

**Welcome to Our Solar Power Hour!**



**GROW SOLAR**

LA CROSSE

We will begin our presentation shortly and start with a brief introduction to zoom



# GROW SOLAR

LA CROSSE

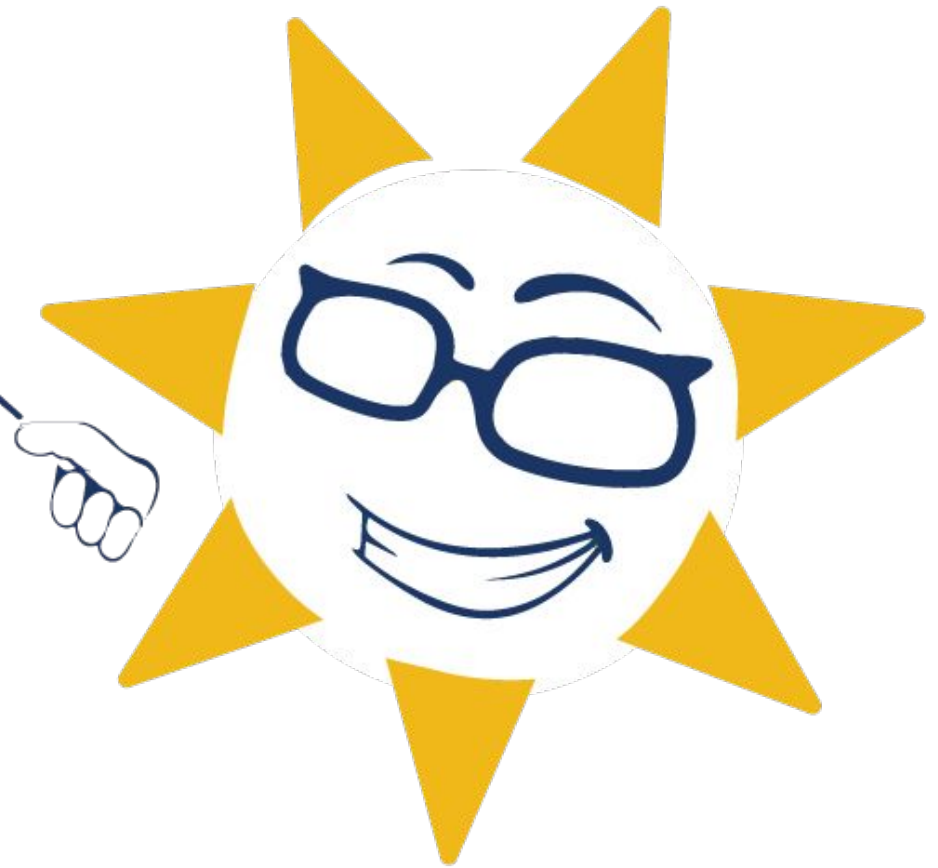


# Today's Agenda

- What is the Grow Solar La Crosse Group Buy Program?
- How does Solar Power work?
- Costs and cost-saving incentives
- How to begin your solar journey



**It's time  
for a  
poll!**



# Why are we here?

To lead in creating more sustainable communities by making solar simple.

Minneapolis

Rochester

WISCONSIN  
Green Bay  
Oshkosh

Madison  
Milwaukee

Rockford

Chicago

Naperville

Peoria

ILLINOIS  
Springfield

Columbia

St. Louis

# What is a group buy?

## Lower Prices through:

1. Competitive Contractor Selection
2. Community-Led Outreach
3. Limited-time Offering
4. Strong Customer Education
5. Economy of Scale

**Everyone wins.**

INDIANA

Indianapolis

Cincinnati

Louisville

Evansville

KENTUCKY

Lexington

WEST VIRGINIA

Roanoke VIRGINIA

Manitoulin Island

Algonquin Provincial Park

Toronto

Mississauga

Buffalo

Detroit

Ann Arbor

Toledo

Pittsburgh

PENNSY

Columbus

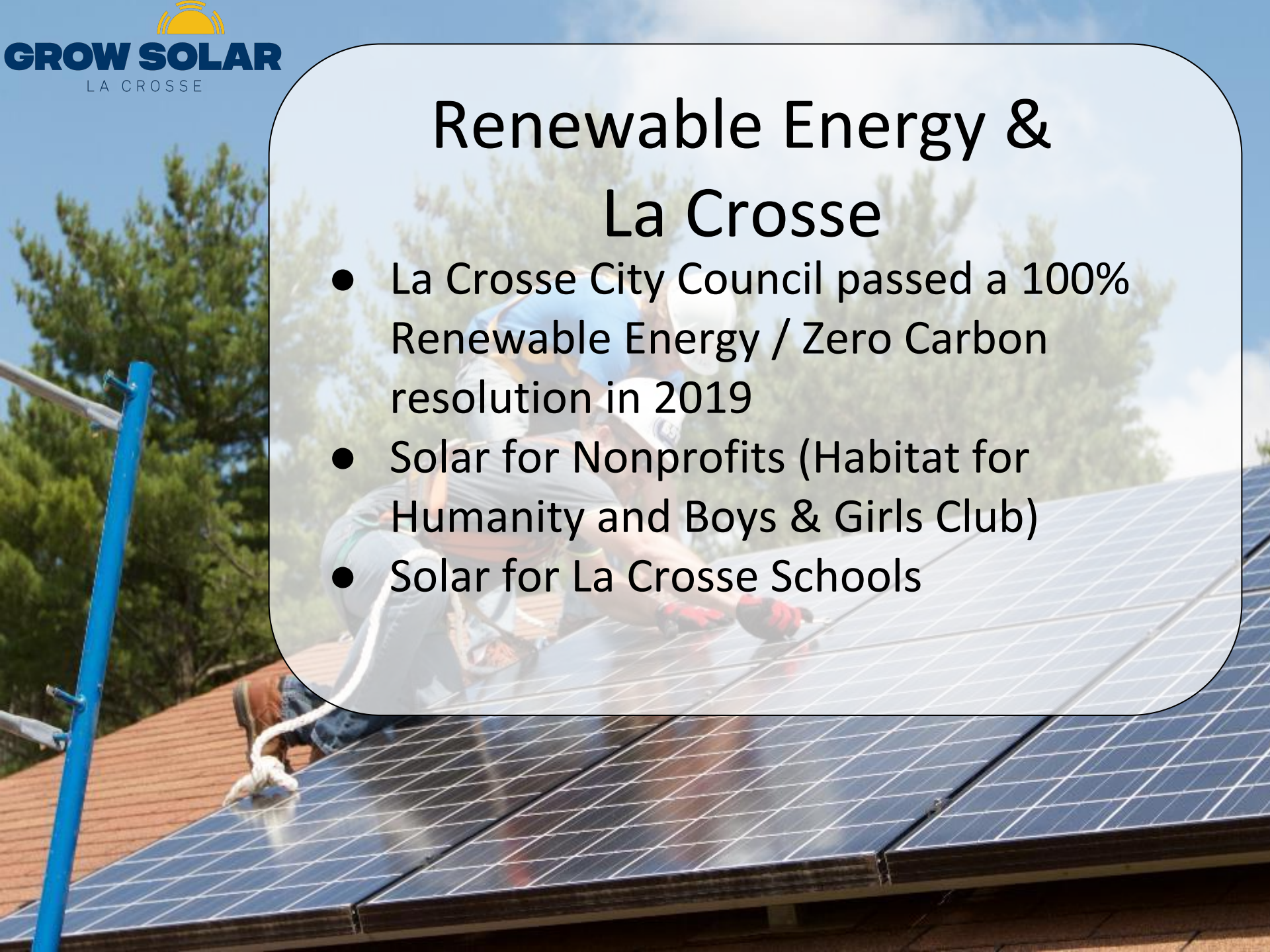
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# Renewable Energy & La Crosse

- La Crosse City Council passed a 100% Renewable Energy / Zero Carbon resolution in 2019
- Solar for Nonprofits (Habitat for Humanity and Boys & Girls Club)
- Solar for La Crosse Schools



# Grow Solar La Crosse Group Buy

## How it works

- Public presentations throughout the summer.
- Installations ongoing; **deadline to sign** is September 30.
- **Open to La Crosse County** residents, businesses, nonprofits.
- **Turnkey Solar Array.** Program Pricing includes design, permitting, components, installation (all-in cost), and warranty (5 years on labor, 10-25 years on equipment)
- Financing & American-made products available





## 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
- 34 Solar group buys, 1,600 properties, 12,000 kW of solar

# INSTALLER PROFILE



- Solar Connection has been in business for 10 years.
- We have installed over 370 systems in this region totaling over 6 MW.
- Our major customer areas are residential, agricultural, and commercial.
- As of 2019, we are part of the Mathy family of companies headquartered in Onalaska, Wisconsin
- Our metric of success is not how many installations we do but whether the systems are operating properly, with satisfied customers.
- We promise you that we will bring high standards, quality focus, and integrity to our work.

# *How Does Solar Work?*

## *Part 2 of 5*



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



## **KILOWATT HOUR (kWh)**

a unit of energy used or produced. This is what shows up on your bill.



## **KILOWATT (kW)**

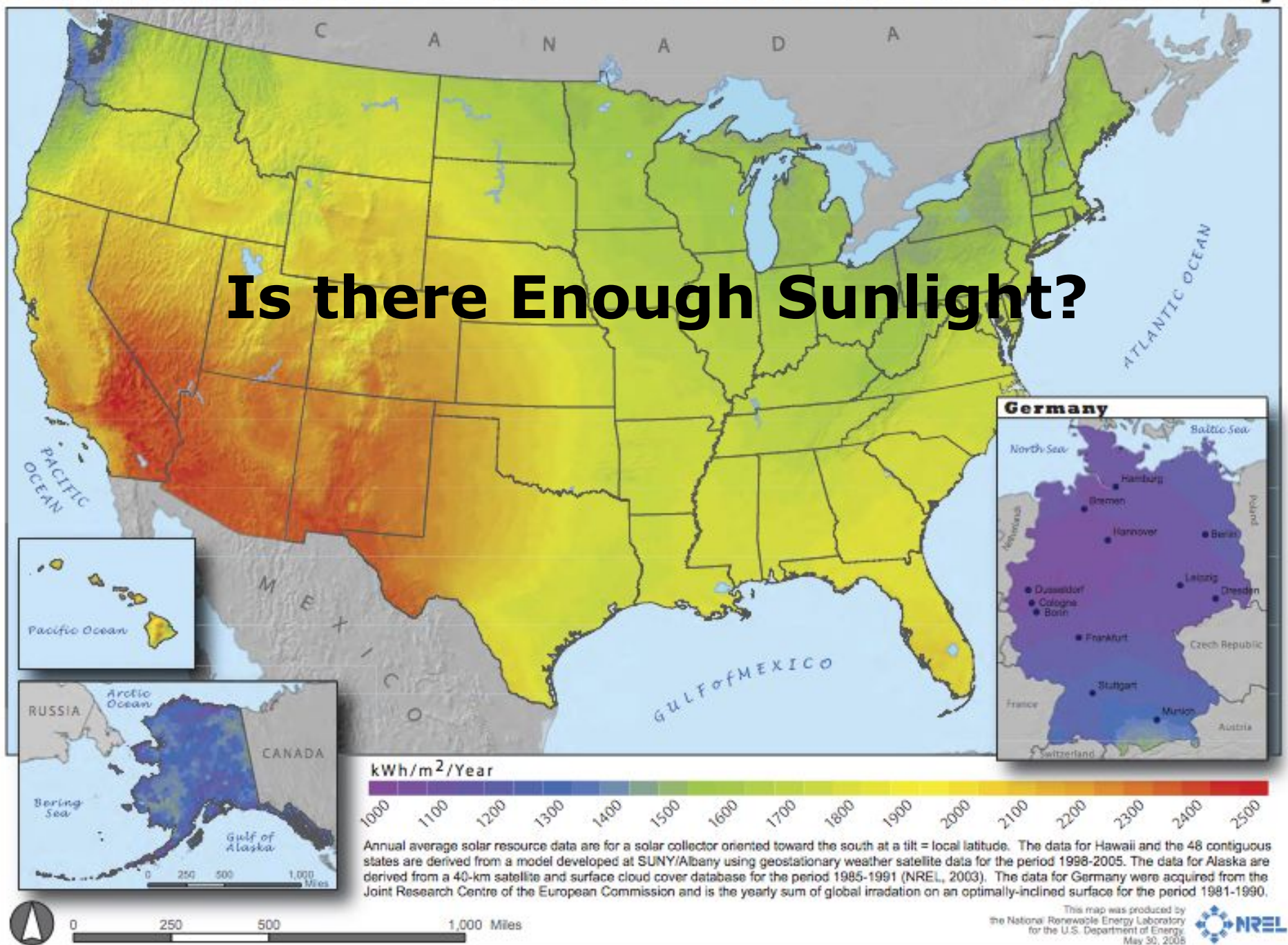
a measurement of capacity: how big your array is.



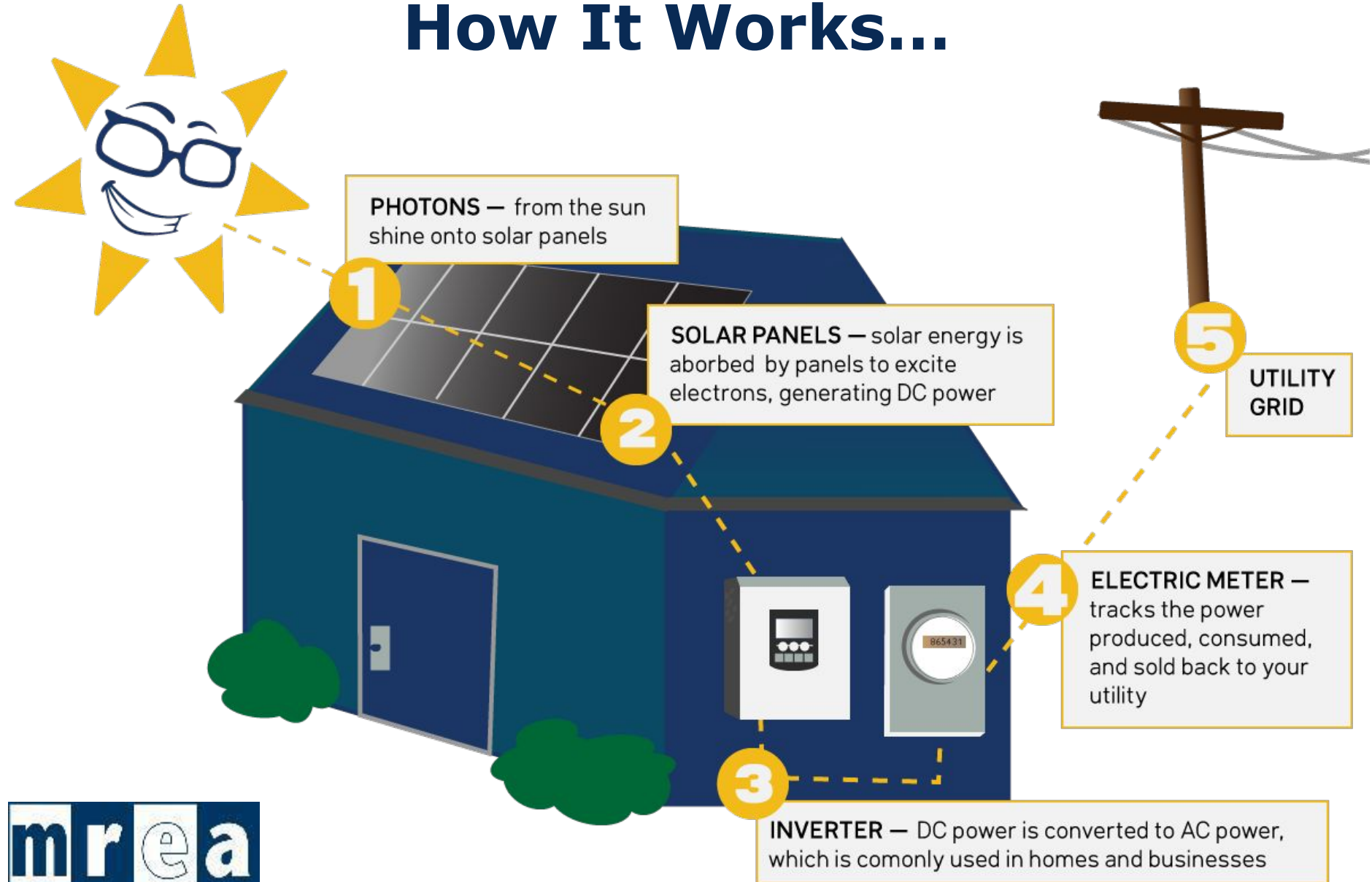
Every home's system size and energy use is different.

# Photovoltaic Solar Resource : United States and Germany

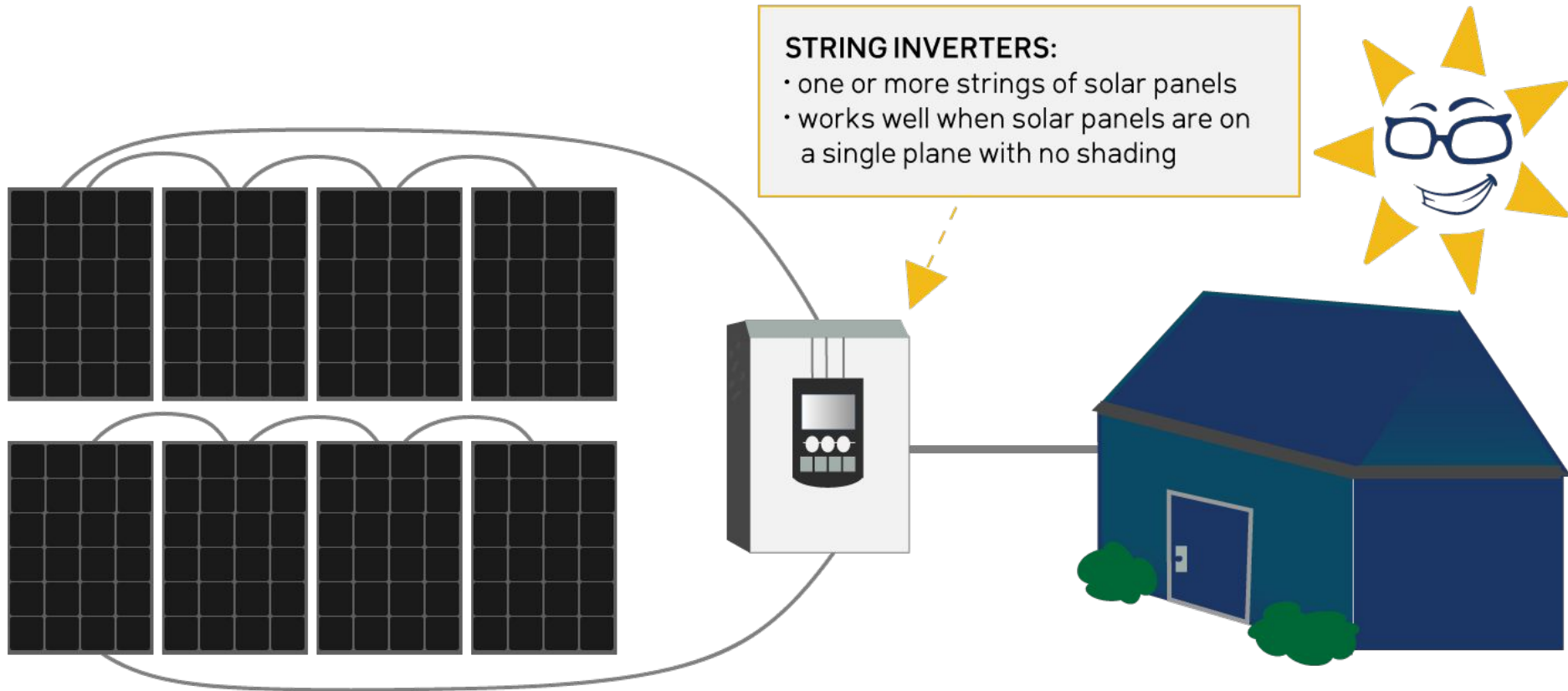
## Is there Enough Sunlight?



# Configuration: How It Works...



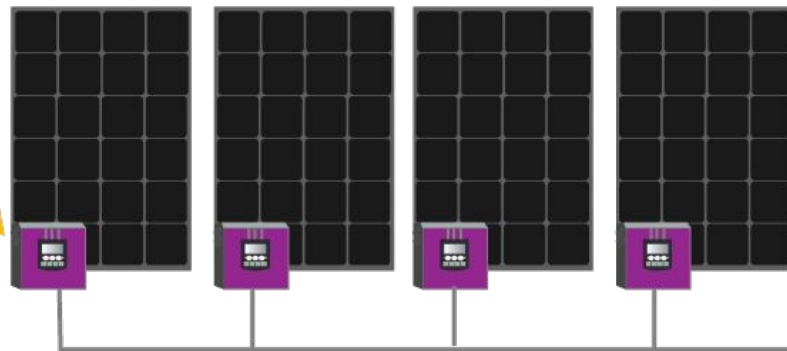
# Inverter, the heart of the array.



# Inverter, the heart of the array.

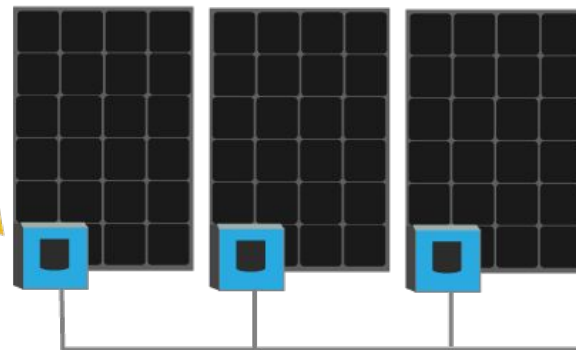
## MICRO INVERTERS:

- 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





# Grid-Tied

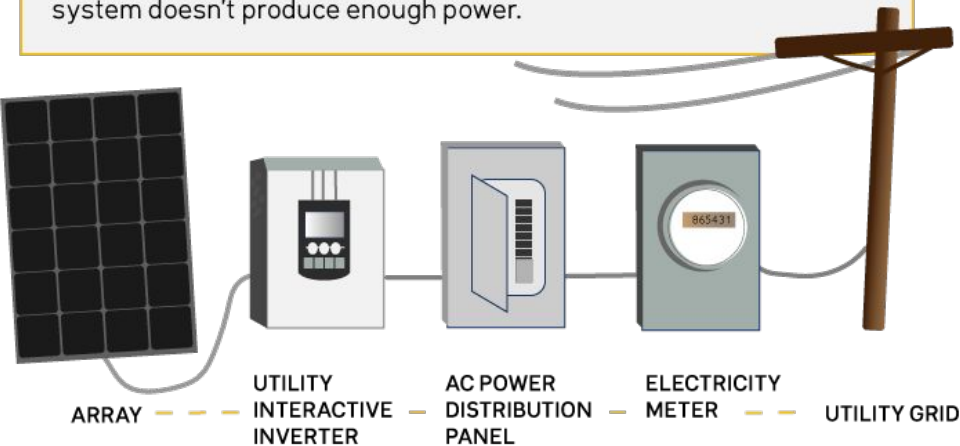


# Off-Grid

## 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.

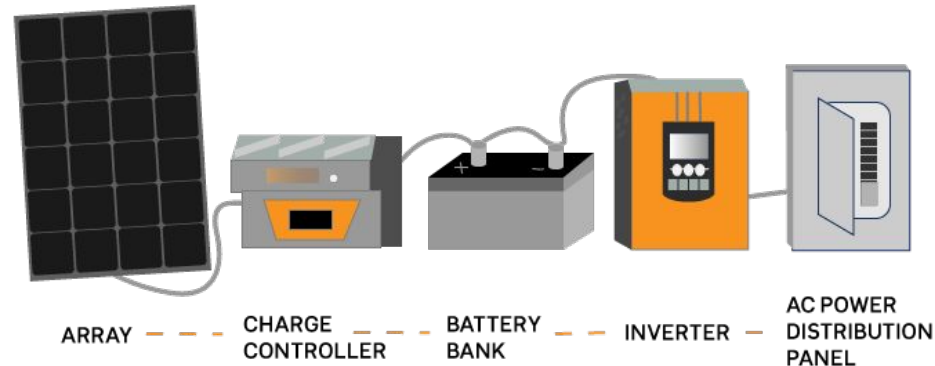
- Least Expensive Option
- Allows for Net Metering
- Grid Off = Solar Off



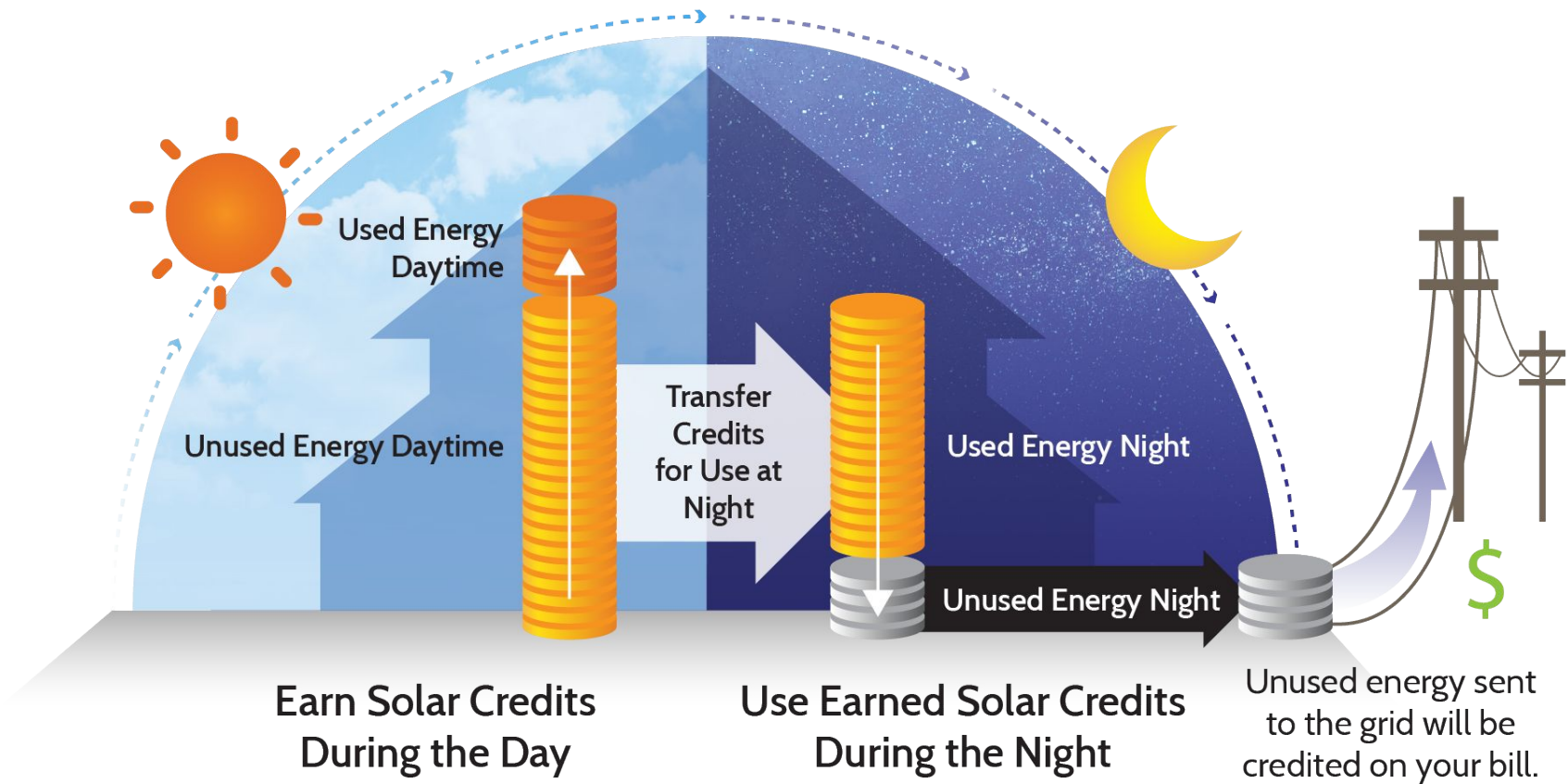
## OFF-GRID DESIGN:

A stand-alone PV system that operates autonomously and supplies power to electrical loads independent of the utility grid.

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

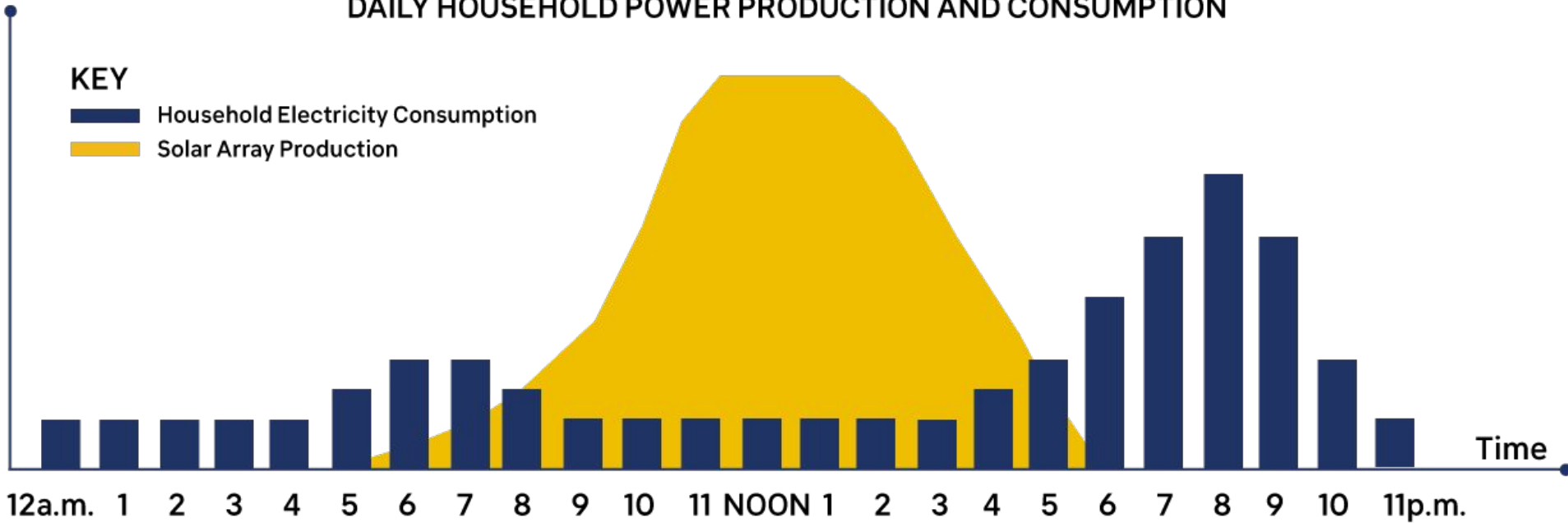


# How Net Metering Works



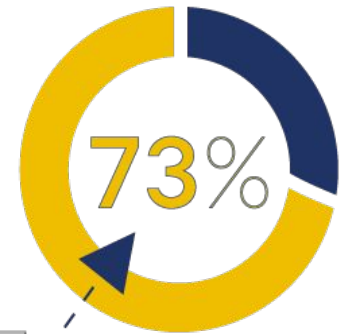
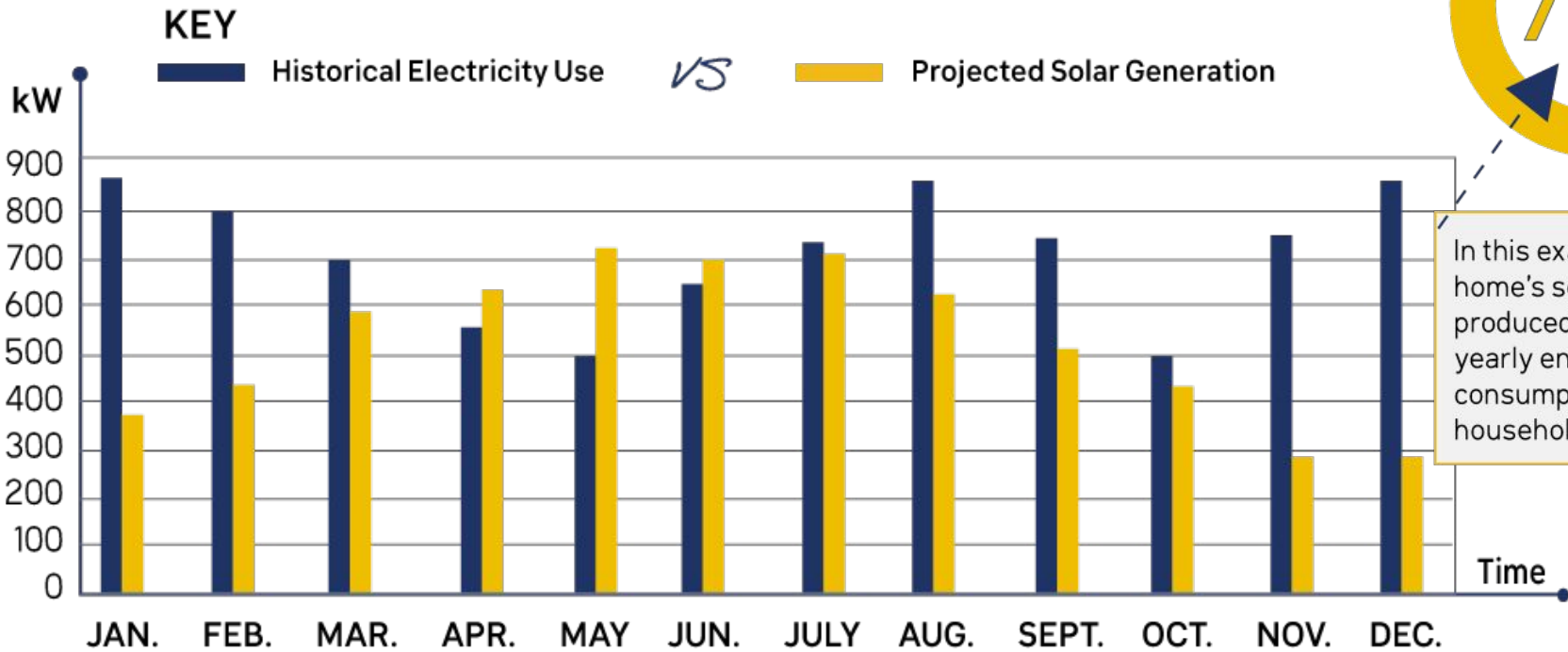

# “A Day in the Life” of a Grid-Tied / Net Metered Home

DAILY HOUSEHOLD POWER PRODUCTION AND CONSUMPTION



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

# “A Year in the Life” of a Grid-Tied / Net Metered Home

In this example, this home's solar array produced **73%** of the yearly energy consumption of the household.

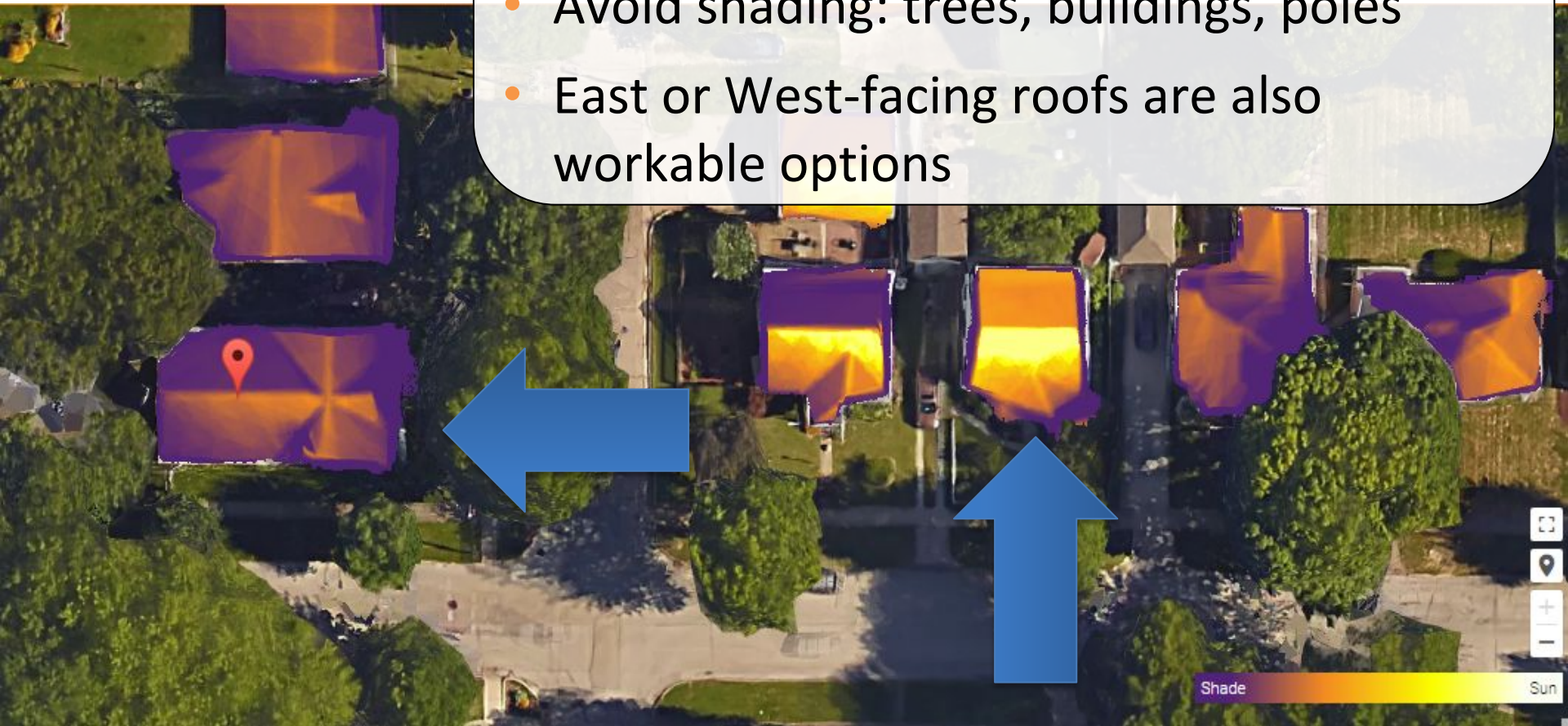
# *Options & Considerations*

## *Part 3 of 5*



# 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
- Considerations
  - Snow / Hail
  - Wind Loading
  - Roof Condition (age of shingles)
  - Squirrels



# 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

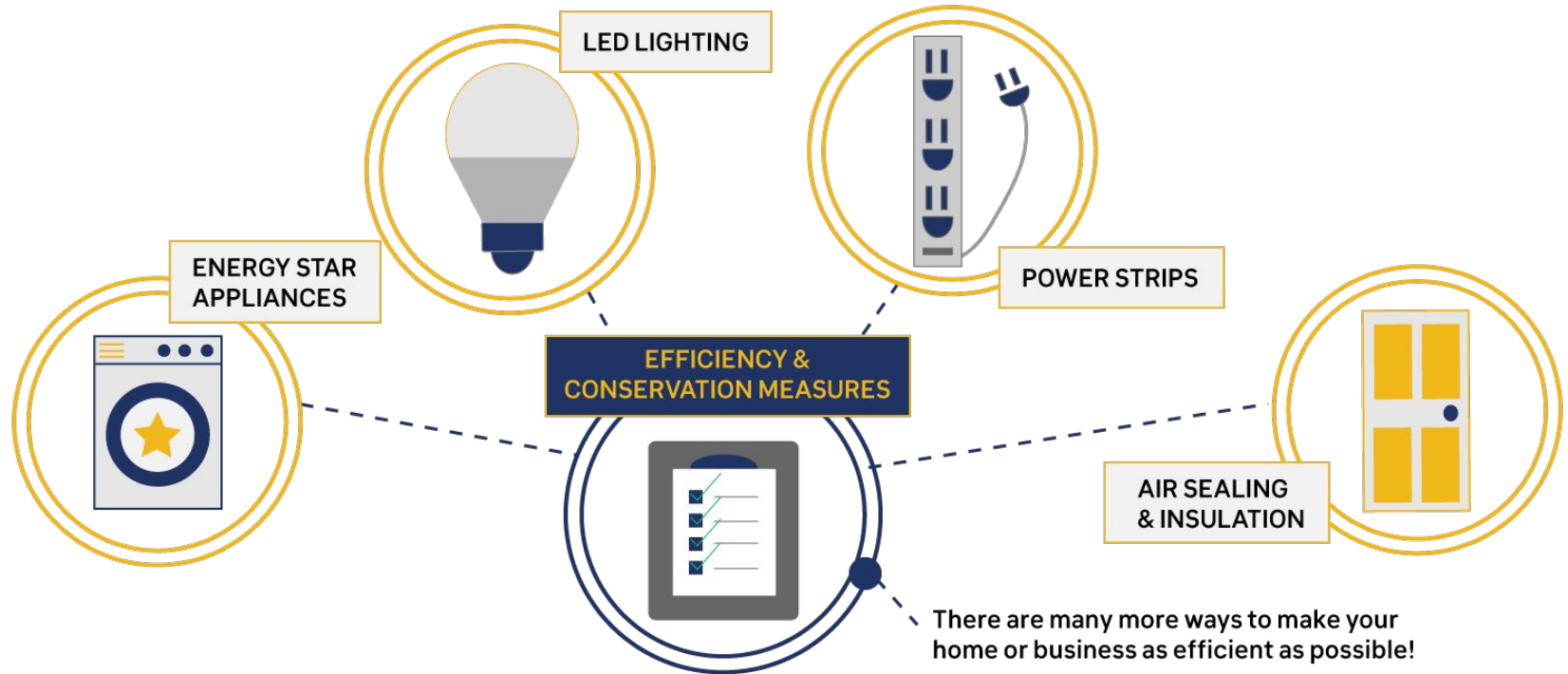


# Considerations

- 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

# Energy Efficiency

The cheapest kWh is the one you don't use in the first place.



**It's time  
for a  
poll!**



## 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?

POWERED BY



# *Solar Costs*

## *Part 4 of 5*



# Group Buy

## How It Works

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

Base Price:

**\$3.25/Watt**

Base price is lower than installer's market rate.

### Group Buy Volume Discounts

Collective kW	>50 kW	>150 kW	>250 kW	>350 kW
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	50-70 homes

# FOCUS ON ENERGY REBATE (WI only)

Solar Electric (PV) System	Incentive
<b>Residential</b> Single Family Homes	\$200 per kW, up to \$1,000
<b>Business</b> Up to 5 kW	\$200 per kW, up to \$1,000
<b>Business</b> 5 - 10 kW	\$1,000 + \$150 per kW above 5 kW, up to \$1,750
<b>Business</b> 10 - 100 kW	\$1750 + \$125 per kW above 10 kW, up to \$13,00

- **First come, first served. Limited funds available.**
  - Total residential funding: \$2,301,000. (\$126,369 remaining or 5.5%)
  - 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
- Steps down to **22% in 2021**; goes away for residential in 2022 (remains at 10% for commercial)



# 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

# Our Process



1. Utility Bill
2. Preliminary System Design
3. Virtual Meeting #1
4. Create Proposal
5. Virtual Meeting #2 - Proposal Review
6. On-Site Evaluation & Contract

# Our Process

## Step #1: Utility Bill



## Step #1: Utility Bill



NORTHERN STATES POWER COMPANY

Page 1 of 6

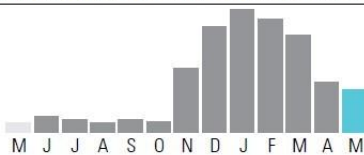
SERVICE ADDRESS	ACCOUNT NUMBER	DUE DATE
[REDACTED]	[REDACTED]	06/03/2020
	STATEMENT NUMBER	STATEMENT DATE
	[REDACTED]	05/13/2020
		AMOUNT DUE
		\$84.41

### YOUR MONTHLY ELECTRICITY USAGE



DAILY AVERAGES	Last Year	This Year
Temperature	51° F	50° F
Electricity kWh	7.5	11.0
Electricity Cost	\$1.47	\$1.85

### YOUR MONTHLY NATURAL GAS USAGE



### SUMMARY OF CURRENT CHARGES (detailed charges begin on page 2)

Electricity Service	04/13/20 - 05/12/20	318 kWh	\$53.72
Natural Gas Service	04/13/20 - 05/12/20	27 therms	\$30.69
<b>Current Charges</b>			<b>\$84.41</b>

### ACCOUNT BALANCE (Balance de su cuenta)

Previous Balance	As of 04/13	\$95.37
Payment Received	Online Payment 05/04	-\$95.37 <b>CR</b>
Balance Forward		<b>\$0.00</b>
Current Charges		\$84.41
<b>Amount Due</b> <small>(Cantidad a pagar)</small>		<b>\$84.41</b>

### INFORMATION ABOUT YOUR BILL

Your safety and the safety of our employees will always be our top priority. We are prepared and are taking steps to ensure we'll continue to be there for you to meet your energy needs as COVID-19 affects a growing number of people in our

## Step #1: Utility Bill



### YOUR MONTHLY ELECTRICITY USAGE



DAILY AVERAGES	Last Year	This Year
Temperature	51° F	50° F
Electricity kWh	7.5	11.0
Electricity Cost	\$1.47	\$1.85

### YOUR MONTHLY NATURAL GAS USAGE



NORTHERN STATES POWER COMPANY

Page 1 of 6

SERVICE ADDRESS	ACCOUNT NUMBER	DUE DATE
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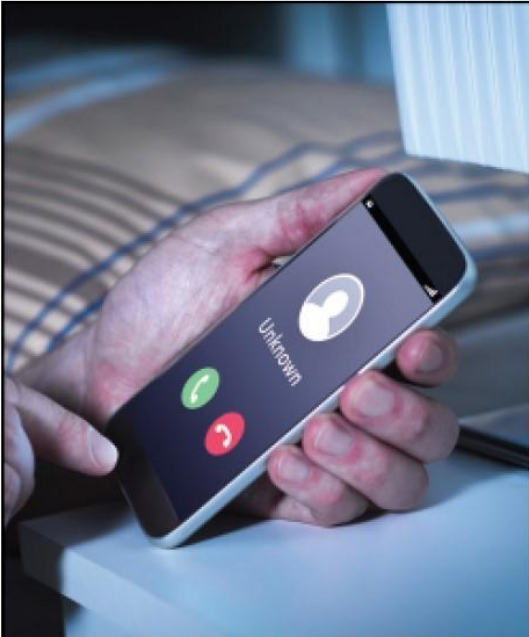
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# Our Process

## Step #1: Utility Bill



**DON'T GET SCAMMED.**

Scammers can spoof phone numbers to look like the call is

SERVICE ADDRESS: [REDACTED]  
 NEXT READ DATE: 06/15/20

### ELECTRICITY SERVICE DETAILS

PREMISES NUMBER: [REDACTED]  
 INVOICE NUMBER: [REDACTED]

### METER READING INFORMATION

METER [REDACTED] Read Dates: 04/13/20 - 05/12/20 (29 Days)			
DESCRIPTION	CURRENT READING	PREVIOUS READING	USAGE
Total Energy	68870 Actual	68552 Actual	318 kWh
1 Cooling Degree Days		480 Heating Degree Days	

### ELECTRICITY CHARGES

### RATE: Residential Service

DESCRIPTION	USAGE UNITS	RATE	CHARGE
Customer Charge			\$17.00
Energy Charge Winter	318 kWh	\$0.071650	\$22.78
Delivery Charge Winter	318 kWh	\$0.042000	\$13.36
2017 Tax Cut Credit	318 kWh	-\$0.005880	-\$1.87 <b>CR</b>
WI Fuel Refund Credit	318 kWh	-\$0.000770	-\$0.24 <b>CR</b>
<b>Subtotal</b>			<b>\$51.03</b>
WI Low Income Assist		3.00%	\$1.53
County Tax		0.50%	\$0.11
State Tax		5.00%	\$1.05
<b>Total</b>			<b>\$53.72</b>

# Our Process

## Step #1: Utility Bill



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Scammers can spoof phone numbers to look like the call is

SERVICE ADDRESS: [REDACTED]  
 NEXT READ DATE: 06/15/20

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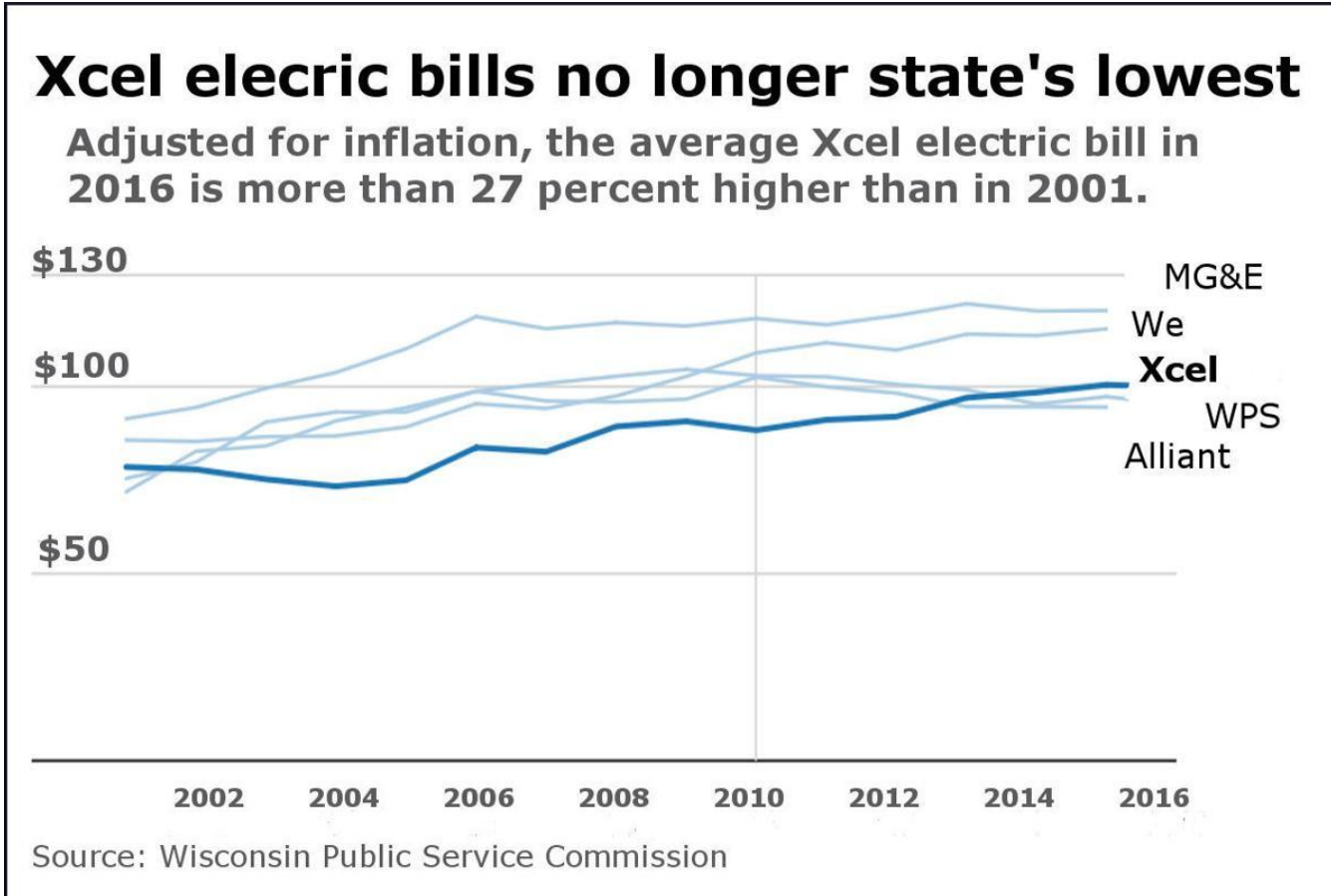
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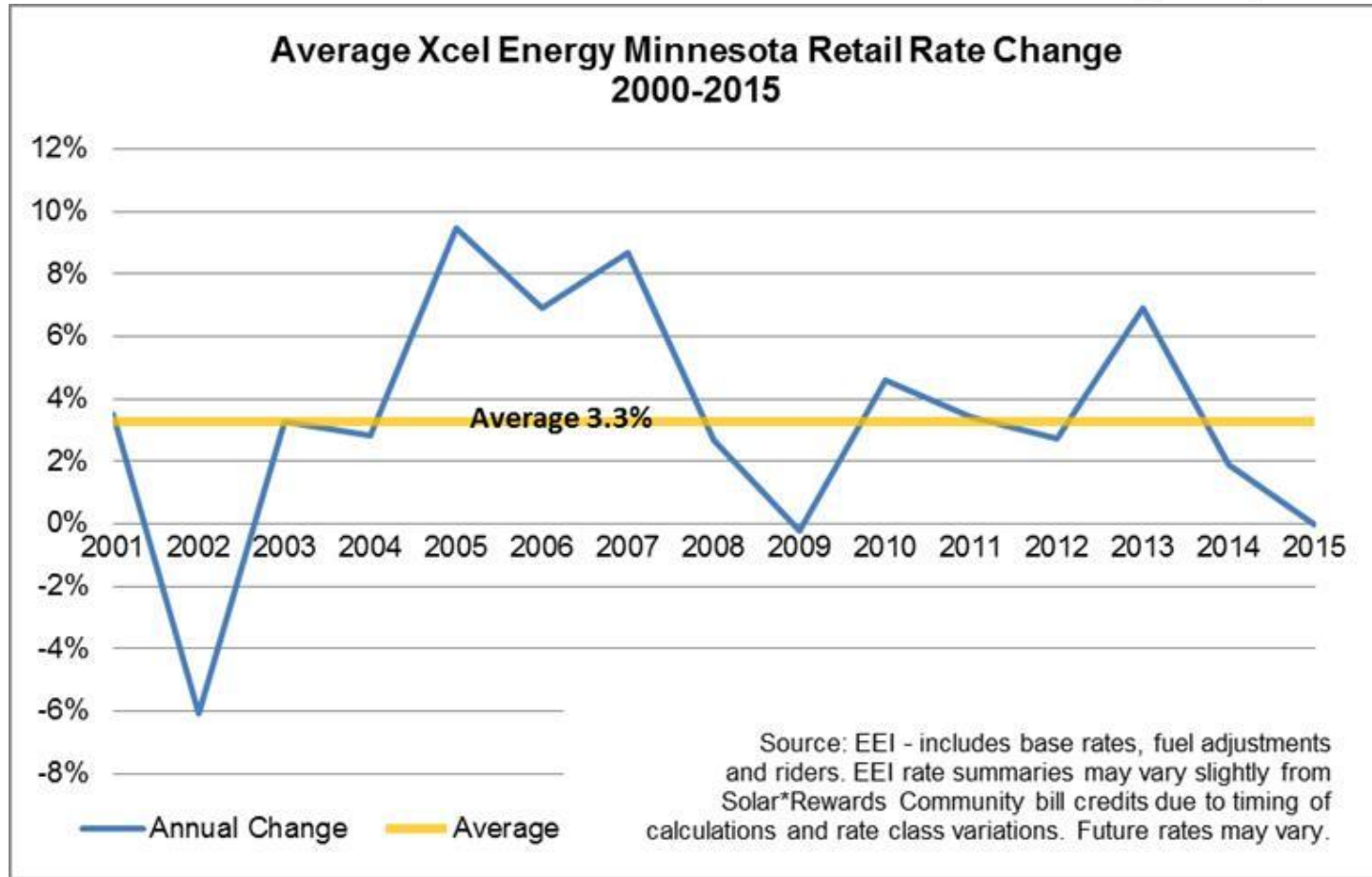
**= \$0.1233 / kWh**

## Step #1: Utility Bill

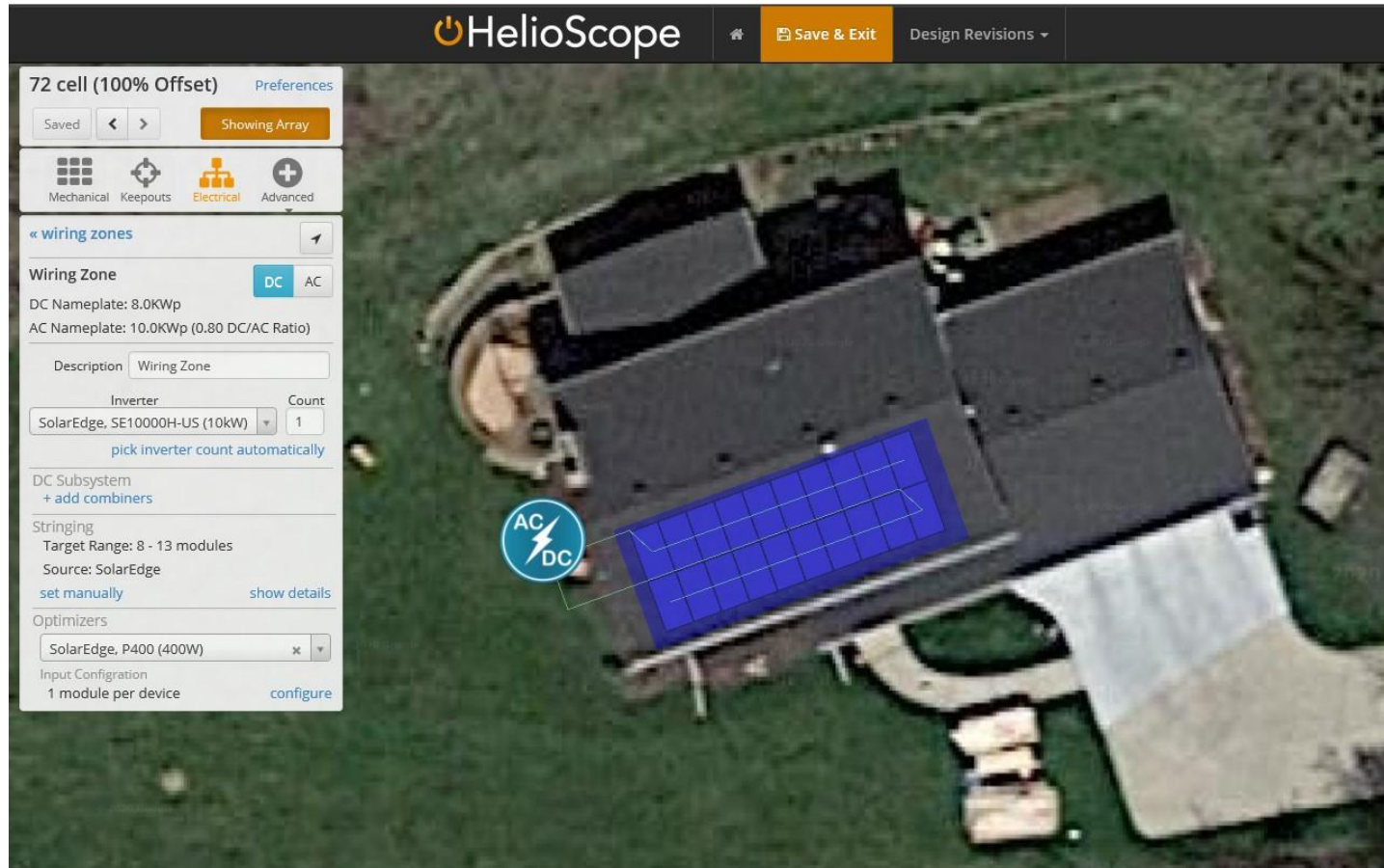




## Step #1: Utility Bill



## Step #2: Preliminary System Design



# Our Process

## Step #3: Virtual Meeting #1



Google Meet



# Our Process




## Step #3: Virtual Meeting #1

- Breaker Panel Location and Size
- Internet Router Location (Online Monitoring)
- Roof Condition & Structural Concerns
- Shading Issues (Tree's, Neighboring Homes, etc.)
- Reliability/Utility Outages (How often? How long?)
- Anticipated Future Usage (Going up, or Going Down?)
- Electric Vehicle Potential
- Energy Efficiency Upgrades
- Homeowners Associations
- Environmental & Financial Benefits of Solar
- Financing Options

# Our Process

## Step #4: Create Proposal





Name Sunny Solar  
 Address 111 Sunshine Drive  
 Phone (507)269-3396  
 Date June 11, 2020  
 Contact Colton Simpson, 612-703-5721

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System Rating: 7.2 kW
Number of Panels: 18
SolarOffset: 105%




Diagram is an approximation



### Financial Impact

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System Rating: 7.2 kW
Number of Panels: 18
SolarOffset: 105%



Category	Amount
What you'll pay for electricity anyway	\$46,995
Cost to install solar	\$23,950
Cost to install solar after credits and rebates	\$17,723

## Total Savings: \$29,272


Total Savings takes into account system cost, system production, financial incentives, utility fees, and estimated interest (if financing).

"I really do feel connected to Solar Connection because Curt was there at the beginning of our farm. He's been an ongoing supporter and we've tried to do the same thing with his business. We really respect and value each other."  
 Roger and Susan, Squashblossom Farm, Oronoco, MN

"We talk it up all the time to our neighbors and they're interested in it now. We talk about the economics with them - you'll have this much money, this is how much we save and it's going to pay for itself after so long, here's the tax credit. It's just a really great deal!"  
 Eric and Angela, Oronoco, MN

"Adding solar panels to my home has made me feel like I have accomplished something great. I am receiving tremendous value in my home with a renewable energy that makes the world better. Solar Connection was so easy to work with, I feel confident I will have this great feeling of accomplishment for decades."

## Step #5: Proposal Review



### Summary

June 11, 2020

Customer Information


**Sunny Solar**  
 111 Sunshine Drive (507)269-3396 Utility: RPU  
 Rochester, MN 55901 SunnyDays@gmail.com Annual Consumption: 7778 kWh  
EnergyConsultant: Colton Simpson

System Description		Financials	
System rating	7.2 kW	Installation cost	\$23,950
Production YR1	8200 kWh	Federal tax credit	\$6,227
Solar offset	105%	Utility rebate	\$0
Equipment		<b>Effective cost</b>	<b>\$17,723</b>
Panels	18 X 400-watt Jinko panels	30-YR production value	\$46,995
Inverters	1 X 6 inverter	Monthly utility fee	\$0.00
Mounting	Unirac	<b>Savings</b>	<b>\$29,272</b>
Optimizers	18 X P505 optimizers	Cost per watt	\$3.33
		Lifetime ROI	2.7X
		Annual rate of return	5.5%
		Savings account: .06%	
		Stock market: 5% - 7%	
		Some real estate funds: 12%	
		<b>Payment Schedule</b>	
		Down payment	\$1,000
		To order equipment (65%)	\$15,570
		Upon system commissioning	\$7,380


Notes  
 Contingent on RPU approval of interconnection. Contingent on final roof measurements.  
 Production numbers assume 95% TSRF, final numbers to be taken before contract signing.

Environmental Impact


Installing your system will have the same environmental impact as:




Driving 378,400 fewer miles



Conserving 166,941 pounds of coal



Planting 4,007 trees



### Checklist

Processes

- Design & permitting
- Inspections & commissioning
- Installation
- Support

Property

Return on Investment

- Acceptable site (area, shading, obstructions, upgrades)
- Remaining with property min. 5 years
- Warranties & insurance reviewed
- Transformer & engineering considered
- Electric vehicle potential considered
- Cost & savings reviewed
- Payment scheduled reviewed
- Incentives & financing reviewed
- Return on investment sufficient
- Annual rate of return sufficient

Installation Order

The above prices, descriptions, and conditions are satisfactory and are hereby accepted, contingent upon approval for financing. You are authorized to do the work as described. I have read the General Conditions. Payments will be made as outlined.

Signed \_\_\_\_\_ Date \_\_\_\_\_

# Our Process

## Step #5: Proposal Review

- System Components & Operation
- Equipment Manufacturers & Warranties
- Financial & Environmental Benefits
- Permitting Requirements
- Payment Schedule & Construction Timeline
- Installation Process & Expectations
- Post Installation Service & Support
- Maintenance & Monitoring



# Our Process

## Step #6: On-Site Evaluation & Contract

- **Terms & Conditions**
- **Installation Contract**
- **Down Payment**
- **Final Measurements**
- **Permitting**
- **Construction Schedule**





# Case Study: 6.4kW System



Estimated Year 1 Production = 8,100 kWh

# Case Study: 6.4kW System

## 6.4 kW Residential Shingle Roof

Install Cost ( <b>\$3.10/Watt</b> )	\$19,840
Focus on Energy (WI only)	(\$1,000)
26% Federal Tax Credit	(\$5,158)
<b>Net Cost</b>	<b>\$13,682</b>



**Simple Payback: 12.7 yrs**

**Max Group Buy Savings for 6.4 kW array: \$1,280**

**Estimated Year 1 Solar production = 8,100 kWh**  
**Assumes Avg kWh rate from utility = \$0.125/kWh**  
**Simple Payback = Net Cost / Year 1 electric bill saving**

# Case Study

## 6.4 kW DC Residential Roof System

Install Cost ( <b>\$3.10/Watt</b> )	\$19,840
Focus on Energy (WI only)	(\$1,000)
26% Federal Tax Credit	(\$5,158)
<b>Net Cost</b>	<b>\$13,182</b>



**Simple Payback: 12.7 yrs**

**Estimated Year 1 Solar production = 8,100 kWh**  
**Assumes Avg kWh rate from utility = \$0.125/kWh**  
**Simple Payback = Net Cost / Year 1 electric bill saving**

# Case Study

## 6.4 kW DC Residential Roof System

	Base \$	>50kW	>150kW	>250kW	>350kW
Installed Cost	\$20,800	\$20,480	\$20,160	\$19,840	\$19,520
Focus on Energy	(\$1,500)	(\$1,500)	(\$1,500)	(\$1,500)	(\$1,500)
26% Federal Tax Credit	(\$5,408)	(\$5,325)	(\$5,242)	(\$5,158)	(\$5,158)
<b>Net Cost</b>	<b>\$13,892</b>	<b>\$13,655</b>	<b>\$13,418</b>	<b>\$13,182</b>	<b>\$12,862</b>
Simple Payback (yrs)	13.72	13.48	13.25	13.01	12.7

**Max Group Buy Savings for 6.4 kW array: \$1,280**

Estimated Year 1 Solar production = 8,100 kWh  
 Avg kWh rate from utility = \$0.125/kWh  
 Year 1 Savings: \$1012.50

# *Next Steps*

## *Part 5 of 5*



# 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*

# 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

# Environmental Benefits

Over the life of a 5 kW system, the electricity produced is equivalent to 163 tons of carbon dioxide (CO<sub>2</sub>).

That's the CO<sub>2</sub> 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.**



# Next Steps

1. Fill out the form we're sending you in the chat (we'll also send it in a follow-up email right after this webinar)
2. Solar Connection will follow up in the next few days to get started on a **free, no obligation quote**. Please collect 12 months of electricity usage.
3. **Request a site assessment**. Solar Connection will verify your quote and provide you documentation and your contract.
4. **Sign contract** and **pay down payment** with Solar Connection before September 30 to lock in Grow Solar La Crosse pricing.
5. Celebrate, share your story, enjoy clean energy every time the sun shines!

[GrowSolarLaCrosse.org](http://GrowSolarLaCrosse.org)

# Stay Informed: Become a Member of the MREA!



**Promoting renewable energy, energy efficiency,  
and sustainable living through education and demonstration.**

- \$20 Off All Courses
- Invite to Virtual Membership Meeting
- Access to Clean Energy Credit Union
- Subscription to Newsletter
- Free Online Tutorials
- Free Rise Up! Publication Mailed to You

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



**When there's a huge solar energy spill, it's just called a "really nice day"**

Presenter: Kathy Allen

Installer: Chris Olofson, Solar Connection

Support: Marta Monti - [Marta@midwestrenew.org](mailto:Marta@midwestrenew.org)

Solar Program Manager, MREA