



SOLAR UNITED NEIGHBORS

Colorado Springs Solar Co-op Information Session

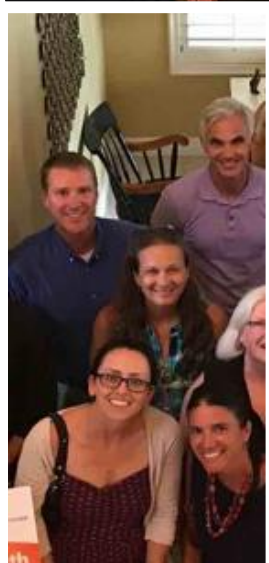


Thank you to our partners!



Overview

1. Who we are
2. How we got started



We're a community of people building a new energy system with rooftop solar at the cornerstone. We help people go solar, join together, and fight for their energy rights.



Working for Equity



How we got started



Started in
2007 and it
wasn't easy!



Helping communities go solar

Arizona

Colorado

D.C.

Florida

Indiana

Maryland

Minnesota

New Jersey

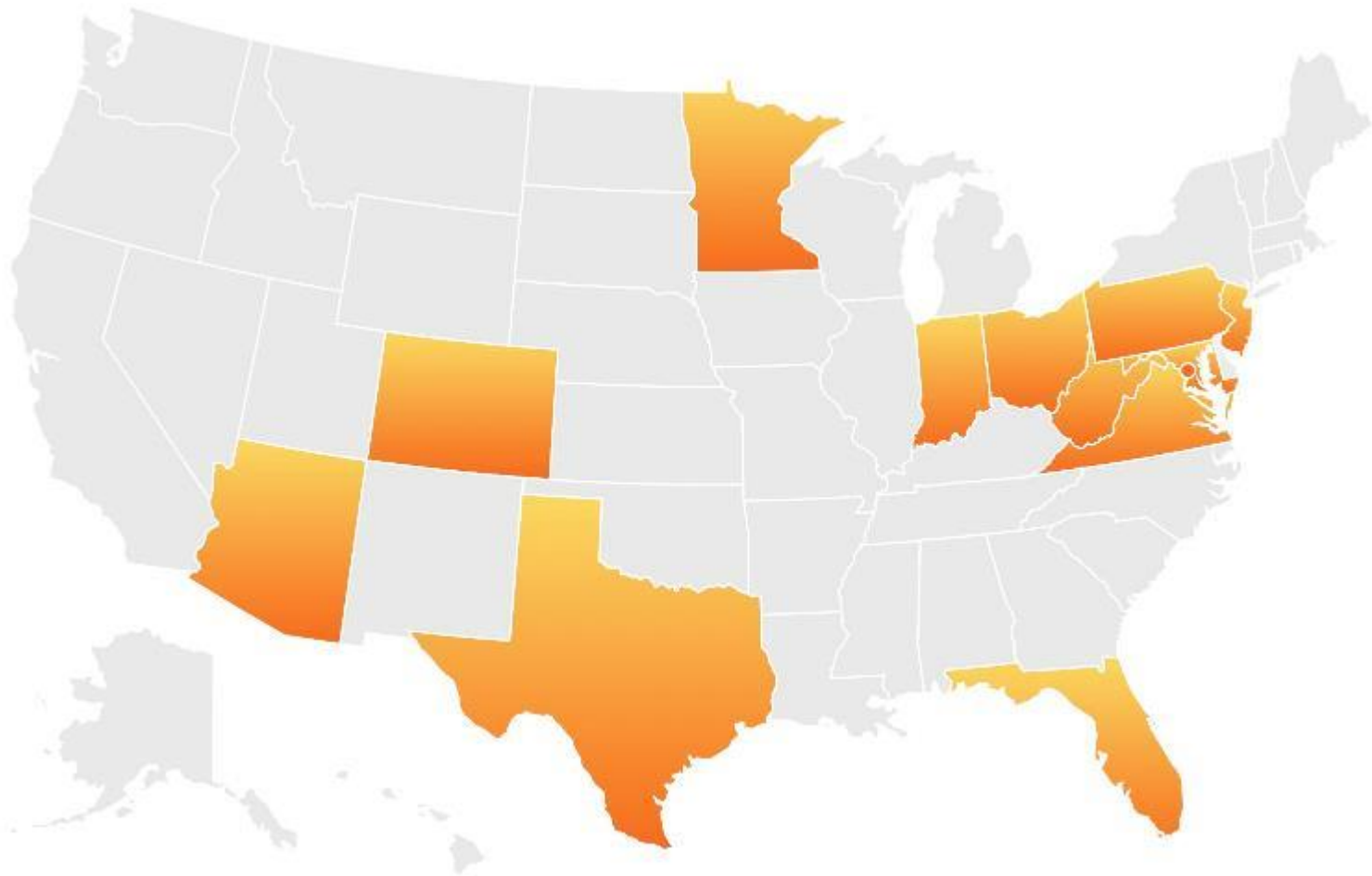
Ohio

Pennsylvania

Texas

Virginia

West Virginia



Presentation in three parts

1. Solar technology

2. How solar co-ops work

3. Solar economics

Part 1: Solar technology

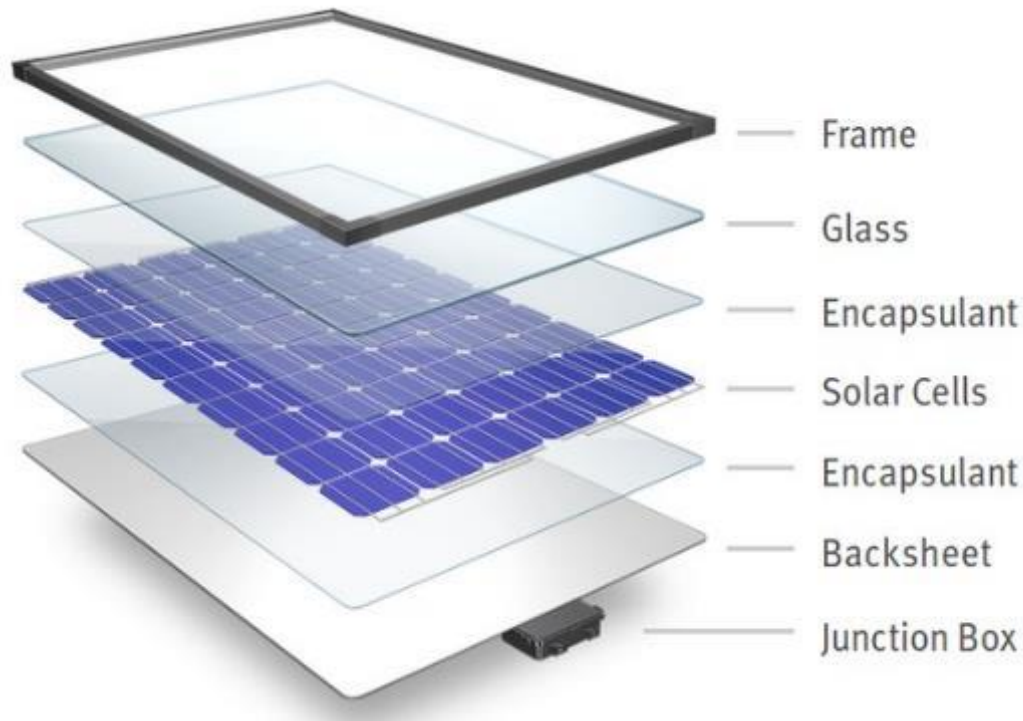
How does a solar panel work?



Solar photovoltaic (PV)

Converts solar energy to electricity

System Components: Panels



Panel / Module

Image Source: DuPont



Solar Array

Important Terminology

Kilowatts (kW) & Kilowatt-hours (kWh)



A 3kW Solar Panel Array - to scale
using 250W panels

System measured in kW

Electricity production in kWh

Most homeowners install between 2 kW – 12 kW

System Components: Inverters



String inverter



String inverter
& DC optimizers



Microinverters

System Components: Electrical Panel



How does my my solar connect to my electrical panel?

Simple connection in panel

Most home electric systems don't need upgrades before solar

HOW SOLAR WORKS



1

Solar
Array

2

Solar
Inverter

3

Electrical
Panel

4

Utility
Meter

System Components: Racking



Attaching racking to roof

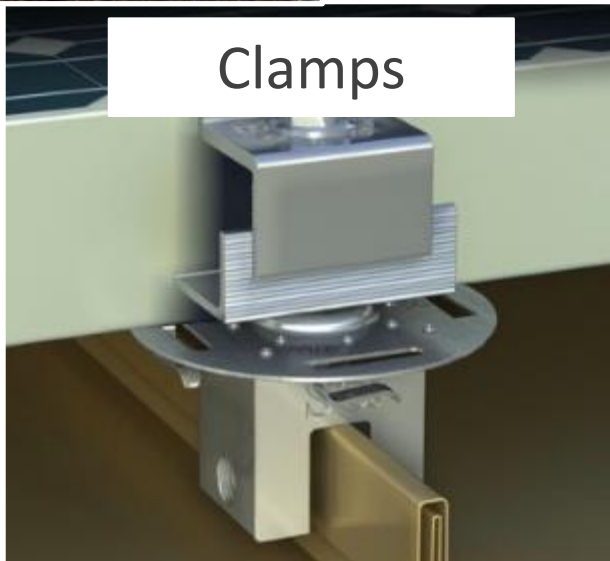
Flashing

Ballast

Stand offs + beams

Clamps

Pitch pockets



Standing seam metal roof



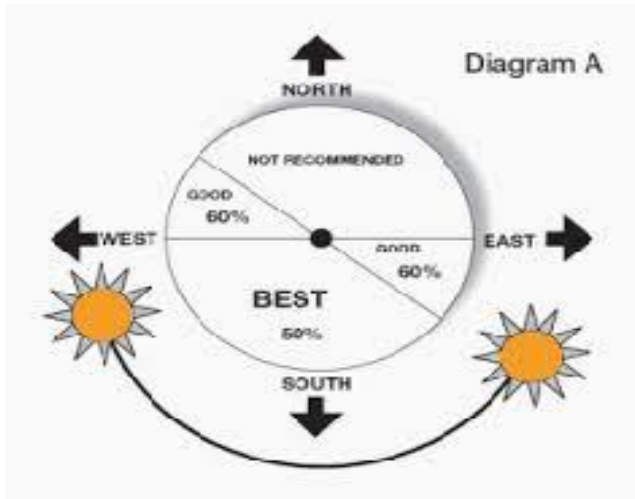
Flat roof



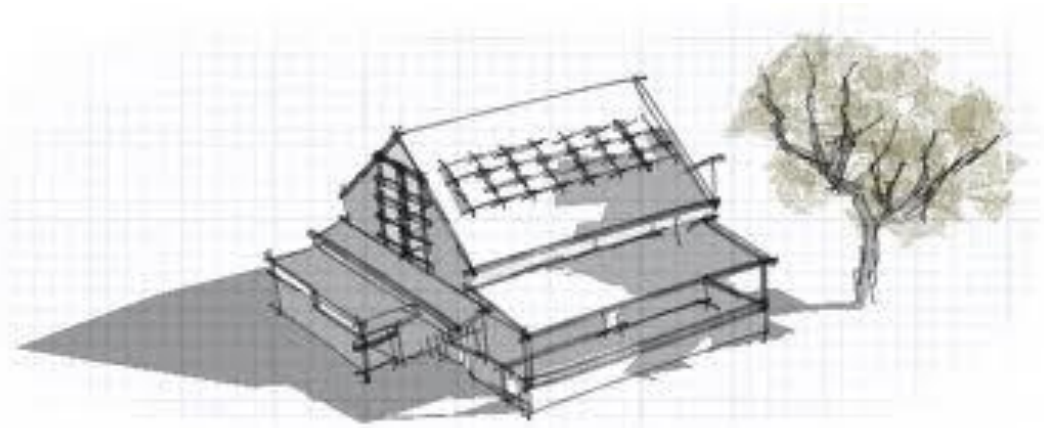
Ground-mounted solar



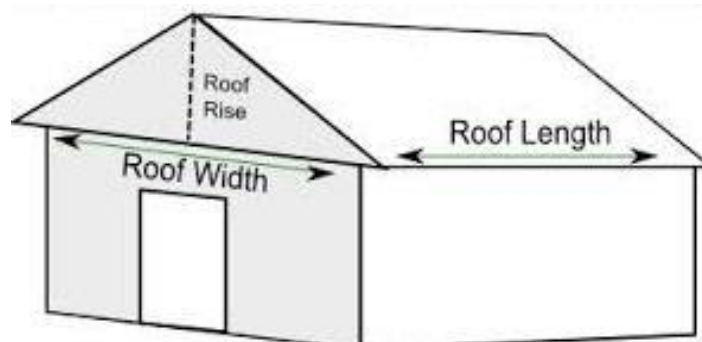
What's a good roof for solar?



Roof faces south



No shading



Enough space to mount panels

Community Solar



Photo Credit: Fresh Energy

Green Power Program



Colorado Springs Utilities
It's how we're all connected

Residential customers can subscribe in 10% increments, beginning at 30%, up to 100% of their demand through a utility scale solar farm

A typical residential customer with 100% Green Power will see an increase of about \$8 per month on their bill.

To learn more and enroll, go to:

[CSU.org/GreenPower](https://www.csu.org/GreenPower)



System Components: 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

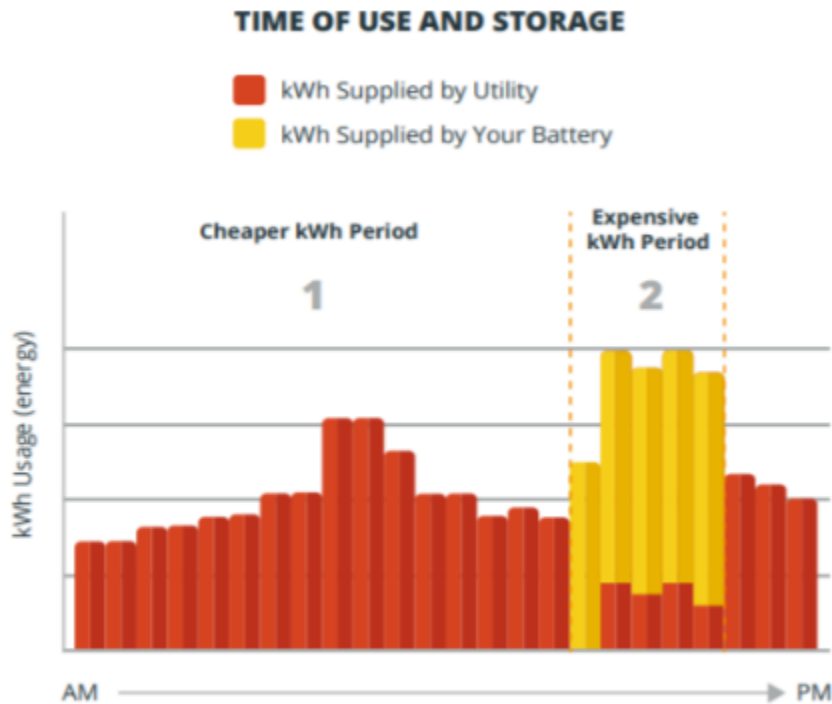
You might want storage if...

- Time of Use
- Rural locations
- Frequent utility outages
- Critical loads at home (ex. well pumps, medical equipment)
- Emergency/disaster preparedness



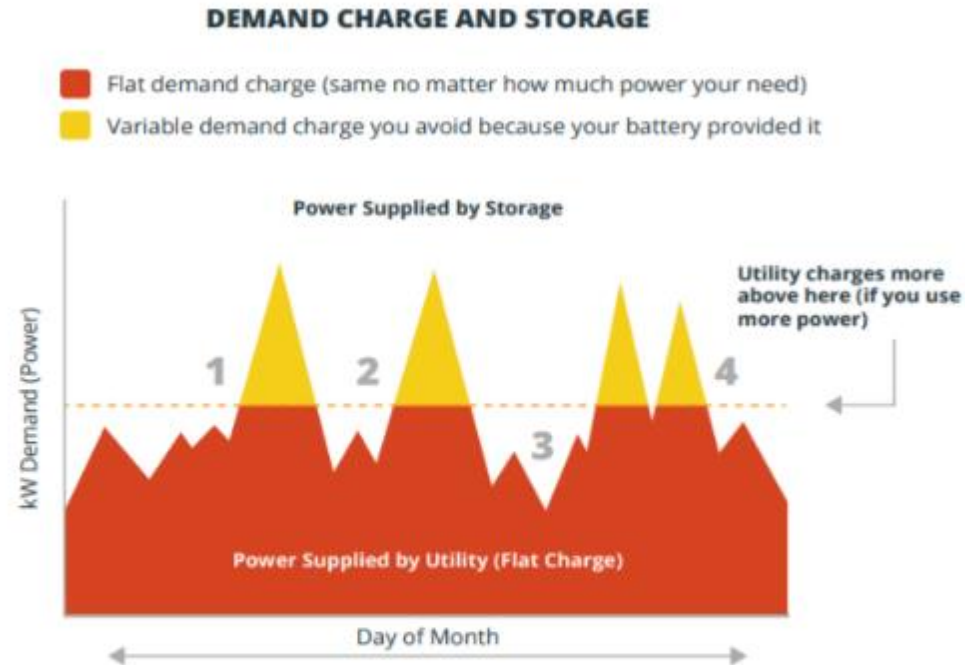
Using Battery Storage to Lower Peak Demand

Residential Time of Use



- 1 Your are getting ready for work in the morning.
- 2 Your are home from work, making dinner, kids are watching TV, and you just turned your AC back on.

Commercial Peak Demand Charges



- 1 & 2 Really cold days and you had your space heaters on.
- 3 Your were out of town.
- 4 You ran the dryer, your microwave, your oven, and you blow dryer all at once.

Most common home batteries

Lead-acid



Pros:

- Lower upfront cost
- Tried and true

Cons:

- Maintenance requirement
- Slow energy discharge (power)
- High space requirement
- Shorter lifespan
- Less usable energy per cycle

Lithium Ion



Pros:

- High energy density
- Lower lifetime costs
- Longer lifespan
- Small space requirement
- More usable energy per cycle

Cons:

- Higher upfront cost
- Newer to market

But wait,
there's
more!

There are other chemistries used in battery applications, but their deployment is **much less common**

Example battery system



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

6 kWh Battery Bank

- Fully re-charged by solar (5.6 kW) daily
- Without sun shining only have 1 day of power

What will run when the power is out:

- Refrigerator; small microwave
- Some lights & outlets
- Cable modem

What they chose not to power:

- Stove; dryer; electric water heater;

Example battery costs

\$15,500: 5.6 kW solar array

+

\$9,000: 6 kWh of storage

Want to learn more?

Check out our new *Battery Storage for Homeowners* guide!

www.solarunitedneighbors.org/storage



Solar and Electric Vehicles



A great combo!

Solar = Local, Clean Fuel

Install an EV charger as part of the co-op

EV Charger

Level 2 chargers



level 2 EV chargers utilize 240 v outlets

- Requires 240 volt outlet
- Installed by professional electrician
- 10-30 miles charge/hour
 - Depends on amps/vehicle
- Variety of units and brands
- Typical Warranty = 3 years

Miles Driven Annually	Solar PV Needed**
3,500 miles	1 KW
7,000 miles	2 KW
10,500 Miles	3 KW
14,000 miles	4 KW
17,500 miles	5 KW
21, 00 miles	6 KW

EV Charger Costs

Charging Unit	\$500-\$700 +
Installation	\$500-2,000 +
Total Cost:	\$1,000--\$2,700 +



What is net metering?

Allows flow of electricity to AND from customer.

1kWh produced = 1kWh consumed

When you generate more than use, extra electricity flows back through meter and you receive a credit on your power bill for that excess production. That credit can roll over month to month.

How it works



$$\begin{aligned} & \text{[Amount electricity used]} \\ & \quad - \\ & \quad \text{[Amount electricity} \\ & \quad \quad \text{produced]} \\ & \quad = \\ & \text{Your monthly electricity bill} \end{aligned}$$

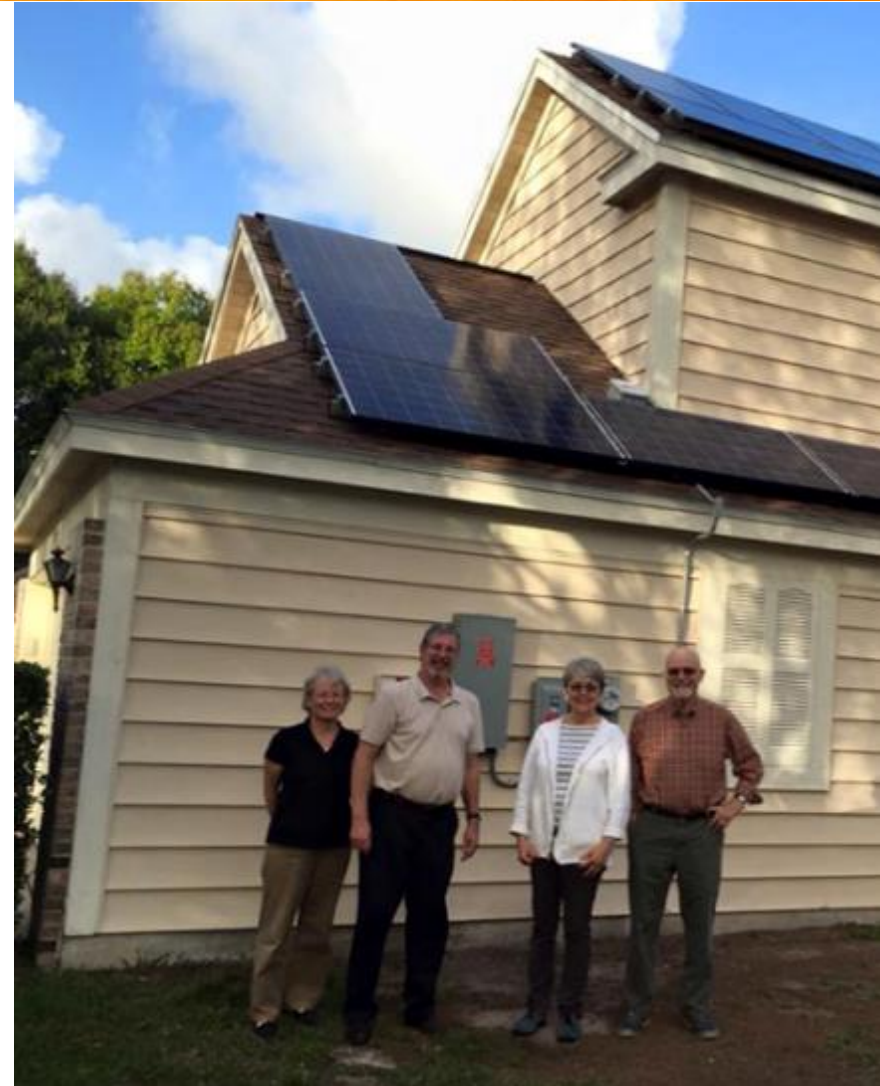
Frequently Asked Questions

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

Part 2: How solar co-ops work

Why go solar with the co-op?

- Best value on installation
- Support throughout the process
- Connect with fellow solar enthusiasts
- Become part of growing solar movement



1 LEARN**about the solar co-op**

Attend an info session, visit our website

2 SIGN UP**online to participate in the solar co-op**

There is a sign-up deadline usually in month 5 or 6

3 GROW THE SOLAR CO-OP**tell your friends and neighbors!****4 SELECT****an installer once the solar co-op has 30 participants****Solar United Neighbors:**

- Issues a competitive RFP on behalf of the solar co-op – open to all installers!
- Review bids, call references and check licensing, equipment and warranties

Solar co-op participants:

- come together to review bids, select a single installer

★ SIGN UP DEADLINE

Last chance to join the solar co-op

5 SCHEDULE**Installer site visit, receive customized proposal based on solar co-op pricing****6 SIGN A CONTRACT with the installer****7 INSTALL solar system****8 PARTY!**

Meet your fellow solar neighbors and celebrate your successes

Who picks the installer?

Co-op members!

Co-op members specific installer criteria including:

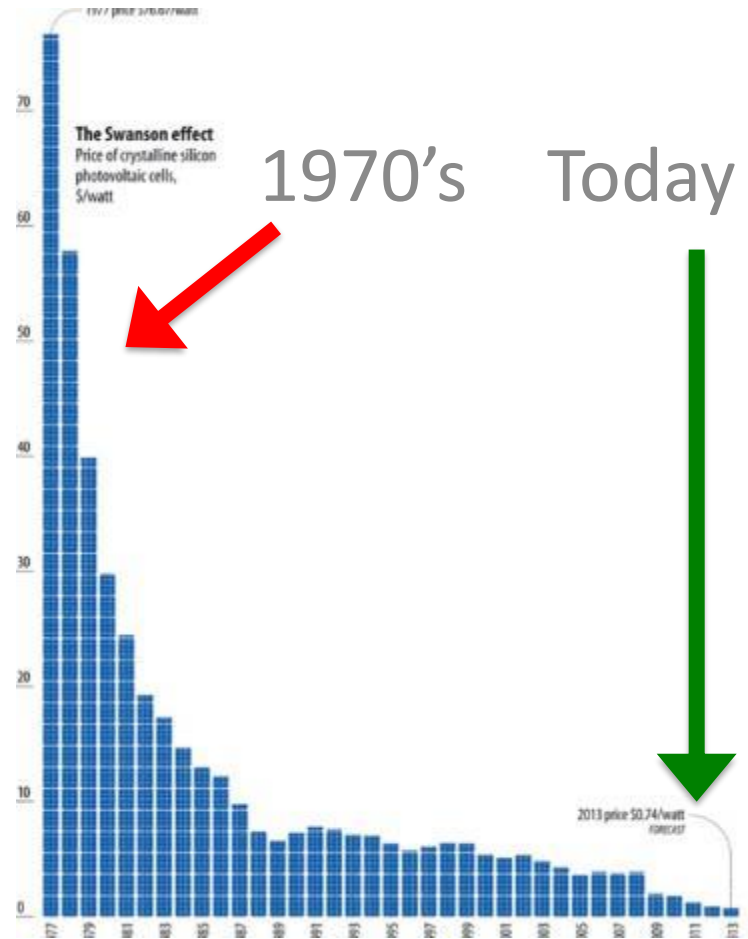
- Price
- Equipment quality
- Warranties
- Experience
- Are a local company

Part 3: Solar economics

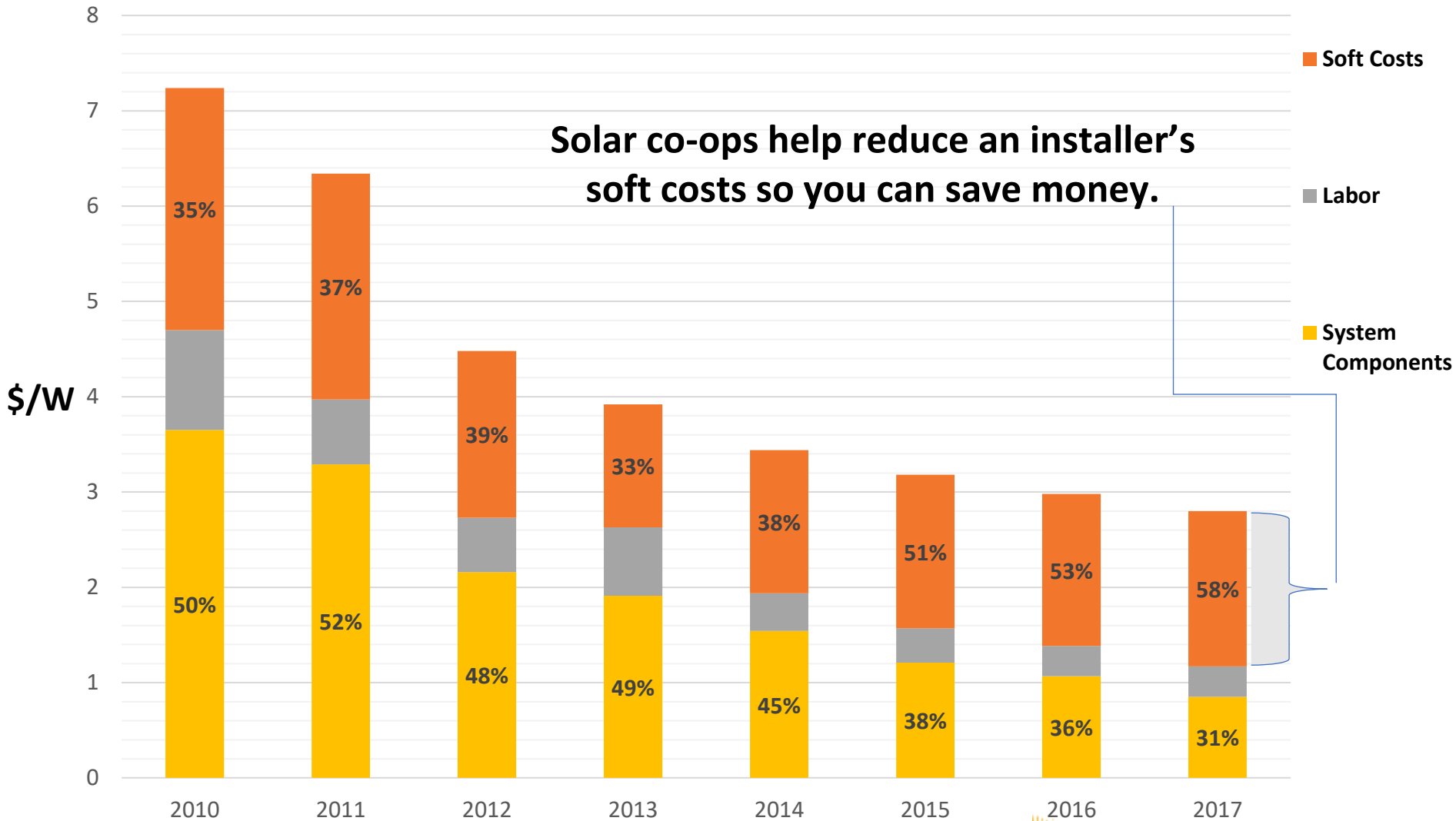
Part 3: Solar economics

Solar is a great investment!

- Costs have dropped 90% in the last decade
- No longer a specialty or boutique project
- Excellent ROI
- 26% federal tax credit (steps down to 22% in 2023; 0% in 2024)



Part 3: Solar economics

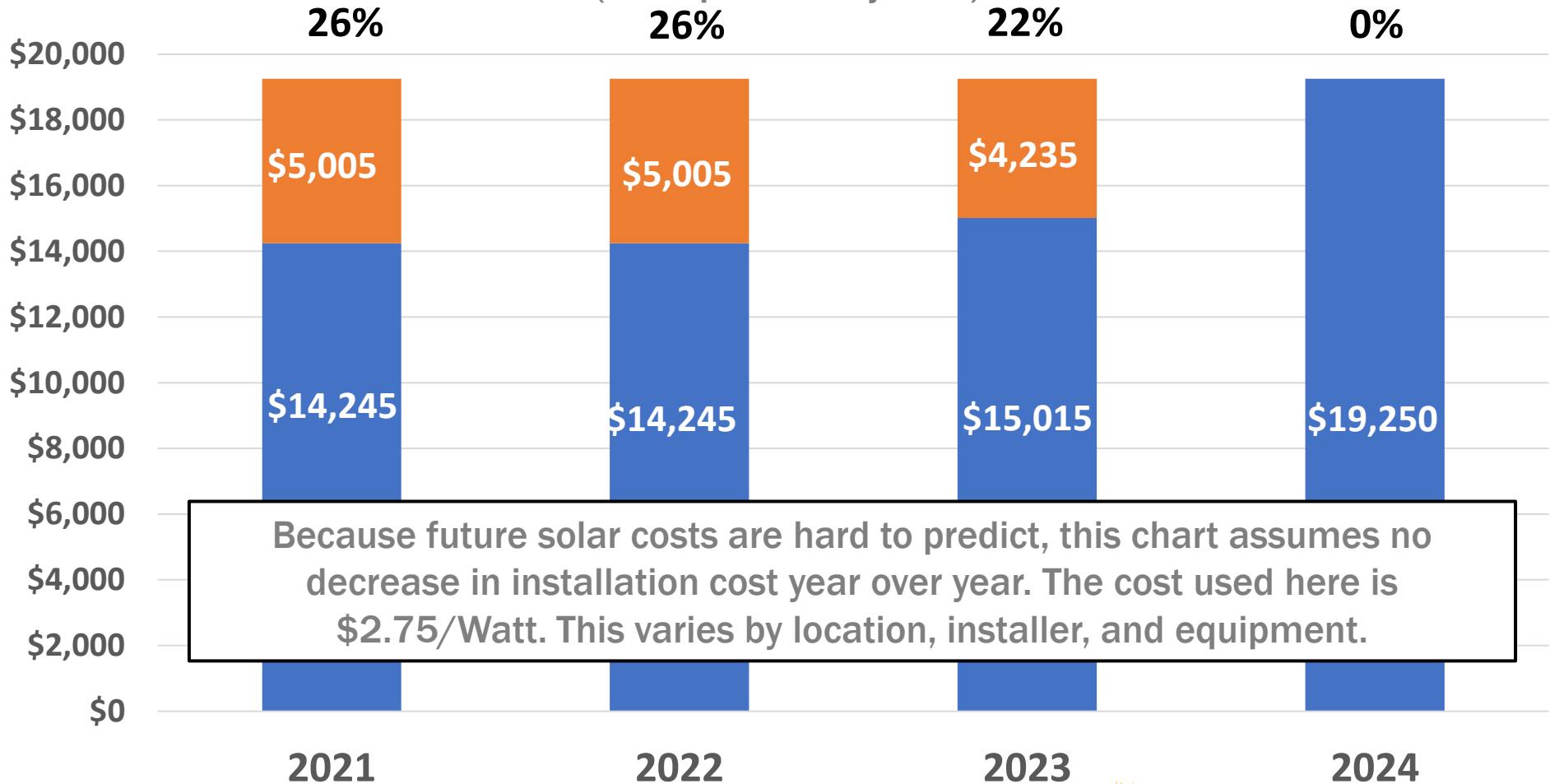


Assumptions: 5.7 kW system size, adjusted for inflation, national data.

Citation: Fu, Ran, David Feldman, and Robert Margolis. 2017. "U.S. Solar Photovoltaic System Cost Benchmark Q1 2017." NREL/TP-6A20-68925. Golden, CO: National Renewable Energy Laboratory (NREL). <https://www.nrel.gov/docs/fy17osti/68925.pdf>.

Federal tax credit is decreasing

Tax credit available as Federal Tax Credit Steps down
(Example 7kW system)



Because future solar costs are hard to predict, this chart assumes no decrease in installation cost year over year. The cost used here is \$2.75/Watt. This varies by location, installer, and equipment.

* Not inclusive of state and local incentives

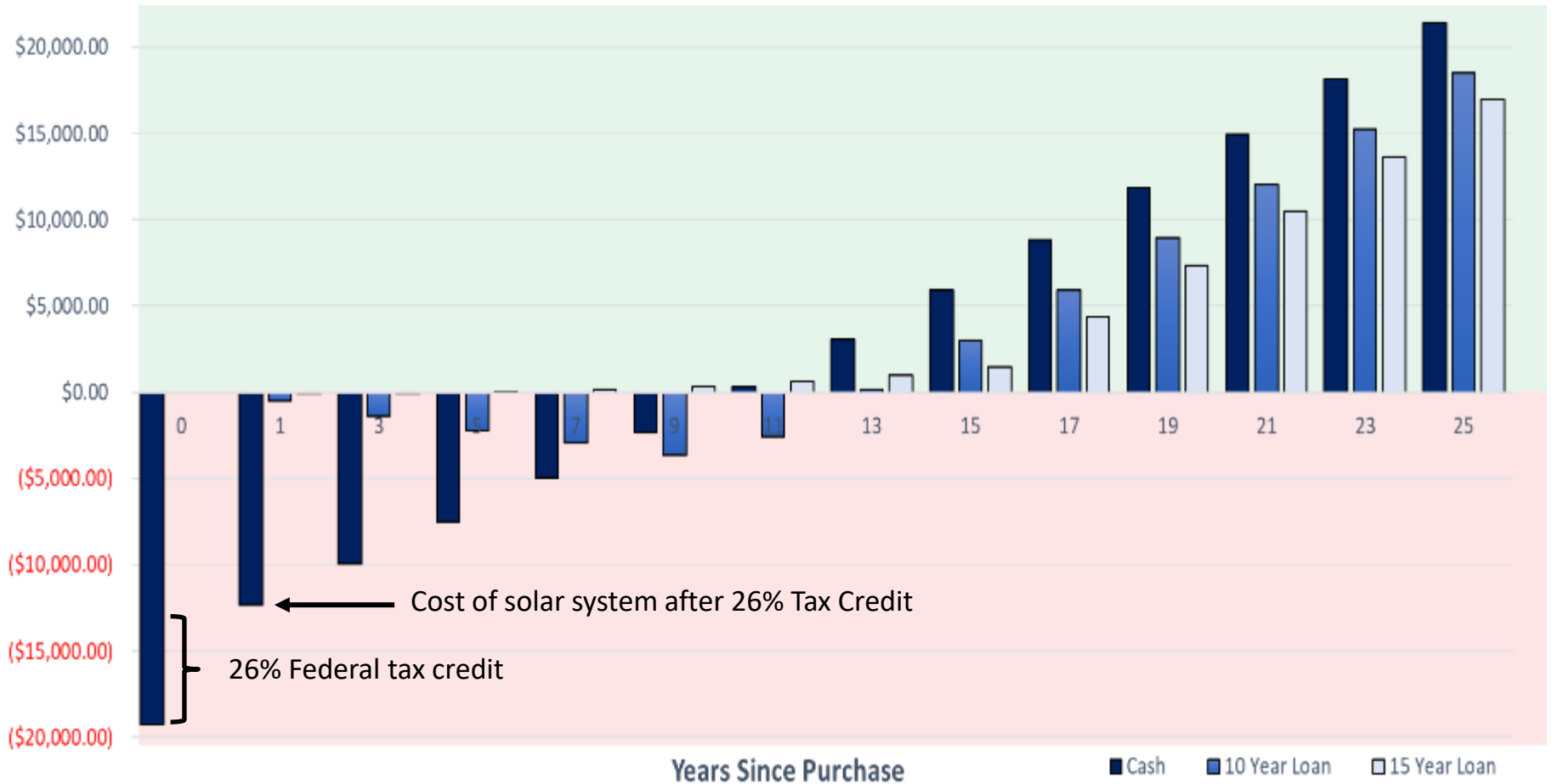
■ Remaining Cost*

Example Pricing

SAMPLE CASH PURCHASE:

EXAMPLE PRICING ONLY. ACTUAL SYSTEM SIZE WILL VARY.	4kW	8kW
Average CO solar pricing (\$3.12/Watt)	\$12,480	\$24,960
26% federal income tax credit	-\$3,245	-\$6,490
\$0.10/W CSU rebate (up to 15kW)	-\$400	-\$800
Net Cost	\$8,835	\$17,670
Estimated year 1 electricity savings	\$784	\$1,568
Estimated year 10 savings (cumulative)	\$8,338	\$16,776
Estimated lifetime savings (25 years)	\$23,543	\$47,086
Net Profit	\$14,708	\$29,416

Cumulative Savings with Solar



Assumptions
 SRECs not included, 2% energy increase per year, 7kW System Size,
 Base Price \$2.75/W, 1336 yearly production of 1kW, \$0.1243 starting
 electricity rate, -0.5% panel degradation per year, 4% Interest rate on
 loan, 70% of cost covered by loan, \$0 Operations and Maintenance
 over system lifetime



Financing Options

Loans (either through installer or on your own)

- HELOC, Standard loans, solar loans & bridge loans
- Refinance and include solar system
- Clean Energy Credit Union or Community 1st Credit Union

Third party ownership

- Power Purchase Agreements (PPAs)/ Leases

Grants

- USDA Rural Energy for America Program (REAP)

Learn more about national and local options:

Solarunitedneighbors.org/financing

What's next?

What's next?

Join the Colorado Springs Solar Co-op:
solarunitedneighbors.org/ColoradoSprings

Tell your friends and neighbors about
the co-op!



Check out the website!


OPEN TO NEW MEMBERS

Colorado Springs Solar Co-op

Residents living within the service area of Colorado Springs utilities are eligible to join

3 months left to join the co-op

[JOIN THE CO-OP](#)

 Co-op closes to new members on July 1, 2021



[CO-OP](#)

[UPDATES \(1\)](#)

[EVENTS \(3\)](#)

[INSTALLERS](#)

Imagine walking into a solar company's office with 50 or 100 of your neighbors and saying, "We all want to get solar. What kind of deal can you give us?"

That's a solar co-op!

In fact, it's even better than that. In addition to competitive pricing on solar panels, you get:

- **Info to help you understand solar.** Our vendor-neutral solar experts are here to help you understand how solar works and make the best decision for your energy needs.
- **A direct line to ask specific questions.** You can call or email us anytime you need help. We'll be here now and long after you install solar.

CO-OP ORGANIZER



Bryce Carter
Colorado Program Director
Solar United Neighbors

Hello and **thank you** for checking out the solar co-op!

Whether you're just curious about solar, or you're ready to make the switch now, **I'm here to help.** I can answer any questions you have about solar. I'll give you installer-neutral guidance to help you make an informed, confident decision about going solar.

I have been a community organizer and environmental

Together we're also fighting for better solar policies!

- Sign Solar Bill of Rights
- Send “I Love My Solar” postcards to elected officials
- Ask Reps to join the solar caucus
- Join a Solar Action Team
- Share action alerts with friends & neighbors



Elected officials need to hear from solar owners & supporters!

Fighting for better solar policies: Pay As You Save Initiative

Colorado PAYS

Pay As You Save® (PAYS®)¹ is a smart way to save us money, create good jobs, and build a sustainable energy system. PAYS helps Coloradans make energy-saving investments and go solar.

Join us to support a bill to require Xcel and Black Hills Energy offer the PAYS programs to their customers.

[SIGN THE PETITION](#)



ColoradoPAYS.org





Thank you!

Bryce Carter

Solar United Neighbors of Colorado

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