

SOLAR ENERGY

BASICS TO BATTERIES

SOLAR ENERGY: BASICS TO BATTERIES

Whether you are just starting to research home solar or you are ready to install, this session will help you take the next step with confidence



SOLAR ENERGY

BASICS TO BATTERIES

AGENDA

- Introductions
- Solar Technology
- Solar Economics
- Plug In Solar
- Financing with Clean Energy CU
- Q&A





CLEAN ENERGY CREDIT UNION

WHO WE ARE

We are an all-online, not-for-profit credit union serving members nationwide with one mission: to make clean energy accessible and affordable for everyone. Every loan we fund goes directly toward advancing climate action and clean energy adoption. We are member-owned, which means we answer to you, not shareholders.



Ethical Banking

Your deposits fund clean energy projects, not fossil fuel extraction. Banking with us is climate action.



We meet the highest standards of social and environmental performance, accountability, and transparency.



The Colorado Renewable Energy Society (CRES) drives environmental, social, and economic benefits for Colorado by promoting renewable energy, energy efficiency, and related technologies to achieve a carbon neutral Colorado powered by 100% renewable energy.

Policy - our policy committee consists of over 30 experts who provide input on energy and sustainability issues in the Colorado legislature and the Colorado Public Utilities Commission to help accelerate towards our renewable energy and decarbonization goals.

Education – our educational programming & events reach over 1,000 attendees annually. Additionally, our YouTube channel featuring over 290 previously recorded events that have achieved 1.4 M views.

CRES is a statewide, non-partisan, non-profit, 501(c)3 supported by our sustaining members and donations.

To learn more about CRES please visit www.cres-energy.org



What is Solar United Neighbors?

We're a vendor neutral, national 501(c)(3) nonprofit.

How SUN got started

2007

- 50 homes in Mt. Pleasant neighborhood Washington, DC

2026

- Members in 50 states
- 400+ solar group purchases run
- 12,000+ homes have gone solar
- Free Solar Help Desk
- National advocacy for solar and utility ratepayers



**Anya Schoolman, SUN
founder!**

Our Theory of Change

1. Go solar

Support with new/existing system

2. Join together

Resources, solar tour, happy hours

3. Fight for energy rights

Net metering, HOAs represent solar owners



What we'll cover today

1

Solar & Storage
Technology

2

Solar
Economics

3

Plug in
Solar and
Colorado
specific info

4

Financing
with CECU

Unit 1: Solar Technology

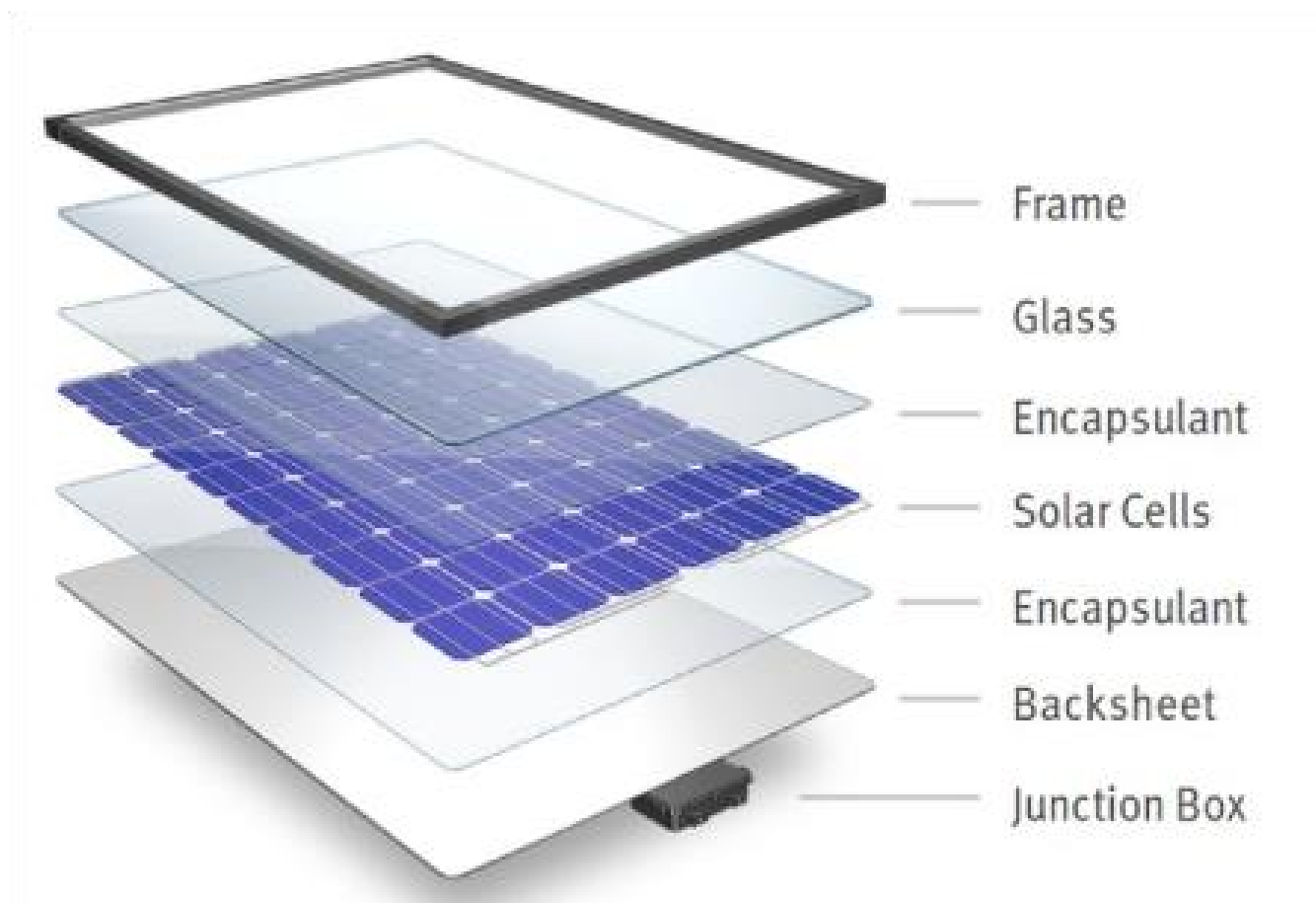


How do solar panels work?



Solar photovoltaic (PV)
converts solar energy to
electricity.

System Components: Panels



Panel / Module

ImageSource: DuPont



Solar Array

System Components: Racking



Racking: Standing seam metal roof



Racking: Ground mounted solar



Racking: Clay tile roof



System Components: Inverters



String Inverter
Mostly used for
ground mounts &
commercial



String inverter & DC
optimizers



Microinverters

System Components: Electrical Panel

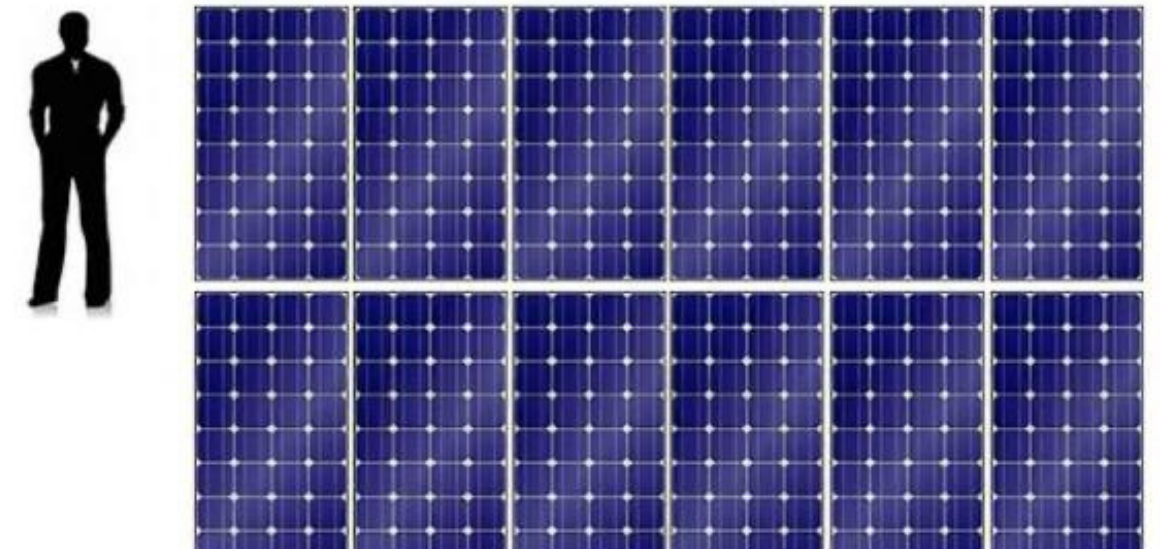


How does my solar connect to my electrical panel?

- Simple connection in panel
- Most home electric systems don't need upgrades before solar

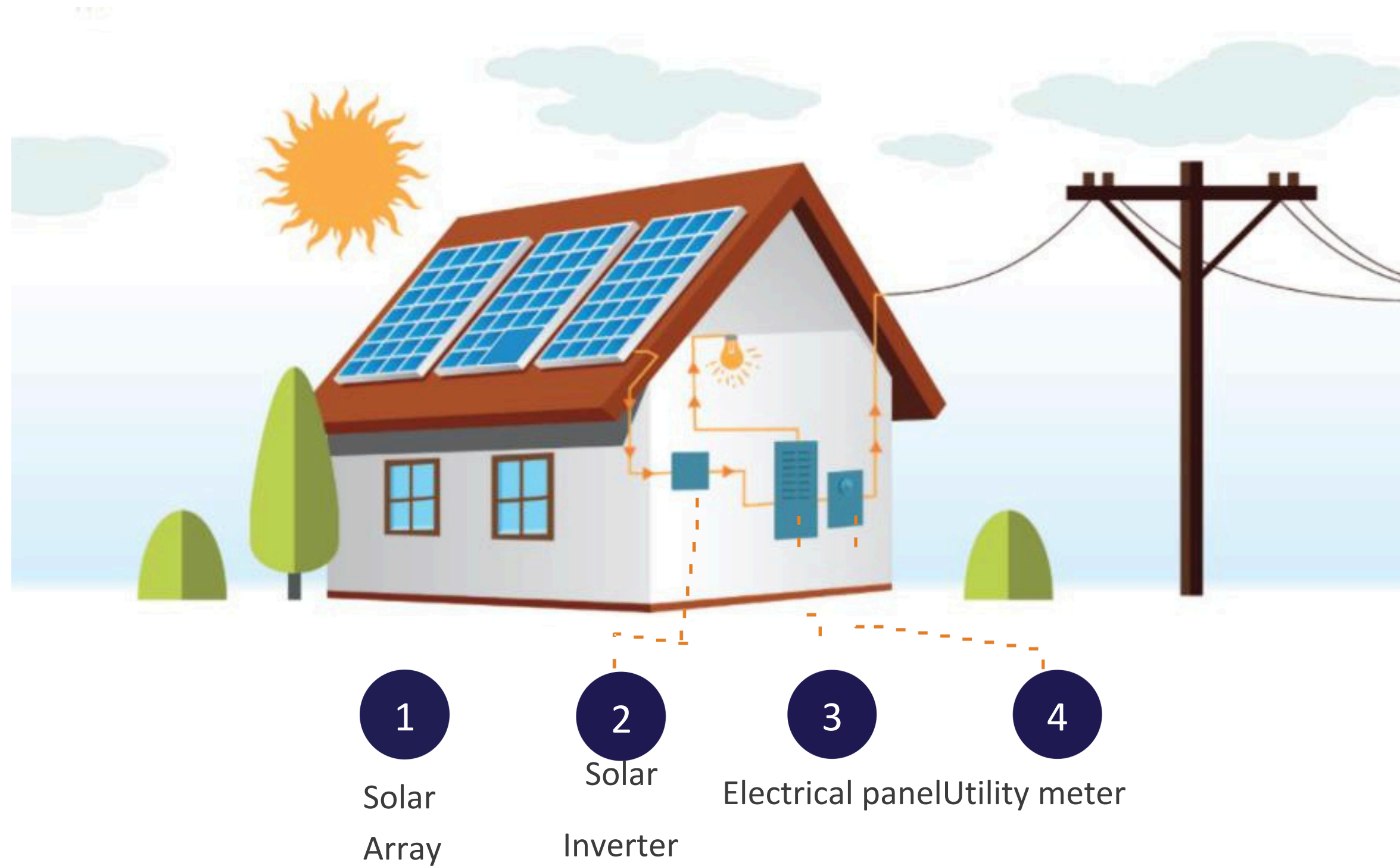
Important Terminology

- Kilowatts (kW): System measured in kW
- Kilowatt-hours (kWh): Electricity production in kWh
- Average size: 6 kW –7 kW, size based on site & goals (budget, covering 100% consumption)

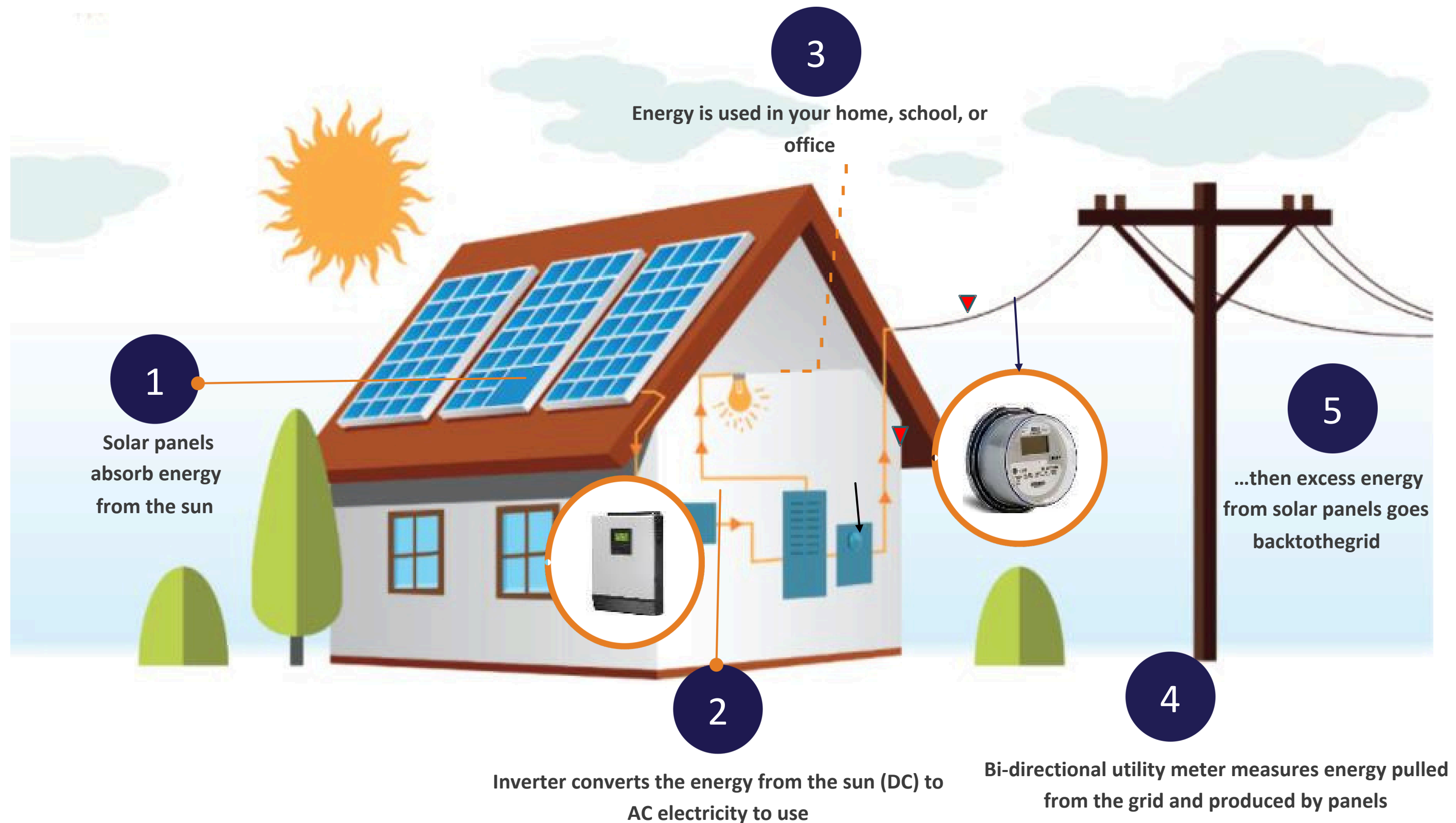


4.2kW Solar Panel Array to scale using 350W panels
(350w x 12 panels = 4,200 watts or 4.2 kW)

Important Terminology



What is Net Metering/Net Billing?



What will your electric bill look like?

Example Electrical Bill	
Electricity used from the grid	300 kWh
- Electricity exported	200 kWh
= Amount of electricity you pay for on your bill	100 kWh

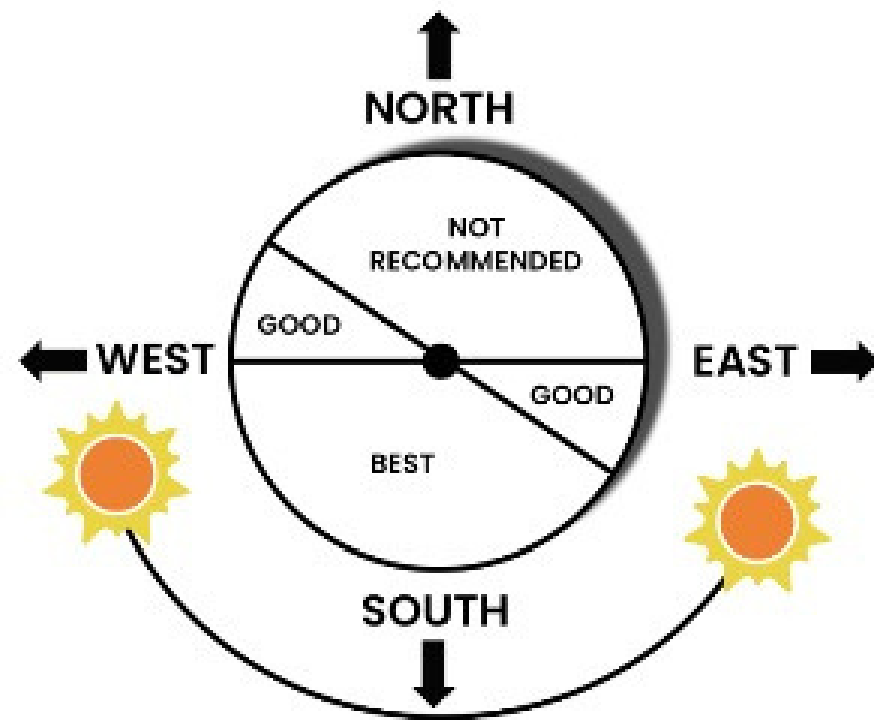
*Your bill may have a service fee or minimum charge

Many electric bills do NOT reflect your self usage. This means that the 200 kWh exported above is what goes to the grid **after your self consumption

What's a good roof for solar?

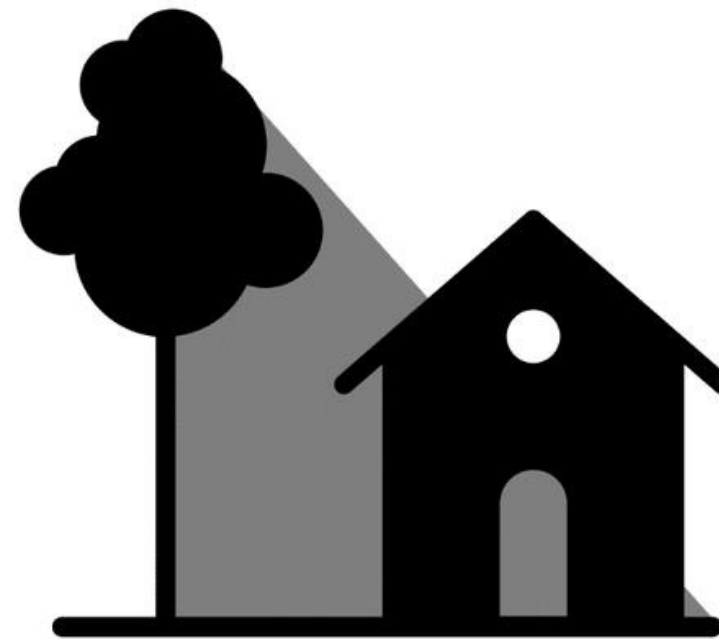
1

Roof
Orientation



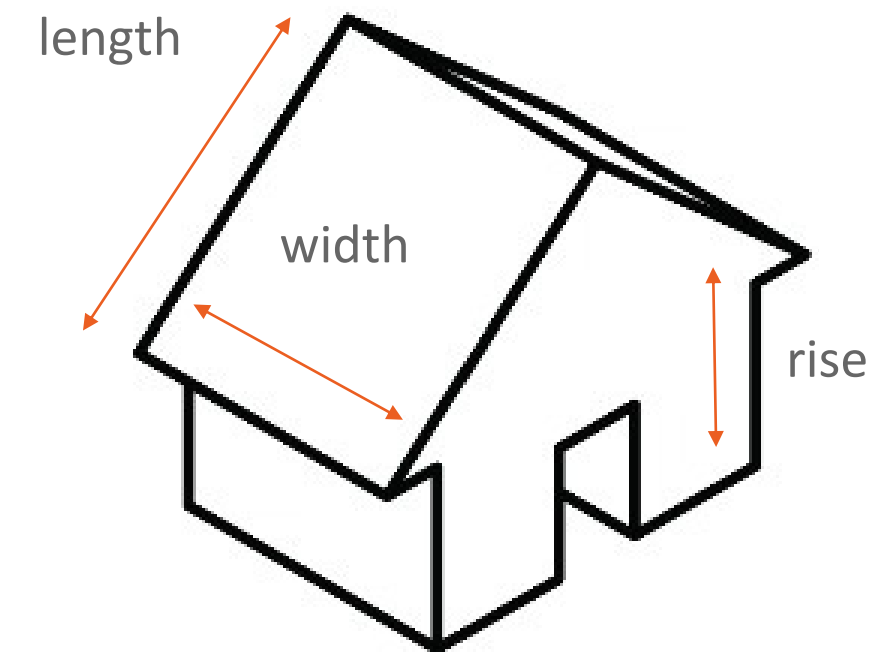
2

Little or no shading



3

Enough space to
mount panels



System Component: Batteries



What happens when the power goes out?

- When grid is down, solar shuts off (safety mechanism)
- Need batteries if you want you want power during outages

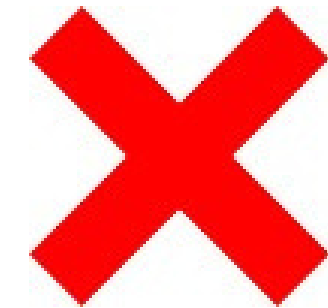
Value of Battery Storage

You might want storage if...

- Frequent utility outages
- Critical loads at home (i.e. well pumps, medical equipment)
- Emergency/disaster preparedness



BACKUP POWER FOR YOU



SAVE MONEY OR GET PAID TO HELP
THE GRID*

*This is coming! How fast depends on where you live.

Example of Battery

13.5 kWh Battery Bank

- Fully re-charged by solar (6kW) daily
- Without sun shining only have 1 day of power
- What will run when the power is out:
 - Refrigerator; microwave
 - Some lights & outlets
 - Cable modem
 - Small window air conditioner
- What they chose not to power:
 - Stove; dryer; electric water heater



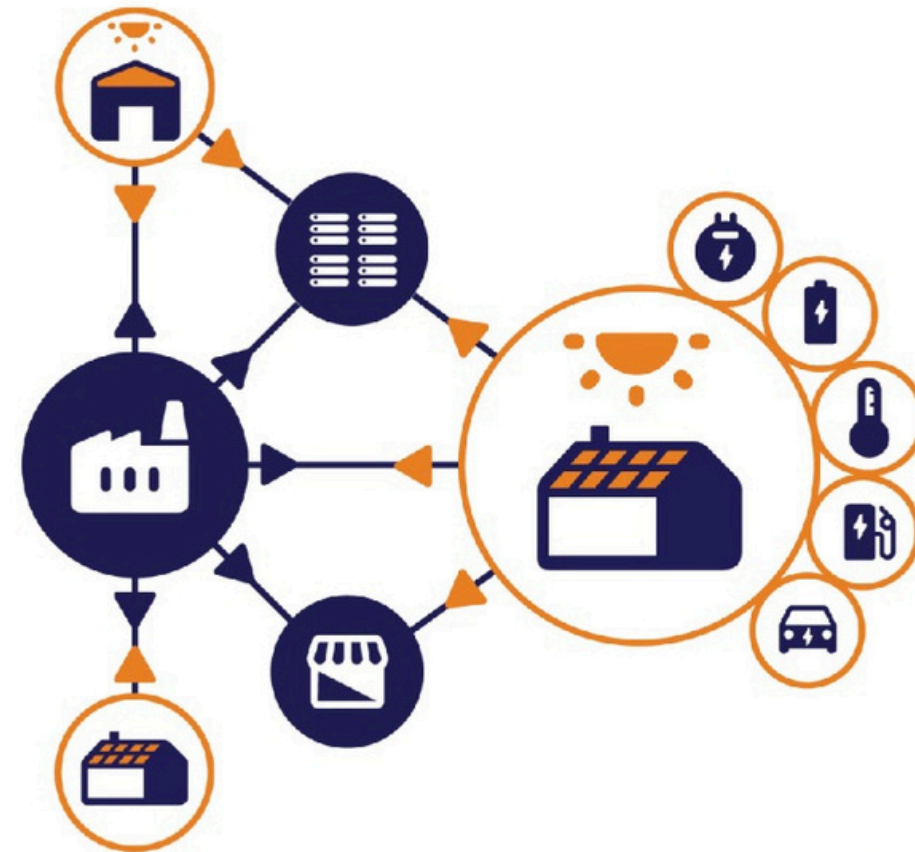
The Johnsons lose power several times of year. Each time the power is out for the entire day.

Value of Battery Storage

Traditional Power Plant



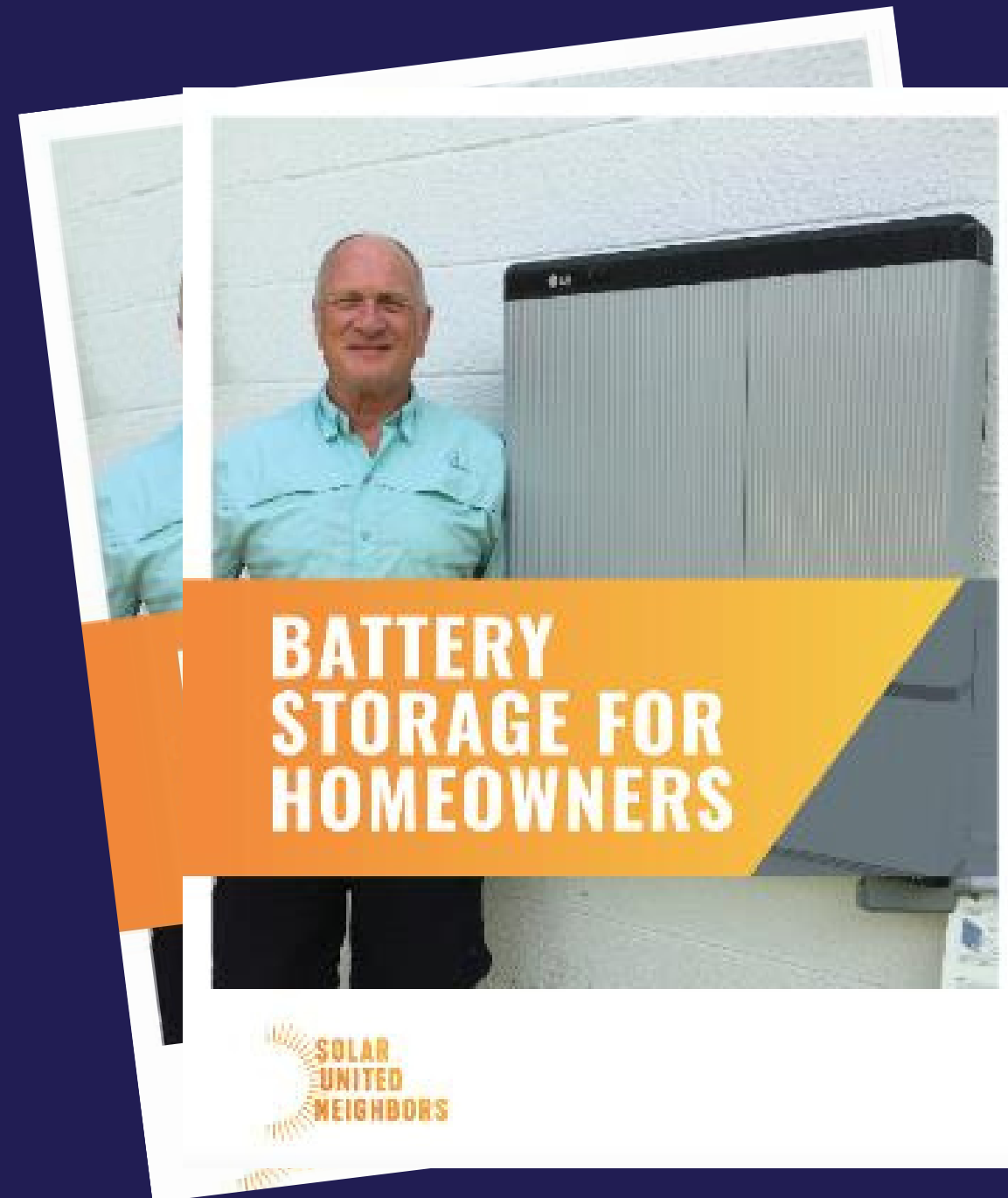
Virtual Power Plant



SOLAR UNITED
NEIGHBORS

- Virtual Power Plants
- Time of Use electric rates
California style
- NEM 3.0

Battery Storage for Homeowners Guide



solaruniteneighbors.org/storage

Frequently Asked Questions

- Warranties?
- Homeowners' insurance?
- Maintenance?
- How long do systems last?
- Will HOA allow solar on my home?
- What if I'm In a historic district?

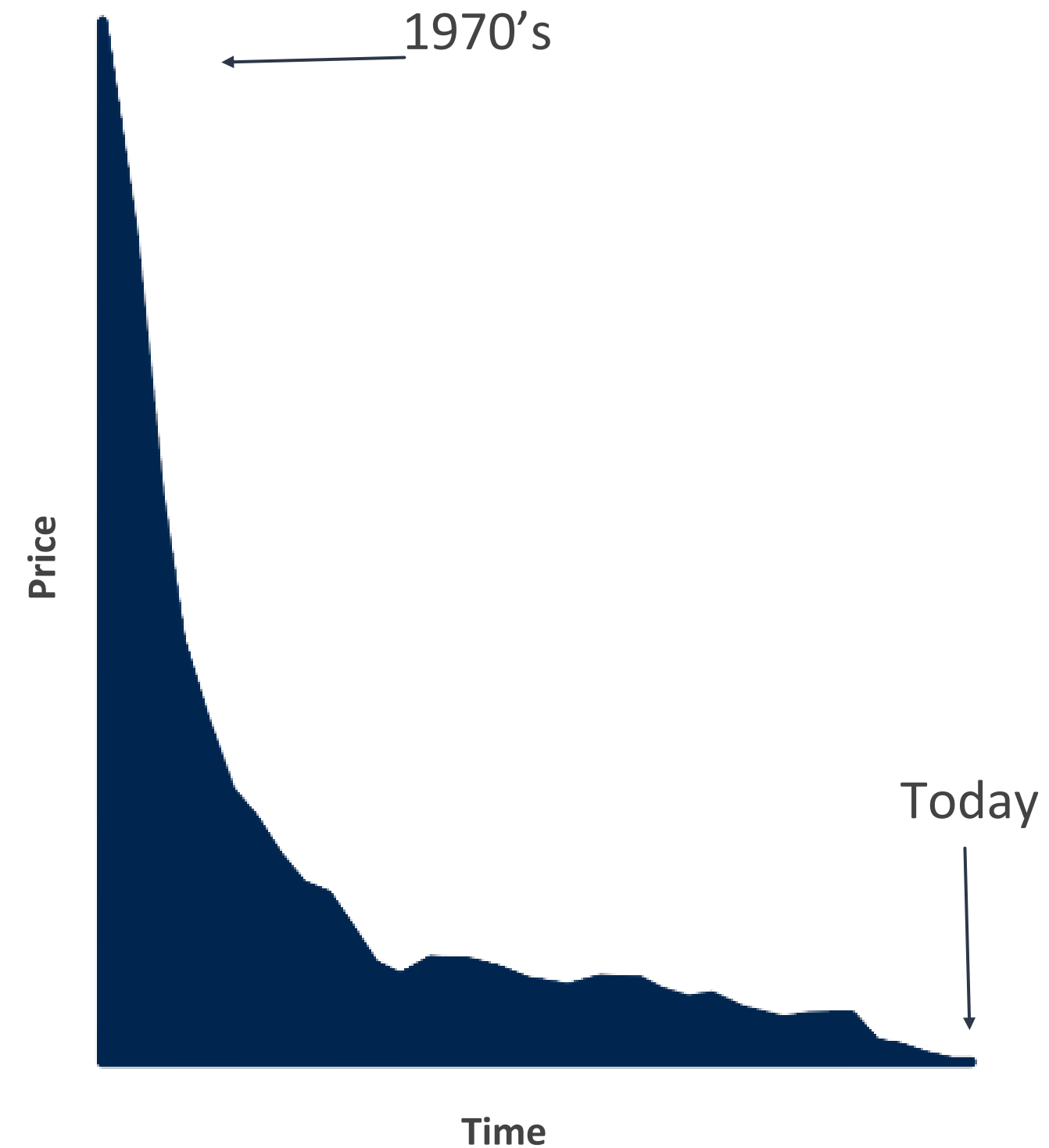
Unit 2: Solar Economics



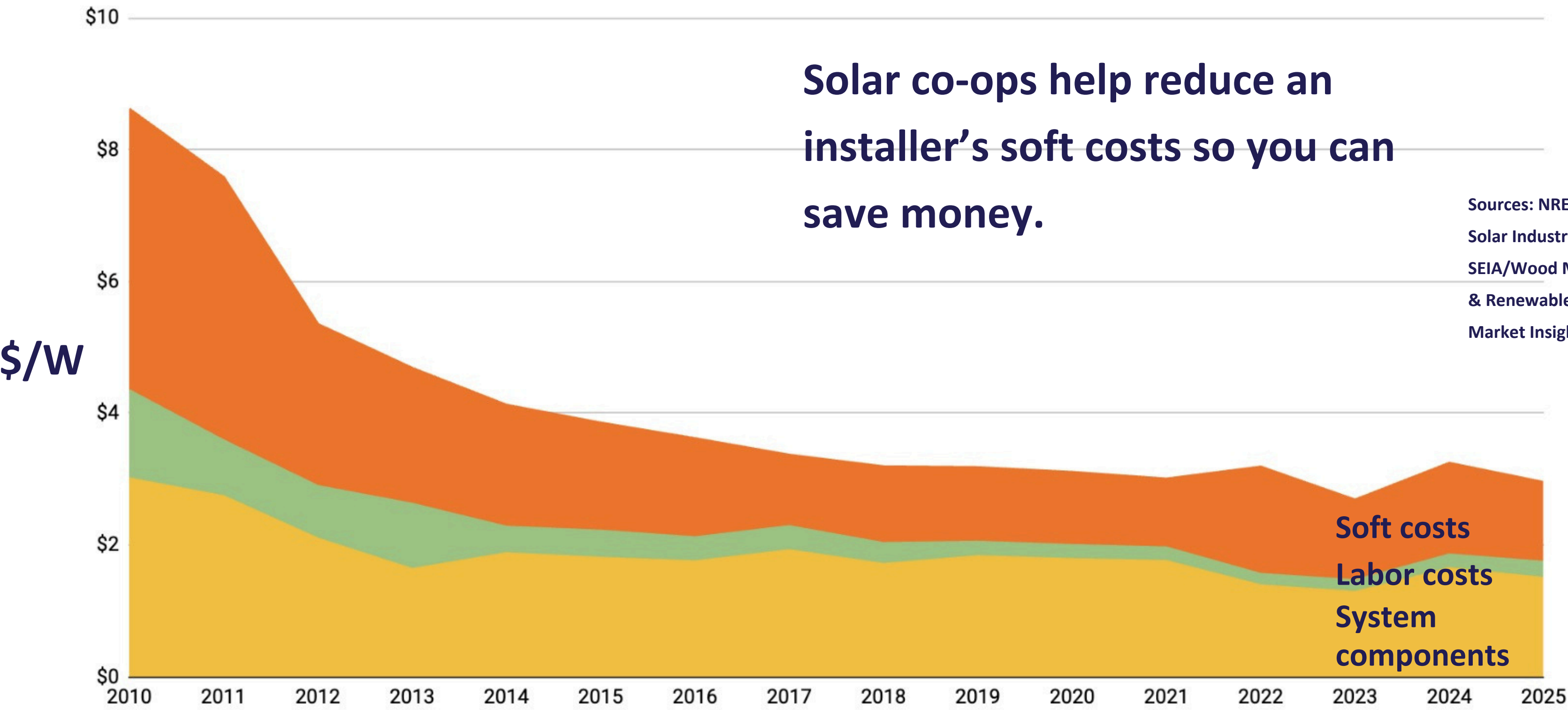
Solar Economics

Solar is a great investment!

- Costs have dropped 73% since 2010
- No longer a specialty or boutique project
- Excellent ROI
- 30% federal tax credit



Breaking down the cost of solar

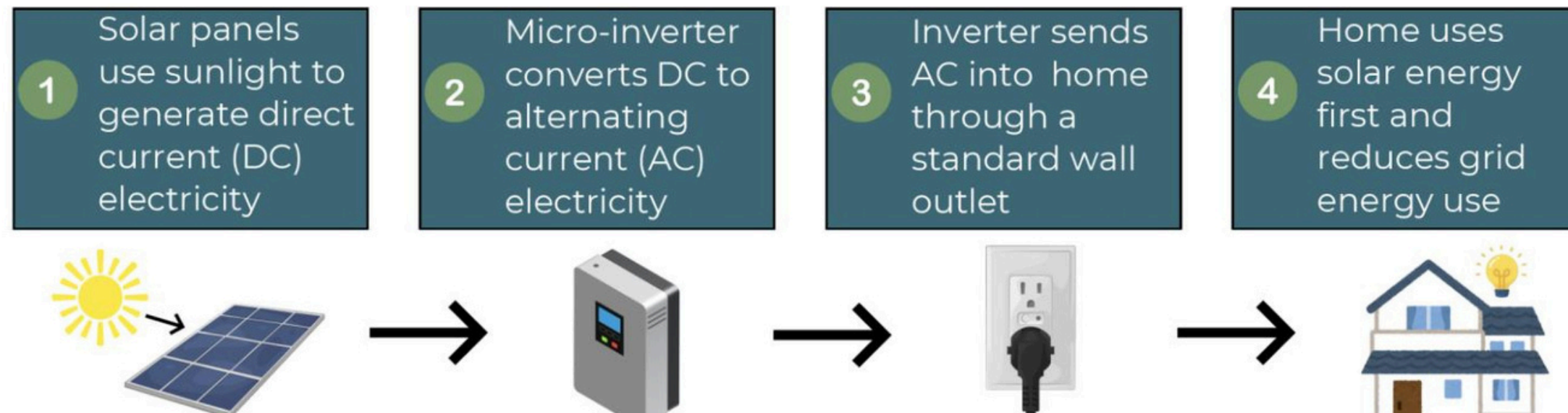


Unit 3: Plug in Solar



What is plug-in solar?

HOW PLUG-IN SOLAR WORKS



Average annual savings: US \$385

Average payback period: US 5 yrs

Average cost of system: \$400-\$2,000

**Average savings are based on national average electricity rates. These will vary by location and utility.*



State legislation is needed to open the market for plug-in solar in the U.S.

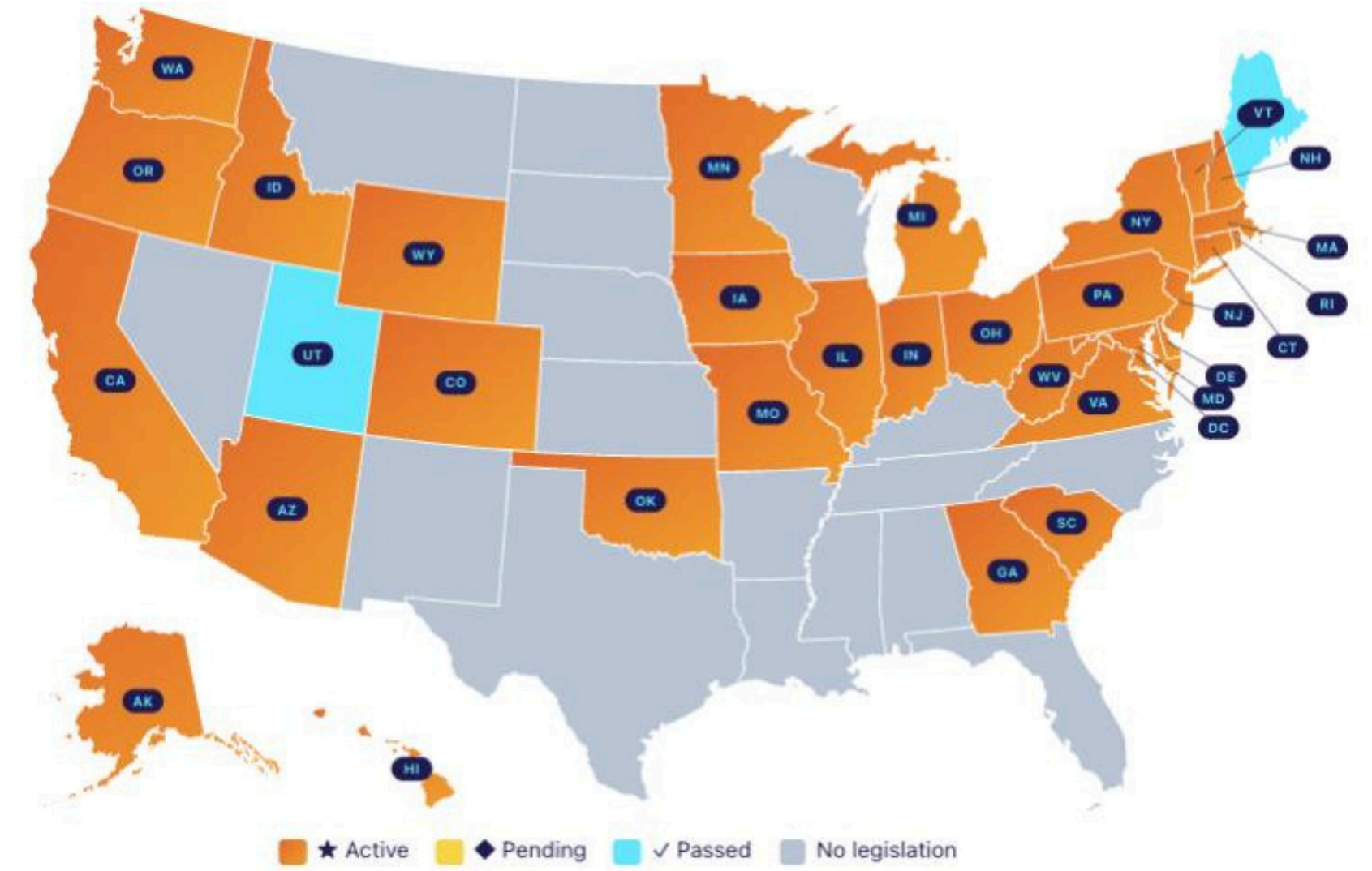
Pass state legislation similar to Utah HB 340 that will enable and open the market for plug-in solar.

- Allow the use plug-in solar without fees or permits
- Removes utility interconnection requirements designed for larger solar installations
- Sets safety standards
- Defines a small, plug-in portable solar system
- Sets system capacity limit: 1200W (~3 panels, 400W each)



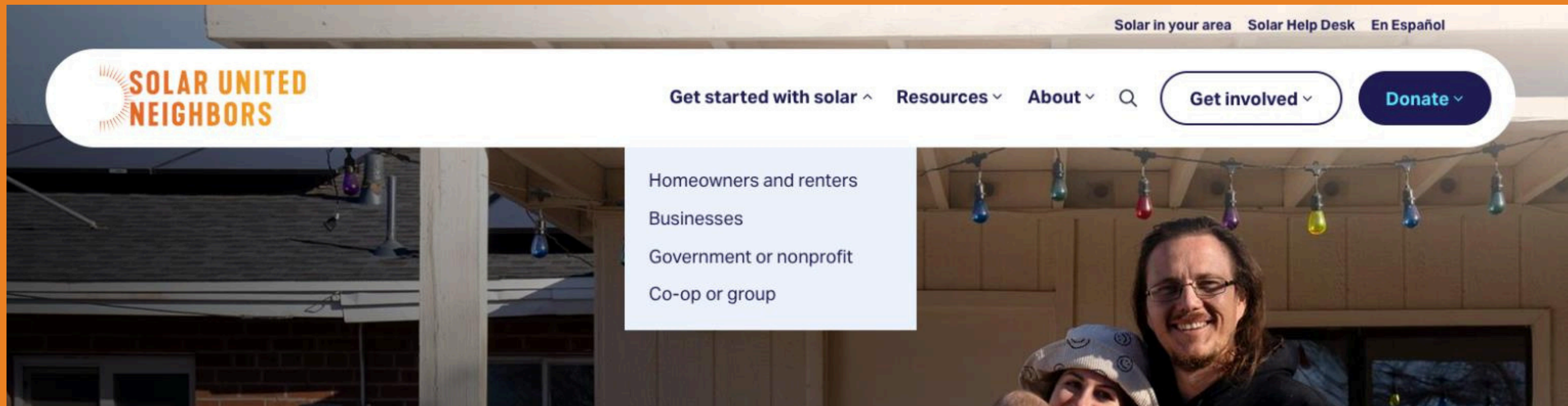
Campaign Update

- **34 states** with bills in state legislatures to legalize plug-in solar.
- Plug-in solar is not only an opportunity to **expand access to the benefits of solar**, but also to a **part of the solution to the energy affordability crisis**.
- Opportunity for **bipartisan collaboration** & to **cultivate solar champions**.
- Offers a new, easy way to **educate decision makers and new audiences** about solar energy.





Get Help with Solar





Problems? Questions? Solar Help Desk



Get started with solar ▾ Resources ▾ About ▾ 🔍

Get involved ▾

Donate ▾

Go Solar Guide

Our guide includes a checklist on going solar, cost and financing info, and a handy glossary.

Solar Owner's Manual

Now that you've installed solar panels on your home, what happens next? We've created a comprehensive 20-page guide about solar panel ownership and maintenance.

Frequently asked questions

The Solar FAQ provides an overview of solar tech, installation, and economics, so you'll have the confidence to go solar.

[→](#)

Get a free roof review

Get a free roof review to determine if your house is eligible for solar.

[→](#)

Schedule a phone call

Hop on the phone with one of our solar experts.

[→](#)

Ask your solar questions

Get feedback on your solar proposal or answers to most of your questions about going solar.

[→](#)

Chat

solarunitneighbors.org/a/go-solar-guide-help-desk

Unit 4: Financing with Clean Energy CU



Rate Comparisons

Comparison of Average Savings, Deposits, and Loan Rates (APR) at Credit Unions and Banks from NCUA as of 12/26/25

Clean Energy CU rates as of 9/1/26

Product	Clean Energy CU	Credit Unions	Banks
1 Year CD (\$10k)	3.6%	2.95%	2.29%
Money market account (\$2.5k)	1.4%	0.74%	0.52%
Interest checking account (\$2.5k)	2.5%	0.15%	0.2%
Credit card (Classic)	NA	12.58%	15.27%
30 Year fixed-rate mortgage	NA	6.26%	6.5%
Used car loan (48 months)	5.49%	5.53%	7.73%
New car loan (48 months)	4.99%	5.32%	7.33%

Source: [ncua.gov/analysis/cuso-economic-data/credit-union-bank-rates/credit-union-and-bank-rates-2025-q4](https://www.ncua.gov/analysis/cuso-economic-data/credit-union-bank-rates/credit-union-and-bank-rates-2025-q4)





CURRENT CLEAN ENERGY CU SOLAR LOAN RATES

Loan Type	Min/Max Loan Amount	Term	APR as low as
Everyday Solar System Loan	\$3,000 to \$150,000	12 years	7.50%
Everyday Solar System Loan	\$3,000 to \$150,000	15 years	8.00%
Everyday Solar System Loan	\$3,000 to \$150,000	20 years	8.25%

1 Clean Energy Credit Union’s solar contractor partners may offer lower rates with modified terms.
2 Rates shown include a 2.00% discount for automatic loan payments.
3 Rates shown are the lowest possible rates for qualified buyers. Rates may change dependent on credit qualifications, underwriting factors, and loan characteristics.
4 Loan proceeds must be used for new equipment.
5 Residences in certain counties and states may be eligible for a 0.50% rate discount, [learn more](#).
6 Refinance loans incur an additional 0.50% added to the rates shown above.
7 APR = Annual Percentage Rate. All rates and programs are subject to change at any time.
See “loan fees” tab for associated fees.



SOLAR REFINANCING

Many solar borrowers are locked into rates that can become predatory over time, and few lenders offer real refinancing opportunities

- Good option for folks with high interest rates, or looking to add panels/battery backup
- Clean Energy CU can refinance your existing loan if you meet the following:
 - Have minimum balance of \$10,000
 - For a system that is under 10 years old
 - Have 6 consecutive on time loan payments preceding refinance
 - Include the original borrowers on the loan
 - Include a current utility bill





DON'T LET COST STOP YOU

FINANCING CLEAN ENERGY UPGRADES

Upfront costs should not stop you from making improvements that save you money long term. There are more financing options out there than most people realize, and it pays to do your research before you need them.

State & Local Programs

State and Local Loan Programs Some states offer 0% or deeply discounted financing for clean energy upgrades. Maryland, New Jersey, and Connecticut all have active programs right now. Check what is available in your state before you borrow.

Mission Driven Lenders

Mission Driven Lenders Credit unions and Community Development Financial Institutions (CDFIs) often offer lower rates and more flexible terms than traditional banks, with programs specifically designed to support low income borrowers and underserved communities.



FIND OUT WHAT YOU MAY QUALIFY FOR

Rewiring America



Rewiring America Calculator
Clean Energy Credit Union

COLORADO
Energy Office

About Us | Clean Energy Future | Residents | Business & Industry | Government & Public Institutions | Contact us

Colorado Home Energy Rebate Program

The Colorado Home Energy Rebate Program will provide rebates to eligible Coloradans for high-efficiency electric appliances and energy efficiency upgrades. These rebates will lower upfront costs for projects that reduce energy use and make homes healthier and more comfortable.

Watch on YouTube

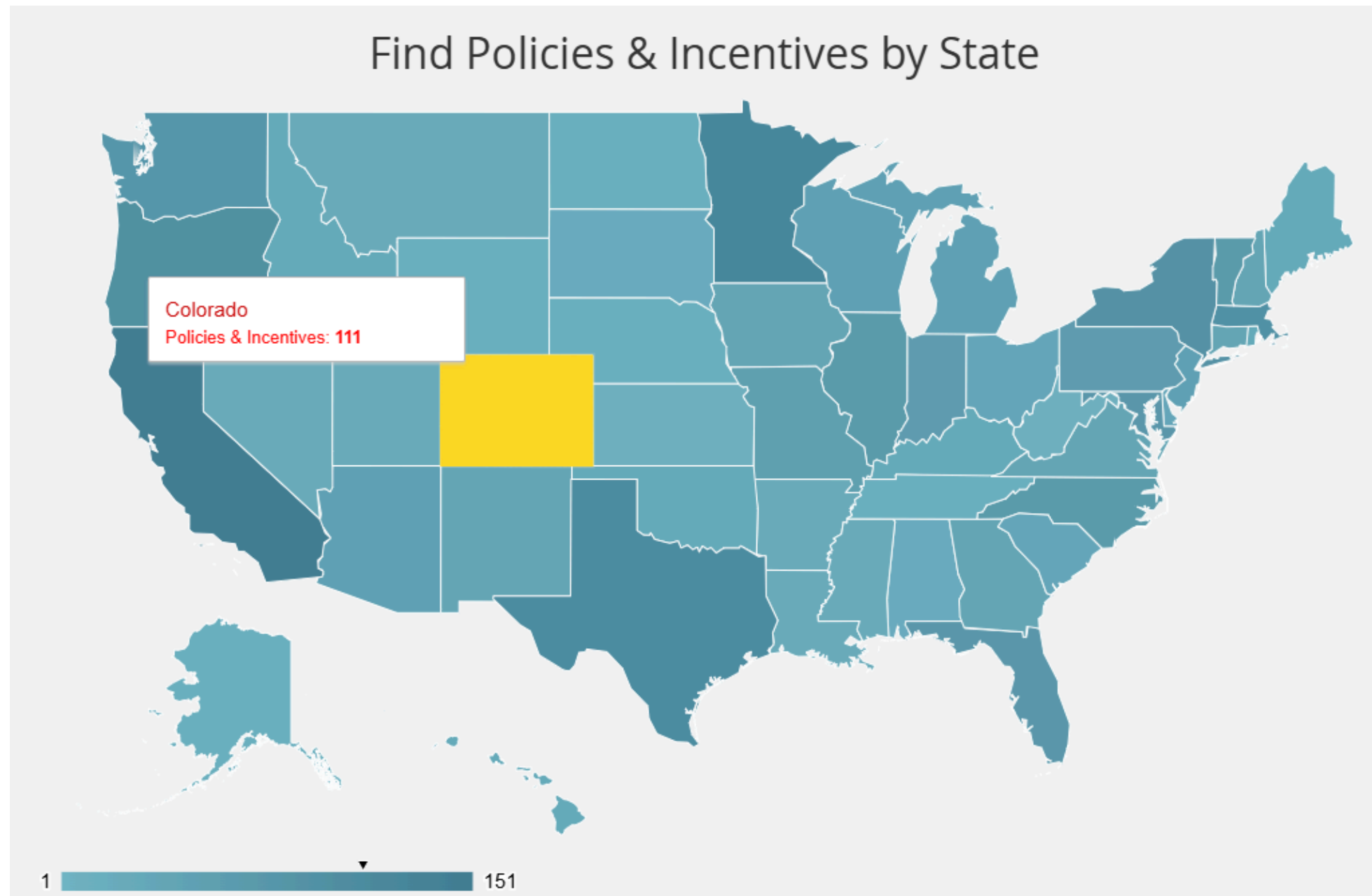
A broad look at federal, state, and utility incentives available to you based on your zip code and household size.

homes.rewiringamerica.org/calculator



FIND OUT WHAT YOU MAY QUALIFY FOR

Database of State Incentives for Renewables & Efficiency (DSIRE)



DSIRE is the most comprehensive source of information on incentives and policies that support renewable energy and energy efficiency in the United States, operating since 1995.

dsireusa.org



Who is the Clean Energy CU movement?



SOLAR ENERGY

**BASICS
TO
BATTERIES**

Q&A



Free Energy Webinar

SAFEGUARD YOUR ENERGY BILL:

HOW TO GET AHEAD OF RISING COSTS BEFORE THEY HIT HARDER

NICK HYLLA

Executive Director of
Midwest Renewable
Energy Association

GARRETT CHAPPELL

Membership Growth and
Development Officer at
Clean Energy Credit Union



SCAN
TO
REGISTER



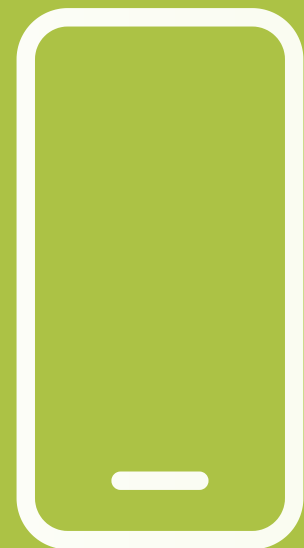
10.29.26

12PM MST



WATCH THE RECORDING TOMORROW

THANKS FOR JOINING US!



**SCAN
ME!**



SOLAR ENERGY

**BASICS
TO
BATTERIES**



THANK YOU!

