



The Clean Energy Co-op Toolkit



**The Clean
Energy Co-op**

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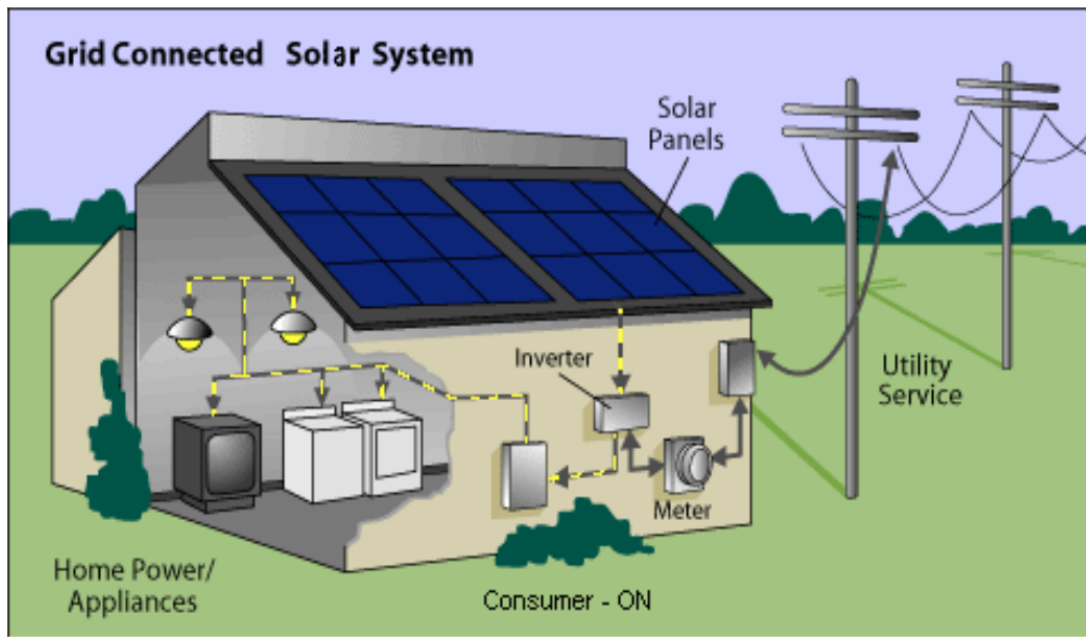
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How does solar electricity work?



A solar system is connected to your home or building's appliances and to the utility grid.

- When sunlight hits the panels, the solar cells in the panels will convert sunlight into electricity to power the building
- Where there is less sunlight, the grid system supplies electricity throughout the day to transfer back into the house
- Unused electricity is credited to the customer's next month's bills at full retail rate and rolls over month to month

Benefits of Going Solar



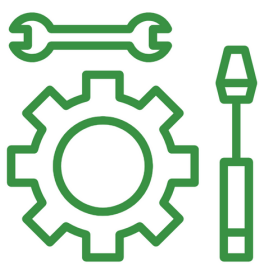
- Fight global warming and reduce pollution
 - According to Project Drawdown, rooftop solar energy is the #10 solution to reduce global warming



- Higher property value
 - On Zillow, houses with solar panels have a 4% increase



- Good return on investment
 - When you install solar panels, you will not need to pay for electricity that you produce.



- No routine maintenance needed
 - Once you have installed solar panels, you don't need to worry about spending money maintaining them yearly unless a rare circumstance has occurred

For more information: contact [Solarize Delco](#) and [Solarize Philly](#).



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For everyone



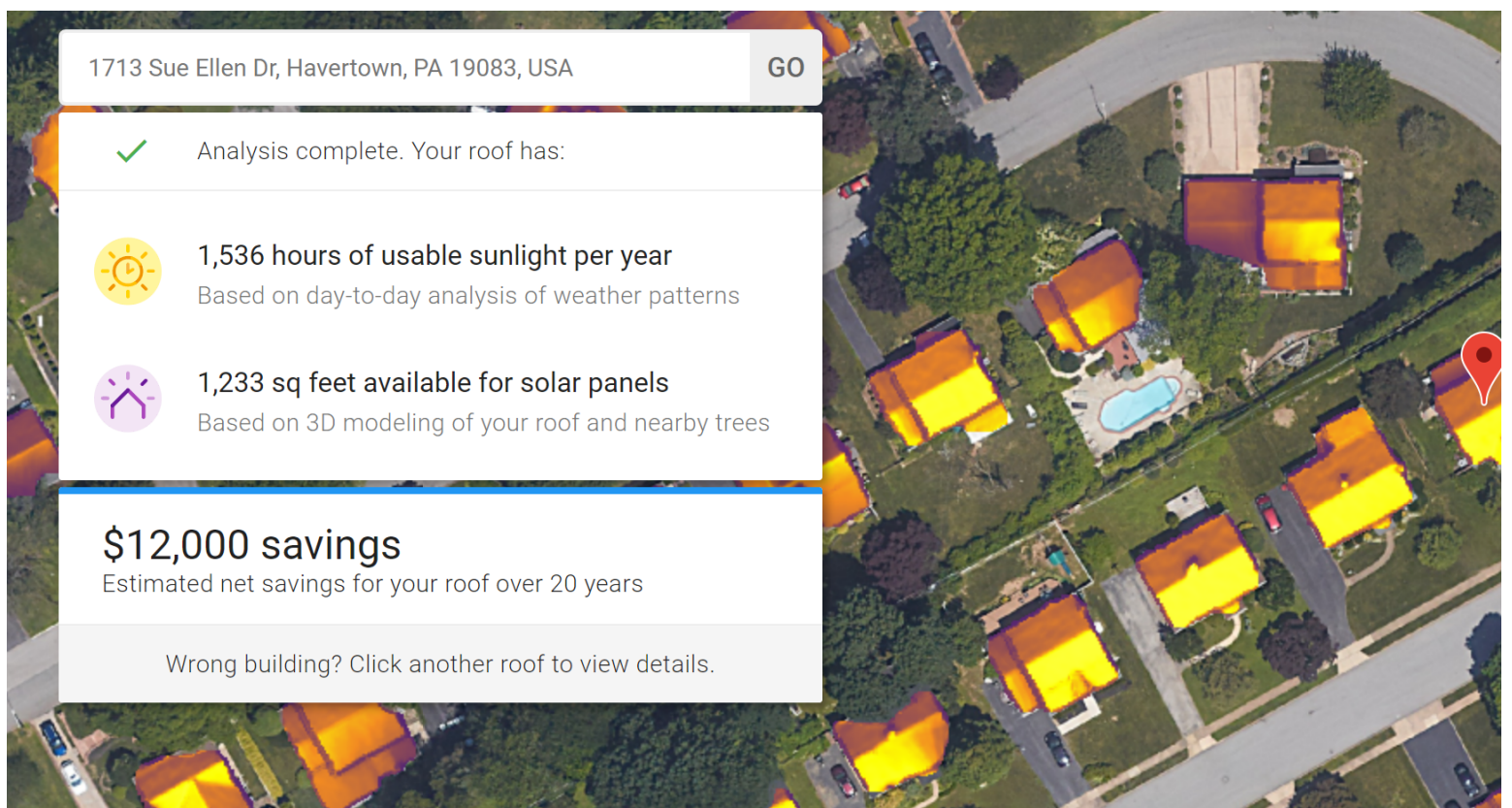
Is my home or business suitable for rooftop solar?

- An important quality is the location and shape of the roof; it should be unshaded or have a south(ish) facing or flat roof
- If the lifetime of your roof is less than 20 years, you should replace your roof before installing solar panels
- However, every house is different...

The best thing you can do is...

Get a free cost estimation from a solar installer -- no strings attached!

Project Sunroof



(Note: Images of properties in "Project Sunroof" are from a few years ago and have not been updated)

- You can also check "Project Sunroof" by Google which can give you an idea of solar potential for residential properties.
- Project Sunroof can detect if your roof has great solar potential as seen by the yellow shading, and not so great solar potential as seen through the dark red and orange.
- Project Sunroof can also give you an estimate of how much money you can save!

For more information: contact [Solarize Delco](#) and [Solarize Philly](#).



The Clean Energy Co-op

See the [Clean Energy Co-op website](#) for more information about us and to learn about the benefits of membership

What if my building is not suitable for solar?

- Buy renewable electricity from sites such as [PAPowerSwitch.com](https://www.papowerswitch.com) and [MakeBenProud.com](https://www.makebenproud.com) for 100% renewables
- Join and invest in co-ops such as The [Clean Energy Co-op](https://www.cleanenergyco-op.com)

You can also address climate change through other ways:

- Energy efficiency
- Electric vehicles
- Green investing
- Plant-based diet
- Supporting environmental and climate justice groups
- Local advocacy



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Reducing installation costs through a group buy with Solarize

Streamlined process

- Your local Solarize chapter negotiates the best price with a pre-selected single trusted installer
- Homeowners, businesses and nonprofits can join in on this contract to reduce installation costs and facilitate the search for a good price
- Available for most financing models (eg. buying outright, buying with a loan, PPA, and lease)

The perk: maximize savings thanks to a volume discount

- Get the same benefits as if buying the system outright
 - ✓ Reduce electricity bills
 - ✓ Tax benefits
 - ✓ Income from SRECs
 - ✓ Protection from fluctuating utility prices
 - ✓ Increasing home property value
- When over 20 homeowners sign contracts, everyone in the group buy contract gets a rebate back from the installer
- The more people enter the group buy, the bigger the discount!
 - Can be up to 8-10% cheaper than the market price for buying your solar system outright



# OF CUSTOMERS	Savings \$/W	% further Cost Reduction*
20	-\$0.05	-1.6-1.9%
30	-\$0.10	-3.1-3.7%
40	-\$0.15	-4.6-5.5%
...100	-\$0.25	-7.4-9.3%

For more information: contact [Solarize Delco](#) and [Solarize Philly](#).



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Solar financing options for homeowners

For each of the following options, installation costs can also be reduced through a **group buy with Solarize.**

Purchasing your solar system upfront

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- Maximizes savings, but you need the capital upfront
- With ownership you get tax benefits and income from SRECs

Purchasing your solar system with a loan

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- You get ownership as if you were buying upfront, but with \$0 down-payment
- With ownership you get tax benefits and income from SRECs
- Savings not maximized due to loan interest

Leasing a solar system

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- Don't have ownership over panels, pay for use of the panels to the installer
- No tax benefits, but has modest savings compared to buying electricity

Purchasing your solar system with a Power Purchase Agreement (PPA)

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- Zero cost upfront
- You don't own the panels, and instead pay to access electricity they generate
- Most similar to traditional electric billing

Contacts and Resources

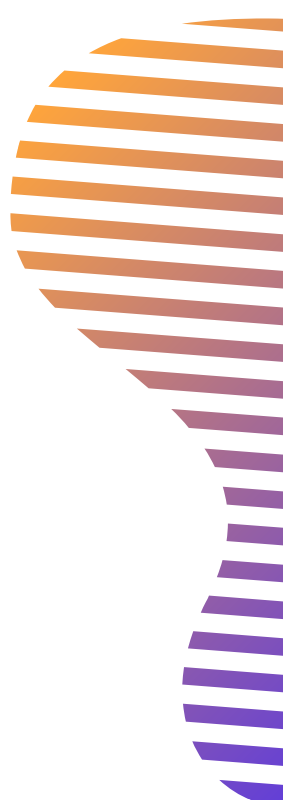
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Purchasing your solar system upfront

- In Pennsylvania, a large household system costs about \$25,000- but will make that back and save an additional \$18,000 over its lifetime
- Solar systems bring in income through net metering and through selling energy credits, or SRECs
- Buying solar in 2021 or 2022 will earn a hefty tax credit of 26% of the system's cost
- Solar also increases the value of the property it's installed on

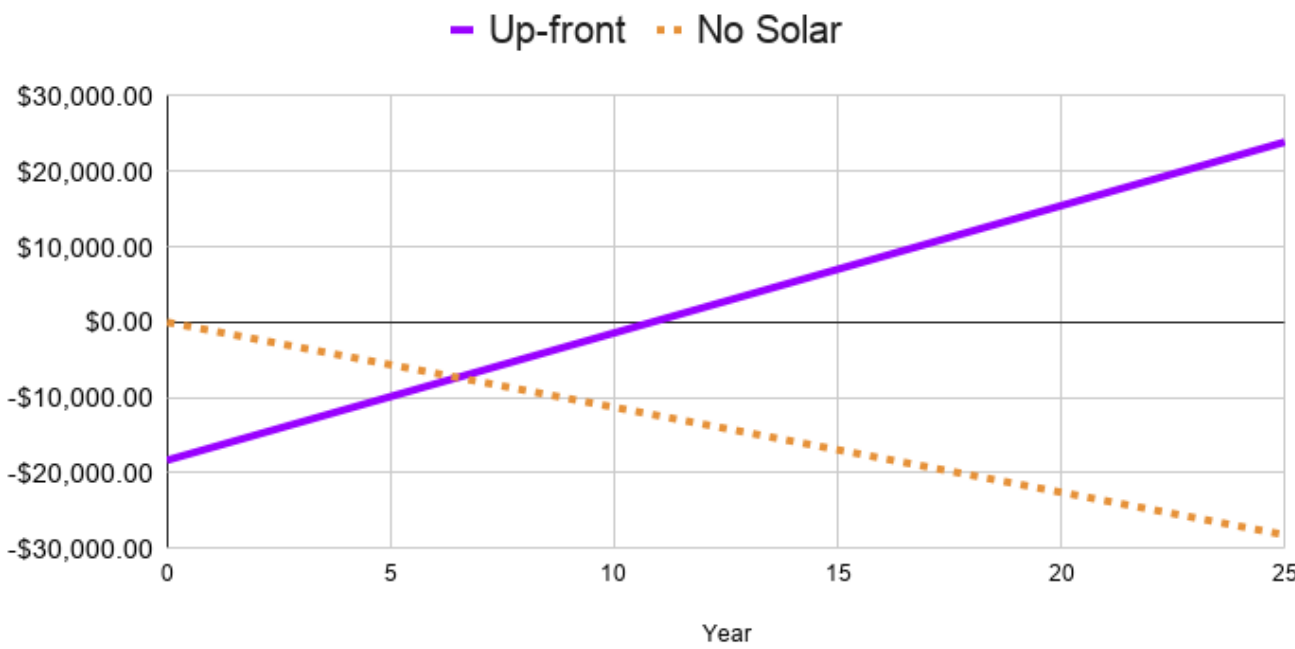


25 Year Net Income from Home Solar:
\$18,000-\$24,000

25 Year Cost of Doing Nothing:
\$30,000



25 Year Cash Flow of Purchasing a Solar System, Against the Costs of No Solar



Not sure where to get started?

- Sign up on the EnergySage Marketplace to receive quotes from solar installers in your area
- Solar installers can also help determine if your house is right for solar
- Visit the PA Solar Center and Solarize websites to learn more about trustworthy solar options

The expenses and returns of buying home solar

<u>Cost up-front</u>	-\$25,000
<u>Income from solar power</u>	\$110 /month
<u>SREC income</u>	\$15 /month
<u>Average savings</u>	\$1,500 /year
<u>Total tax benefit</u>	\$6,400
<u>Average savings after 25 years</u>	\$18,000

Estimates for an 8.3 kW solar system



Purchasing your solar system with a loan

Own your system with zero upfront cost!

Pros & Cons

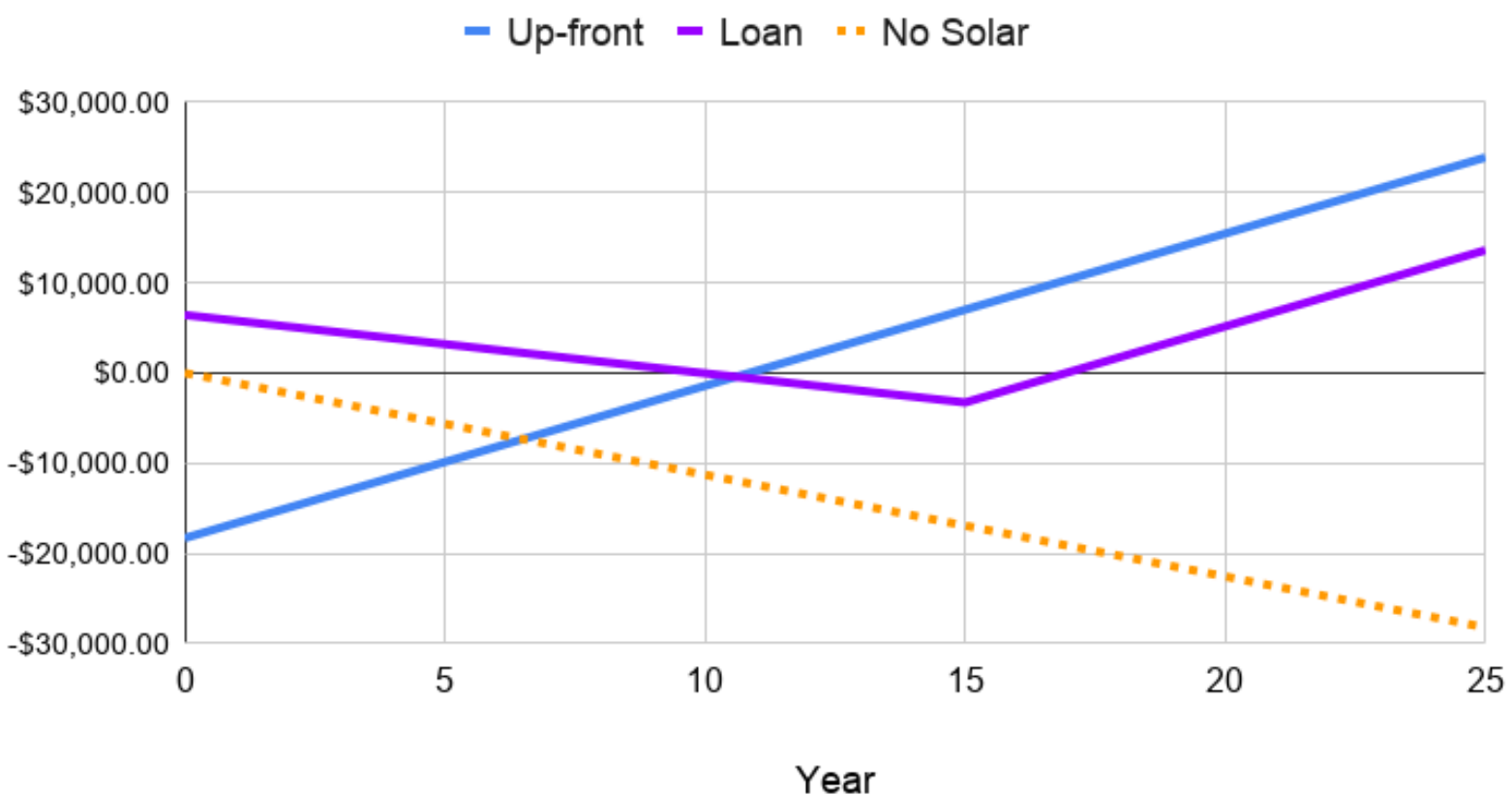


- Ownership → access to tax benefits
- Reduce electricity bills
- Income from SRECs
- Protection from fluctuating utility prices, like locking in a fixed electricity price for 25+ years
- Increasing home property value
- Generally cheaper than a solar lease/PPA

- Interest rates → more expensive than buying upfront
- Need a good credit score

Long-term savings after purchasing your solar system with a loan

25 Year Cash Flow, Upfront Purchase vs Loan



Estimates based on 8.3 kW system, using cost averages from EnergySage and the Clean Energy Co-op and loan terms from the Clean Energy Credit Union.

Loan options for homeowners

- Banks (see a list on [EnergySage](#))
- Solar Installers (see a list on [EnergySage](#))
- [Clean Energy Credit Union](#)
 - Annual Percentage Rate as low as 4.99%
- Home equity loans



The Clean Energy Co-op

For guidance, see [Solarize Southeast PA](#) and [PA Solar Center](#)



Leasing a solar system



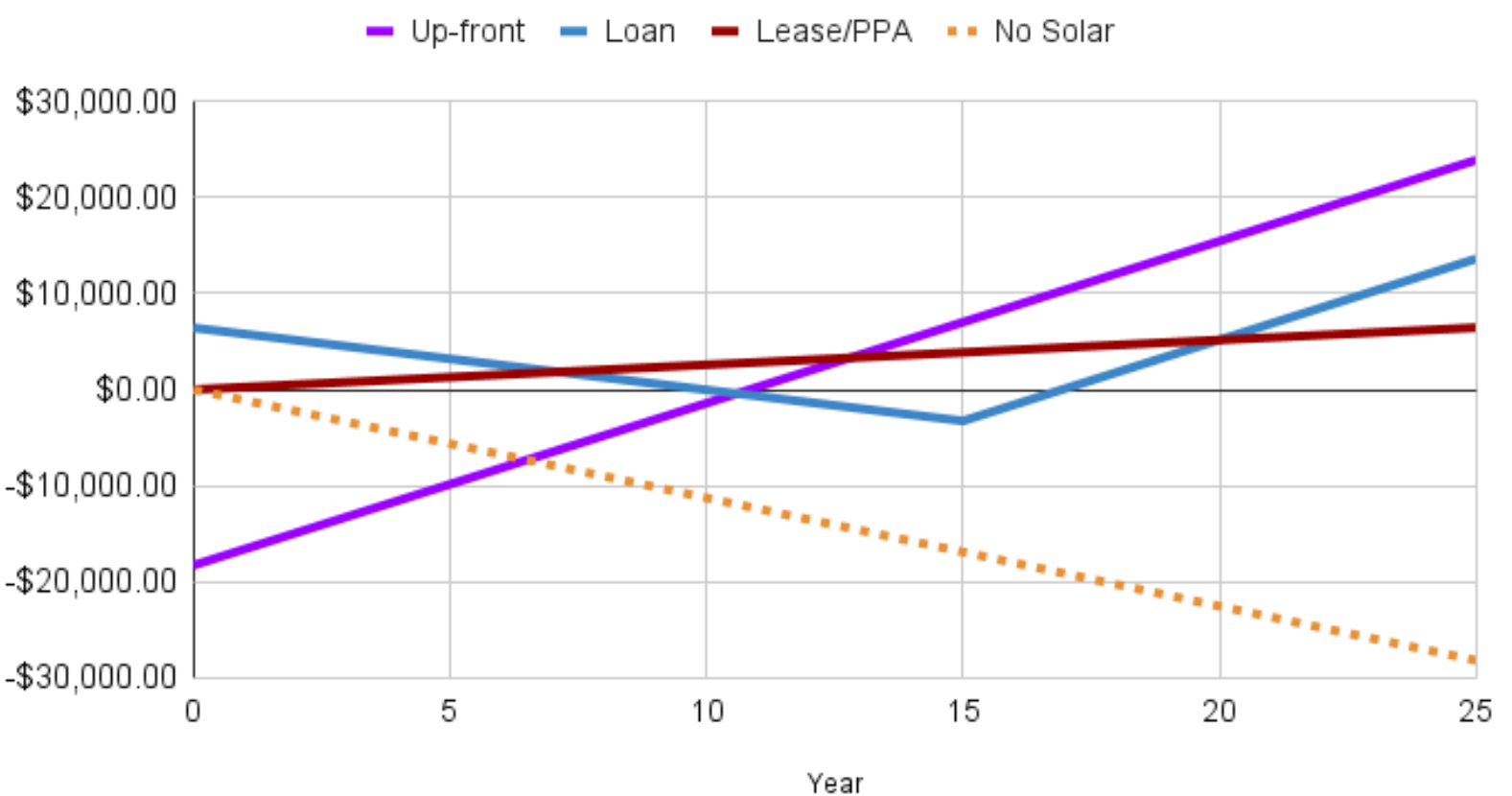
Pros & Cons



- You aren't responsible for any maintenance that might be needed
- Monthly payments are set at a fixed rate, and save money over an electric bill
- Extra power is credited towards your bill
- Solar panels add property value
- Most leases can be bought out early or transferred to a new homeowner

- You don't own the panels, so don't receive any tax benefits
- Added solar panels may also affect the valuation of property, requiring careful attention to lease terms
- Lease contracts last 15-20 years, and someone buying your property may not want to assume responsibility

Comparing the Cash Flow of Leases to Other Solar Models



Estimates based on 8.3 kW system, using cost averages from EnergySage and the Clean Energy Co-op

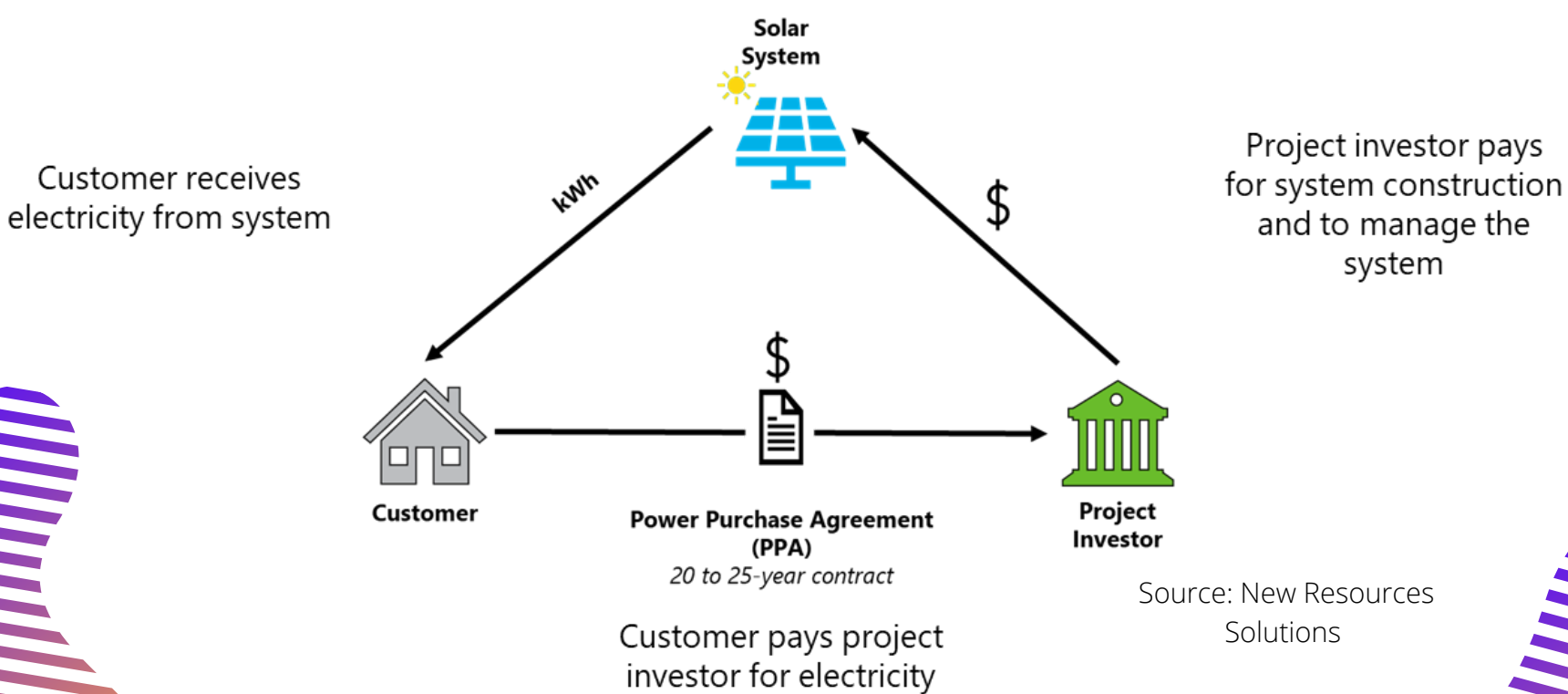
Still not sure if a lease is for you?

If you're worried that you can't afford solar panels otherwise, but concerned about the possible drawbacks of a lease contract, look at the options available from solar financing companies around you and talk them over with a financial advisor or real estate advisor!

Purchasing Your Solar System with a Power Purchase Agreement

A Zero Upfront Cost Approach to Solar

Simple Diagram of a Solar PPA



Pros & Cons



- Zero upfront cost
- Most hassle-free solar option
 - Most similar to a traditional electricity billing format
- Most solar installers will have PPA options
- Fixed-rate options agreed upon upfront
- Potential option to purchase the panels at later date



- Do not own panels
- Do not realize tax or SREC benefits
- Potential challenge when selling property

PPA options for homeowners

Most solar installers and [Solarize](#) will have PPA options
Also see [Energy Sage Marketplace](#)

Solar financing options for businesses

For each of the following options, installation costs can also be reduced through a **group buy with Solarize**.

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Purchasing your solar system upfront

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- Maximizes savings, but you need the capital upfront
- With ownership you get generous tax benefits plus income from SRECs

Purchasing your solar system with a loan

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- Can get the tax and income benefits of ownership without necessarily having all the capital upfront
- Interest rates make this more expensive in the long run

Purchasing your solar system with a Power Purchase Agreement (PPA)

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- Don't have ownership over panels, pay for electricity from the panels to the installer
- No tax benefits, but has modest savings compared to buying electricity
- Lock in electricity at a fixed price for 25+ years

Purchasing your solar system with a C-PACE loan

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- C-PACE is a financial tool for businesses and nonprofits
- Can provide both long-term loans and financing for building improvements
- Option to delay repayment until you've started to save money

Contacts and Resources

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Purchasing your solar system upfront

A strong long-term investment for your business

- Purchasing solar eliminates electricity expenses for your system and protects your business from fluctuating electricity costs
- Generate income through net metering and selling energy credits
- Demonstrate a commitment to sustainability to your customers and partners

Where to get started



-The PA Solar Center can assist with writing your RFP and finding reliable installers



-The Sustainable Energy Fund can help identify funding sources and work through logistics



-The EnergySage Marketplace is the best place to compare offers from solar installers and financiers

Businesses receive competitive tax credits against the value of a solar system



Residential Buyers

Benefit from a 26% investment tax credit



Business Buyers

Can claim the ITC as well as writing off solar panels as a depreciable asset

The expenses and returns of a small business solar system

<u>Cost up-front</u>	-\$25,000
<u>Income from solar power</u>	\$48 /month
<u>SREC income</u>	\$15 /month
<u>Average savings</u>	\$760 /year
<u>Total tax benefit</u>	\$12,000
<u>Average savings after 25 years</u>	\$6,000

Average savings for a small, single-lot business with an 8.3 kW solar system



Purchasing your solar system with a loan

Own your business' system with zero upfront cost!



Pros & Cons



- Ownership → access to tax benefits
- Solar as a depreciable asset
- Reduce electricity bills
- Income from SRECs
- Protection from fluctuating utility prices, like locking in a fixed electricity price for 25+ years
- Increasing building property value
- Generally cheaper than a solar lease/PPA
- Demonstrates commitment to sustainability

- Interest rates → more expensive than buying upfront
- Need a good credit score

Loan options for businesses

- [Clean Energy Co-op](#)
- Banks (see a list on [EnergySage](#))
- Solar Installers (see a list on [EnergySage](#))

For guidance, check out the [Clean Energy Co-op](#), [Solarize Southeast PA](#) or the [PA Solar Center](#)

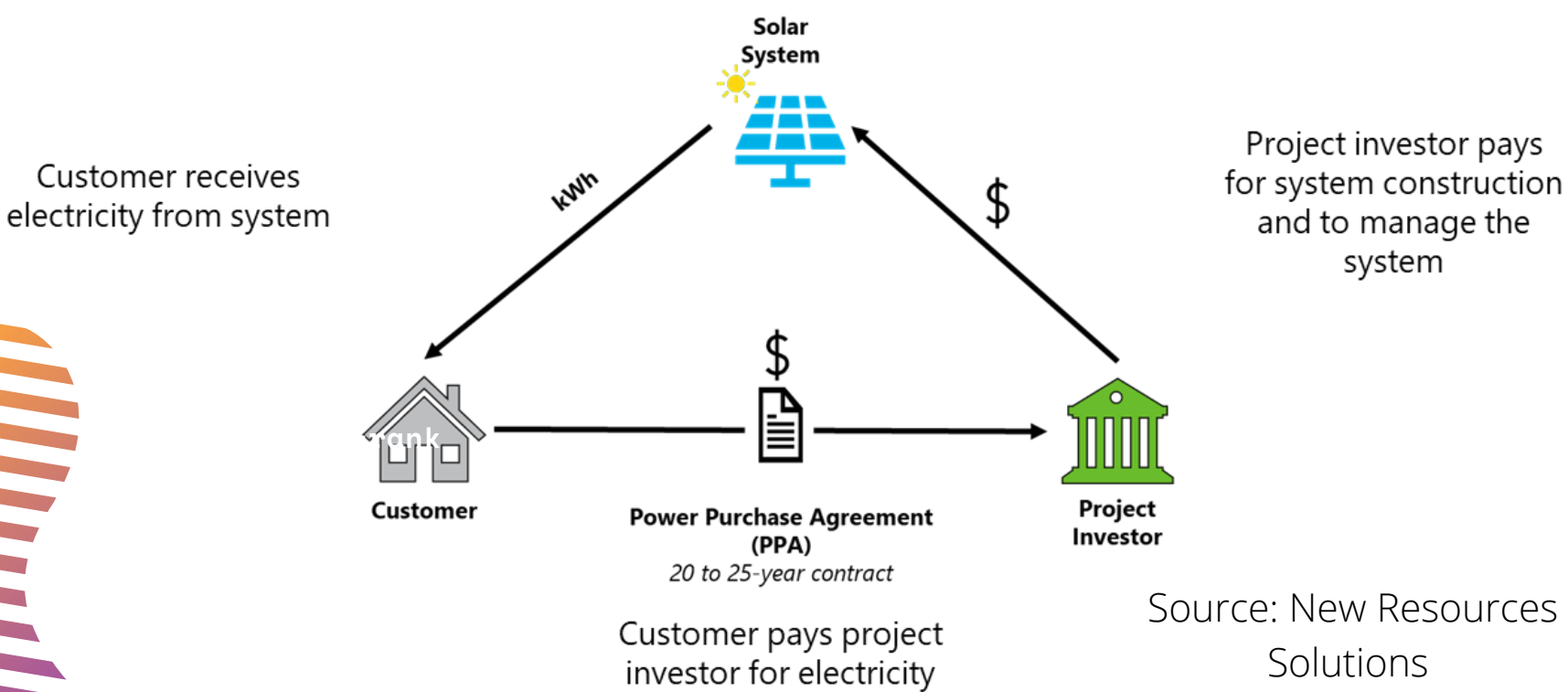


The Clean Energy Co-op

Purchasing Your Solar System with a Power Purchase Agreement

A Zero Up-Front Cost Approach to Solar

Simple Diagram of a Solar PPA



Pros & Cons



- Zero upfront cost
- Most hassle-free solar option
 - Most similar to a traditional electricity billing format
- Most solar installers will have PPA options
- Cost-effective fixed-rate options available
- Potential option to purchase the panels at later date



- Do not own panels
- Do not realize tax or SREC benefits
- Potential challenge when selling property

PPA options for Businesses

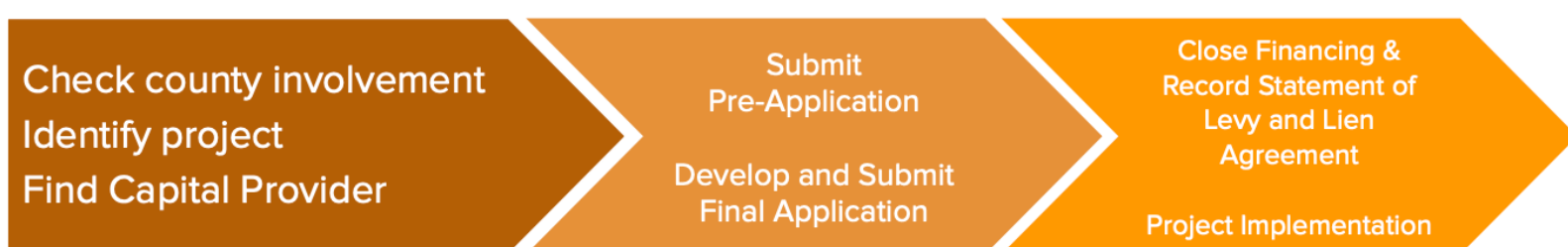
Check Out: [Energy Sage Marketplace](#) for options.

Purchasing Your Solar System with a C-PACE Loan

Financing Tool for Businesses and Nonprofits

- Financial tool for commercial business owners and nonprofits to obtain low-cost, long-term financing for energy-efficient equipment, renewable energy, and water conservation projects.
- *Can provide up to 100% funding of total project costs by placing a special voluntary assessment on the property*
- Median Loan awarded - \$250,000, some lenders will go lower
- *Long-term loans in the 5-6% range*
- If roof needs to be replaced to have solar, the new roof can also be financed by C-PACE
- *Potential for delayed loan repayment until savings occur*
- Option only in select counties → available in Montgomery, Delaware Berks, Wayne, Philadelphia Counties in SE PA

C-PACE Process



C-PACE Next Steps

Contact [Sustainable Energy Fund](#) or [Philadelphia Energy Authority](#). (Philadelphia)
for more info



The Clean Energy Co-op

Solar financing options for nonprofits

For each of the following options, installation costs can also be reduced through a **group buy with Solarize.** 6

Purchasing your solar system upfront 18

- Usually not the best option for nonprofits due to high cost and lack of tax benefits

Purchasing your solar system with a loan 19

- Can get the tax and income benefits of ownership without necessarily having all the capital upfront
- Interest rates make this more expensive in the long run
- Often not a strong option for nonprofits, as you don't accrue tax benefits

Leasing a solar system 20

- Don't have ownership over panels, and pay the installer for use of the panels
- Nonprofits can save by arranging a lease through Collective Sun
- Lock in electricity at a fixed price for 25+ years

Purchasing your solar system with a Power Purchase Agreement (PPA) 21

- Don't have ownership over panels, pay for electricity from the panels to the installer
- Lock in electricity at a fixed price for 25+ years
- May still find an effective cost through setting up a one-person LLC

Purchasing your solar system with a C-PACE loan 22

- C-PACE is a financial tool for businesses and nonprofits
- Can provide both long-term loans and financing for building improvements
- Option to delay repayment until you've started to save money

Contacts and Resources 23



The Clean Energy Co-op

Purchasing your solar system upfront

Purchasing a solar system directly is usually not the best financial option for nonprofits, though there are other ways to approach it!

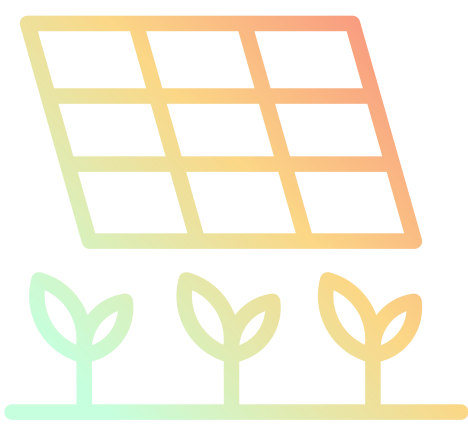
Pros & Cons



- Reduce electricity bills
- Income from SRECs
- Protection from fluctuating utility prices, like locking in a fixed electricity price for 25+ years
- Demonstrates commitment to sustainability
- Possible to reduce cost through partnerships or organizing an LLC



- Nonprofits receive no tax benefits to offset the cost of solar panels!
- Very rare for nonprofits to have the full cost of solar panels directly on hand



Consider the local solar options available through financing companies or EnergySage- you may find a plan that meets your needs!

Just keep in mind that as a nonprofit organization, there are usually better options than saving up to buy panels up front.



Purchasing your solar system with a loan

Own your nonprofit's solar system with no upfront cost, but not the most cost-effective option for nonprofits

Pros & Cons



- Good option when ownership is required by a grant
- Reduce electricity bills
- Income from SRECs
- Protection from fluctuating utility prices, like locking in a fixed electricity price for 25+ years
- Increasing building property value
- Demonstrates commitment to sustainability



- No tax benefits despite ownership
- Interest rates → more expensive than buying upfront
- Need a good credit score

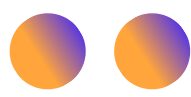
Loan options for nonprofits

- [Clean Energy Co-op](#)
 - In conjunction with a grant
- Banks (see a list on [EnergySage](#))
- Solar Installers (see a list on [EnergySage](#))

For guidance, check out the [Clean Energy Co-op](#), [Solarize Southeast PA](#) or the [PA Solar Center](#)



The Clean Energy Co-op

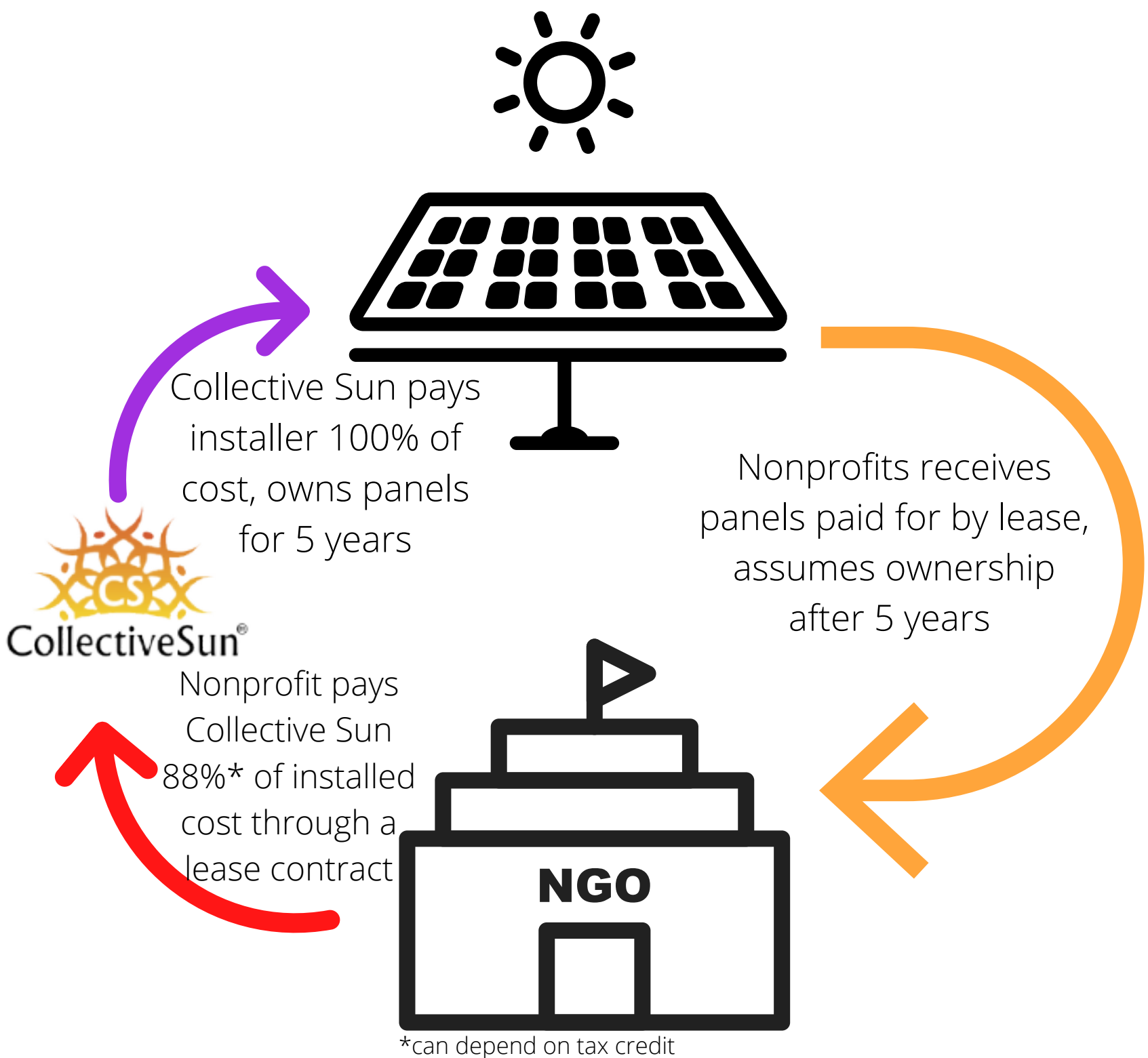


Leasing a solar system

For a nonprofit, solar leases have some unique advantages

- Without putting money down on solar panels, you can start saving 10-50% on electricity payments right away
- Leases are easier to secure than a loan
- Nonprofits don't benefit from tax credits on solar, so unlike for businesses and homeowners, the expense of buying panels doesn't result in larger savings.
- Can choose "escalator" rates that start at a reduced cost and slowly increase over the lease term

The Collective Sun Method

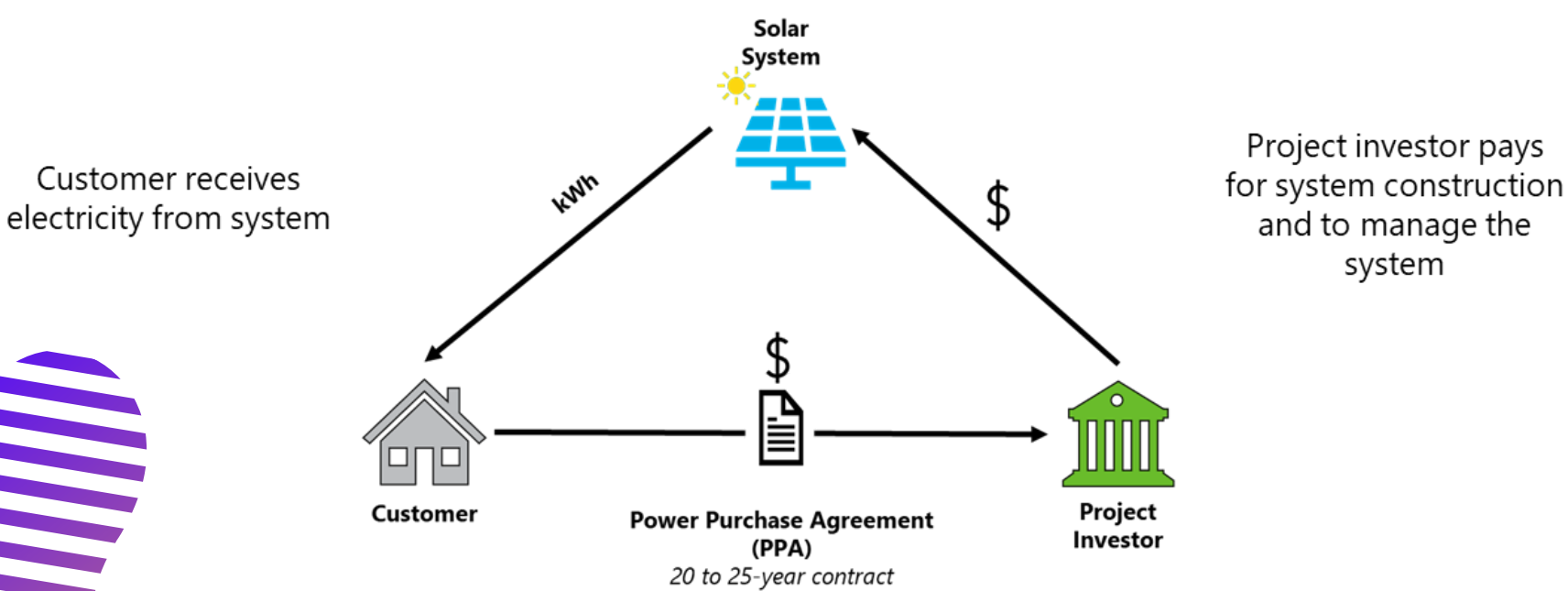


A lease through Collective Sun represents a strong savings opportunity for nonprofits that do not have the capacity to set up a one-person LLC

Purchasing Your Solar System with a Power Purchase Agreement

A Zero Upfront Cost Approach to Solar

Simple Diagram of a Solar PPA



Source: New Resources Solutions

Pros & Cons



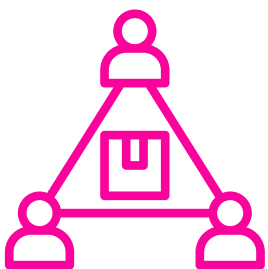
- Zero up-front cost
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 - Most similar to a traditional electricity billing format
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- Fixed-rate options agreed upon upfront
- Potential option to purchase the panels at later date



- Do not own panels
- Do not realize tax or SREC benefits
- Potential challenge when selling property

Organizing a one person LLC

With one member of a nonprofit forming their own LLC, they can assume ownership of a PPA and keep tax credits within the organization. It is complicated to navigate the legal & financial requirements, so for assistance reach out to Joy Baxter of the Clean Energy Co-op at joybaxter@gmail.com!



The Clean Energy Co-op



Purchasing Your Solar System with a C-PACE Loan

Financing Tool for Businesses and Nonprofits

- Financial tool for commercial business owners and nonprofits to obtain low-cost, long-term financing for energy-efficient equipment, renewable energy, and water conservation projects.
- **Can provide up to 100% funding of total project costs by placing a special voluntary assessment on the property**
- Median Loan awarded - \$250,000, some lenders will go lower
- **Long-term loans in the 5-6% range**
- If roof needs to be replaced to have solar, the new roof can also be financed by C-PACE
- **Potential for delayed loan repayment until savings occur**
- Option only in select counties → available in Montgomery, Delaware Berks, Wayne, Philadelphia Counties in SE PA

C-PACE Process



C-PACE Next Steps

Contact Sustainable Energy Fund or Philadelphia Energy Authority (Philadelphia) for more info



The Clean Energy Co-op



Contacts & Resources

For homeowners

- Contact any installer or [Solarize](#) for a free property assessment
- [Solarize Delco](#) or [Solarize Philly](#) → group buying discount program
- [Solarize Southeast PA](#) → unbiased consultation with neighbors
- Go to the [PA Solar Center's](#) website for great solar info on trusted installers
- National installer: Tesla for solar panels (non-customized)
- Loans: [Clean Energy Credit Union](#) or banks or installers

For businesses

- C-PACE: [Sustainable Energy Fund](#) or [Philadelphia Energy Authority](#) (Philadelphia)
- [PA Solar Center](#) → help with RFPs and finding an installer
- [Clean Energy Co-op!](#) → help with financing or guidance

For nonprofits

- [Collective Sun](#) uses the solar tax credit to offer a 12% discount on your financing
- [PA Solar Center](#) → help with RFPs and finding an installer
- [Clean Energy Co-op!](#) → help with financing or guidance
- 1 person LLC (contact JoyBaxter@gmail.com): most complex but most profitable



**The Clean
Energy Co-op**



Toolkit creators

Created during a partnership between The Clean Energy Co-op and students from Haverford and Bryn Mawr Colleges' Environmental Studies Department.

Colin Battis, Haverford College '21

Colin was drawn to this project for the Clean Energy Co-op because of the opportunity to hone his skills in science & environmental communications! He is currently a Quaker Voluntary Service fellow at Communities Responding to Extreme Weather in Boston, MA. You can contact him at captchalogue@outlook.com.

Mallory Kastner, Haverford College '21

Mallory was really excited to collaborate with the Clean Energy Co-op and gain practical experience towards her long-term goal of helping to advance climate mitigation through scientifically informed solutions and policies. After graduation, she hopes to work at the intersection of policy and environmental science for a couple of years before going to graduate school. To contact her, email mallorykastner2@gmail.com.

Margaret Chen, Haverford College '21

Margaret enjoyed collaborating with the Clean Energy Co-op as she gained a better understanding about the benefits of renewable energy and enjoyed the community-building aspects involved in solar energy initiatives. Next year, Margaret will join the 74th Coro Class of Northern California in the Coro Fellows Program, rotating through six placements in San Francisco across government, nonprofit, and business sectors to accelerate positive change. To contact her, email mchen8320@gmail.com.

Johnluca Fenton, Haverford College '21

Johnluca is super appreciative of his time working with the Clean Energy Co-op. Having already amassed a background in the solar industry prior to the project, it was interesting and exciting for Johnluca to transfer that skillset into helping grow the Co-op and general interest for solar in the local area. Post graduation, Johnluca will be heading to graduate school at Columbia University pursuing an MPA in Environmental Science and Policy. He looks forward to applying the lessons he learned about solar, community organizing, and environmental initiatives in general in his time with the Co-op to his future endeavors in the program and beyond.



Project advisors: Joy Baxter, Christine Weigand, and Professor Sara Grossman