Solar information session
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.
How we got started

Started in 2007 and it wasn’t easy!

Mount Pleasant Solar Cooperative
How we got started

It was harder than we thought!
Helping communities go go solar

We represent solar owners and supporters across the country, and have on-the-ground staff in 12 states.
How we help you go solar

Co-op Membership
• Group process
• 50 – 100 neighbors
• 6-8 month process
• Group selects single installer
• Bulk negotiation for best pricing
• Sign individual contract
• Free 1-year membership!

Individual Membership
• Individual process
• Get help reviewing up to 3 proposals
• Negotiate your own deal
• Faster timeline
• Ongoing advice & assistance (post install)
• $85 annual membership
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

Panel / Module
Image Source: DuPont

Solar Array

Frame
Glass
Encapsulant
Solar Cells
Encapsulant
Backsheet
Junction Box
Part 1: Solar technology

**Terminology:** Kilowatts (kW) & kilowatt-hours (kWh)

- System measured in kW
- Electricity production in kWh
- Most homeowners install between 2 kW – 12 kW
Part 1: Solar technology

System components: Inverters

String inverter(s) & DC optimizers

String inverter(s)

Microinverters
Part 1: Solar technology

System Components: Racking (pitched roof)

Usually flashings or clamps
Part 1: Solar technology

How does solar connect to my roof?
Part 1: Solar technology
Part 1: Solar technology
Part 1: Solar technology
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

**HOW SOLAR WORKS**

1. Solar Array
2. Solar Inverter
3. Electrical Panel
4. Utility Meter
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

Community Solar

Photo Credit: Fresh Energy
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
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 1: Energy Storage for Homeowners

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
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 of power

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;
Example Upfront Costs (small system)

$9,000 : 6 kWh of storage
   (lithium ion battery & installation)
+

$15,500 : 5.6 kW solar array
   (optional)
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
Part 2: How Solar Co-ops Work

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 1 THRU 2

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

5. SCHEDULE
   Installer site visit, receive customized proposal based on solar co-op pricing

MONTH 4 THRU 8

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 participants

Co-op participants select 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 73% since 2010
- No longer a specialty or boutique project
- Excellent ROI
- 30% federal tax credit (steps down after 2019)
Part 3: Solar economics

Solar co-ops help reduce an installer’s soft costs so you can save money.

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

• Solar is priced by the watt (not by panel)
  – $9000 / 3000 Watts (i.e. 3kW) = $3/Watt
• Solar is a long-term investment
• No moving parts & at least 25 year lifespan
• Rising energy prices
## Part 3: Solar economics

### SAMPLE CASH PURCHASE:

<table>
<thead>
<tr>
<th>Example Pricing Only. Actual System Size Will Vary.</th>
<th>4kW</th>
<th>8kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average CO solar pricing ($3.45/Watt)</td>
<td>$13,800</td>
<td>$27,600</td>
</tr>
<tr>
<td>30% Federal tax credit</td>
<td>-$4,140</td>
<td>-$8,280</td>
</tr>
<tr>
<td>Net cost</td>
<td>$9,700</td>
<td>$19,300</td>
</tr>
<tr>
<td>Estimated year 1 electricity savings*</td>
<td>$500</td>
<td>$1,000</td>
</tr>
<tr>
<td>Estimated year 10 savings (cumulative)*</td>
<td>$5,300</td>
<td>$10,600</td>
</tr>
<tr>
<td>Estimated lifetime savings (25 years)*</td>
<td>$14,900</td>
<td>$29,800</td>
</tr>
<tr>
<td>Net Profit</td>
<td>$5,200</td>
<td>$10,500</td>
</tr>
</tbody>
</table>

*Solar United Neighbors*
Part 3: Solar economics

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

<table>
<thead>
<tr>
<th>Year</th>
<th>30% Remaining Cost*</th>
<th>26% Remaining Cost*</th>
<th>22% Remaining Cost*</th>
<th>0% Remaining Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$13,475</td>
<td>$14,245</td>
<td>$15,015</td>
<td>$19,250</td>
</tr>
<tr>
<td>2020</td>
<td>$5,775</td>
<td>$5,005</td>
<td>$4,235</td>
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<tr>
<td>2021</td>
<td>$14,245</td>
<td>$15,015</td>
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</tr>
</tbody>
</table>

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
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

Cost of solar system after 30% Tax Credit

30% Federal tax credit
Part 3: Ft. Collins Rate Structure

- Fort Collins Utilities uses a **Time-of-Day** pricing structure for electric customers
- Price per kilowatt-hour (kWh) depends on
  - Time of day (Peak hours vs. off-peak hours)
  - Season
  - Previous usage in the billing period
  - Type of home heating system (all-electric or not)
- Net metering: with this rate, the value of your solar energy varies along with the cost of utility electricity
- Battery storage can help you store solar energy when it is cheaper to use when purchasing electricity is more expensive

Source: https://www.fcgov.com/utilities/residential/rates/electric/
Daily electric price variation:

**NON-SUMMER OCTOBER–APRIL**

On-peak hours are weekdays only (no weekends or major holidays)

**PREVIOUS RATE**

APPX. 7¢/kWh

OFF-PEAK HOURS

12 AM — 5 PM

APPX. 22¢/kWh

ON-PEAK HOURS

5 PM — 9 PM

APPX. 7¢/kWh

9 PM — 12 AM

Source: https://www.fcgov.com/utilities/residential/rates/electric/
Part 3: Ft. Collins Rate Structure

Seasonal peak hour windows

**NON-SUMMER**
**OCTOBER–APRIL**
**WEEKDAYS ONLY**

- Off-peak hours (appx. 7¢/kWh)
- On-peak hours (appx. 22¢/kWh)
- 5PM
- 9PM

**SUMMER**
**MAY–SEPTEMBER**
**WEEKDAYS ONLY**

- Off-peak hours (appx. 7¢/kWh)
- On-peak hours (appx. 24¢/kWh)
- 2PM
- 7PM

Source: https://www.fcgov.com/utilities/residential/rates/electric/
Part 3: Solar economics

Financing

• Loans
  – Standard loans
  – Solar loans & bridge loans
  – Home Equity Line of Credit

• Third party ownership
  – Leases
  – Power Purchase Agreements
What’s next?

www.solarunitedneighbors.org/FortCollins

Join the Fort Collins Solar Co-op

Spread the word!
Fort Collins Solar Co-op

WHAT IS A SOLAR CO-OP?

We bring homeowners together into a group, or solar co-op. We provide unbiased, installer-neutral support to solar co-op participants through each stage of the process of going solar. Our experienced team ensures you understand how solar works, how it can be financed, and how it can be installed on your home.

Solar co-ops take advantage of the group’s bulk-purchasing power to get discounted pricing and a quality installation. Volunteer solar co-op participants choose an installer on behalf of the entire group through an open and competitive bidding process. The selected installer provides solar co-op participants a personalized proposal for their consideration.

The Fort Collins Solar Co-op is open to residents and small businesses in Fort Collins.
Thank you!

Bryce Carter

Solar United Neighbors of Colorado
Part 3: Solar economics

Solar Panel Tariff

- 30% tariff on imported solar panels
- Only about 10-15 cents/watt (estimated)
- Average 7kW system = $1,050 -- $735 after tax credit

Tariff drops down over next four years
- 2018 – 30%
- 2019 – 25%
- 2020 – 20%
- 2021 – 15%

Source: NREL