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Bay Area SunShares / Solar for All Workshop Berkeley

Solar Finance

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Who's Doug?

SunWork.org

NorCalSolar.org

LightsOnSolar.com and AspirationalCoaching.com

LinkedIn linkedin.com/in/renewabledoug

EV owner, and finally a resident of Berkeley again!

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Agenda

- *Elephant-in-the-room-question:*
  - *Is putting solar on your roof a good investment*?
- *Two Types of Residential Solar Ownership*
  - *Pros and Cons*
- *Solar Finance Examples*

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Is putting solar on your roof a good investment?

Google search: is solar a good investment

4,490,000 results, including:

"Yes, installing a solar energy system on your roof is absolutely a good investment"

http://www.solarcity.com/residential/solar-energy-faqs/are-solar-panels-worth-it

And

"Sorry, But Solar Energy Is a HORRIBLE Investment"

http://investorplace.com/2016/07/solar-energy-fslr-scty-tsla-stock

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Is putting solar on your roof a good investment?

- Bottom line: in California and Berkeley, the answer is, from OK to extremely good, depending mostly on how it's financed*

*Assuming competitive pricing on materials and labor

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Two types of Residential Solar Ownership

Homeowner owns the system

- Cash purchase
- Home Equity Loan
- Unsecured Solar Loan
- Property-Tax Loan (PACE – Property Assessed Clean Energy)

Homeowner does not own the system

- Power Purchase Agreement (PPA)
- Lease

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*Homeowner **owns** the system – pros and cons*

- ✓ Eligible for the 30% federal tax credit on the *total* system cost
- ✓ Homeowner is responsible for system maintenance*
  - ➢ Cash purchase
    - Pros: Excellent return on investment (ROI)
    - Cons: High upfront cost ($10,000 to $25,000)
  - ➢ Home Equity Loan
    - Pros: Decent interest rate (~3-8%) = good ROI; Minimal upfront cost
    - Cons: Need good credit; Home is at risk on default
  - ➢ Unsecured Solar Loan
    - Pros: Home is not at risk on default; Minimal upfront cost
    - Cons: Need good credit; Higher interest rates = lower ROI
  - ➢ Property-Tax Loan (PACE - Property Assessed Clean Energy)
    - Pros: Decent interest rate = good ROI; Minimal upfront cost; Good credit is not needed; repayment is transferable to new owners
    - Cons: Higher interest rates = lower ROI

*Most installers provide a 10 year workmanship warranty

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*Homeowner **does not own** the system – pros and cons*

- Power Purchase Agreement (PPA): Pay per kilowatt-hour for energy generated by the system
- Lease: Pay a set monthly fee for energy generated by the system
- ✓ Pros (PPAs and Leases)
  - ✓ Not responsible for any system maintenance
  - ✓ Can be low or zero upfront cost to go solar
  - ✓ Payback for lower cost of electricity is immediate (for $0 down systems)
- ✓ Cons (PPAs and Leases)
  - ✓ Not Eligible for the 30% federal tax credit
  - ✓ Home is encumbered with a lien
  - ✓ May complicate sale of home
  - ✓ Many PPAs and leases have an “escalator” increasing your payments over time

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Solar Finance Example *for homeowner cash purchase*

- Simple Payback

  Total investment divided by annual savings. Example (4 kilowatt system):
  - Total Investment = $12,500 [$15,000 upfront minus 30% ITC plus $2000 for a replacement inverter]
  - Annual Savings = $1800 [$150 per month lower electricity bill]
  - **Simple Payback: 6.9 years** [$12,500 / $1800]

- Simple Return on Investment (ROI)

  Annual savings divided by total investment, times 100. Same Example:
  - **Simple ROI: 14.4%** [($1800 / $12,500) * 100]

- Simple Cost per kilowatt-hour (kWh)

  Total investment divided by total lifetime energy generated. Same Example:
  - A typical 4 kW system should generate at least 6000 kWh per year and so about 125,000 kWh over its 25 year life.
  - **Simple Cost per kWh: 8.3¢ per kWh** [$12,500 / 150,000 kWh]

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*So… Is **paying cash** to put solar on your roof a great investment*?

- Example Simple Payback: 6.9 years
- Example Simple ROI: 14.4%
- Example Simple Cost per kWh: 8.3¢ per kWh

Yes!!! 14+% return, ***after tax,*** with very low risk!

Compare:

- 10 year US treasury rate: 1.6% before tax
- 5-year CD yields today: 0.81% before tax
- Stock market: ~6% before tax, with high risk
- PG&E (E-1 plan average): ~22¢ per kWh

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Solar Finance Example *for purchase via home equity loan*

- Simple Payback

  Total investment divided by annual savings. Example (4 kilowatt system):
  - 10 year 5% loan: ~$3400 in interest payments
  - Total Investment = $15,900 [$15,000 upfront minus 30% ITC plus $2000 for a replacement inverter, plus $3400 in interest]
  - Annual Savings = $1800 [$150 per month lower electricity bill]
  - **Simple Payback: 8.8 years** [$15,900 / $1800]

- Simple Return on Investment (ROI)

  Annual savings divided by total investment, times 100. Same Example:
  - **Simple ROI: 11.3%** [($1800 / $15,900) * 100]

- Simple Cost per kilowatt-hour (kWh)

  Total investment divided by total lifetime energy generated. Same Example:
  - A typical 4 kW system should generate at least 6000 kWh per year and so about 125,000 kWh over its 25 year life.
  - **Simple Cost per kWh: 10.6¢ per kWh** [$15,900 / 150,000 kWh]

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*So… Is **taking out a home equity loan** to put solar on your roof a great investment*?

- Example Loan: 10 years @ 5%
- Example Simple Payback: 8.8 years
- Example Simple ROI: 11.3%
- Example Simple Cost per kWh: 10.6¢ per kWh

Yes!! 11+% return, *after tax,* with very low risk!

- Interest on the loan may be tax deductible

Note: Other types of loans (Unsecured, PACE) will have different terms and interest rates. Home equity loan term and interest will vary depending on credit score, etc.

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Solar Finance *for PPAs and Leases*

Simple Payback, *Simple ROI*, and *Simple Cost per kWh* do not work well for PPAs and Leases

- PPA and Lease terms vary: $0 down or partial-down or pre-paid, escalator clauses, provisions for purchase of system after period of time, …
- More sophisticated financial instruments are needed*
  - Time Value of Money including Internal Rate of Return (IRR)
  - Levelized Cost of Energy (LCOE)
- Benefit of immediate cash flow
- Non-financial: lien, move complications

Skipping to the Bottom line for PPAs and Leases

- *IRR for $0 down PPAs/Leases*: up to about 5%
- *IRR for prepaid PPAs/Leases* can be high, varies by company

* More about these at the free Solar Simplified Workshop on Oct 20, 7-9pm, at the El Cerrito City Hall

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Thank you, and Go Solar!

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