



# The Value of Solar:

## A Guide for Real Estate Professionals



# Who might benefit from this information?

1. Realtors
2. Appraisers
3. Homebuilders
4. Real estate investors
5. Property managers
6. HOA boards

# Today's Schedule

1. Who we are
2. Solar and real estate values
3. Solar technology
4. Solar economics
5. Resources / Wrap-up

# **Part 1:**

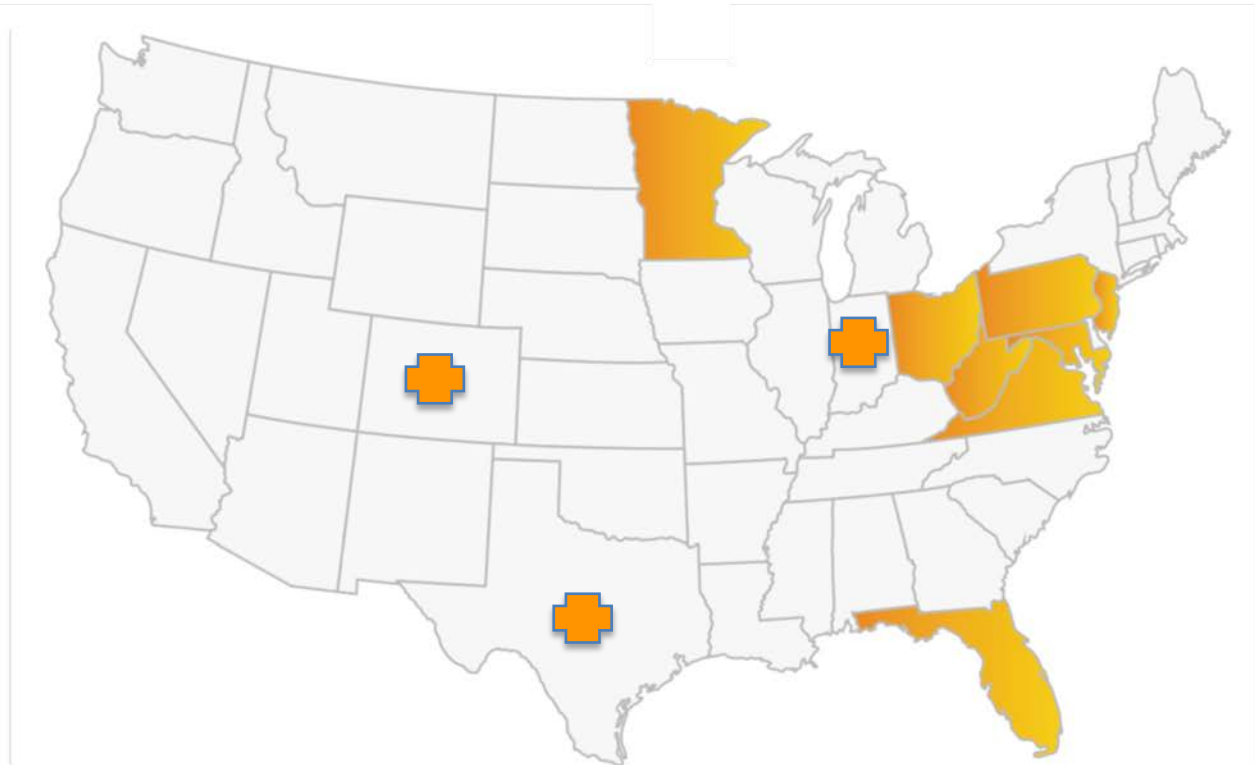
# **Who we are**



# Helping communities go solar

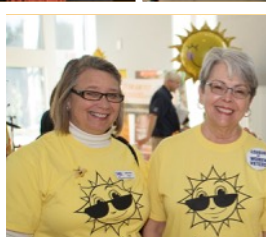


D.C.  
Florida  
Maryland  
Minnesota  
New Jersey  
Ohio  
Pennsylvania  
Virginia  
West Virginia



We represent solar owners and supporters across the country, and have on-the-ground staff in nine states.





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.





# How we got started



**Started in  
2007 and it  
wasn't easy!**





# How we got started



It was harder than we thought!



**IRS**

Department of the Treasury  
Internal Revenue Service





# How Solar Co-ops Work

**What is it?**

**Who picks the installer? Co-op members**

**Co-op participants select specific installer criteria including:**

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

## MONTH 1 THRU 2

### **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!**

## MONTH 3

### **4 SELECT**

#### **an installer once the solar co-op has 30 participants**

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##### **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

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##### **Solar co-op participants:**

- come together to review bids, select a single installer

## MONTH 4 THRU 8

### **★ 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

# Membership

We're the only national organization dedicated to representing the needs and interests of solar homeowners and supporters



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Get expert,  
unbiased solar help

Together we have  
more power

---



**Questions?**



# **Part 2:**

## **Solar and Real-Estate Values**



"While selling our home over the last few weeks, **every real estate agent has called after the showing to ask how the panels work.** I left the book and a sheet out; having an education effort geared toward agents could be a great idea -- even if people don't buy the house with solar panels, they've learned how they work and the value they add to a home. In Gainesville the average time on market is two months, and our house sold in about a week. Yay solar!!" Alachua County, FL homeowner



# Do You Watch HGTV?



**Solar adds  
long-term value  
to a home**



# Quantifying the Effects of PV Solar on Home Sales



- Total Sale Price
- Increase Based on System Size
- Increase Based on Energy Savings
- Speed of Sale
- Increased \$ for Mortgage



# Quantifying PV Solar Effects on Sales of Homes

## Solar Homes ~ Premium Prices

THE NUMBER OF **SOLAR HOMES**  
IN AMERICA IS GROWING QUICKLY



**SOLAR HOMES SELL  
FOR MORE MONEY**

**\$15,000  
PREMIUM**

Two 2015 studies from Berkeley Lab show that home buyers across the country have been willing to **PAY A PREMIUM** of about **\$15,000** for a home with an average-sized host-owned solar array.



# Energy Savings = Real Money



Each \$1 in energy bill savings adds  
\$20 to a home's value\*



# Solar Helps Realtors



**Solar homes sell 20% faster than equivalent non-solar homes\***

<https://www.nrel.gov/docs/fy07osti/38304-01.pdf>



# Solar Helps Investors



*Image Source: Vox.com*



# Cost of Ownership or Occupancy

- Energy
- HOA
- Taxes
- Insurance
- Mortgage or Rent

**FHA**

**Mortgage**

“A mortgage is eligible for an increase of up to 20 percent in the maximum insurable mortgage amount, if such an increase is necessary for the installation of solar energy equipment.”

Can you afford to pay more \$ for  
Mortgage or Rent if electricity \$ is low to \$0?

# Solar Statistics (DE, NJ, NY, PA)



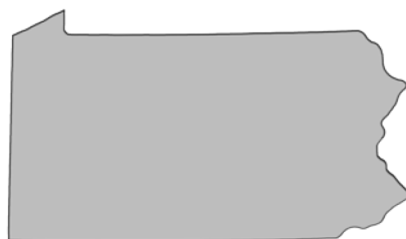
102,508 installations



94,150 installations



6,163 installations



22,293 installations

SunCatcherStudio.com



# Part 2: Solar & home values

Solar consistently adds value across a variety of states, housing and solar markets, and home types\*



\*Hoen, B., S. Adomatis, T. Jackson, J. Graff-Zivin, M. Thayer, G.T. Klise, and R. Wiser. 2014. Selling into the Sun: Price Premium Analysis of a Multi-State Dataset of Solar Homes. Berkeley, CA: Lawrence Berkeley National Laboratory.

# Part 2: Solar & home values

## Appraising a solar home

- **Factors impacting value determination:**
  - Location
  - Size of system
  - Age of system
  - Efficiency of system
  - Retail cost of electricity
  - Local incentives



# Part 2: Solar & home values

## Resources for appraisers:

- **Department of Energy PV Value Tool** ([www.pvvalue.com](http://www.pvvalue.com))
  - allows for calculation of both cost and income approach to value
- **Appraisal Institute's Green Building Resources** ([www.appraisalinstitute.org](http://www.appraisalinstitute.org))
  - Valuation of Sustainable Buildings Professional Development Program
  - Publications, seminars, and webinars

our home presentation.

Every real estate agent has called after the showing to ask how the panels work. I left the



# Break!



# **Part 3:**

# **Solar technology**



"We have a contract on our home, and we go to closing on September 15 . . . Our buyers were VERY impressed with our \$8.20 electric bills earlier this spring. Also they thought the \$60.00 was great for the summer months. SO was solar a factor in the sale? I would say so, yes."

- Satellite Beach, FL homeowner

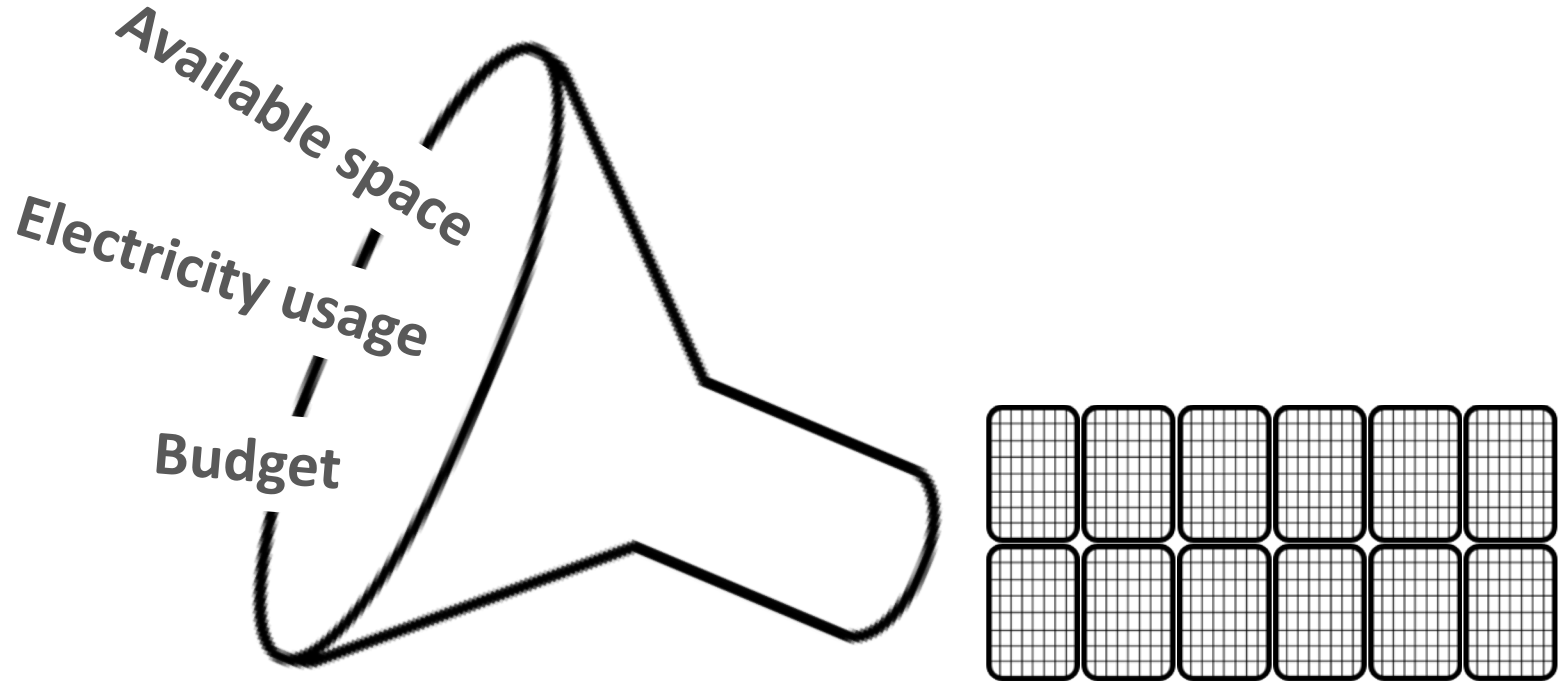
(Realtor used a drone to highlight solar in the listing.)





# Part 3: Solar technology

How big will my solar array be?



# Part 3: Solar technology



**How does a solar panel work?**

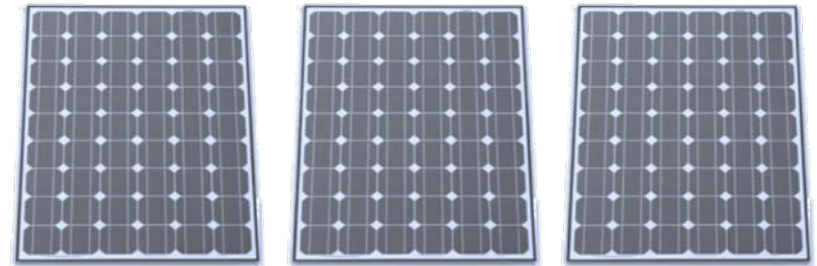
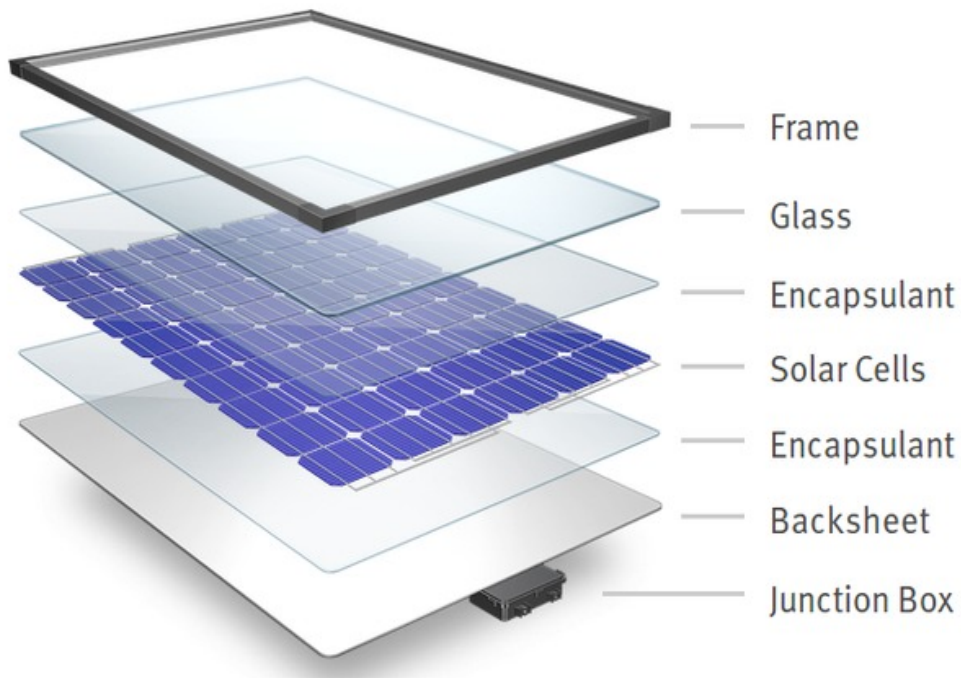
Solar photovoltaic (PV)

Converts solar energy to electricity



# Part 3: Solar technology

## System components: Panels



**Solar Array**

**Panel / Module**

*Image Source: DuPont*

# Part 3: Solar technology

## What about solar shingles?



Image from tesla.com



**“Building Integrated Photovoltaics” or BIPV**



# Part 3: Solar technology

## What the hail?



**In 2017 a giant array at the National Renewable Energy Labs (NREL) of more than 3,000 panels was hit with large hail and only one panel was damaged**

# Part 3: Solar technology

## System components: Inverter & Racking



**Racking system**



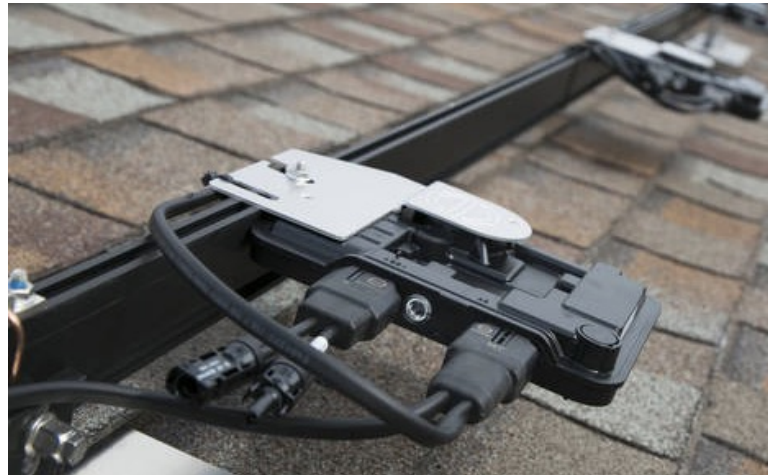
**Inverter**

# Part 3: Solar technology

## Different Types of Inverters



String inverter(s)



Microinverters



Optimizers +  
String inverter(s)





# Part 3: Solar technology

How does solar connect to a roof?



# Part 3: Solar technology

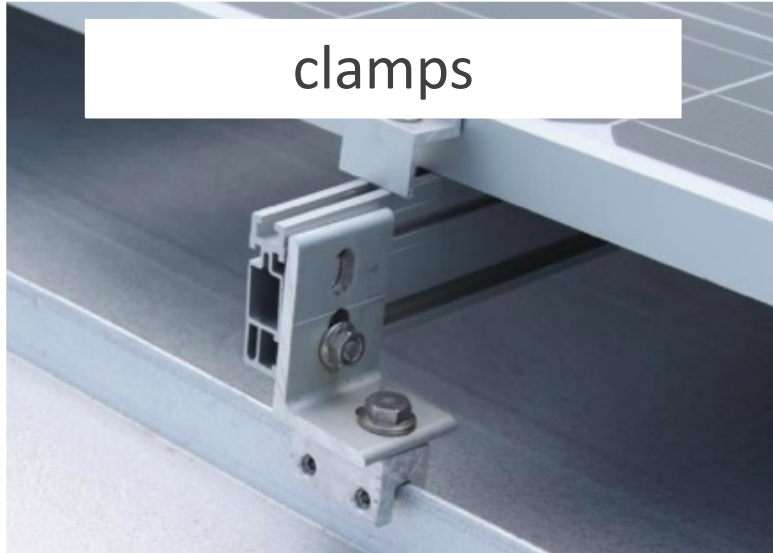
How  
does  
solar  
connect  
to a flat  
roof?



ballast



stand offs + beams



clamps



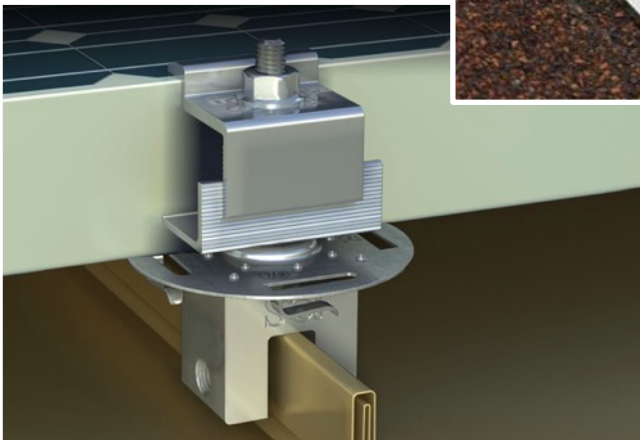
pitch pockets



# Part 3: Solar technology

## How does solar connect to a pitched roof?

Usually flashings,



or clamps



# Part 3: Solar technology



# Part 3: Solar technology





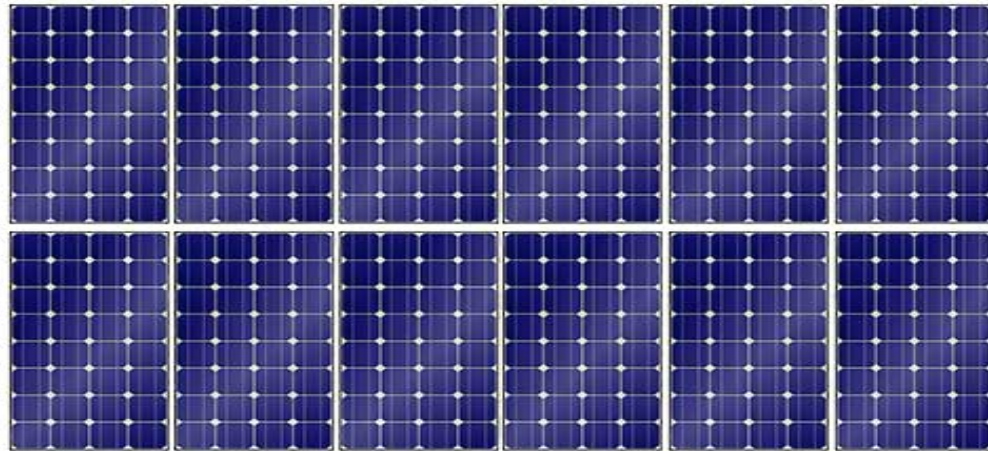
# Part 3: Solar technology





# Part 3: Solar technology

## Terminology: Kilowatts (kW) & Kilowatt-hours (kWh)



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

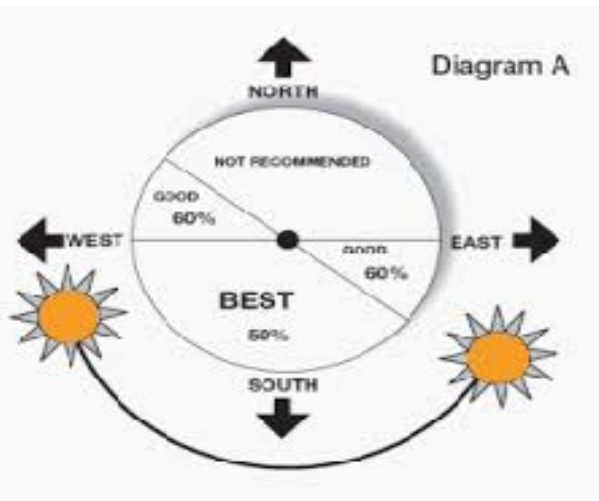
System measured in kW

Electricity production measured in kWh

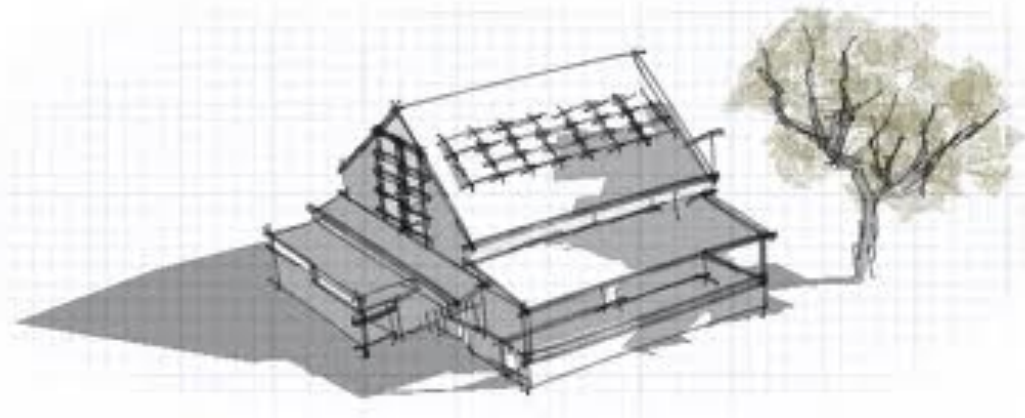
Most homeowners install between 3 kW – 15 kW

# Part 3: Solar technology

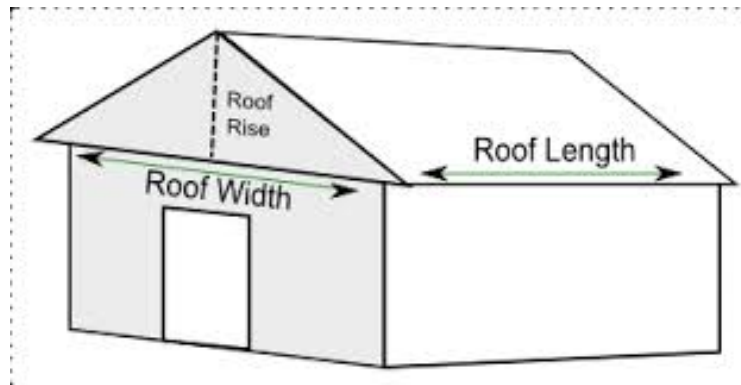
## What makes a site good for solar?



**Roof faces southerly direction**



**No shading**



**Enough space to mount panels**

# Part 3: Solar technology

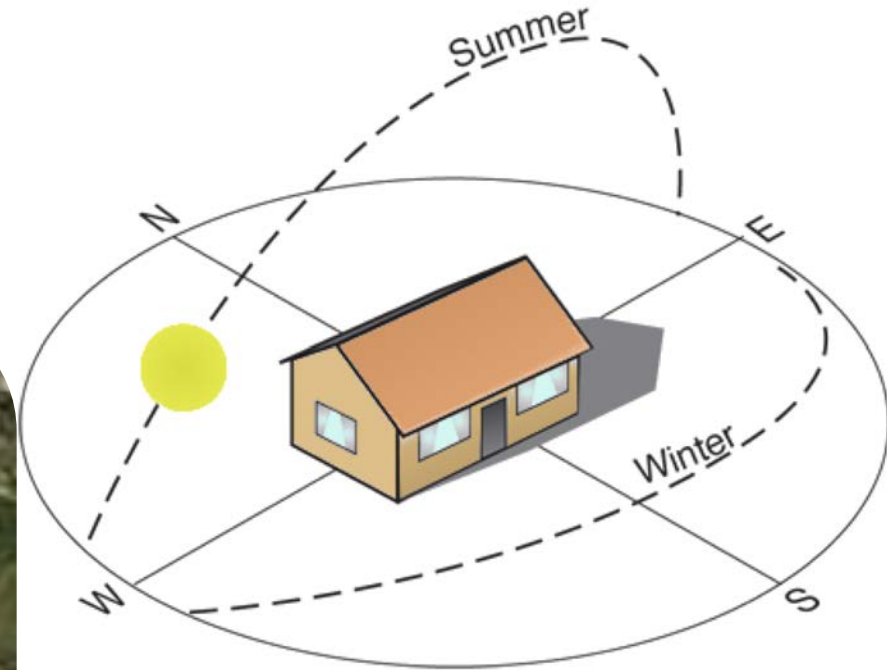


Image credit: solarenergy-usa.com



# Part 3: Solar technology



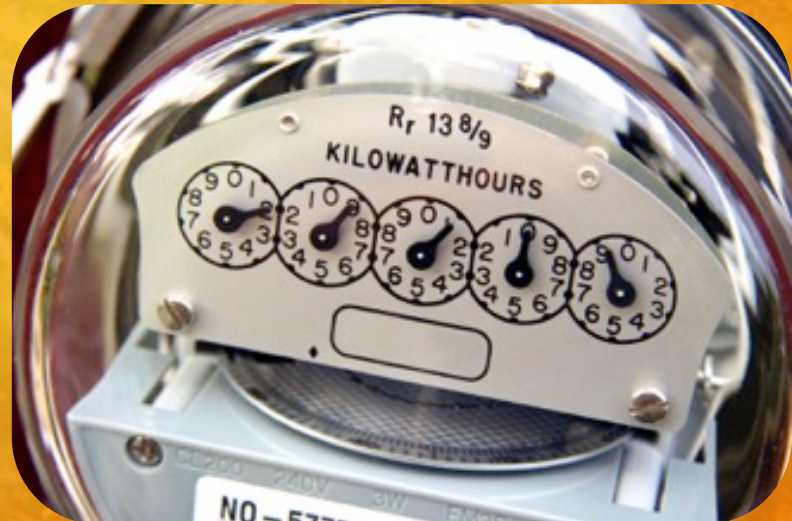


# Part 3: Solar technology

What about people who can't put solar  
where they are?



Image credit: Forbes.com



# Part 3: Solar technology

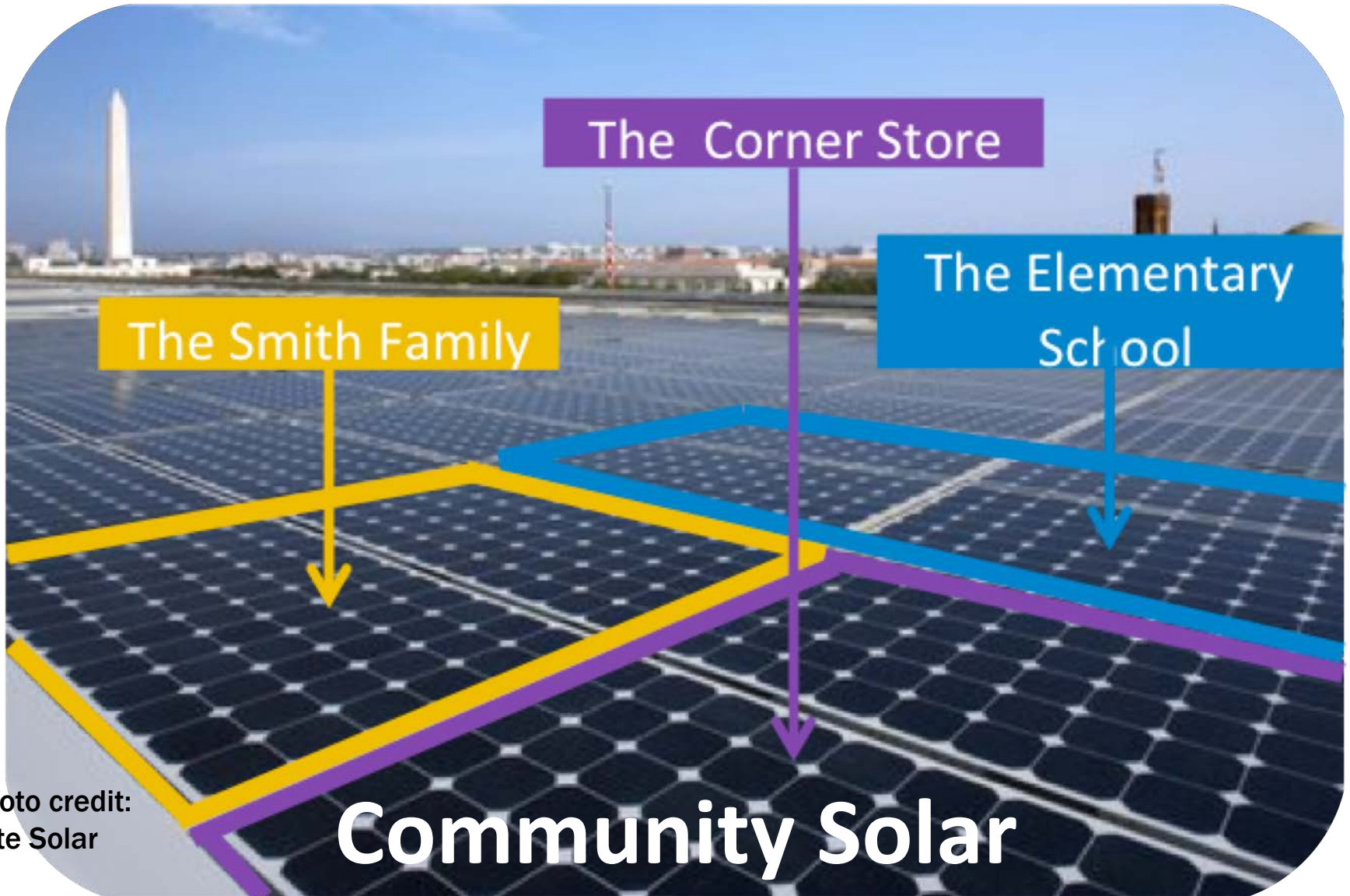


Photo credit:  
Vote Solar



# Part 3: Solar technology



## HOW SOLAR WORKS



1

Solar  
Array

2

Solar  
Inverter

3

Electrical  
Panel

4

Utility  
Meter

# Part 3: Solar technology

## What is net metering?

Accounts for electricity to AND from customer

When generation exceeds usage, extra electricity flows out through meter to the grid

– You receive a credit on your power bill for that excess production



# Part 3: Solar technology

## Net metering (continued)

Monthly electric bill:

**[Qty. electricity used] – [Qty. electricity produced]**

Utilities required by law to let you net meter



# Part 3: Solar technology

Self-consumption: 17.89 KWh      Export: 14.8 KWh

Consumption: 35.34 KWh

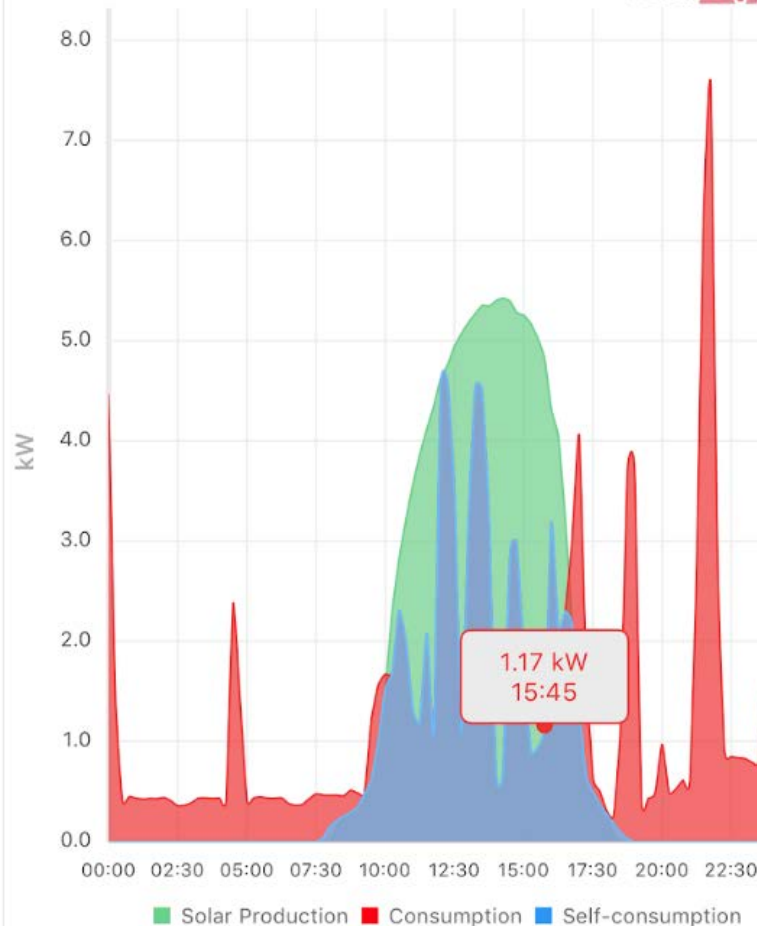
51%

49%

Self-consumption: 17.89 KWh

Import: 17.45 KWh

solaredge



kWh

- Green Solar Production
- Red Electric Consumption
- Blue is Self-Consumption



# Part 3: Solar technology

## Frequently asked questions

- Warranties?
- Homeowners' insurance?
- Maintenance? What about roof repairs?
- How long do systems last?
- Will HOAs allow solar?
- What about historic districts?

# Part 3: Solar technology

## HOA Solar Access Laws

**DE - 25 Del. C.3 § 318**

**NJ - Statute § 45:22A-48.2**

**NY - No HOA solar protection**

**PA - No HOA solar protection**

# Part 3: Solar technology

## Choosing a contractor

- **Standard contracting licensure**
- **Years of solar experience**
- **Number of installations in the area**
- **References**
- **Industry certifications (NABCEP, RISE)**
- **Other factors**



# Part 3: Solar technology

## How long does it take?

- **Contract sign**
- **Design & engineering**
- **Permitting & Interconnection**
- **Installation**
- **Inspection**
- **Utility approvals**

# Part 3: Solar technology



**What happens when the power goes out?**

**When grid is down, solar shuts off (safety mechanism)**

**Need batteries if you want power during outages**

# Part 3: Energy Storage for Homeowners

The two main values of battery storage





# Part 3: Energy Storage for Homeowners

You might want storage if...

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



# Part 3: Energy Storage for Homeowners



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
- NOTE: No solar = 1 day only

## What will run when the power is out:

- refrigerator; small microwave
- Some lights; Some outlets
- cable modem

## What they chose not to power:

- stove; dryer; electric water heater;

# Electric Vehicles & Residential Solar

Tesla  
Model S



Mercedes-Benz EQ

Electric intelligence for the world's greatest automobiles.



**Go Together Like  
Pizza & Beer**



100% ELECTRIC NISSAN LEAF

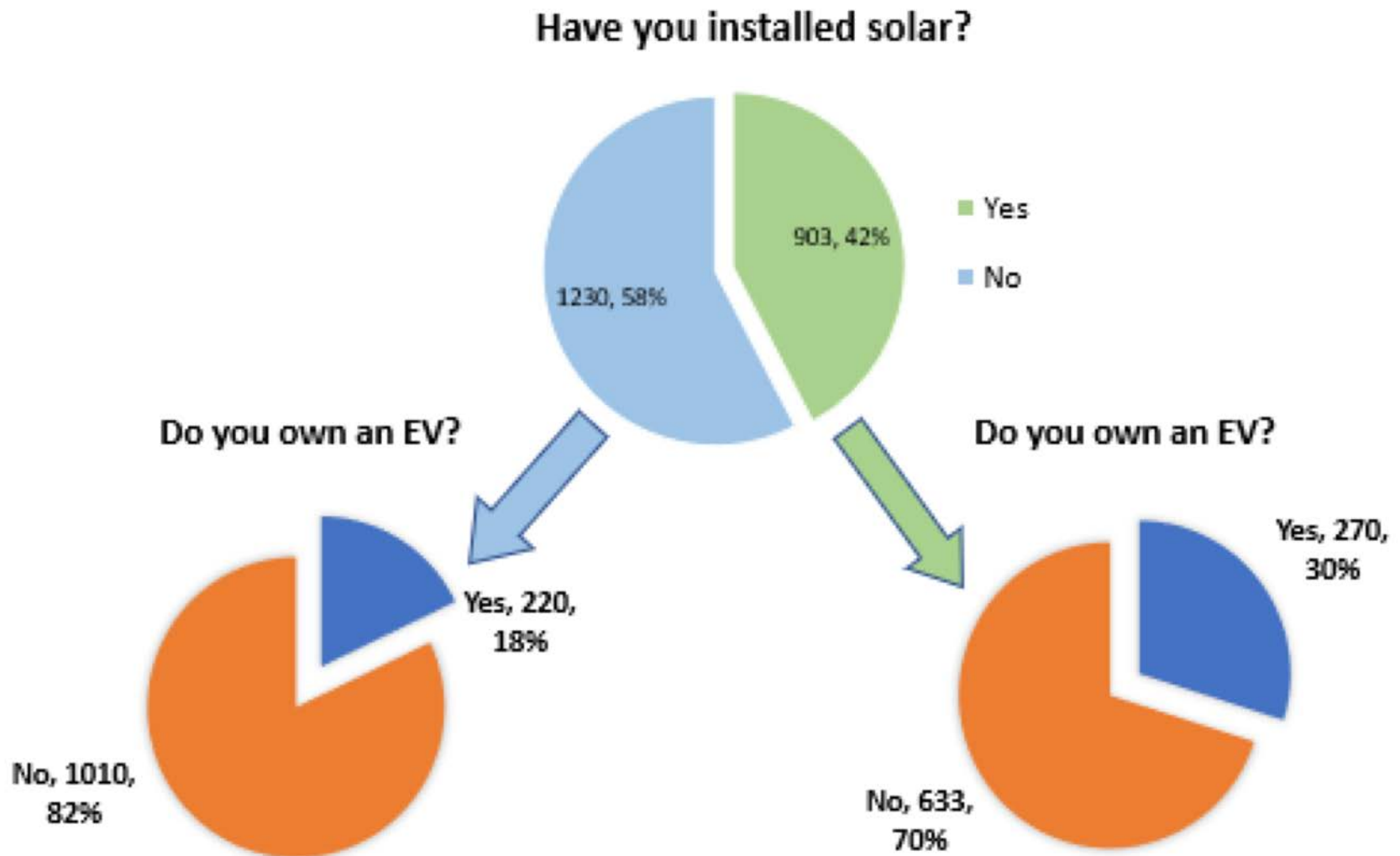


**BOLT EV**





# EV Owners ~ Likely Solar Home Buyers



# EV Owners ~ Likely Solar Home Buyers



Solar + EV Charger co-op  
participants - Arlington, VA





sun home presentation

every real estate agent has called after the showing to ask how the panels work. I left the

# Solar Trivia!



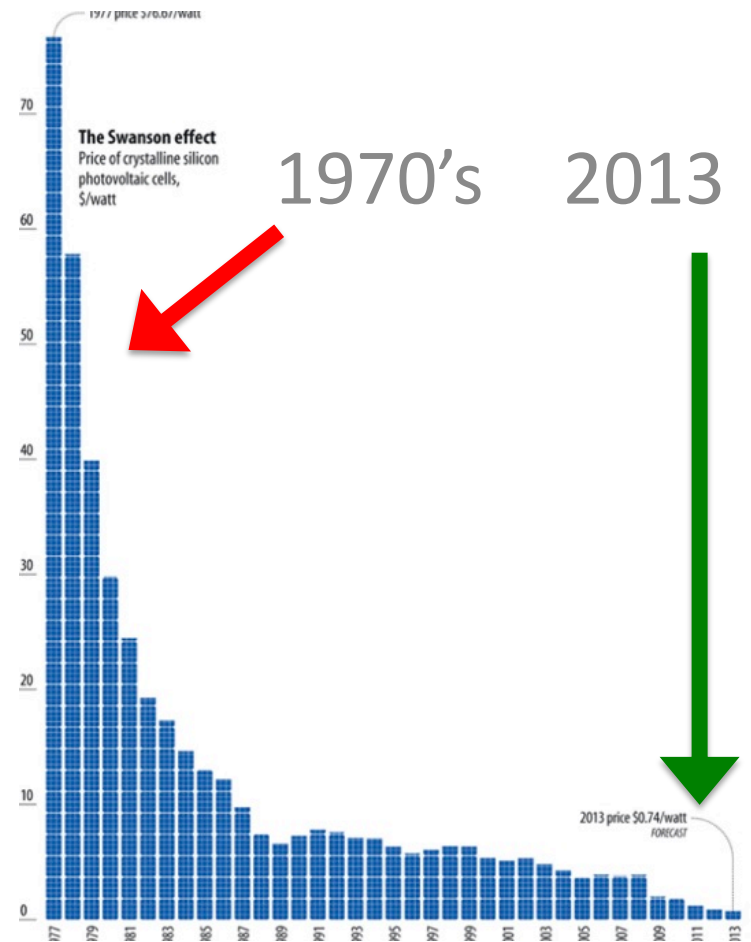
# **Part 4:**

# **Solar economics**

# Part 4: Solar economics

## Solar is increasingly affordable

- Costs have dropped 90% since the 1970s
- Solar is no longer a specialty, expensive, or boutique project
- Comparable to cost of used car



# Part 4: Solar economics

## A few considerations

- Solar is priced by the watt (not by the panel)  
 $\$9000 / 3000 \text{ Watts (i.e. 3kW)} = \$3/\text{Watt}$
- Solar is a long-term investment that reduces energy costs ( $\geq 25$ -year lifespan)
- Rising energy prices  $\longrightarrow$  higher solar value



# Part 3: Solar economics

## SAMPLE CASH PURCHASE:

EXAMPLE PRICING ONLY. ACTUAL SYSTEM SIZE WILL VARY.

	4kW	8kW
Average solar co-op pricing (\$2.75/Watt)	\$11,000	\$22,000
30% Federal tax credit (calculated before SREC sale)	-\$3,300	-\$6,600
Solar Renewable Energy Credit (15- year upfront)	-\$1,800	-\$3,600
<b>Net cost</b>	<b>\$5,900</b>	<b>\$11,800</b>
Estimated year 1 electricity savings*	\$700	\$1,400
Estimated year 10 savings (cumulative)*	\$7,400	\$14,900
Estimated lifetime savings (25 years)*	\$20,900	\$41,800
<b>Net Profit</b>	<b>\$15,000</b>	<b>\$30,000</b>

# Part 3: Solar economics

Energy Year	% Solar Requirement	Estimated SRECs Required (MWh)	SACP
2014	2.05%	1,568,508	\$339
2015	2.45%	1,893,304	\$331
2016	2.75%	2,146,389	\$323
2017	3.00%	2,364,930	\$315
2018	3.20%	2,547,818	\$308
2019	3.29%	2,645,670	\$300
2020	3.38%	2,745,225	\$293
2021	3.47%	2,846,506	\$286
2022	3.56%	2,949,538	\$279
2023	3.65%	3,054,346	\$272

## NJ SRECs – Alternative Compliance Penalty (ACP)

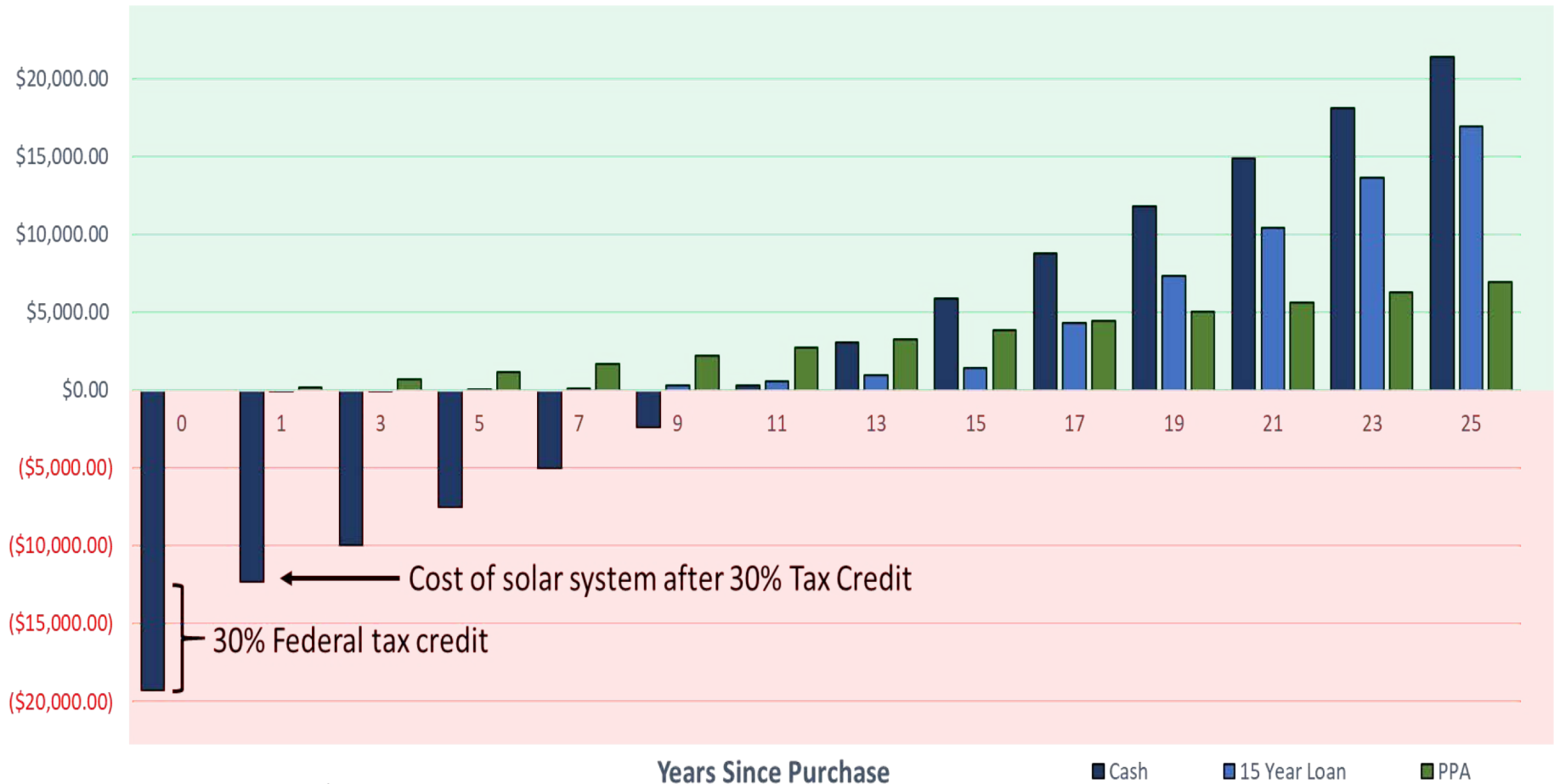
# Part 4: Solar economics

## Solar Financing Options

- **Loans**
  - Standard loans
  - Solar loans & bridge loans
  - HELOC
- **Grants** (for farms and rural small businesses)
  - USDA Rural Energy for America Program (REAP)



# 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, Pay 80% of normal electricity cost with PPA

## Years Since Purchase

■ Cash ■ 15 Year Loan ■ PPA

# Part 4: Solar economics

## Cost savings for new construction

- **Minimizes soft costs**
  - Permitting/inspecting/interconnection
  - Install labor
  - Electrical system equipment
  - Economies of scale
- **Can eliminate more than half the cost of a residential system\***

\*<https://pv-magazine-usa.com/2018/05/14/california-residential-solar-power-headed-to-1-12-w-2-5%C2%A2-kwh/>

# **Part 5:**

## **Resources / Wrap-up**



# Useful Resource: Solar United Neighbors' Selling Your Solar Home guide

[www.solarunitedneighbors.org/sellingsolarhomes](http://www.solarunitedneighbors.org/sellingsolarhomes)

## SELLING YOUR SOLAR HOME



### Millions of homeowners have gone solar.

They are saving money on their electric bills and investing in energy freedom with a clean power source. Solar's growing popularity also means that more homeowners are looking to sell their solar homes. If you are one of those homeowners, this guide is for you.



## STEPS TO TAKE WHEN SELLING A SOLAR HOME

- 1 Work with realtors and appraisers who have experience with solar homes.<sup>1</sup> This will help you capture the full value of your solar home during the sale process. The National Association of Realtors offers its members a Green Designation.<sup>2</sup> Realtors with this designation may be more familiar with solar and other energy retrofits.
- 2 Request a real estate appraiser who is properly trained in evaluating the impact of solar and ask about adding a green energy addendum to your appraisal.<sup>3</sup>
- 3 Provide your realtor information about your monthly solar bill savings and the predicted remaining lifespan of your panels. Your realtor can display that information during open houses. If you're unsure of the remaining lifespan of your panels, contact your solar installer and request the product spec sheet for your brand of solar panels. The spec sheet will list the term length of your panels' power production warranty. Subtract the age of your system from the warranty length to estimate your system's remaining lifespan.
- 4 If you're thinking about moving your solar array to your new home, consult your installer about the cost and viability of re-installation. State law may also treat the system as a fixture and require negotiation for its removal with the homebuyer.
- 5 If you financed your array with a loan, check with your loan provider on any requirements related to the sale of your home.

<sup>1</sup> <http://www.nar.org/research-resources/guide-valuing-residential-solar-energy-systems>  
<sup>2</sup> <http://greenrealestateguide.org/>  
<sup>3</sup> <http://greencommunities.com/appraisers/>



# Selling your Solar Home

- Find realtors and appraisers that know solar
- Demonstrate monthly energy savings
- Should you take the system with you?
- Solar loan considerations
- Power Purchase Agreement (PPA) or lease?

# Selling your Solar Home

## PPAs and Leases

- Read the contract before you sell
- Call your provider, tell them you're moving
- Work with realtor to disclose to buyers
- Coordinate with solar provider during sale



# Selling your Solar Home

## Common PPA and lease options at sale

1. Transfer PPA or lease to homebuyer
2. Prepay PPA or lease and convey solar
3. Move system to your new home
4. Pay to have system removed

# Individual Membership

Helpdesk experts help throughout the process:

- What are the basics of solar?
- How can you pay for solar?
- How should you choose an installer?
- How should you compare bids?
- How do you overcome a homeowners association's resistance?

Long term support after installation

**\$85**

***Contact our members-only Solar Help Desk for real-time advice when and where you need it.***



# Institutional Membership

**NEW!**

Everything with Individual  
Membership

+

Volume Discounts for employees or  
customers

+

Discounts on solar consulting services





# Useful Resource: Solar United Neighbors website

[www.solarunitedneighbors.org](http://www.solarunitedneighbors.org)



[About us](#) [Press & media](#) [For installers](#) [Contact us](#) [Store](#) [En Español](#) [My account](#)

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[GO SOLAR](#) [SOLAR IN YOUR STATE](#) [LEARN THE ISSUES](#) [TAKE ACTION](#) [GET INVOLVED](#) [NEWS](#) [MEMBERSHIP](#)

**WE HELP NEW JERSEY  
GO SOLAR, JOIN  
TOGETHER, AND FIGHT  
FOR ENERGY RIGHTS!**

[OUR WORK](#)

We help New Jersey go solar, join together, and fight for energy rights!

See if solar + storage is right for you.

Webinar: Learn about community solar in New Jersey.





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**VP, Go Solar Programs**

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**[corey@solarunitedneighbors.org](mailto:corey@solarunitedneighbors.org)**

**[www.solarunitedneighbors.org](http://www.solarunitedneighbors.org)**

# When Did You Last Use A Pay Phone?

AT&T Still Exists

&

Utilities Will  
Survive Solar

