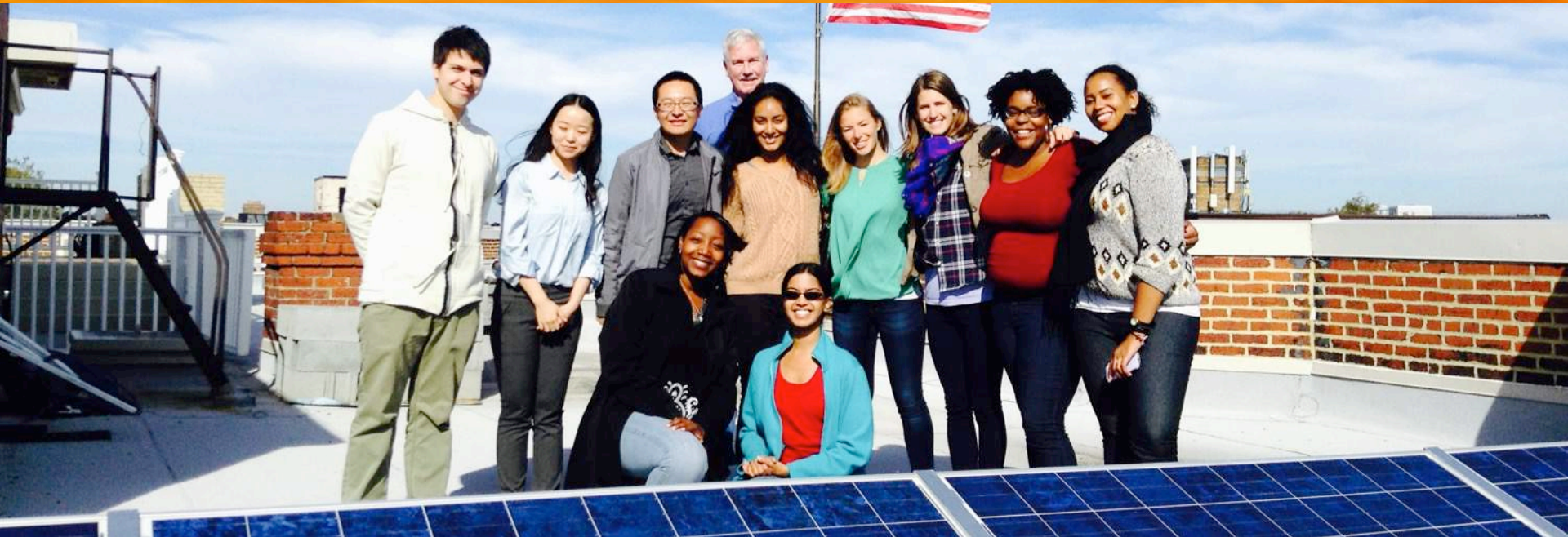




Solar 101

3rd Annual WV Solar Congress

May 5, 2018



Presentation in three parts:

1. Solar technology
2. How solar co-ops work
3. Solar economics

Part 1: Solar technology

Part 1: Solar Technology



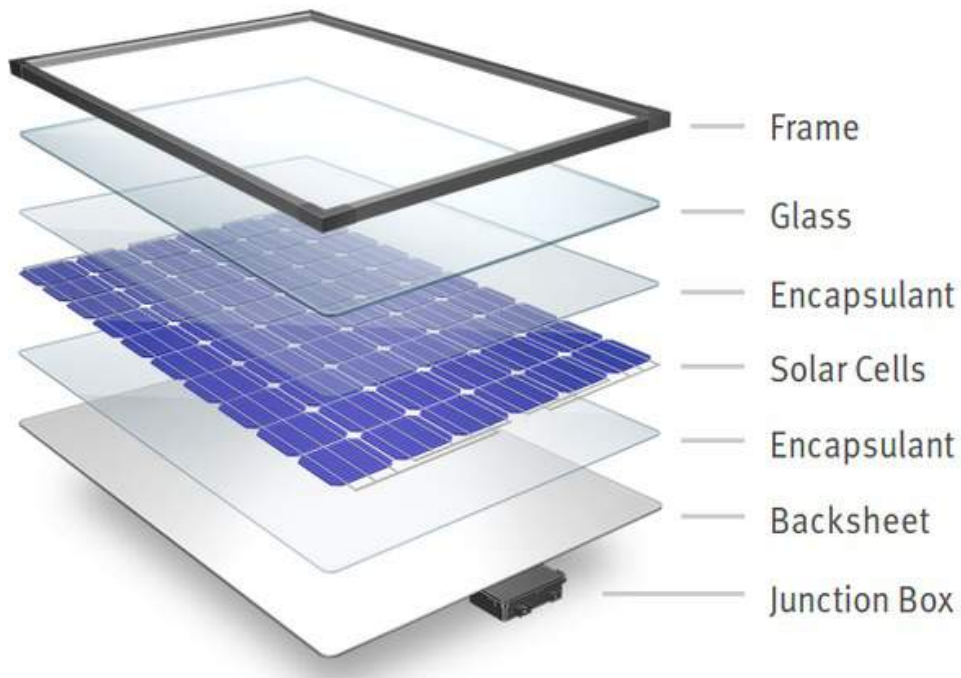
How does a solar panel work?

Solar photovoltaic (PV)

Converts solar energy to electricity

Part 1: Solar Technology

System components: Panels



Solar Array

Panel / Module

Image Source: DuPont

Part 1: Solar Technology

System components:
Inverter & Racking



Racking system



Inverter

Part 1: Solar Technology

How does solar connect to my roof?



Source: Huffington Post

Part 1: Solar Technology



Part 1: Solar Technology



Part 1: 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 2 kW – 12 kW

Part 1: Solar Technology

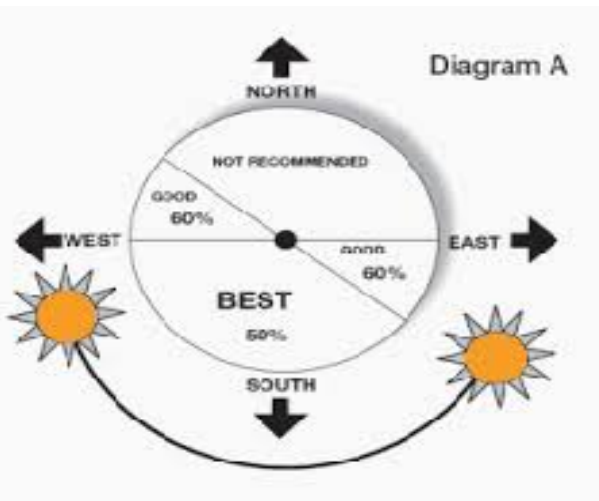


How does it connect to my electrical panel?

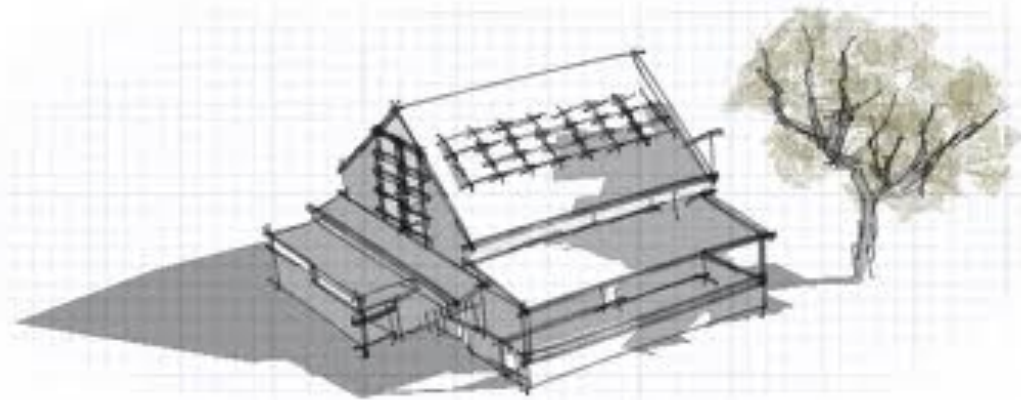
Simple connection, most home electric systems don't need upgrades before solar

Part 1: Solar Technology

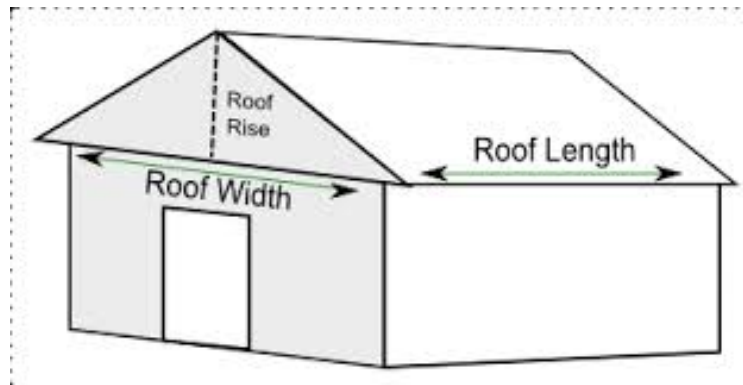
What makes a site good for solar?



Roof faces southerly direction



No shading



Enough space to mount panels

Part 1: Solar Technology

Autumn's solar garden shed



Part 1: Solar Technology

How a solar PV system works (grid tied)

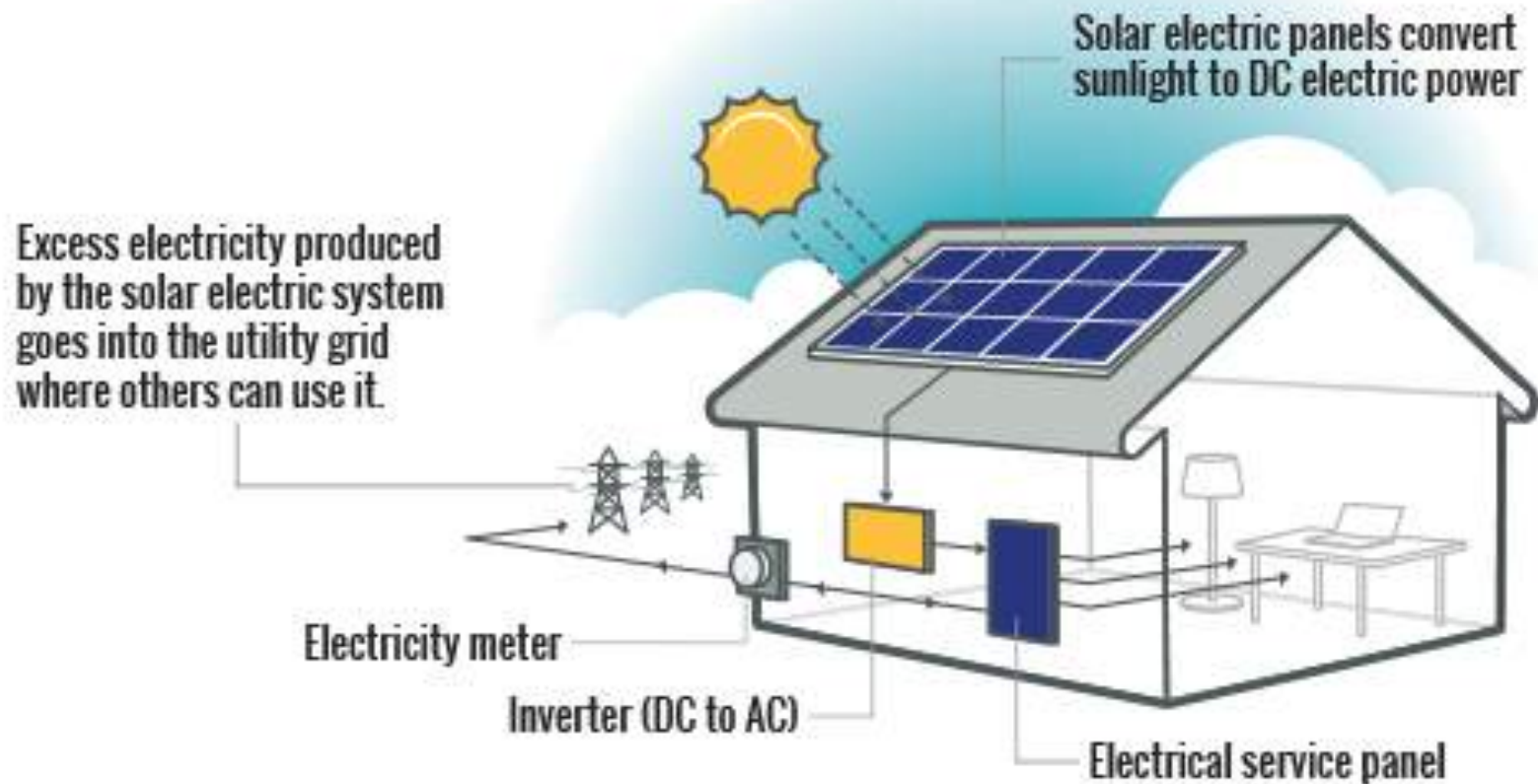


Image Source: NYSERDA

Part 1: Solar Technology

What is net metering?

Allows flow of electricity to AND from customer

When generation is more than use, extra electricity flows back through meter

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

Part 1: Solar Technology

Net metering, continued

Monthly electric bill:

– [Amount electricity used] – [Amount electricity produced]

Utilities required by law to let you net meter



Part 1: Solar Technology



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

Part 1: Solar Technology

Frequently asked questions

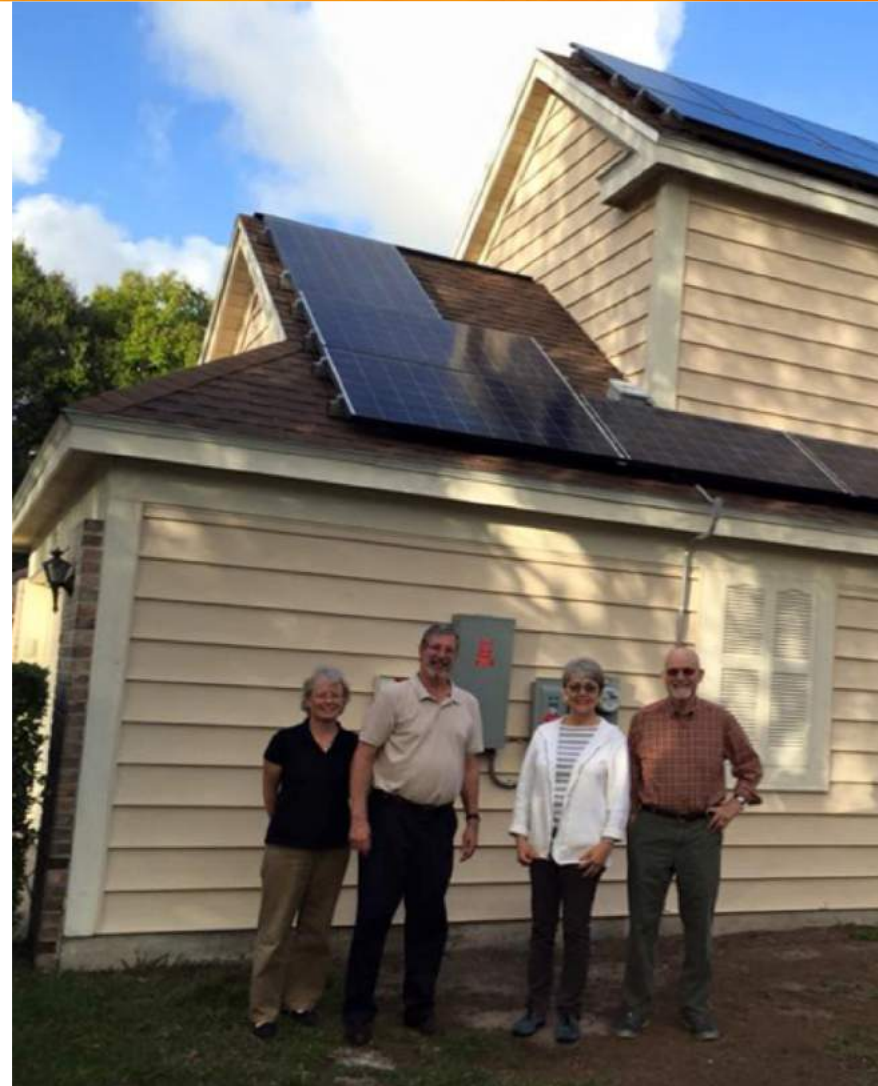
- Warranties?
- Homeowners' insurance?
- Maintenance?
- How long do systems last?
- Will HOA allow solar on my home?
- What if I'm In a historic district?

Part 2: How Solar Co-ops Work

Part 2: How Solar Co-ops Work

Solar co-op benefits

- Get best value on installation and support throughout the process
- Connect with fellow solar enthusiasts
- Become part of the growing solar movement



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

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

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

Part 2: How Solar Co-ops Work

Who picks the installer? Co-op members

Co-op participants select specific installer criteria including:

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

Part 3: Solar Economics

Part 3: Solar Economics

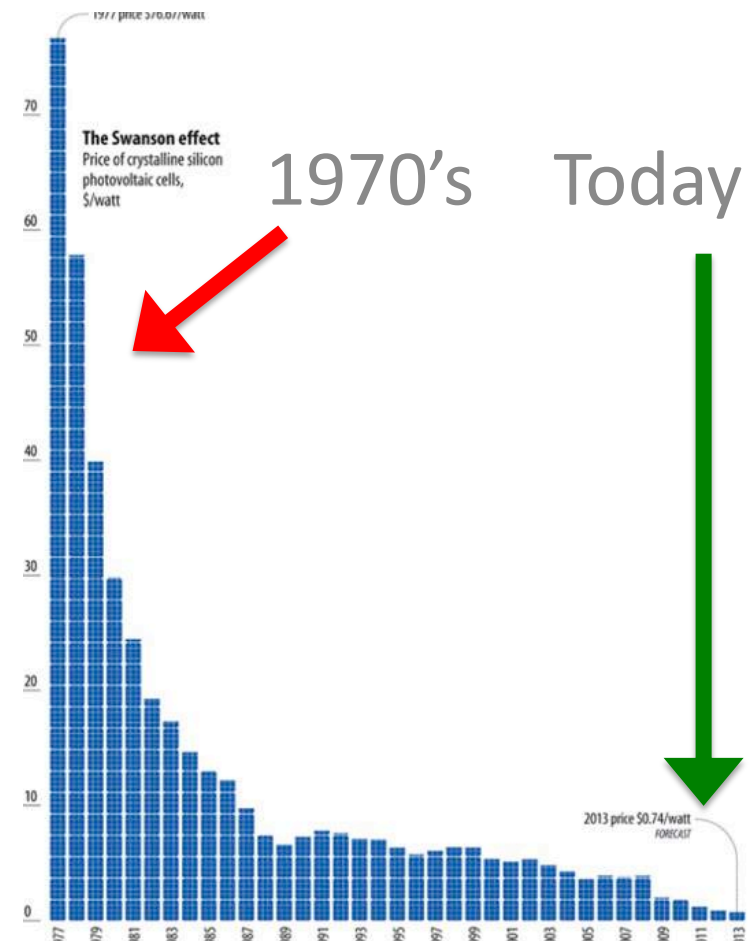
A few considerations

- Solar is priced by the watt (not by panel)
 - \$9000 / 3000 Watts (i.e. 3kW) = \$3/Watt
- Solar is long-term
 - No moving parts & at least 25 year lifespan
- Average residential electricity rate in WV
 - 10-12 year payback time
- Rising energy prices
 - increased value for your solar array

Part 3: Solar Economics

Solar is increasingly affordable

- Costs have dropped 90% since the 1970s
- Solar is no longer a specialty, expensive, or boutique project
- But, can still be daunting to tackle



Part 3: Solar Economics

EXAMPLE PRICING ONLY. ACTUAL SYSTEM SIZES WILL VARY.	4kW	8kW
Average WV solar co-op pricing (\$2.75/Watt)	\$11,000	\$22,000
30% Federal tax credit (calculated before SREC sale)	-\$3,300	-\$6,600
Net cost	\$7,700	\$15,400
Solar Renewable Energy Credit (annual estimate)	\$15	\$30
Estimated year 1 electricity savings*	\$600	\$1,200
Estimated year 10 savings (cumulative)*	\$6,200	\$12,500
Estimated lifetime savings (25 years)*	\$17,500	\$35,000
Net Profit	\$9,800	\$19,600

Part 3: Solar Economics

Financing

- **Loans**
 - Standard loans
 - Solar loans & bridge loans
 - HELOC
- **Grants**
 - REAP USDA Rural Energy for America Program
 - Solar United Neighbors of WV has a special program to help WV farms and small businesses go solar anywhere in the state

What's Next?

What's Next?

www.solarunitedneighbors.org/westvirginia

Join a solar co-op

- Open co-ops in WV:
 - Upper Ohio Valley
 - Potomac Highlands
 - Jefferson, Berkeley, & Morgan Counties
- Upcoming co-ops:
 - North-Central WV
 - New River
 - Canaan Valley?

Join the listserv

Spread the word!

Live in Pennsylvania?

www.solarunitedneighbors.org/pennsylvania

Pennsylvania Co-ops

- Open co-ops in PA:
 - Upper Ohio Valley (Washington and Greene Counties)
 - Allegheny County
 - Cambria County
- Upcoming co-ops:
 - Crawford County

Join the listserv

Spread the word!

Useful Resource

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WV SUN is now **Solar United Neighbors of West Virginia**. Learn how we help people go solar, join together, and fight for their energy rights.

[READ MORE](#)

WEST VIRGINIA

► [ABOUT SOLAR UNITED NEIGHBORS OF WEST VIRGINIA](#)

Solar United Neighbors of West Virginia

Stay informed on solar news & action opportunities:

[SIGN UP](#)

Share with your community:



Thank You!

**Henry McKay, Program Director
Solar United Neighbors of Pennsylvania**