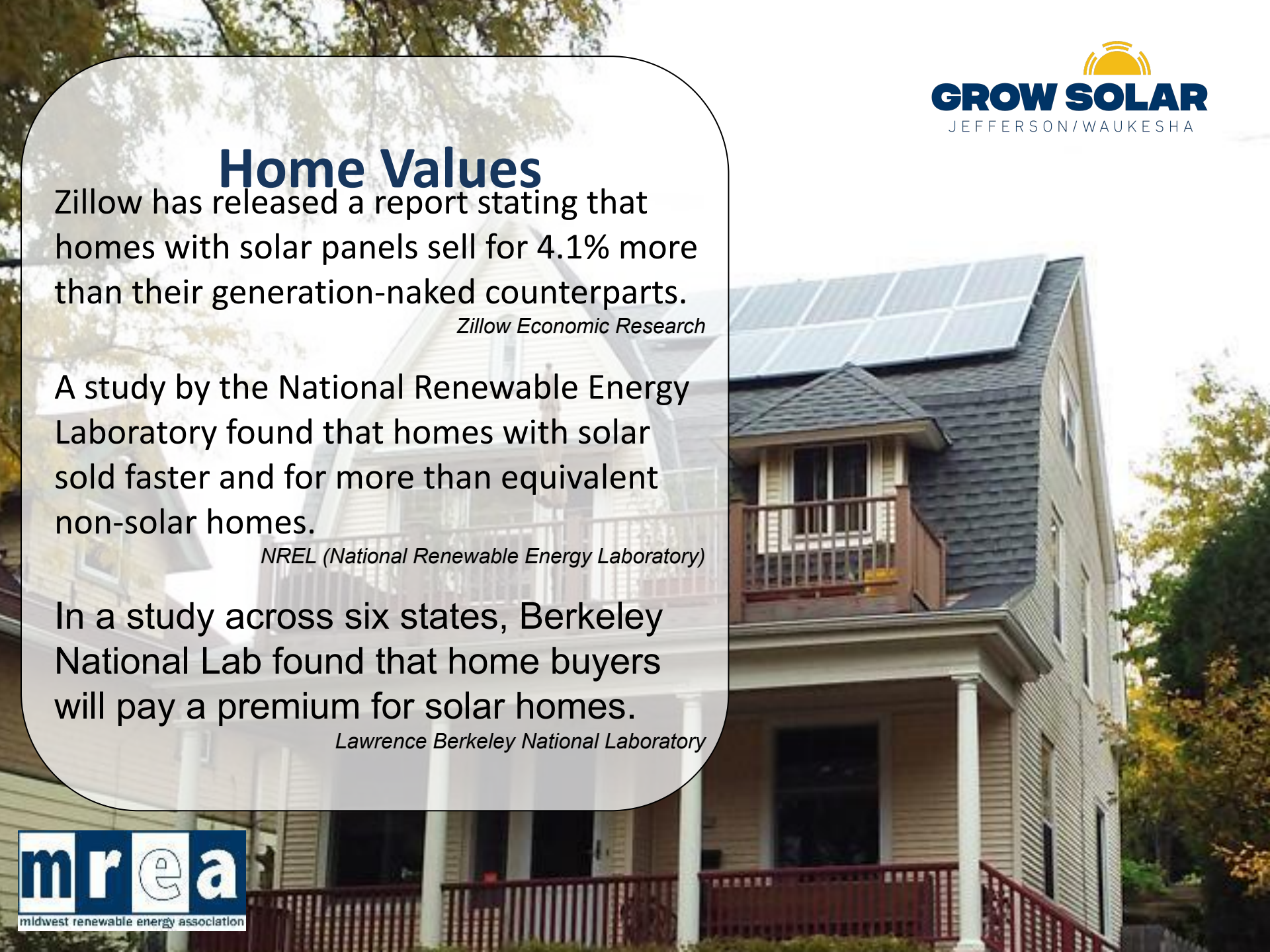
Zillow Economic Research

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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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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GREEN HOMEOWNERS UNITED

414-604-6450
www.GreenHomeownersUnited.com

Green Mortgages

- Multiple banks are now offering “green mortgages”, where homebuyers and those refinancing can add in an extra 15% of the value of the home into the mortgage for “energy efficiency” improvements, including solar & insulation/air sealing, water efficiency upgrades, and more

- Approximately the same interest rate as conventional home loan. Offered by Fannie Mae, Freddie Mac, VA & FHA. For every $1 the mortgage lender puts in, utility bills slated to decrease by at least $1, making it effective no-cost to cut emissions at home!

- If you are buying a home or have a mortgage interest rate over 3% then contact Green Homeowners United to get a no-cost Home Energy Score assessment and to be guided through the upgrade process.
  - 414-604-6450 www.GreenHomeownersUnited.com Kevin@greenhomeownersunited.com

From Associated Bank website, 4.9.2021

Product	Rate
10 Year Fixed	2.125%
15 Year Fixed	2.375%
20 Year Fixed	3.000%
30 Year Fixed	3.125%

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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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Next Steps

1. **Fill out the form** we're sending to you in the chat AND in a follow-up email right after this webinar.

2. All Energy Solar will follow up to get started on a free, no obligation preliminary Solar Analysis. **Prepare to supply a copy of your recent utility bill along with the last 12-months of your electrical usage data.**

3. All Energy Solar will set an appointment to review your **free, no obligation Solar Assessment**. This report can be delivered via online meeting, phone or in person.

4. **Sign contract and pay down payment** with All Energy Solar by **September 30, 2021**, to participate in Grow Solar Jefferson and Waukesha Counties.

5. **Formal site inspection.** All Energy Solar will verify your design, finalize measurements, update your quote if necessary.

6. Celebrate and enjoy clean energy! Tell your neighbors and friends to participate!

JeffersonWaukesha.GrowSolar.org

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INSTALLATION TIMELINE (approximate)

Day 1	Sign Contract
Week 1-6	Engineered design by All Energy Solar submitted for permitting and interconnection applications
Week 6-12	Getting approval for interconnect application from Utility Company
Week 12-13	Construction
Week 13-16+	Waiting for inspection/approval and Utility Company Permission to Operate

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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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